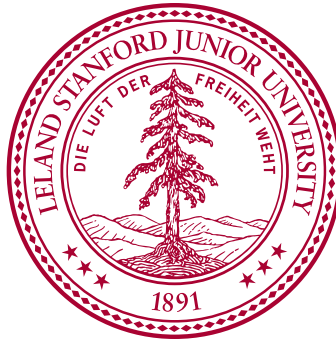


# STANFORD UNIVERSITY

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## STANFORD BULLETIN 2017-18



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

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### **ADDITIONAL INFORMATION**

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

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# ACADEMIC CALENDAR

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## Stanford Academic Calendar, 2017-18

The University bill is issued on the 20th of each month. Billed charges are due by the 15th of the following month. For more information, see the Student Financial Services (<https://sfs.stanford.edu/student-accounts/pay-your-bill/understanding-your-student-account>) site.

See the R&DE Student Housing site (<https://rde.stanford.edu/studenthousing>) for additional information on Housing deadlines. Key undergraduate dates are included below.

Legal-size Printable Calendar (<https://stanford.box.com/v/Calendar-AY-1718>) • Letter-size Printable Calendar (<https://stanford.box.com/v/Calendar-AY-1718-letter>) • This calendar is also available on the Registrar's web site (<https://registrar.stanford.edu/2017-18-stanford-academic-calendar>).

*Issued March 6, 2017. All dates are subject to change at the discretion of the University.*

## AUTUMN QUARTER 2017-18

**August 1 (Tue)** Access opens for course enrollment. Stanford Bulletin (<http://bulletin.stanford.edu>) publishes academic year 2017-18 degree requirements

**August 28 (Mon)** M.D. first-year students, first day of instruction.

**August 31 (Thu)** M.D. second-year students, first day of instruction.

**September 5 (Tue)** Law School instruction begins for 1st-year J.D. students. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**September 15 (Fri)** Autumn Quarter Cardinal Care Waiver Deadline; see the Cardinal Care web site (<https://vaden.stanford.edu/insurance>).

**September 15 (Fri)** M.B.A. 1st-year instructions begins.

**September 15 (Fri, 5:00 p.m.)** At-status enrollment deadline in order to receive stipend or financial aid refund within the first week of term.

**September 19 (Tue)** New undergraduates arrive. Convocation (<https://undergrad.stanford.edu/advising/freshman/new-student-orientation-nso/nso-volunteers/opening-convocation-student-speaker>). Undergraduate housing opens for new students; see Residential & Dining Enterprises Calendar (<http://studenthousing.stanford.edu/calendar>).

**September 21 (Thu)** Undergraduate housing opens for returning students; see Residential & Dining Enterprises Calendar (<http://studenthousing.stanford.edu/calendar>).

**September 25 (Mon)** First day of quarter; instruction begins.

**September 25 (Mon, 5:00 p.m.)** Preliminary Study List deadline (<https://registrar.stanford.edu/students/enrolling-courses/preliminary-study-list-deadline-courses-or-units>). Students must be "at status"; i.e., students must have a study list with sufficient units to meet requirements for their status, whether full-time, 8-9-10 units (graduate students only), or approved Undergraduate Special Registration Status (<https://sregistrar.stanford.edu/students/special-registration-and-leaves/special-registration-statuses-undergraduates>) or Graduate Special Registration Status (<https://registrar.stanford.edu/students/special-registration-and-leaves/special-registration-statuses-graduate-professional>). The late study list fee is \$200.

**September 25 (Mon, 5:00 p.m.)** Deadline to submit Leave of Absence for full refund (see undergraduate leaves of absence (<http://exploreddegrees.stanford.edu/undergraduatedegreesandprograms/#leavesandrestatementtext>) and graduate leaves of absence (<http://exploreddegrees.stanford.edu/graduatedegrees/#leavereinstatementtext>)). See Tuition and Refund Schedule (<https://registrar.stanford.edu/students/tuition-and-fees/tuition-refund-schedule>) for a full refund schedule.

**September 25 (Mon)** Law School instruction begins for 2nd/3rd-year J.D. and advanced degree students. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**September 28 (Thu)** Conferral of degrees, Summer Quarter 2016-17.

**September 29 (Fri)** GSB course add/drop deadline.

**October 13 (Fri, 5:00 p.m.)** Final Study List deadline (<https://registrar.stanford.edu/students/enrolling-courses/final-study-list-deadline-add-drop-swap-or-adjust-courses-or-units>), except GSB. Last day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a 'W' notation will appear on the transcript.

**November 6 (Mon, 5:00 p.m.)** Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund.

**November 17 (Fri, 5:00 p.m.)** Change of grading basis deadline, except GSB.

**November 17 (Fri, 5:00 p.m.)** Course withdrawal deadline, except GSB, Law, and M.D.

**November 17 (Fri, 5:00 p.m.)** Application deadline for Autumn Quarter degree conferral (<https://sites.stanford.edu/sa-registrar/students/graduation>).

**November 20-24 (Mon-Fri)** Thanksgiving Recess (no classes).

**December 1 (Fri)** Last day of Law classes. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**December 2-7 (Sat-Thu)** Law School Reading Period. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**December 4-10 (Mon-Sun)** End-Quarter Period.

**December 8 (Fri)** Last day of classes (unless class meets on Sat.), except Law.

**December 8 (Fri)** Last opportunity to arrange Incomplete in a course, at last class.

**December 8 (Fri, noon)** University thesis, D.M.A. final project, or Ph.D. dissertation, last day to submit.

**December 8 (Fri, 5:00 p.m.)** Late application deadline for Autumn Quarter degree conferral (<https://registrar.stanford.edu/students/graduation>) (\$50 fee).

**December 8-15 (Fri-Fri)** Law School examinations. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**December 11-15 (Mon-Fri)** End-Quarter examinations.

**December 15 (Fri)** Winter Quarter Cardinal Care Waiver Deadline; see the Cardinal Care web site (<https://vaden.stanford.edu/insurance>).

**December 16 (Sat, noon)** Undergraduate housing closes for Winter Break; see Residential & Dining Enterprises Calendar (<http://studenthousing.stanford.edu/calendar>).

**December 19 (Tue, 11:59 p.m.)** Grades due.

**January 11 (Thu)** Conferral of degrees, Autumn Quarter.

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## WINTER QUARTER 2017-18

**October 29 (Sun)** Access opens for course enrollment.

**December 29 (Fri)** At-status enrollment deadline in order to receive stipend or financial aid refund within the first week of term.

**January 6 (Sat, 8:00 a.m.)** Undergraduate housing opens for Winter Quarter; see Residential & Dining Enterprises Calendar (<http://studenthousing.stanford.edu/calendar>).

**January 8 (Mon)** First day of quarter; instruction begins for all students.

**January 8 (Mon, 5:00 p.m.)** Preliminary Study List deadline (<https://registrar.stanford.edu/students/enrolling-courses/preliminary-study-list-deadline-courses-or-units>). Students must be "at status"; i.e., students must have a study list with sufficient units to meet requirements for their status, whether full-time, 8-9-10 units (graduate students only), or approved Undergraduate Special Registration Status (<https://registrar.stanford.edu/students/special-registration-and-leaves/special-registration-statuses-undergraduates>) or Graduate Special Registration Status (<https://registrar.stanford.edu/students/special-registration-and-leaves/special-registration-statuses-graduate-professional>). The late study list fee is \$200.

**January 8 (Mon, 5:00 p.m.)** Deadline to submit Leave of Absence for full refund (see undergraduate leaves of absence (<http://exploreddegrees.stanford.edu/undergraduatedegreesandprograms/#leavesand reinstatementtext>) and graduate leaves of absence (<http://exploreddegrees.stanford.edu/graduatedegrees/#leaverinstatementtext>)). See Tuition and Refund Schedule (<https://registrar.stanford.edu/students/tuition-and-fees/tuition-refund-schedule>) for a full refund schedule.

**January 12 (Fri)** GSB course add/drop deadline.

**January 15 (Mon)** Martin Luther King, Jr., Day (holiday, no classes).

**January 26 (Fri, 5:00 p.m.)** Final Study List deadline (<https://registrar.stanford.edu/students/enrolling-courses/final-study-list-deadline-add-drop-swap-or-adjust-courses-or-units>), except GSB. Final day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a 'W' notation will appear on the transcript.

**February 19 (Mon)** Presidents' Day (holiday, no classes; Law does hold classes).

**February 21 (Wed, 5:00 p.m.)** Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund.

**March 2 (Fri, 5:00 p.m.)** Change of grading basis deadline, except GSB.

**March 2 (Fri, 5:00 p.m.)** Course withdrawal deadline, except GSB, Law, and M.D.

**March 2 (Fri, 5:00 p.m.)** Application deadline for Winter Quarter degree conferral (<http://sites.stanford.edu/sa-registrar/students/graduation>).

**March 12 (Mon)** Last day of Law classes. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**March 12-18 (Mon-Sun)** End-Quarter Period.

**March 13-15 (Tue-Thu)** Law School Reading Period. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**March 16 (Fri)** Last day of classes (unless class meets on Sat.)

**March 16 (Fri)** Last opportunity to arrange Incomplete in a course, at last class.

**March 16 (Fri, noon)** University thesis, D.M.A. final project, Ph.D. dissertation, last day to submit.

**March 16 (Fri, 5:00 p.m.)** Late application deadline for Winter Quarter degree conferral (<http://sites.stanford.edu/sa-registrar/students/graduation>) (\$50 fee).

**March 16-23 (Fri-Fri)** Law School examinations. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**March 19-23 (Mon-Fri)** End-Quarter examinations.

**March 24 (Sat)** Undergraduate housing move-out (if departing at end of Winter Quarter); see Residential & Dining Enterprises Calendar (<http://studenthousing.stanford.edu/calendar>).

**March 27 (Tue, 11:59 p.m.)** Grades due.

**April 5 (Thu)** Conferral of degrees, Winter Quarter.

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## SPRING QUARTER 2017-18

**February 11 (Sun)** Axess opens for course enrollment.

**March 23 (Fri)** At-status enrollment deadline in order to receive stipend or financial aid refund within the first week of term.

**March 31 (Sat)** Undergraduate housing move-in date for Spring Quarter; see Residential & Dining Enterprises Calendar (<http://studenthousing.stanford.edu/calendar>).

**April 1 (Mon)** First day of quarter; instruction begins for all students.

**April 2 (Mon, 5:00 p.m.)** Preliminary Study List deadline (<https://sites.stanford.edu/sa-registrar/students/enrolling-courses/preliminary-study-list-deadline-courses-or-units>). Students must be "at status"; i.e., students must have a study list with sufficient units to meet requirements for their status, whether full-time, 8-9-10 units (graduate students only), or approved Undergraduate Special Registration Status (<https://sites.stanford.edu/sa-registrar/students/special-registration-and-leaves/special-registration-statuses-undergraduates>) or Graduate Special Registration Status (<https://sites.stanford.edu/sa-registrar/students/special-registration-and-leaves/special-registration-statuses-graduate-professional>). The late study list fee is \$200.

**April 2 (Mon, 5:00 p.m.)** Deadline to submit Leave of Absence for full refund (see undergraduate leaves of absence (<http://exploreddegrees.stanford.edu/undergraduatedegreesandprograms/#leavesand reinstatementtext>) and graduate leaves of absence (<http://exploreddegrees.stanford.edu/graduatedegrees/#leaver reinstatementtext>)). See Tuition and Refund Schedule (<https://registrar.stanford.edu/students/tuition-and-fees/tuition-refund-schedule>) for a full refund schedule.

**April 5 (Thurs)** GSB classes begin.

**April 10 (Tues)** GSB course add/drop deadline.

**April 13 (Fri, 5:00 p.m.)** Application deadline for Spring Quarter degree conferral (<http://registrar.stanford.edu/students/graduation>).

**April 15 (Sun)** Spring Quarter Cardinal Care Waiver Deadline; see the Cardinal Care web site (<https://vaden.stanford.edu/insurance>).

**April 20 (Fri, 5:00 p.m.)** Final Study List deadline, except GSB (<https://registrar.stanford.edu/students/enrolling-courses/final-study-list-deadline-add-drop-swap-or-adjust-courses-or-units>). Last day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a "W" notation will appear on the transcript.

**May 14 (Mon, 5:00 p.m.)** Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund.

**May 25 (Fri, 5:00 p.m.)** Change of grading basis deadline, except GSB.

**May 25 (Fri, 5:00 p.m.)** Course withdrawal deadline, except GSB, Law, and M.D.

**May 28 (Mon)** Memorial Day (holiday, no classes).

**June 1-7 (Fri-Thu)** End-Quarter Period.

**June 1 (Fri)** Last day of Law classes. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**June 2-3 (Sat-Sun)**. Law School reading Period. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**June 4-8 (Mon-Fri)** Law School examinations. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**June 6 (Wed)** Last day of classes.

**June 6 (Wed)** Last opportunity to arrange Incomplete in a course, at last class.

**June 6 (Wed, noon)** University thesis, D.M.A. final project, or Ph.D. dissertation, last day to submit.

**June 6 (Wed, 5:00 p.m.)** Late application deadline for Spring Quarter degree conferral (<http://sites.stanford.edu/sa-registrar/students/graduation>) (\$50 fee).

**June 7 (Thu)** Day before finals, no classes.

**June 8-13 (Fri-Wed)** End-Quarter examinations.

**June 13 (Wed, noon)** Grades for GSB graduating students due.

**June 14 (Thu, noon)** Grades for graduating students due.

**June 15 (Fri)** Undergraduate housing move-out date (for all students not involved in Commencement); see Residential & Dining Enterprises Calendar (<http://studenthousing.stanford.edu/calendar>).

**June 16 (Sat)** Senior Class Day.

**June 16 (Sat)** Baccalaureate Saturday.

**June 16 (Sat)** Law School Diploma Ceremony. See the full Law School academic calendar (<https://www-cdn.law.stanford.edu/wp-content/uploads/2015/04/2017-18-Academic-Calendar.pdf>) (pdf).

**June 16 (Sat)** GSB Diploma Ceremony.

**June 16 (Sat)** Medical School Commencement Ceremony.

**June 17 (Sun)** Commencement. Conferral of degrees, Spring Quarter.

**June 18 (Mon)** Undergraduate Housing move-out date (for graduates and others involved in Commencement with permission); see Residential & Dining Enterprises Calendar (<http://studenthousing.stanford.edu/calendar>).

**June 19 (Tue, 11:59 p.m.)** Grades for non-graduating students due. Top of page (<http://studentaffairs.stanford.edu/node/1278/edit/#top>)

## SUMMER QUARTER 2017-18

**April 8 (Sun)** Axess opens for course enrollment.

**June 15 (Fri)** Summer Quarter Cardinal Care Waiver Deadline; see the Cardinal Care web site (<https://vaden.stanford.edu/insurance>)

**June 15 (Fri)** At-status enrollment deadline in order to receive stipend or financial aid refund within the first week of term.

**June 25 (Mon)** First day of quarter; instruction begins.

**June 25 (Mon, 5:00 p.m.)** Preliminary Study List deadline (<https://registrar.stanford.edu/students/enrolling-courses/preliminary-study-list-deadline-courses-or-units>).

**June 25 (Mon)** Deadline to submit Leave of Absence for full refund (see undergraduate leaves of absence (<http://exploreddegrees.stanford.edu/undergraduatedegreesandprograms/#leavesand reinstatementtext>) and graduate leaves of absence (<http://exploreddegrees.stanford.edu/graduatedegrees/#leaver reinstatementtext>)). See Tuition and Refund Schedule (<https://registrar.stanford.edu/students/tuition-and-fees/tuition-refund-schedule>) for a full refund schedule.

**July 4 (Wed)** Independence Day (holiday, no classes).

**July 6 (Fri, 5:00 p.m.)** Final Study List deadline (<https://registrar.stanford.edu/students/enrolling-courses/final-study-list-deadline-add-drop-swap-or-adjust-courses-or-units>). Final day to add or drop a class; last day to adjust units on a variable-unit course. Last day for tuition reassessment for dropped courses or units. Students may withdraw from a course until the Course Withdrawal deadline and a "W" notation will appear on the transcript.

**July 27 (Fri, 5:00 p.m.)** Term withdrawal deadline; last day to submit Leave of Absence to withdraw from the University with a partial refund.

**August 3 (Fri, 5:00 p.m.)** Change of grading basis deadline.

**August 3 (Fri, 5:00 p.m.)** Course withdrawal deadline.

**August 3 (Fri, 5:00 p.m.)** Application deadline for Summer Quarter degree conferral (<http://registrar.stanford.edu/students/graduation>).

**August 11-16 (Sat-Thu)** End-Quarter Period.

**August 16 (Thu)** Last day of classes.

**August 16 (Thu)** Last opportunity to arrange Incomplete in a course, at last class.

**August 17-18 (Fri-Sat)** End-Quarter examinations.

**August 21 (Tue, 11:59 p.m.)** Grades due.

**August 31 (Fri, noon)** University thesis, D.M.A. final project, or Ph.D. dissertation, last day to submit.

**August 31 (Fri, 5:00 p.m.)** Late application deadline for Summer Quarter degree conferral (<http://registrar.stanford.edu/students/graduation>) (\$50 fee).

**September 27 (Thu)** Conferral of degrees, Summer Quarter.

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## **2018-19 First Day of Classes and End of Term**

- *Autumn 2018-19*: September 24 and December 14
- *Winter 2018-19*: January 7 and March 22
- *Spring 2018-19*: April 1 and June 12 (Commencement June 16)
- *Summer 2018-19*: June 24 and August 17

# STANFORD'S MISSION

The Stanford University Founding Grant ([https://wasc.stanford.edu/system/files/FoundingGrant\\_2.pdf](https://wasc.stanford.edu/system/files/FoundingGrant_2.pdf)) (pdf), dated November 11, 1885, outlines the founding principles of the University. The Founding Grant describes the "Nature, Object, and Purposes of the Institution" founded by Leland Stanford and Jane Lathrop Stanford in these terms:

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

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

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

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

- School of Earth, Energy and Environmental Sciences Mission Statement (<http://pangea.stanford.edu/about>)
- Graduate School of Business Mission Statement (<http://www.gsb.stanford.edu/about/mission.html>)
- School of Humanities and Sciences Mission Statement (<http://www.stanford.edu/dept/humsci/external/about>)
- School of Engineering Mission Statement (<http://soe.stanford.edu/about>)
- School of Medicine Mission Statement (<http://med.stanford.edu/about/vision.html>)
- Graduate School of Education Mission Statement (<http://ed.stanford.edu/suse/aboutsuse/mission.html>)
- Stanford Law School Mission Statement (<https://law.stanford.edu/about/#slsnav-sls-distinctions>)

## A Brief History of Stanford

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

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

From the beginning, it was clear that Stanford would be different. It was coeducational at a time when single-sex colleges were the norm. It was non-sectarian when most private colleges were still affiliated with a church. And it offered a broad, flexible program of study while most schools insisted on a rigid curriculum of classical studies. Though there were many difficulties during the first months (housing was inadequate,

microscopes and books were late in arriving from the East), the first year foretold greatness. As Jane Stanford wrote in the summer of 1892, "Even our fondest hopes have been realized."

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

## Leland and Jane Stanford

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

## The Case for a Liberal Education

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

## Stanford Lands and Architecture

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

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

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

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

successive half-circle arches, the latter supported by short columns with decorated capitals.

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

## Current Perspectives

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

The Cantor Center opened in January 1999. The center includes the historic Leland Stanford Junior Museum building and the Rodin Sculpture Garden. Next door is the Anderson Collection at Stanford University, which houses one of the nation's finest assemblages of modern American art. At the Stanford University Medical Center (<http://stanfordmedicine.org>), world-renowned for its research, teaching, and patient care, scientists and physicians are searching for answers to fundamental questions about health and disease. Ninety miles down the coast, at Stanford's Hopkins Marine Station (<https://hopkinsmarinestation.stanford.edu>) on the Monterey Bay, scientists are working to better understand the mechanisms of evolution and ecological systems.

The University is organized into seven schools: Earth, Energy and Environmental Sciences; Education; Engineering; the Graduate School of Business; Humanities and Sciences; Law; and Medicine. In addition, there are more than 30 interdisciplinary centers, programs, and research laboratories (p. 842) including: the Hoover Institution on War, Revolution and Peace (<http://www.hoover.org>); the Freeman Spogli Institute for International Studies (<http://fsi.stanford.edu>); the Woods Institute for the Environment (<http://woods.stanford.edu>); the SLAC National Accelerator Laboratory (<http://www.slac.stanford.edu>); and the Stanford Program for Bioengineering, Biomedicine, and Biosciences (Bio-X) (<http://biox.stanford.edu>), where faculty from many fields bring different perspectives to bear on issues and problems. Stanford's Bing Overseas Studies Program (<http://bosp.stanford.edu>) offers undergraduates in all fields remarkable opportunities for study abroad, with campuses in Australia, Beijing, Berlin, Cape Town, Florence, Kyoto, Madrid, Oxford, Paris, and Santiago.

## Stanford People

By any measure, Stanford's faculty, which numbers more than 2,100, is one of the most distinguished in the world. It includes 19 living Nobel laureates, 4 Pulitzer Prize winners, 19 National Medal of Science winners, 171 members of the National Academy of Sciences, 288 members of the American Academy of Arts and Sciences, 112 members of the National Academy of Engineering, and 27 members of the National Academy of Education. Yet beyond their array of honors, what truly distinguishes Stanford faculty is their commitment to sharing knowledge with their students. The great majority of professors teach undergraduates both

in introductory lecture classes and in small freshman, sophomore, and advanced seminars.

Enrollment in Autumn Quarter 2016 totaled 16,336 of whom 7,032 were undergraduates and 9,304 were graduate students. Like the faculty, the Stanford student body is distinguished: 116 Stanford students have been named Rhodes Scholars and 90 have been named Marshall Scholars. The six-year graduation rate for freshmen who entered Stanford University full-time in 2010 was 94 percent. In 2016, Stanford awarded 2,011 bachelor's degrees, 2,338 master's degrees, 269 professional degrees and 763 doctoral degrees.

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

In the athletic arena, Stanford students have enjoyed tremendous success as well. Stanford fields teams in 36 Division I varsity sports. The Cardinal has won at least one national team championship 41 consecutive years, which leads the NCAA. Stanford has won the Director's Cup, which honors the most successful program in NCAA Division I sports, the last 22 years. Stanford scholar-athletes have earned 159 NCAA Postgraduate Scholarships—a national best.

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

## Looking Ahead

In her address to the Board of Trustees in July 1904, Jane Stanford said, "Let us not be afraid to outgrow old thoughts and ways, and dare to think on new lines as to the future of the work under our care."

Stanford's 11th president, Marc Tessier-Lavigne, echoed these thoughts in his inaugural address in 2016: "When I reflect on Stanford's 125-year history, I see a University that has pressed forward through thick and thin, gaining in stature as a leader in education and scholarship, to make increasingly important contributions to society and to human well-being. Thanks to over a century of inspired leadership, including by the distinguished presidents emeriti here today, Stanford has become the "University of high degree" its founders envisioned. Stanford's preeminence derives from its bedrock dedication to fostering education, research, and creativity for the benefit of humanity. But I believe it also stems from its optimism, its resilience, and its courage to evolve."

# UNIVERSITY GOVERNANCE AND ORGANIZATION

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

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

## Accreditation

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

## Executive Officers

### Stanford Administration

- Marc Tessier-Lavigne, President
- Persis Drell, Provost
- David Demarest, Vice President for Public Affairs
- Harry Elam, Vice President for the Arts
- Lisa Lapin, Vice President for University Communications
- Randall S. Livingston, Vice President for Business Affairs and Chief Financial Officer
- William J. Madia, Vice President, SLAC National Accelerator Laboratory
- Robert Reidy, Vice President for Land, Buildings and Real Estate
- Martin Shell, Vice President for Development
- Howard Wolf, Vice President for Alumni Affairs and President, Stanford Alumni Association
- Elizabeth Zacharias, Vice President for Human Resources
- Debra Zumwalt, Vice President and General Counsel

### Senior Cabinet

- Ann Arvin, Vice Provost and Dean of Research
- Jennifer Widom, Dean, School of Engineering
- Harry Elam, Senior Vice Provost for Education, Vice Provost for Undergraduate Education
- Thomas Gilligan, Director, Hoover Institution on War, Revolution and Peace
- Stephan Graham, Dean, School of Earth, Energy & Environmental Sciences
- Patricia Gumpert, Vice Provost for Graduate Education
- Chi-Chang Kao, Director, SLAC National Accelerator Laboratory
- Jon Levin, Dean, Graduate School of Business
- M. Elizabeth Magill, Dean, School of Law
- Lloyd Minor, Dean, School of Medicine
- Richard Saller, Dean, School of Humanities & Sciences

- Dan Schwartz, Dean, Graduate School of Education

## The Board of Trustees

### Powers and Duties

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

### Membership

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

### Officers of the Board

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

### Committees

Standing committees of the Board are Audit, Compliance and Risk; Development; Finance; Land and Buildings; Student, Alumni and External Affairs; and Trusteeship. Special committees include Athletics, Compensation, and Investment Responsibility.

### Meetings

The Board generally meets five times each year.

### Members of the Board of Trustees as of July 2, 2018

- Felix J. Baker, Co-Founder and Managing Partner, Baker Brothers Investments, New York, NY
- Mary T. Barra, Chief Executive Officer, General Motors, Detroit, MI
- Robert M. Bass, President, Keystone Group LP, Fort Worth, TX
- Michelle R. Clayman, Managing Partner & Chief Investment Officer, New Amsterdam Partners LLC, New York, NY
- Bret E. Comolli, Chairman, Asurion Corporation, Atherton, CA
- RoAnn Costin, President, Wilderness Point Investments, Cambridge, MA
- Dipanjan Deb, CEO & Co-Founder, Francisco Partners, San Francisco, CA
- Henry A. Fernandez, Chairman and CEO, MSCI Inc., New York, NY
- Angela S. Filo, Co-Founder, Yellow Chair Foundation, Palo Alto, CA
- Sakurako D. Fisher, San Francisco, CA
- Bradley A. Geier, Co-Managing Partner, Merlone Geier Partners, San Diego, CA
- James D. Halper, Senior Advisor, Leonard Green & Partners, Los Angeles, CA
- Christine U. Hazy, Co-Founder and Managing Director, Sketch Foundation, Los Angeles, CA
- Ronald B. Johnson, Founder & CEO, Enjoy, Menlo Park, CA
- Tonia G. Karr, San Francisco, CA
- Carol C. Lam, Sr. Vice President; Deputy General Counsel, Qualcomm, Inc., San Diego, CA
- Christy MacLear, New Canaan, CT

- Kenneth E. Olivier, Chairman Emeritus, Dodge and Cox, San Francisco, CA
- Carrie W. Penner, Chair of the Board, Walton Family Foundation, Aspen, CO
- Ruth M. Porat, Chief Financial Officer, Alphabet Inc. and Google Inc., Mountain View, CA
- Laurene Powell Jobs, Founder/Chair, Emerson Collective, Palo Alto, CA
- Jeffrey S. Raikes, Co-Founder, The Raikes Foundation, Seattle, WA
- Mindy B. Rogers, Atherton, CA
- Victoria B. Rogers, President, Rose Hills Foundation, Pasadena, CA
- Kavitar Ram Shriram, Founder, Sheralo Ventures, Menlo Park, CA
- Ronald P. Spogli, Founding Partner, Freeman Spogli & Co., Los Angeles, CA
- Srinija Srinivasan, Palo Alto, CA
- Jeffrey E. Stone, Chairman Emeritus and Senior Partner, McDermott Will & Emery LLP, Chicago IL
- Gene T Sykes, Global Co-Head of M&A & Chairman, Goldman Sachs Group, Inc., Los Angeles, CA
- Marc Tessier-Lavigne, President, Stanford University, Stanford, CA
- Jerry Yang, AME Cloud Ventures, Palo Alto, CA

## The President

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

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

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

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

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

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

## Committees and Panels Appointed by the President

University Committees are appointed by and are primarily responsible to the President. Such committees deal with matters on which the responsibility for recommendation or action is clearly diffused among

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

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

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

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

## The Provost

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

## Schools of the University

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

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

The deans of the schools report to the Provost.

## The Academic Council

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

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

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

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

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

## Committees of the Academic Council

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

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

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

## Associated Students of Stanford University (ASSU)

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

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

### Executive

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

### Legislative

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

# UNIVERSITY REQUIREMENTS

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## Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, veteran status, or marital status to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, marital status or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence.

The following person has been designated to handle inquiries regarding this nondiscrimination policy: Stanford's Director of the Diversity and Access Office, Rosa Gonzalez, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email). Stanford's Title IX Coordinator, Catherine Glaze, has been designated to handle inquiries regarding sexual harassment and sexual violence: Kingscote Gardens (2nd floor), 419 Lagunita Drive, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), [titleix@stanford.edu](mailto:titleix@stanford.edu) (email).

Individuals may also file complaints directly with the Office for Civil Rights, within the United States Department of Education, by following the information on this web site: <https://www2.ed.gov/about/offices/list/ocr/complaintintro.html>

## University Communication with Students

Stanford University uses electronic means (such as email, texts, and the Internet) as a primary method of communication and of providing billing, payment, and enrollment services. Signatures or acknowledgments provided by the student electronically to Stanford via Stanford systems and/or @stanford.edu email are valid and legally binding.

# ADMISSION AND FINANCIAL AID

## Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, veteran status, or marital status to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, marital status or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence.

The following person has been designated to handle inquiries regarding this nondiscrimination policy: Stanford's Director of the Diversity and Access Office, Rosa Gonzalez, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email). Stanford's Title IX Coordinator, Catherine Glaze, has been designated to handle inquiries regarding sexual harassment and sexual violence: Kingscote Gardens (2nd floor), 419 Lagunita Drive, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), [titleix@stanford.edu](mailto:titleix@stanford.edu) (email).

Individuals may also file complaints directly with the Office for Civil Rights, within the United States Department of Education, by following the information on this web site: <https://www2.ed.gov/about/offices/list/ocr/complaintintro.html>

## Visas

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

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

The Certificate of Eligibility (I-20/DS-2019) is issued to an admitted student after receipt of certification of adequate financial support. An F-1 student transferring from another U.S. school must obtain a new I-20 document from Stanford and complete a transfer process at the

Bechtel International Center no later than 15 days after the effective date of the transfer. A J-1 student transferring from another U.S. school must obtain a new DS-2019 document from Stanford and complete a transfer process at the Bechtel International Center no later than 30 days after the effective date of the transfer.

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

## Rescission

By applying for admission to Stanford University academic programs, applicants certify that the information they provide in their applications is complete, accurate, and their own work. As also noted in the application materials, Stanford reserves the right to withdraw an offer of admission under certain circumstances, including (but not limited to):

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

Indeed (and for example), Stanford may rescind an individual's admission at any time, including after attendance and after degree conferral, if it determines, for example, that an individual has been admitted to Stanford on the basis of having provided false information; has withheld requested information; or has engaged in behavior prior to the first day of enrolled Stanford attendance that indicates a serious lack of judgment or integrity.

The University reserves the right to require individuals to provide additional information (and/or authorization for the release of information) about any such matter, and to place a hold on registration and/or the conferral of a degree during the investigation into any such matter. Stanford also reserves the right in perpetuity to investigate the authenticity, accuracy, and authorship of materials submitted, information provided, and assertions made in connection with the application.

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

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

## Holds

A hold can be placed on the registration of any student with unmet financial or other University obligations; in addition to being unable to register for and take classes, among other limitations, such a student cannot receive a transcript, statement of completion, degree certificate, or diploma until the hold is released. As a condition of attending Stanford, students accept this provision.



## Undergraduate Admission

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

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

In order to preserve the residential character of the University and to maintain a favorable student-faculty ratio, Stanford has a limited undergraduate enrollment. The anticipated size of the freshman class is approximately 1,600-1,700 students who are admitted for Autumn Quarter enrollment. Approximately 20-40 transfer students, entering either the sophomore or junior class, are also typically admitted for Autumn enrollment if space allows. Each year, the University receives many more applications from qualified students than there are places available.

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

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

### Nonmatriculated Study (Undergraduate)

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

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

Students interested in nonmatriculated status during the Autumn, Winter, and Spring quarters should contact the Office of the University Registrar, not the Office of Undergraduate Admission. Note: newly admitted Stanford students (that is, those admitted to a Stanford degree program) are not eligible to enroll for nonmatriculated study for any quarter, except

with the permission of the Vice Provost for Undergraduate Education (or his or her designee) under extenuating circumstances.

### High School Nonmatriculated Students

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

### Summer Session

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

## Graduate Admission

### Matriculated Study (Graduate Students)

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

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

### Honors Cooperative Program

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

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

To participate, HCP students must have the support of their employer as a participating company of the Stanford Center for Professional Development. For more information, see the Stanford Center for

Professional Development (SCPD) (<http://scpd.stanford.edu>) web site, or phone (650) 725-3000.

## The Coterminal Degree Program

This program permits matriculated Stanford undergraduates to study for a Master of Arts (M.A.) or Master of Science (M.S.) degree while completing their bachelor's degree(s) in the same or a different department. Application policies and procedures are established by each master's department or program. Interested Stanford undergraduates should directly contact the department or program in which they wish to pursue a master's degree and must adhere to the application deadlines. Stanford undergraduates may also choose to apply to Stanford graduate degree programs through the standard graduate admissions process as described in the Graduate Admission (p. 16) section of this bulletin. Such applicants are not coterminal students and coterminal policies do not apply. For more information, see the Coterminal Degrees (p. 46) section of this bulletin.

## Application Process

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

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

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

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

### Business

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

### Law

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

### M.D. Program

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

## Rescission

By applying for admission to Stanford University academic programs, applicants certify that the information they provide in their applications is complete, accurate, and their own work. As also noted in the application materials, Stanford reserves the right to withdraw an offer of admission under certain circumstances, including (but not limited to):

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

Indeed (and for example), Stanford may rescind an individual's admission at any time, including after attendance and after degree conferral, if it determines, for example, that an individual has been admitted to Stanford on the basis of having provided false information; has withheld requested information; or has engaged in behavior prior to the first day of enrolled Stanford attendance that indicates a serious lack of judgment or integrity.

The University reserves the right to require individuals to provide additional information (and/or authorization for the release of information) about any such matter, and to place a hold on registration and/or the conferral of a degree during the investigation into any such matter. Stanford also reserves the right in perpetuity to investigate the authenticity, accuracy, and authorship of materials submitted, information provided, and assertions made in connection with the application.

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

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

## Holds

A hold can be placed on the registration of any student with unmet financial or other University obligations; in addition to being unable to register for and take classes, among other limitations, such a student cannot receive a transcript, statement of completion, degree certificate, or diploma until the hold is released. As a condition of attending Stanford, students accept this provision.

## Nonmatriculated Study (Graduate Students)

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

1. Stanford alumni who wish to return to Stanford to take courses that are prerequisites for Medical School admission, such as undergraduate Biology or Chemistry courses, are eligible to apply for nonmatriculated status. An application form, application fee, statement of purpose, and three letters of recommendation are required. The decision to admit or deny is made by the Director of

Graduate Admissions on the basis of relevant factors, including at least a 3.0 GPA and positive letters of recommendation.

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

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

Nonmatriculated students are not permitted to enroll in certain courses, such as those in the following departments or programs: film and broadcasting courses in Art; all courses in Computer Science, Electrical Engineering, International Policy Studies, and the School of Medicine. Nonmatriculated students must limit their enrollment to classes in the department in which they have been admitted. Nonmatriculated students receive academic credit for courses satisfactorily completed and may obtain an official transcript. As a general proposition, they may use University facilities and services. In classes of limited enrollment, students in degree programs have priority. Nonmatriculated students may apply for housing but have a low priority for assignment and are not guaranteed housing. No fellowships, assistantships, or Stanford loans are available for nonmatriculated students. Nonmatriculated students are not eligible for a leave of absence.

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

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

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

## Non-Degree-Granting Programs

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

Individuals may apply to these programs directly. Application requirements, admissions decisions, tuition requirements and financial support are all handled by the specific program. Individuals who

are admitted to these programs will be registered at Stanford as nonmatriculated graduate students in the appropriate program. Upon completion of their program, they will receive a transcript and certificate of program completion.

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

## Stanford Center for Professional Development

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

## Postdoctoral Scholars

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

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

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

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

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

## Visiting Student Researchers

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

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

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

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

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

Visiting Student Researchers are subject to the rules and regulations of Stanford University. These include, but are not limited to:

- *Intellectual Property*—Visiting Student Researchers are required to sign an SU-18 Stanford Patent and Copyright Agreement.
- *The Honor Code and Fundamental Standard*—Visiting Student Researchers who commit violations of these behavioral standards as reasonably determined by the sponsoring department are subject to termination of their Stanford appointment; these cases do not proceed through the Office of Community Standards.
- *Required Training*—The faculty member who invited the Visiting Student Researcher is responsible to assure that they receive any required training in order to be able to carry out their research at Stanford, including appropriate privacy and data security training for the protection of personally identifying information and Stanford data, health and safety training, instruction in the protection of human subjects, or any other instruction required by the work that the student will do here.

Citizens of other countries who enter the United States to be Visiting Student Researchers at Stanford must have a DS-2019 Certificate (to

apply for a J-1 visa) issued by the Bechtel International Center and must be registered each quarter, including Summer Quarter, to maintain their visa status.

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

## Undergraduate Visiting Researcher Interns (Nonmatriculated Study)

During the summer term, students from other universities who have not yet obtained a bachelor's degree (or its foreign equivalent) may be invited by Stanford faculty to conduct research on the Stanford campus. Participants must be a degree-seeking student for at least two years at the bachelor's level in a U.S. college or university accredited by a regional accrediting association or international college or university of recognized standing. Participation is contingent upon the approval of Graduate Admissions, Office of the University Registrar.

These students are registered as Undergraduate Visiting Research Interns. Appointments are limited to the Summer term. Invited persons must be qualified to conduct research at a level comparable to that of other Stanford undergraduates, and the research must be of benefit to Stanford as well as to the visitor. Forms for the appointment of Undergraduate Visiting Research Interns are submitted to Graduate Admissions, Office of the University Registrar by the department issuing the invitation.

Undergraduate Visiting Researcher Interns are charged a quarterly fee. They may waive the University's student medical insurance plan only if they have comparable coverage with another carrier and submit proof of the comparable coverage prior to the term start date. Visiting Research Interns are not entitled to any financial support from Stanford University. Funds intended for the support of matriculated Stanford students may not be used to support Visiting Researcher Interns. Stanford cannot certify visiting researchers for deferment of U.S. educational loans.

## Students of New Faculty

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

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

Appointment of these students into nonmatriculated Stanford graduate status requires the approval of the incoming faculty member, that faculty member's Stanford department chair and school dean, and Stanford's office of the Vice Provost for Graduate Education, as well as of the appropriate office at the student's home institution.

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

timing of the appointment and the sources of financial support, if any, for each student.

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

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

## Undergraduate Financial Aid

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

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

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

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

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

and universities. Students must also maintain satisfactory academic progress to retain financial aid eligibility.

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

## Graduate Financial Aid

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

## Veterans' Educational Benefits

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

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

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

Subject to current federal and University guidelines, students eligible for receipt of VA educational benefits have their prior education and training evaluated up to the credit limits outlined in the "Residency Policy for Graduate Student (p. 57)s" section of this bulletin. As an exception to that policy, students in master's programs in the schools of Earth Sciences, Education, Engineering, Humanities and Sciences, Law, Medicine, and Graduate Business are allowed a maximum of 6 transfer (quarter) units. Students should consult with the Office for Military Affiliated Communities (OMAC) (<https://military.stanford.edu/gi-bill-benefits>) for consideration of optimal use of educational benefits.

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

graduate students may be eligible for the Yellow Ribbon provision, and the amount of institutional contribution varies by school and program at the graduate level.

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

# TUITION, FEES, AND HOUSING

## University Communication with Students

Stanford University uses electronic means (such as email, texts, and the Internet) as a primary method of communication and of providing billing, payment, and enrollment services. Signatures or acknowledgments provided by the student electronically to Stanford via Stanford systems and/or @stanford.edu email are valid and legally binding.

### Notification/Obligation to Read Email

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

### Obligation to Pay Charges

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

Regular quarterly tuition for the 2017-18 academic year, payable Autumn, Winter, and Spring quarters, is as follows:

Type	Fee
Undergraduate	\$16,329
Graduate 11-18 units	\$16,329
Graduate 8-10 units	\$10,620
Each graduate unit above 18	\$1,089
Graduate Engineering	\$17,396
Graduate Engineering 8-10 units	\$11,310
Each graduate Engineering unit above 18	\$1,160
Graduate School of Business, first year MBA*	\$22,956
Graduate School of Business, second year MBA*	\$22,180
School of Medicine (M.D. Program-FY 2011 and beyond)*	\$18,743
School of Medicine (M.D. Program -FYi 2010 and earlier)*	\$19,760
Stanford Law School	\$19,347
GSB/Law Joint Program **	\$20,348
Permit for Services Only (PSO)	\$4,939
Permit to Attend (PTA)***	\$4,939
Terminal Graduate Registration (TGR)	\$3,186
Terminal Medical Registration (TMR - FY 2010 and earlier)	\$2,964
Medical School Research Rate (FY 2011 and beyond)	\$3,747

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

\*\* Law/GSB joint program tuition rate

\*\*\* Policies concerning auditing are available in the Stanford Bulletin

For complete tuition information, see the Registrar's tuition (<https://registrar.stanford.edu/students/tuition-and-fees>) web site.

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

Eligibility for registration at reduced tuition rates is described below. Tuition exceptions may also be made for illness, disability, pregnancy, new-parent relief, or other instances at the discretion of the University.

No reduction in tuition charges is made after the first two weeks of the quarter.

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

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

## Undergraduate Student Tuition

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

During Summer Quarter, Stanford undergraduates may register on a unit-basis. For Summer Quarter tuition rates and policies, see the Registrar's Summer tuition (<https://registrar.stanford.edu/summer-tuition>) web site.

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

### 1. Permit to Attend for Services Only (PSO)

Undergraduates completing honors theses, clearing incompletes, or requiring a registration status, and who meet the PSO conditions listed in the "Special Registration Statuses (Undergraduate) (p. 38)" section of this Bulletin, may petition for PSO status one time only in their terminal quarter.

### 2. 13th Quarter

Undergraduates who meet the 13th Quarter conditions listed in the "Special Registration Statuses (Undergraduate) (p. 38)" section of this Bulletin may petition one time only to register for a minimum of eight units. For per-unit tuition rates, see the Registrar's tuition web site.

### 3. Graduation Quarter

Undergraduates may petition to register for Graduation Quarter registration status in the quarter in which they are receiving a degree if they are not using any University resources (including housing), have completed all University requirements, and meet the Graduation Quarter conditions listed in the "Special Registration Statuses (Undergraduate) (p. 38)" section of this bulletin. Graduation Quarter may be permitted one time only. The tuition per quarter is \$150 in 2017-18.

Coterminal students are only eligible for the Graduation Quarter special registration status if they are applying to confer both the undergraduate and graduate degree in the same quarter.

## Coterminal Student Tuition

Coterminal students are assigned to either the undergraduate coterminal tuition group or the graduate coterminal tuition group, which dictates whether the student is charged undergraduate or graduate tuition. A coterminal student is subject to graduate tuition assessment and adjustment policies once placed in the coterminal graduate tuition group. Coterminal students are not eligible for undergraduate special registration statuses (with the exception of Graduation Quarter, if the student is applying to confer both their undergraduate and graduate degrees in the same quarter). Coterminal students may only be eligible to apply for graduate special registration statuses once their undergraduate degrees have been conferred. Coterminal students should see the student policies and procedures for tuition assessment, as described under in the "Coterminal Degrees (p. 47)" section of this bulletin.

## Graduate Student Tuition

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

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

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

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

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

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

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

### 1. Terminal Graduate Registration (TGR)

Doctoral students, master's students, and students pursuing Engineer degrees who have completed all degree requirements other than the University oral exam and dissertation (doctoral students) or a required project or thesis (Engineer or master's students) and meet the conditions listed in the "TGR (p. 60)" section of this bulletin may request Terminal Graduate Registration tuition status.

Each quarter, TGR students must enroll in the 801 (for master's and Engineer students) or 802 (for doctoral students) course in their department for zero units, in the appropriate section for their adviser.

TGR students register at a special tuition rate: \$3,186 per quarter in 2017-18. TGR students may enroll in up to 3 units of course work per quarter at this tuition rate. Within certain restrictions, TGR students may enroll in additional courses at the applicable unit rate. The additional courses cannot be applied toward degree requirements since all degree requirements must be complete in order to earn TGR status.

### 2. Graduate Petition for Part-time Enrollment (formerly Graduate Tuition Adjustment)

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

### 3. Graduation Quarter

Registration is required for the term in which a student submits a dissertation or has a degree conferred. Students who meet the conditions listed in the "Graduation Quarter (p. 60)" section of this bulletin are eligible to be assessed a special tuition rate of \$150 for the quarter in which they are receiving a degree.

## International Students

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

## Application Fee

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

## ASSU Fees

The Associated Students of Stanford University (ASSU) fees are established by student vote in Spring Quarter. Fees directly fund activities of student organizations and not operations of ASSU. The 2017-18 fees are:

- Undergraduates—\$186 per quarter
- Graduate Students—\$34 per quarter

ASSU fees are assessed in Autumn, Winter, and Spring quarters and can be waived subject to certain conditions. Waivers can be requested during the first two weeks of each quarter. The window for requesting waivers begins on the first Friday of each quarter, and remains open for two calendar weeks. Contact the ASSU (<http://assu.stanford.edu>) for details. Waivers granted result in a credit to the student's University bill.



## Document Fee

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

The document fee for students admitted to new degree or non-degree programs in 2017-18 is \$250.

## Campus Health Service Fee

All students enrolled on the main Stanford campus are required to pay the Campus Health Service Fee. The Campus Health Service Fee covers most of the services provided by Vaden Health Center, including primary care medical visits, psychological evaluation and short-term therapy at Counseling and Psychological Services (CAPS), and health and wellness programs. The services provided by Vaden Health Center are not covered by Cardinal Care or a student's private health insurance. More information and answers to questions about the fee can be found at the Campus Health Service Fee (<https://vaden.stanford.edu/about/fees/campus-health-service-fee-health-fee>) web site. The fee for 2017-18 is \$210 per quarter.

## Health Insurance

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

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

## Special Fees

### New Student Orientation Fee

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

### Law Student Services Fee

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

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

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

### Late Study List Fees

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

### Laboratory Fee

Students in chemistry laboratory courses are charged a nonrefundable fee.

### Course Fees

Courses for which special fees are charged, such as in Music Practice; Athletics, Physical Education, Recreation; and Dance, are indicated in

the notes of the scheduled class on Axess (<http://axess.stanford.edu>) or ExploreCourses (<http://explorecourses.stanford.edu>).

## Dissertation Fee

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

## International Scholar Service Fee

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

## Housing

University housing is available to enrolled Stanford degree-seeking undergraduates and graduate students as space permits and according to policies described on the R&DE Student Housing (<http://studenthousing.stanford.edu>) web site. Residential and Dining Enterprises (R&DE) Student Housing is responsible for managing and maintaining student residences, assigning students to housing, and operating the regional housing front desks. Information on University housing assignments, options, policies, application procedures, and deadlines may be obtained on the R&DE Student Housing (<http://studenthousing.stanford.edu>) web site, by mail or in person at 408 Panama Mall, Suite 101, Stanford University, Stanford, CA 94305, by telephone at (650) 725-2810, or by email at [studenthousing@stanford.edu](mailto:studenthousing@stanford.edu) ([housingassignments@lists.stanford.edu](mailto:housingassignments@lists.stanford.edu)). Current and prospective students may also contact R&DE Student Housing by filing a HelpSU (<https://helpsu.stanford.edu/helpsu/3.0/helpsu-form?pcat=studenthousing>) request. Information regarding off-campus housing may be obtained from the Community Housing (<http://offcampus.stanford.edu>) section of the R&DE Student Housing web site, by mail or in person at 408 Panama Mall, Suite 101, Stanford University, Stanford, CA 94305, by telephone at (650) 723-3906, or by email at [communityhousing@stanford.edu](mailto:communityhousing@stanford.edu).

Residential Education (<http://resed.stanford.edu>) (650-725-2800) and the Graduate Life Office (<http://glo.stanford.edu>) (650-723-1171) are responsible for residential staff, educational programs, counseling, and crisis intervention in undergraduate and graduate housing respectively.

## Housing Rates

Complete information on housing (<https://rde.stanford.edu/studenthousing/housing-options>) is available on the R&DE Student Housing web site. Campus housing rates are generally below local area market rents.

- See Assignments and Contracts (<https://rde.stanford.edu/studenthousing/assignments-contracts>) to learn how to apply for upperclass undergraduate, single graduate, couple without children, or student with children housing.
- Rates for 2017-18 are posted online:
  - Undergraduate residence rates chart (<https://rde.stanford.edu/studenthousing/undergraduate-rates-2017-18>)
  - Graduate residence rates chart ([https://rde-stanford-edu.s3.amazonaws.com/Housing/PDF/2017-18\\_Grad\\_RatesChart.pdf](https://rde-stanford-edu.s3.amazonaws.com/Housing/PDF/2017-18_Grad_RatesChart.pdf))

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

## House Dues

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

## Technology Fee

Students who live in housing are automatically assessed a technology fee on their university bill that covers in-room network connections and a land-line phone with telephone service (phone service is provided on campus only).

## Undergraduate Residences

Approximately 97 percent of undergraduates live in University housing, not counting students studying abroad during the academic year. All freshmen are required to live in University residences their first year on campus and are automatically assigned housing following admission. Information on the housing assignment process is included in the R&DE Student Housing (<https://view.publitas.com/stanford-undergrad/approaching-stanford-2017/page/58-59>) section of Approaching Stanford (<http://approaching.stanford.edu>). Because freshmen must live in campus housing, losing eligibility for University housing also leads to a loss of student status until the student has returned to University housing unless an extraordinary exemption is granted from the Office of the Vice Provost for Undergraduate Education.

Residence assignments for continuing undergraduates are made on the basis of an annual lottery, called the Draw (<http://thedraw.stanford.edu>), and quarterly waiting lists. Undergraduates are guaranteed four years of University housing (three years for transfer students) if:

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

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

## Graduate Residences

Approximately 66 percent of matriculated graduate students live in housing provided by R&DE Student Housing, both on campus and off campus. Residence assignments are made on the basis of an annual lottery and quarterly waiting lists. New matriculated students are guaranteed University housing for their first year of study if:

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

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

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

assigned after new first-year graduate students who are guaranteed housing and continuing students with remaining priority years.

Academic-year assignment priorities for graduate students are detailed on the Assignment Guarantee and Priorities (<https://rde.stanford.edu/studenthousing/assignment-guarantee-and-priorities>) page of the R&DE Student Housing website. Priorities are dependent upon degree level and number of years each student has already lived in housing.

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

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

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

## Community Housing

Community Housing provides resources to assist students in locating private rooms, houses, and apartments available for rent in surrounding communities. Students must make rental arrangements directly with landlords. An online listing service (<https://rde.stanford.edu/studenthousing/housing-listings>) facilitates the process of making connections. Information on community housing may be obtained from the Community Housing web site (<http://offcampus.stanford.edu>), by mail or in person at 408 Panama Mall, Suite 101, Stanford University, Stanford, CA 94305, by telephone at (650) 723-3906, or by email at [communityhousing@stanford.edu](mailto:communityhousing@stanford.edu).

During mid-August to mid-September, temporary accommodations are available in student residence halls at a modest charge for graduate students searching for off-campus housing for Autumn Quarter. Review the Stanford Conferences (<https://rde.stanford.edu/conferences/short-term-grad-student-summer-housing>) short-term housing web page for information.

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

## Meal Plans

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

Stanford University's Residential Education program promotes the philosophy that living and learning are integrated and that formal teaching, informal learning, and personal support in residences are integral to a Stanford education. Meals play a key role in this mission of community building, leading, and learning. Therefore, residents of designated university residence halls (Branner, Crothers/Crothers Memorial, Florence Moore, Gerhard Casper, Lakeside, Ricker, Stern, Toyon, Wilbur, Yost, Murray, and EAST) are required to participate in an

R&DE Stanford Dining Meal Plan. R&DE Stanford Dining is Committed to Excellence by providing meal plans that offer significant value, the highest quality, and most flexibility of dining across campus, along with a daily variety of delicious, nutritious options including vegetarian (<https://rde.stanford.edu/dining/vegetarian-vegan-dining>), vegan (<https://rde.stanford.edu/dining/vegetarian-vegan-dining>), nut-free (<https://rde.stanford.edu/dining/ricker-dining>), kosher (<https://rde.stanford.edu/dining/kosher-dining-program-florence-moore>), and halal (<https://rde.stanford.edu/dining/halal-options>). The Food Allergies @Stanford (<https://rde.stanford.edu/dining/food-allergies>) program offers support and dining accommodations to students with food allergies or other dietary concerns.

*New for 2017-2018:* Arrillaga Family Dining Commons is open for student meals during spring break.

All freshmen and upperclass students living in the above houses can choose an R&DE voluntary meal plan which offers expanded flexibility and numerous options for use on the campus. Residents of Yost, Murray, and EAST have a dedicated row meal plan. Students assigned to the Governor's Corner Suites and the remaining row houses are required to purchase either a Dining Societies meal plan (Suites), or a house meal plan (managed through their self-operated or co-op row house staff).

Students are allowed to switch meal plans up until the last two weeks of the quarter. Meal plans are billed on a quarterly basis, and the cost is determined by the number of service days in each quarter. Cardinal Dollars do not expire and carry over from year to year as long as you are enrolled as a student. The remaining Meal Plan Dollar balance carries over at the end of each quarter and can be used throughout the academic year as long as the student is enrolled in a meal plan. All Meal Plan Dollars expire at the end of Summer Quarter. Meal Plan Dollars provided per quarter as part of the Ultimate Flex, Premier Flex, Cardinal Select and Cardinal Light plans vary depending on the number of days in each quarter.

## Meal Plans

### Ultimate Flex

- Most flexible of all meal plans offering the most options (dining halls, late night, cafés, Munger Market)
- 19 meals per week plus 410 Meal Plan Dollars, 100 Cardinal Dollars and 5 guest meals per quarter
- All 19 meals are served in the dining halls
- Meal Plan Dollars can be used in the dining halls, most R&DE cafés, Munger Market and late night venues
- Cardinal Dollars can be used in the dining halls, R&DE cafés, Munger Market and late night operations plus Starbucks, Panda Express and Subway locations in Tresidder Memorial Union
- During home football games a meal swipe can be used at the Stanford Stadium

### Premier Flex (Pilot)

- Second most flexible meal plan (dining halls, late night, cafés, Munger Market) giving students the most meal plan dollars
- 15 meals per week plus 485 Meal Plan Dollars and 5 guest meals per quarter
- All 15 meals are served in the dining halls
- Meal Plan Dollars can be used in the dining halls, most R&DE cafés, Munger Market and late night venues
- During home football games a meal swipe can be used at the Stanford Stadium

Undergraduate students living in Branner, Crothers/Crothers Memorial, Florence Moore, Gerhard Casper, Lakeside, Ricker, Stern, Toyon, Wilbur are required to be at a minimum on one of the Cardinal mandatory meal plans (Classic, Select, and Light), but can choose to switch meal plans

at any time, including up to the Ultimate Flex or Premier Flex meal plans, until the last two weeks of each quarter:

### Cardinal Classic

- 19 meals per week served only in the dining halls
- 5 guest meals per quarter
- Students on this meal plan who desire kosher meals are able to eat 3 kosher dinner meals in Florence Moore using meal swipes
- During home football games a meal swipe can be used at the Stanford Stadium

### Cardinal Select

- 14 meals per week plus 420 Meal Plan Dollars and 5 guest meals per quarter
- All 14 meals are served in the dining halls
- Meal Plan Dollars can be used in the dining halls, most R&DE cafés, Munger Market and late night venues
- Students on this meal plan who desire kosher meals are able to eat 3 kosher dinner meals in Florence Moore using meal swipes
- During home football games a meal swipe can be used at the Stanford Stadium
- The default meal plan for freshmen and upperclass students not living in Yost, Murray or EAST

### Cardinal Light

- 10 meals per week plus 750 Meal Plan Dollars and 5 guest meals per quarter
- All 10 meals are served in the dining halls and the Meal Plan Dollars can be used in the dining halls, most R&DE cafés and late night venues
- Students on this meal plan who desire kosher meals are able to eat 3 kosher dinner meals in Florence Moore using meal swipes
- During home football games a meal swipe can be used at the Stanford Stadium
- This meal plan is only available for upperclass students.

### Row House

Students living in Yost, Murray, or EAST are required to be on the Row House mandatory undergrad meal plan: 12 meals per week plus 345 meal plan and open kitchen dollars.

- 10 meals are served at the row house
- 2 meals can be eaten at any dining hall
- Meal Plan Dollars can be used in the dining halls, most R&DE cafés and late night venues
- Open kitchen funds are available for additional meals in the row house when meals are not being served
- During home football games a meal swipe can be used at the Stanford Stadium

## Payments

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

Charges and credits from offices within the University are aggregated in a student's individual account and presented on the University bill (<https://sfs.stanford.edu/student-accounts/pay-your-bill/understanding-your-student-account>). Student Financial Services sends the University bill electronically to students monthly via Stanford ePay. Students may designate 'Authorized Payers' via Stanford ePay to allow others to view the student account and make payment. Students and Authorized Payers may view the student account online 24 hours a day, seven days a week,

via Stanford ePay (<https://sfs.stanford.edu/student-accounts/pay-your-bill>). Payments should be made online through Stanford ePay. If necessary, the student or Authorized Payer may print a bill or receipt from Stanford ePay.

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

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

Stanford offers an installment payment plan for undergraduates. See Installment Payment Plan (<https://sfs.stanford.edu/student-accounts/pay-your-bill/installment-payment-plan>) for information.

## Forms of Payment

Stanford's standard method of payment is the online service, Stanford ePay, which includes electronic check (eCheck) and an International Funds Transfer option. No fee is associated with ePay payments. International students wishing to pay in foreign currencies should use the International Funds Transfer option within ePay which allows students to arrange for payment in foreign currencies. This electronic option offers students favorable exchange rates and eliminates bank fees typically charged for wire transfer.

Payers may use their personal online banking portal with any U.S. bank to pay the University bill. Stanford does not accept cash, credit cards or postdated checks for payments to the University bill.

See University Bill Payment Methods (<https://sfs.stanford.edu/student-accounts/pay-your-bill/methods-payment>) for information.

## Credit Balances

Stanford uses Direct Deposit to refund credit balances to students. See the Direct Deposit enrollment instructions (<https://sfs.stanford.edu/student-accounts/refunds/direct-deposit>) web site. Students are expected to enroll in Direct Deposit at the beginning of their Stanford career or as soon as possible thereafter. Direct Deposits reach the bank within 24-48 hours of processing. Receipt of funds will not be delayed by mail time, lost checks, or the need to go to the bank as is the case with paper checks.

Generally credit balances resulting from financial aid are refunded every Monday, Wednesday and Friday. Credit balances resulting from an overpayment of cash (e.g. ePayment, check) remain on the student account to be applied to future charges. A refund of a cash overpayment may be provided at any time upon student request. Annually, in August, Student Financial Services will refund any remaining overpayment of cash to students who have graduated or otherwise discontinued their career at Stanford.

## Account Fees and Actions

### Late Payment Fees

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

## Holds

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

## Insufficient Funds

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

## Delinquent Accounts

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

## Refunds

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

See the Registrar's Tuition Refunds page for a schedule of refunds (<https://registrar.stanford.edu/students/tuition-and-fees/tuition-refund-schedule>).

## Annulled Registration

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

## Cancellation of Registration or Suspension

Students who have their registrations canceled or are suspended from the University generally receive refunds on the same basis as those receiving leaves of absence unless otherwise specified. A student whose registration is canceled less than one week after the first day of instruction for an offense committed during a preceding quarter receives a full refund of tuition fees.

## Institutional Interruption of Instruction

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

## Leaves of Absence

A student in good standing who desires or is required to take a leave of absence from the University after the first day of instruction, but

before the end of the first 60 percent of the quarter (term withdrawal deadline), may file a petition for a leave of absence and tuition refund. Graduate students submit the completed leave of absence form to the Student Services Center (<http://studentservicescenter.stanford.edu>). Undergraduates who wish to withdraw from the current quarter, or from a quarter for which they have registered in advance and do not wish to attend, must file a Leave of Absence Petition (<https://stanford.box.com/v/leaveofabsence>) with and receive approval from the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall. A voluntary leave of absence after the first 60 percent of the quarter (term withdrawal deadline) is only granted for approved health and emergency reasons. For more information on leaves of absence, undergraduates should see the "Leaves of Absence and Reinstatement (Undergraduate) (p. 39)" section of this bulletin, and graduate students should see the "Leaves of Absence (Graduate) (p. 58)" section of this bulletin.

## **Room and Meal Plan Refunds**

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

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

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

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

# UNDERGRADUATE DEGREES AND PROGRAMS

## Degree Requirements

### A Liberal Education

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1. with no overlapping courses, the curricular requirements of two majors which ordinarily would lead to different bachelor's degrees (that is, a Bachelor of Arts degree and a Bachelor of Science).
2. These students must have applied in advance for graduation with the B.A.S. degree instead of the B.A. or B.S. degree, been recommended by the Committee on Undergraduate Standards and Policy (C-USP),
3. Fulfilled a minimum of 180 units of University work described in point 1 of the "Bachelor of Arts (B.A.), Bachelor of Science (B.S.)" section.
4. The requirements of each major without applying any course towards the requirements of more than one major, according to "Multiple

Majors" section of this bulletin. The Major-Minor and Multiple Major Course Approval Form (<https://stanford.app.box.com/v/majmin-multmaj>) is required for graduation for students with the B.A.S degree.

5. The Writing, General Education, and Language requirements.
6. Students admitted as freshmen—A minimum of 180 units (including the last quarter in residence) at Stanford. In special cases, students who have earned at least 180 units in resident work may petition for a waiver of the last quarter-in-residence requirement for up to 15 units.
7. Students admitted as transfers—A minimum of 135 units (including the last quarter in residence) at Stanford. In special cases, students who have earned at least 135 units in resident work may petition for a waiver of the last quarter-in-residence requirement.

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

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

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

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

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

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

## Second Bachelor's Degree

Stanford does not award a second Bachelor of Arts (B.A.) degree to an individual who already holds a Bachelor of Arts, nor a Bachelor of Science (B.S.) degree to an individual who already holds a Bachelor of Science degree. Nor does Stanford award a Bachelor of Arts and Sciences degree to the holder of either a B.A. or B.S.

However, the holder of a Bachelor of Arts degree from Stanford may apply to the C-USP Subcommittee on Academic Progress for admission to candidacy for a Bachelor of Science degree, and the holder of a Bachelor of Science degree from Stanford may apply for candidacy for a Bachelor of Arts degree. A recommendation of the major department for the

second bachelor's degree must accompany the application. Generally, a holder of a B.A. or B.S. degree from Stanford may not apply for the Bachelor of Arts and Sciences degree, although a student may submit a petition for exception. The C-USP Subcommittee on Academic Progress determines whether the application for a second degree may be approved and/or the conditions a student must meet in order to be allowed to earn a second degree. The office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall, reviews these petitions. A student approved for this program may register as an undergraduate and is subject to the current rules and regulations affecting undergraduates. Requirements for a second Stanford bachelor's degree are the same as those described above for dual bachelor's degrees.

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

Finally, inquiries by students who have earned their bachelor's degree elsewhere for a second bachelor's degree at Stanford are not accepted.

## Coterminal Bachelor's and Master's Degrees

See the "Coterminal Degrees (p. 46)" section of this Bulletin.

## The Major

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

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

## Degree Requirements

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

Check individual department or program listings in this bulletin for the undergraduate degrees offered and for specific major requirements. If an area of study has no baccalaureate degree, that discipline is not available as a regular undergraduate major.

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

## Limits of the Major

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

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

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

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

## Multiple Majors

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

1. Formally declare all majors through Axxess to the Office of the University Registrar.
2. Satisfy the requirements of each major without applying any course towards the requirements of more than one major or any minor unless:
  - a. overlapping courses constitute introductory skill requirements (for example, introductory math or a foreign language);
  - b. overlapping courses enable the student to meet school requirements (for example, for two majors within the School of Engineering). Currently, only the School of Engineering has school requirements for its undergraduate majors.
3. Submit the Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) by the Final Study List deadline of the quarter of intended graduation. The form is required for graduation for students with multiple majors or a minor and should be submitted to the Student Services Center (<https://studentservicescenter.stanford.edu>).

Students pursuing multiple majors must complete a multiple major program form indicating which courses they plan to apply toward each major and any minor(s). Departments must certify that the plan of study meets all requirements for the majors and any minor(s) without unallowable overlaps in course work; the School of Engineering Dean's office certifies this information in any case involving an Engineering major or minor. To facilitate advance planning, multiple major program forms are available at any time from the Registrar's forms web site (<https://registrar.stanford.edu/resources-and-help/forms>).

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

When students cannot meet the requirements of multiple majors without overlaps, the secondary major (<http://exploreddegrees.stanford.edu/undergraduatedegreesandprograms/#themajortext>), may be relevant.

## Secondary Major

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

## Joint Major Program

A joint major differs from a multiple major in that 1-2 fewer optional courses are required for each major, while an integrative senior capstone experience is required for all students in the program. Fourteen joint major programs were approved for a six-year pilot beginning in Autumn Quarter, 2014-15. See the "Joint Major (p. 31)" section of this bulletin for details.

## Foreign Language Proficiency

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

## The Joint Major Program (JMP)

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

Each of the new joint major programs leads to conferral of a B.A.S. (Bachelor of Arts and Sciences), and are distinct from multiple degrees in which a student may formally declare more than one major within a single bachelor's degree (B.A., B.S., or B.A.S.) program.

The following fourteen programs are currently offered (each major is linked to the department's bulletin site with specific information for that major):



- Computer Science (p. 278) and Art Practice (p. 389)
- Computer Science (p. 278) and Classics (p. 437)
- Computer Science (p. 278) and Comparative Literature (p. 453)
- Computer Science (p. 278) and English (p. )
- Computer Science (p. 278) and French (p. 542)
- Computer Science (p. 278) and German Studies (p. 557)
- Computer Science (p. 278) and History (p. 587)
- Computer Science (p. 278) and Iberian and Latin American Cultures (p. 600)
- Computer Science (p. 278) and Italian (p. 542)
- Computer Science (p. 278) and Linguistics (p. 644)
- Computer Science (p. 278) and Music (p. 665)
- Computer Science (p. 278) and Philosophy (p. 676)
- Computer Science (p. 278) and Slavic Languages and Literatures (p. 737)
- Computer Science (p. 278) and Spanish (p. 600)

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

## Requirements for Joint Majors

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

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

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

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

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

## Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

## Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) . Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

## Transcript and Diploma

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

## Undergraduate Minor

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

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

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

1. Overlapping courses constitute introductory skill requirements (for example, introductory math or a foreign language), or
2. Overlapping courses enable the student to meet school requirements. However, courses used for the major and/or the minor depth/core must not be duplicated within any other of the student's degree programs (for example, for a major within the School of Engineering and a minor within or outside of the School of Engineering). Currently, only the School of Engineering has school requirements for its undergraduate majors.

Undergraduates use Axess to declare or drop a minor. The Major-Minor and Multiple Major Course Approval Form (<https://stanford.app.box.com/v/majmin-multmaj>) is required for graduation for students with a minor. The form should be submitted to the Student Services Center (<https://studentservicescenter.stanford.edu>) by the final study list deadline of the quarter of intended graduation.

Students with questions about declaring minors or double-counting courses towards combinations of majors and/or minors should consult with the departments or programs involved or the Student Services Center. For academic advising regarding minors, students should

consult the Undergraduate Advising and Research Office (<https://undergrad.stanford.edu>) (UAR).

## Baccalaureate Honors

### With Distinction

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

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

### Departmental Honors Programs

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

### Interdisciplinary Honors Programs

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

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

The interdisciplinary honors programs are designed to complement study in a department major. The requirements for these honors programs are described in the department sections of this bulletin. If approved for interdisciplinary honors, the student should submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program form (<https://stanford.box.com/change-UG-program>) to the Student

Services Center (<https://studentservicescenter.stanford.edu>) to declare the Interdisciplinary Honors Program.

## General Education Requirements

*Note: Undergraduates admitted prior to 2013-14 and late should consult the "General Education Requirements through 2012-13" (<http://exploreddegrees.stanford.edu/archive/2015-16/undergraduatedegreesandprograms/#gerstext>) in the Stanford Bulletin 2015-16. Such students seeking to change to the current GER requirements should consult the "Changing from GERs to Ways Requirement" section below.*

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

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

### Purpose

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

General Education Requirement courses must be taken for a letter grade and a minimum of 3 units of credit, with the exception of courses taken to fulfill the Language requirement, which may be taken for credit/no credit. Additionally, a course taken to satisfy the Creative Expression Way (Way-CE) may be taken for a minimum of 2 units and must be taken for a letter grade (unless a letter grade is not offered, and the course is only offered for a Satisfactory/No Credit grade).

### Thinking Matters

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

- THINK courses

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

- Immersion in the Arts: Living in Culture (ITALIC (<http://explorecourses.stanford.edu/search?q=ITALIC&view=catalog&page=0&academicYear=20162017&collapse=&filter-coursestatus-Active=on&filter-departmentcode-ITALIC=on>))
- Structured Liberal Education (SLE (<http://explorecourses.stanford.edu/search?filter-departmentcode-SLE=on&q=SLE&filter-coursestatus-Active=on&filter-catalognumber-SLE=on&academicYear=20162017>))
  - Each of these also satisfies at least part of the Writing and Rhetoric Requirement as well as several Ways requirements.

Another option, in Autumn Quarter only, allows students to enroll in Education as Self-Fashioning (ESF (<http://explorecourses.stanford.edu/search?q=ESF&filter-coursestatus-Active=on&filter-departmentcode-ESF=on&academicYear=20162017>)) that satisfies the Thinking Matters requirement as well as PWR 1.

## Ways of Thinking/Ways of Doing (Ways)

Entering first-year students must fulfill the Ways general education requirement which is a skills capacity-based approach to fostering breadth rather than a traditional discipline-based approach.

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

- Way-A-II: Aesthetic and Interpretive Inquiry (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYAI=on&collapse=,5,&filter-coursestatus-Active=on>) (2 courses)
- Way-AQR: Applied Quantitative Reasoning (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYAQR=on&collapse=,5,&filter-coursestatus-Active=on>)
- Way-CE: Creative Expression (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYCE=on&collapse=,5,&filter-coursestatus-Active=on>) (2 units)
- Way-ED: Engaging Diversity (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYED=on&collapse=,5,&filter-coursestatus-Active=on>)
- Way-ER: Ethical Reasoning (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYER=on&collapse=,5,&filter-coursestatus-Active=on>)
- Way-FR: Formal Reasoning (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYFR=on&collapse=,5,&filter-coursestatus-Active=on>)
- Way-SI: Social Inquiry (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYSI=on&collapse=,5,&filter-coursestatus-Active=on>) (2 courses)
- Way-SMA: Scientific Method and Analysis (<https://explorecourses.stanford.edu/search?q=%25&view=catalog&page=0&catalog=&filter-ger-WAYSMA=on&collapse=,5,&filter-coursestatus-Active=on>) (2 courses)

Students are required to take eleven certified Ways courses, with two courses in Way-All, Way-SI, and Way-SMA, and one course in each of the remaining five Ways. Transfer students fulfill the Ways requirement as outlined in the "Transfer Credit for Ways" section below.

Although courses may be certified to fulfill two Ways, a student may only count a course toward one Way in a program of study. Thinking Matters courses typically fulfill a Way. Courses may also count for both major and Ways requirements.

## Transfer Credit for Ways

Transfer students admitted in 2015-16 or later must fulfill a portion of their Ways requirement at Stanford. Transfer students who matriculate with the following number of transfer units must complete the defined number of Ways courses as part of their undergraduate education.

Number of Transfer Units	Ways Course Requirement
90	5 courses certified in 5 different Ways
75-89	6 courses certified in 6 different Ways
60-74	7 courses certified in 7 different Ways

45-59	8 courses certified in 8 different Ways
44 or fewer	10 courses certified in 8 different Ways

- Excludes Advanced Placement (AP) or other external test units
- A minimum of 2 units is required to complete the Creative Expression (CE) Ways requirement. This may be fulfilled by taking one 2-unit minimum CE course, taking a 1-unit CE course twice, or taking two 1-unit CE courses in the same program such as Dance, Music, or TAPS.

Matriculated students may fulfill a maximum of five Ways courses out of the 11 course requirement from another accredited college or university; these courses may be certified in any of the eight Ways categories but no more than one course in any one Way (i.e., up to one course in Way-A-II, Way-SI, Way-SMA, which have a two-course requirement; one course in Way-AQR, Way-ED, Way-ER, Way-FR; and 2 units in Way-CE). No more than 45 units in total transfer credit may count toward the undergraduate degree. The five course transfer limit is cumulative over a student's undergraduate career at Stanford. Courses taken prior to matriculation, independent study courses, graduate courses, and online courses are not eligible for Ways credit. Courses must be a minimum of 3 units and taken for a letter grade except Way-CE which may be taken for fewer units.

## Pre-Approval of Courses for Transfer Credit for Ways

Courses taken at another accredited college or university must be pre-approved for Ways certification prior to enrollment in the course.

Courses that have not been pre-approved prior to enrollment at another accredited college or university are not eligible for Ways credit. Matriculated students must submit their Ways pre-approval request(s) by the quarterly deadline in the quarter prior to the term in which they intend to enroll in the transfer course, as defined on the Ways web site (<https://undergrad.stanford.edu/programs/ways/getting-credit/ways-credit-classes-taken-other-us-universities>). The student is subject to a five-course limit for Ways pre-approval requests per term.

To request a Ways requirement through transfer work, the pre-approved course must be taken for a minimum of 3 quarter units, except for Creative Expression which is a minimum of 2 units, and be taken for a letter grade.

Once Ways transfer credit has been posted to the student's record by the Office of the University Registrar, it is final and may not be changed.

Students seeking transfer credit should consult the Transfer Credit Procedures (<https://registrar.stanford.edu/transfer-credit-procedures>) page on the Office of the Registrar web site.

## Changing from GERs to Ways Requirement

Students admitted prior to Autumn Quarter 2013-14 are eligible to change to the Ways requirement. In order to change to the Ways system, students must submit the GER to Ways General Education Requirement Change Request (<https://stanford.box.com/GER-Ways-Request>).

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

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

## Language Requirement

To fulfill the Language Requirement, undergraduates are required to complete one year of college-level study or the equivalent in a foreign

language. Students may fulfill the requirement in any one of the following ways:

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

Test Subject	Score
Chinese	630
French	640
German	630
Latin	630
Spanish	630
Italian	630
Japanese	620
Korean	630
Hebrew	540

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

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

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

## Writing and Rhetoric Requirement

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

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

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

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

1. PWR 1: a course emphasizing writing and research-based argument.
2. SLE: writing instruction in connection with the Structured Liberal Education program.

3. ESF: writing instruction in connection with the Education as Self-Fashioning Thinking Matters course.
4. ITALIC: writing instruction in connection with the ITALIC Integrated Learning Environment.
5. Transfer credit approved by the Office of the University Registrar for this purpose.

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

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

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

For a full description of the Program in Writing and Rhetoric (PWR), see the "Writing and Rhetoric (p. 119)" section of this bulletin under the Vice Provost of Undergraduate Education.

## Unit Credit

### Activity Courses

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

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

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

Departments may also limit the number of satisfactory or credit courses accepted towards the requirements for a major. Satisfactory/Credit courses applied towards a minor may be similarly limited. Courses not letter-graded are not accepted in fulfillment of the General Education Requirements, except for Ways-CE (see the "General Education Requirements/Ways (p. 33)" section of this bulletin for further information). Writing in the Major courses are usually offered letter grade only. In those instances where the course is offered for a letter grade or CR/NC, the course must be taken for a letter grade to fulfill Ways of Thinking/Ways of Doing requirement and Writing in the Major requirement.

### Internship Credit Guidelines

Undergraduate internships should not by themselves carry any credit. However, an individual student may arrange with a faculty member for a research or other academic project to be based on the internship. Arrangements between students and faculty regarding credit are expected to be made well in advance of the internship. Credit should be arranged within departmental rules for directed reading or independent

study and should meet the usual department standards. No transfer credit is awarded for internships.

### Concurrent Enrollment (Undergraduate)

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

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

### Advanced Placement

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

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

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

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

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

Further information is available from the Student Services Center (<https://studentservicescenter.stanford.edu>) or on the Registrar's (<https://registrar.stanford.edu/students/transfer-credit/advanced-placement>) web site.

### AP Scores and Placement

Test Subject	Score	Placement	Quarter Units
Calculus AB (or AB subscore) **	5	Take placement diagnostic, see the Math Placement website; <a href="https://mathematics.stanford.edu/academics/undergraduate/math-placement/">https://mathematics.stanford.edu/academics/undergraduate/math-placement/</a>	8
Calculus BC **	5	Take placement diagnostic, see the Math Placement website; <a href="https://mathematics.stanford.edu/academics/undergraduate/math-placement/">https://mathematics.stanford.edu/academics/undergraduate/math-placement/</a>	10
Calculus BC **	4	Take placement diagnostic, see the Math Placement website; <a href="https://mathematics.stanford.edu/academics/undergraduate/math-placement/">https://mathematics.stanford.edu/academics/undergraduate/math-placement/</a>	8
Chemistry	5	CHEM 33 or above	5
Chinese (Language and Culture)*	5	Take placement exam if continuing in this language	10
Computer Science A	4,5	CS 106B or CS 106X	5
Computer Science Principles	4,5	CS 106A	5
French (Language)*	5	Take placement exam if continuing in this language	10
German (Language)*	5	Take placement exam if continuing in this language	10
Italian (Language)*	5	Take placement exam if continuing in this language	10
Japanese (Language and Culture)*	5	Take placement exam if continuing in this language	10
Latin (Literature or Virgil)*	4,5	Take placement exam if continuing in this language	10
Physics B	5	PHYSICS 25	10
Physics B	4	PHYSICS 23 and PHYSICS 25	5
Physics C Mechanics only	5	PHYSICS 43 and PHYSICS 45; or PHYSICS 23 and PHYSICS 25	5
Physics C Mechanics only	4	PHYSICS 41, PHYSICS 43, and PHYSICS 45; or PHYSICS 23 and PHYSICS 25	4
Physics C E&M only	5	PHYSICS 41 and PHYSICS 45; or PHYSICS 21 and PHYSICS 25	5

Physics C E&M only	4	PHYSICS 41, PHYSICS 43, and PHYSICS 45; or PHYSICS 21 and PHYSICS 25	4
Physics C Both Parts	5	PHYSICS 45 or PHYSICS 25	10
Physics C Both Parts	4	PHYSICS 41, PHYSICS 43, and PHYSICS 45; or PHYSICS 25	8
Spanish (Language)*	5	Take placement exam if continuing in this language	10
Physics 1 & 2, Both Parts***	9,10	PHYSICS 25	10
Physics 1 & 2, Both Parts***	8	PHYSICS 23 and 25	5

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

\*\* Starting for freshman entering Stanford in 2016-17, Stanford accepts PHYSICS 1 and 2; this rule is not retroactive to previous years. Students must have taken both PHYSICS 1 and 2 to receive credit along with scoring a minimum of 4 on each exam. The standard rules apply such that students cannot receive credit for multiple exams taken within the same subject. The best score and or unit rate is applied to the transcript of Physics. If a student wants to have a certain Physics exam reflected on the transcript, s/he should contact the Student Services Center (<https://helpsu.stanford.edu/helpsu/3.0/helpsu-form?pcat=StuAcct&dtag=10983>).

\*\*\* Students are eligible for Physics B, Physics C (both), or Physics 1&2, however not a combination of the three. For more information on these exams, see the Physics Department's Physics (<https://physics.stanford.edu/undergraduate-program/advanced-placement>) Advanced Placement web site.

## International Baccalaureate (IB) Transfer Credit

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

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

Test Subject	Score	Placement	Quarter Units
Chemistry	5	CHEM 35	10
Chinese A or B*	5	Take placement exam if continuing in this language	10
Computer Science	5	CS 106B or 106X	5
French A or B*	5	Take placement exam if continuing in this language	10

German A or B*	5	Take placement exam if continuing in this language	10
Japanese A or B*	5	Take placement exam if continuing in this language	10
Korean A or B*	5	Take placement exam if continuing in this language	10
Mathematics**	6 or higher	Take placement diagnostic, see the Math Placement website; <a href="https://mathematics.stanford.academics/undergraduate/math-placement/">https://mathematics.stanford.academics/undergraduate/math-placement/</a>	10
Physics	6 or higher	PHYSICS 25	8
Physics	5	PHYSICS 23, PHYSICS 25	4
Portuguese A or B*	5	Take placement exam if continuing in this language	10
Russian A or B*	5	Take placement exam if continuing in this language	10
Spanish A or B*	5	Take placement exam if continuing in this language	10

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

\*\* Enrollment may require taking the Math Placement Diagnostic. See the Math Placement (<http://mathematics.stanford.edu/academics/undergraduate/math-placement>) web site for more information and a link to take the diagnostic.

## Undergraduate Transfer Work

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

- Credit may be granted for work completed at institutions in the U.S. only if the institutions are regionally accredited.
- Study in institutions outside the U.S., when validated by examination results, tutorial reports, or other official evidence of satisfactory work, may be credited toward a Stanford bachelor's degree, subject to the approval of the credit evaluator and the appropriate departments. See the Registrar's web site (<https://registrar.stanford.edu/students/transfer-credit>) for additional information regarding transfer credit requests for course work completed abroad.
- Credit is officially allowed only after the student has been unconditionally admitted to Stanford.
- Credit is allowed for work completed at institutions in the U.S. only on the basis of an official transcript received by the Registrar at Stanford directly from the institution where the credit was earned. In order for transfer credit to be awarded, students must submit an official transcript that clearly indicates all of the below information for each course:
  - Course codes/numbers
  - Course titles or descriptions
  - Final grades earned
  - Course credits earned
- Credit from another institution may be transferred for courses which are substantially equivalent to those offered at Stanford University

on the undergraduate level, subject to the approval of the credit evaluator. A maximum of 20 quarter units may represent courses which do not parallel specific undergraduate courses at Stanford, again, subject to the approval of the credit evaluator as to quality and suitability.

6. Course work cannot duplicate, overlap, or regress previous work.
7. Transfer course work cannot count towards secondary school diploma and/or graduation requirements.
8. For students interested in fulfilling a Ways of Thinking/Doing (Ways) breadth requirement through transfer work, transfer courses are reviewed to determine if courses can be certified to fulfill Ways requirements. Requests for fulfilling Ways requirements in transfer require pre-approval prior to course enrollment and the pre-approval requests must be submitted by the quarterly deadline in the quarter prior to the term in which students intend to enroll in the transfer course, as defined on the Ways (<https://undergrad.stanford.edu/programs/ways/getting-credit/ways-credit-classes-taken-other-us-universities>) web site. Courses must be taken for a minimum of 3 quarter units (2 units in the case of Creative Expression only) and must be taken for a letter grade.

For transfer students admitted in 2015-16 and later, a proportion of their Ways requirement must be fulfilled at Stanford. Based on the number of qualified transfer units awarded at matriculation, students must complete a number of Ways courses to fulfill the Ways requirement as outlined in the "Transfer Credit for Ways (p. 33)" section of this bulletin.

For students who are subject to the previous GER system in place prior to Autumn 2013-14 who want to fulfill general education requirements through transfer work, a proposed transfer course must match a specific Stanford course that fulfills the same GER requirement; it must be a minimum of 3 quarter units and have been taken for a letter grade.

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

See the Registrar's web site (<https://registrar.stanford.edu/students/transfer-credit-and-advanced-placement/transfer-credit-policies>) for additional information regarding transfer credit policies and procedures.

## Special Registration Statuses (Undergraduate)

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

### Permit to Attend for Services Only (PSO)

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

### 13th Quarter

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

### Last Units out of Residence

Students may petition to complete their final 15 units out of residence to complete their degree requirements. The final 15 units of transfer credit must meet the criteria in the undergraduate "Transfer Work (p. 37)" section of this bulletin. Students must submit the Request for Last Units Out of Residence Petition (<https://stanford.box.com/last-units-out-of-residence>) to determine eligibility and to request pre-approval of the transfer work. A registration status is required to graduate. Students should select either the Graduation Quarter or the Permit for Services Only special registration status on the Last Units Out of Residence petition. Refer to the Special Registration Status section of the bulletin for a description of these statuses. An application to graduate should be submitted through Axess.

### Graduation Quarter

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

1. filing a Request for Last Units Out of Residence (<https://stanford.box.com/last-units-out-of-residence>) in order to complete up to 15 final units at another institution; or
2. returning from a discontinued status and filing a Request to Return and Register in Undergraduate Study (<https://undergrad.stanford.edu/planning/academic-policies/returning-students>) in order to confer their degree; or
3. if all degree requirements, including honors theses, have been completed and student requires a registration status to graduate, but will not be using University resources or housing.

Coterminal students are only eligible for the Graduation Quarter special registration status if they are applying to confer both the undergraduate and graduate degree in the same quarter. Undergraduates may be eligible for Graduation Quarter status in these three situations only if the student has completed all graduation requirements and will not be utilizing University resources, including housing. The deadline for the completed Graduation Quarter petition (<https://stanford.box.com/grad-qtr-ug>) is the Preliminary Study List (<https://registrar.stanford.edu/students/enrolling-courses/preliminary-study-list-deadline-courses-or-units>) deadline of the applicable quarter.

courses/preliminary-study-list-deadline-courses-or-units) deadline of the applicable quarter. Undergraduates must apply to graduate through Axxess if applying for the Graduation Quarter special registration status.

## Minimum Progress for Undergraduates

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

## Leaves of Absence and Reinstatement (Undergraduate)

A Leave of Absence allows a student to take a break from enrollment either before or after a quarter begins. There may also be conditions associated with a Leave, which are outlined in greater detail below. Undergraduates are admitted to Stanford University with the expectation that they complete their degree programs in a reasonable amount of time, usually within four years.

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

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

New freshmen and transfers are required to register in Autumn Quarter and may not take a leave of absence prior to their first quarter. However, new undergraduate students may request a deferment from the Office of Undergraduate Admission before the first day of Autumn Quarter. Under rare and exceptional circumstances, new freshmen and transfers may take a leave of absence during their first quarter with the permission of the Vice Provost for Undergraduate Education (or his or her designee). When circumstances arise which make it advisable or necessary for freshmen to take a leave of absence during any of their first three quarters, the student is required to wait until Autumn Quarter of the following academic year to return.

### Voluntary Leave

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

Undergraduates who take an approved leave of absence while in good standing from a quarter for which they have registered in advance and do not wish to attend may enroll in the University for the subsequent quarter with the privileges of a continuing student. For undergraduates who wish to withdraw from the current quarter after the beginning of the term, courses in which the student was enrolled after the final study list deadline appear on the student's transcript and show the symbol 'W' (withdraw). For additional information regarding satisfactory academic progress, refer to the "Academic Progress" section of this bulletin. In either situation, the University may condition its approval of a petition for leave of absence on the student's meeting such requirements as the University deems appropriate in the individual case for the student to be eligible to return (such as, in the case of a leave for medical reasons, proof of treatment and/or an interview with a provider at Vaden Health Center (<http://vaden.stanford.edu>) or Counseling and Psychological Services (<https://vaden.stanford.edu/caps-and-wellness/counseling-and-psychological-services-caps>) or its designee). Undergraduates who wish to withdraw from the current quarter, or from a quarter for which they have registered in advance and do not wish to attend, must file a Leave of Absence form (<https://stanford.box.com/leaveofabsence>) with and receive approval from the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall.

Information on tuition refunds is available in the "Refunds (p. 27)" section of this bulletin. For a full refund, petitions must be received by the Office of the University Registrar no later than the first day of classes for the quarter.

### Dean's Leave of Absence

While the University provides a wide range of services to support and address the mental and physical health of students, in some circumstances a student may be unable to perform the basic academic and/or nonacademic activities of student life, or the level of care required for a particular student may exceed the resources and staffing that a university can be expected to provide. Under such circumstances, a voluntary or mandatory leave of absence may be necessary.

A student may be placed on a Dean's Leave of Absence following an individualized assessment, when the University determines in the exercise of its judgment that a student reasonably meets one or more of the following criteria. The student:

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

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



Psychological Services (<https://vaden.stanford.edu/caps-and-wellness/counseling-and-psychological-services-caps>) or its designee). The Dean of Students Office publishes the full Dean's Leave of Absence Policy (<https://studentaffairs.stanford.edu/policies/deans-leave-absence>) on its web site.

When a student is granted or placed on a leave of absence after the beginning of the term, courses in which the student was enrolled after the final study list deadline appear on the student's transcript and show the symbol "W" (withdraw). For additional information regarding satisfactory academic progress, refer to the "Academic Progress (p. 74)" section of this bulletin. Information on tuition refunds is available in the "Refunds (p. 27)" section of this bulletin.

## Discontinuation and Reinstatement

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

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

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

Applications for reinstatement through the Request to Return and Register in Undergraduate Study (<https://undergrad.stanford.edu/planning/academic-policies/returning-students>), must be submitted eight weeks prior to the start of the term in which the student seeks to enroll in classes. Information and instructions may be obtained by contacting the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising Research (UAR), Sweet Hall.

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

Students who wish to terminate their study as undergraduates (e.g., for transfer to another institution) should submit a properly endorsed Request to Permanently Withdraw from Degree Program form (<https://stanford.box.com/permanent-withdraw>) to the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall. In this instance, applications for reinstatement through the Request to Return and Register in Undergraduate Study are not appropriate. Any student wishing then to return to undergraduate study at Stanford is required to apply as a transfer student through the Office of Undergraduate Admission, and such re-admission is not guaranteed.

Leaves of absence and reinstatement of graduate students are addressed in the "Graduate Degrees (p. 50)" section of this bulletin.

## Conferral of Degrees

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

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

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

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

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

Stanford University awards no honorary degrees.

# UNDERGRADUATE MAJOR UNIT REQUIREMENTS

## Undergraduate Major Unit Requirements

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

### School of Earth, Energy and Environmental Sciences

Major Department	Units required outside the dept./ program	Units required within the dept./ program	Total # of units	Notes/ Special Requirements	WIM Course
Earth Systems	62-111	21	83-132	internship, senior capstone and project	BIOHOPK 172H, EARTHSYS 135, EARTHSYS 149, EARTHSYS 177, EARTHSYS 191, EARTHSYS 200
Energy Resources Engineering	77-86	33-34	110-120	Senior Project and Seminar (ENERGY 199)	ENERGY 199
Geological Sciences	38-48	65-72	102-121	advanced summer field experience	GS 150, GEOPHYS 199
Engineering Geology & Hydrogeology	55-81	19-31	85-101	-	GS 150, GEOPHYS 199
Geophysics	43-45	15	min. 58	-	GS 150, GEOPHYS 199

### School of Engineering

Major Department	Units required outside the dept./ program	Units required within the dept./ program	Total # of units	Notes/ Special Requirements	WIM Course
Aeronautics and Astronautics	47	60	107	-	AA 190
Architecture Design	40	63	103	-	CEE 100, CEE 32B, CEE 32D
Atmosphere Energy	48-50	49-51	97-101	-	CEE 100, EARTHSYS 200, BIOE 131, COMM 120W, MS&E 152W
Bioengineer	min. 64	min. 39	min. 103	-	BIOE 131

Biomechanical Engineering	48-50	49-51	97-101	-	ENGR 199W with directed research units; ME 112
Biomedical Computation	51-65	47-56	109-114	Two quarters guided research	ENGR 199W with directed research units (preferred), CS 191W, or CS 272 / BIOMEDIN 212
Chemical Engineering	min. 70	50	min. 120	-	CHEMENG 185A
Civil Engineering	39 (Architecture Design); 48 (Atmosphere Energy); min. 54 (Civil Engineering)	62	116	-	CEE 100, CEE 32B, CEE 32D (Architectural Design); CEE 100, EARTHSYS 200, BIOE 131, COMM 120W, MS&E 152W (Atmosphere/ Energy); CEE 100 (Civil Engineering); BIOE 131, COMM 120W, EARTHSYS 191, EARTHSYS 200, CEE 100,
Computer Science	min. 33	min. 43	96-106	senior project	CS 181W, CS 191W, CS 194W

Electrical Engineering	40	60	100	EE191W only applies for Honors Thesis. EE191W may satisfy WIM only if it is a follow-up to an REU or independent study project, where a faculty agrees to provide supervision of writing a technical paper and with suitable support from the Writing Center.	CS 194W, EE 109, EE 133, EE 134, EE 153, EE 155, EE 168, EE 191W, EE 264W, EE 264W, EE 155
Energy Resources Engineering	78-84	36-37	114-121		
Engineering Physics	min. 48	min. 45	min. 93	at least 45 units in Engineering Fundamentals with Depth and elective courses must be engineering units	EE 152/ EE 155, ENGR 199W with research or, depending upon specialty track, one of the following: AA 190, BIOE 131 (ETHICSOC 131X), CS 181W, EE 134, ENGR 199W, MATSCI 161, MATSCI 164, ME 112, ME 131A, ME 140, ME 141, PHYSICS 107
Environmental Systems Engineering	20	57	97	Capstone course	BIOE 131, COMM 120W, EARTHSYS 191, EARTHSYS 200, CEE 100
Individually Designed Major	41	40	90-107	-	see adviser

Management Science and Engineering	42	65	107	Senior Project	MS&E 108
Material Science and Engineering	min. 53	min. 50	min 103	-	MATSCI 161, MATSCI 164
Mechanical Engineering	48	68	116	-	3-course required sequence to fulfill WIM for ME majors: ME 112, ME 131A, ME 140, ME 141
Product Design	min. 58	53-56	113		ME 112

### School of Humanities and Sciences

Major Department	Units required outside the dept./ program	Units required within the dept./ program	Total # of units	Notes/ Special Requirements	WIM Course
African and African Studies	50	10	60	AAAS thesis seminar	AFRICAAM 200X
American Studies			60		AMSTUD 160
Anthropology	45	50	65	ANTHRO 193A, ANTHRO 193B, Contemporary Debates in Anthropology	ANTHRO 90C
Archaeology	45	20	65	foreign language 1st qtr. at 2nd-year level	ARCHLGY 103
Art History	-	65	65	library orientation, junior seminar	ARTHIST 294
Art Practice (Studio)	-	65	65	Interdisciplinary art survey, advanced undergraduate seminar, library orientation	ARTHIST 294
Asian American Studies	40	20	60	Comparative and Major Core Curriculum, Methodology/ Research, Interdisciplinary Breadth Requirement	CSRE 200X, CSRE 201X

Biology	33-47	55	88-102		BIO 46, BIO 47, BIO 107 (HUMBIO 136), BIO 168, BIO 196A, BIO 197WA, BIO 199W, BIOHOPK 47, BIOHOPK 172H	East Asian Studies	75	3	78	Capstone Course (EALC 198); studies in an East Asian country for 1 qtr; Senior Essay or Honors Thesis	CHINA 111, JAPAN 138 (COMPLIT 138A), KOREA 120
Chemistry	20-39	47-68	82-104	The Biological Chemistry Concentration requires more units.	CHEM 134						
Chicana/o Studies	40	20	60	Comparative and Major Core Curriculum, Methodology Research Course, Senior Research, Interdisciplinary Breadth Requirements	CSRE 200X, CSRE 201X						
						Economics	-	80	80	-	ECON 101
						English	-	64	68-70	-	ENGLISH 162W
						English w/ Creative Writing	-	73-75	73-75	dept. approval	ENGLISH 162W, ENGLISH 164; ENGLISH 196A, ENGLISH 164C
						English w/ Interdisciplinary Emphasis	15	58-60	73-75	dept. approval and interdisciplinary paper	ENGLISH 162W, ENGLISH 164; ENGLISH 196A, ENGLISH 164C
Classics	-	-	60-65	majors seminar (CLASSICS 100)	CLASSICS 150 (Formerly CLASSGEN 176)	English w/ Interdepartmental Emphasis	16-20	53-55	69-75	16-20 units in foreign lang. lit.; dept. approval	ENGLISH 162W, ENGLISH 164; ENGLISH 196A, ENGLISH 164C
Communication	5	60	65	-	COMM 137W, COMM 104W, COMM 142W	English w/ Philosophy	20-25	57-59	77-84	-	ENGLISH 162W, ENGLISH 164; ENGLISH 196A, ENGLISH 164C
Comparative Literature		40	65	Gateway Course: COMPLIT 101. Core: COMPLIT 121, COMPLIT 122, COMPLIT 123. Capstone course: COMPLIT 199, and 25 units of electives in COMPLIT	COMPLIT 101	Feminist, Gender, and Sexuality Studies	45	18 core	63	Practicum	AMSTUD 160, ANTHRO 90B, FEMGEN 157
						Film and Media Studies	-	64	64	library orientation, senior seminar	FILMSTUD 101, FILMSTUD 102
Comparative Studies in Race & Ethnicity	45	15	60	Comparative Core Curriculum, Methodology Research Course, Senior Research, Major Concentration Interdisciplinary Breadth Requirements	CSRE 200X, CSRE 201X, EDUC 199A	French	-	32	56	Gateway courses: FRENCH 101, FRENCH 121; Capstone: any FRENCH 200-level. Oral Proficiency Interview (OPI).	FRENCH 131, FRENCH 133

French and Philosophy	min. 21	32 above #100	65	Gateway course: FRENCH 131, FRENCH 133, FRENCH 181. Capstone: COMPLIT 153C, FRENCH 246, ILAC 240E, ITALIAN 246. Oral Proficiency Interview (OPI)	FRENCH 131, FRENCH 133	Italian and Philosophy	min. 21	32 above #100	72	Gateway course; Capstone: ITALIAN 236 or equiv.; Oral Proficiency Interview (OPI)	ITALIAN 127, ITALIAN 128
German	0-25	35-60	60	Gateway course: GERMAN 116, GERMAN 150 capstone; Oral Proficiency Interview (OPI)	GERMAN 116, GERMAN 150	Jewish Studies (Individually Designed)	75-77	-	75-77	Comparative Studies and Major-Core Curriculum, Methodology/Research Course, Senior Research, Interdisciplinary Breadth Requirement	CSRE 201X
German and Philosophy	min. 21	min. 39	65	Gateway course; capstone; Oral Proficiency Interview (OPI)	GERMAN 116, GERMAN 150	Linguistics	-	28	55	Additional courses counting toward the 50 unit requirement should form a coherent program of study, and specific courses must be approved by the Undergraduate Adviser.	LINGUIST 121A, LINGUIST 121B, LINGUIST 130A
History	-	63-74	63-74	3 from #200-298	HISTORY 209S						
Human Biology (B.A.)	min. 6	min. 40	min. 81	Capstone	HUMBIO 2B, HUMBIO 3B, HUMBIO 4B						
Human Biology (B.S.)	min. 6	min. 40	min. 81	Capstone	HUMBIO 2B, HUMBIO 3B, HUMBIO 4B						
Iberian and Latin American Cultures	0	40	60	Gateway course (2 of 3): ILAC 130, ILAC 131, ILAC 132. Senior Seminar: ILAC 278A. Oral Proficiency Interview (OPI)	ILAC 278A	Mathematical & Computational Science	-		78-84	Capstone course	CS 181W, MATH 109, MATH 110, MATH 120, MATH 171
International Relations	55-70	0-15	70	2 yr. foreign lang; Overseas studies 1 qtr.	INTNLREL 110L, INTNLREL 140A, INTNLREL 140C, INTNLREL 174, INTNLREL 200B	Mathematical up to 15 units	49		64	-	MATH 101, MATH 109, MATH 110, MATH 120, MATH 171
Italian	-	32	56	Gateway course; or equiv.; Oral Proficiency Interview (OPI)	ITALIAN 127, ITALIAN 128, ITALLANG 22A	Music	-	62-78	62-78	Total units dependent upon selected, optional concentration area	3 from the following: MUSIC 144K, MUSIC 145K, MUSIC 146J, MUSIC 146L

Native American Studies	40	20	60	Comparative and Major-Core Curriculum, Methodology Research Course, Senior Research, Interdisciplinary Breadth Requirement	CSRE 200X, CSRE 201X	Russian Literature & Philosophy	21	40	67	1st- and 2nd- year Russian; Gateway course; capstone; language assessment	SLAVIC 146
Philosophy	-	55	55	course in	PHIL 80 194 series	Science, Technology, & Society (B.A.)	max. 72	min. 8	min. 76	Gateway course; capstone	ANTHRO 90C; CS 181W; COMM 142W; COMM 120W; HISTORY 140A; HISTORY 232F
Philosophy and Literature	min. 15	min. 47	65	Gateway course;	PHIL 80 194	Science, Technology, & Society (B.S.)	max. 72	min. 8	min. 76	Gateway course; capstone	ANTHRO 90C; CS 181W; COMM 142W; COMM 120W; HISTORY 140A; HISTORY 232F
Philosophy and Religious Studies	-	60	60	3 seminars; in each dept. + 20 advanced units from both depts.	PHIL 80 or RELIGST 290	Slavic Languages and Literatures	-	-	56	Capstone: any SLAVIC 300-level course	SLAVIC 146
Physics	21-24	56-60	77-84	-	PHYSICS 107	Sociology	5-15	45-55	60		SOC 202, SOC 204
Political Science	0	45-70	70	Introductory course	POLISCI 103, POLISCI 110D, POLISCI 1, and advanced seminar (200 or 300 level)	Spanish	0	35	60	Gateway course: ILAC 130, ILAC 131; Seminar: ILAC 277; Oral Proficiency Interview (OPI)	ILAC 277
Psychology	N/A	60	70	-	PSYCH 164, PSYCH 175	Studio Art: See Art Practice (Studio)					
Public Policy	25-54	25-68	min. 77		PUBLPOL 106 (ECON 154), PUBLPOL 154, PUBLPOL 156,	Symbolic Systems	66-81	4	70-85	-	PHIL 80
Religious Studies	-	60	60	introductory course, majors' seminar, senior essay or honors thesis, senior colloquium	RELIGST 290	Theater and Performance Studies	-	60	60	Gateway course; capstone	TAPS 157, TAPS 167H
Russian Language & Literature	0-10	46-56	56	1st- and 2nd- year Russian; Gateway course; capstone; language assessment	SLAVIC 146	Urban Studies	34	36	70	20 units in concentration; capstone courses	URBANST 202, URBANST 203
Russian Language, Culture, & History	12-20	36-39	56	1st- and 2nd- year Russian; Gateway course; capstone; language assessment	SLAVIC 146						

## COTERMINAL DEGREES

The coterminal degree program allows undergraduates to study for a Master of Arts (M.A.) or Master of Science (M.S.) degree while completing their bachelor's degree(s) in the same or a different department. To qualify for both degrees, a student must complete requirements for both the bachelor's degree (p. 29) and the master's degree (p. 50) as described under their respective sections of this bulletin.

### Application and Admission to a Coterminal Master's Program

Undergraduates with strong academic records may apply for admission to a Stanford Master of Arts (M.A.) or Master of Science (M.S.) program (p. 50) that offers coterminal admission via the process outlined below. Any master's degree granting program may elect not to offer coterminal admission.

#### Eligibility Requirements

An undergraduate is eligible to apply for admission to a coterminal program once all of the following conditions have been met:

- Completion of 120 units towards graduation as shown on the undergraduate transcript, including credit earned from transfer credit, Advanced Placement exams, and other external test credit.
- Completion of six non-Summer quarters at Stanford; or two non-Summer quarters at Stanford for transfer students.
- Declaration of an undergraduate major.
- An admitted coterminal student must have a minimum of one quarter overlap between the undergraduate and graduate degree programs. If this is not possible, students should consider applying as an external candidate via the Graduate Admissions (<http://exploreddegrees.stanford.edu/admissionandfinancialaid/#graduatetext>) process. Such applicants are not coterminal students and coterminal policies do not apply.
- Students may apply to one coterm program per quarter, and may not apply to another coterm master's program until the admissions process for the initial application has been completed, including the student's response to the offer of admission (if admitted).

*Note:* departments may have additional eligibility requirements, so students are encouraged to check with the department prior to applying for the coterm program.

Undergraduates interested in applying to a coterm program should contact the coordinator of coterminal advising in Undergraduate Advising and Research (UAR) (<http://exploreddegrees.stanford.edu/undergraduateeducation/uar>).

#### Application Deadlines

Applicants must meet all requirements and deadlines established by the department or program to which they are applying. While application deadlines may vary by department and program, coterm applications should be submitted to departments early enough to give departments ample time to review applications thoroughly and to make a decision regarding admission.

Applicants submit their completed coterm application to their department and, if admitted, respond to the offer of admission no later than the quarter prior to the expected completion of their undergraduate degree.

Approved coterminal applications are processed every quarter, and should thus be submitted to the Registrar's Office by the department for

processing no later than the last day of classes of the quarter prior to the coterm matriculation quarter. Please refer to the below deadlines:

- For Autumn 2017-18 Quarter coterm matriculation, approved applications must be submitted to the Office of the University Registrar by: August 17, 2017
- For Winter 2017-18 Quarter coterm matriculation, approved applications must be submitted to the Office of the University Registrar by: December 8, 2017
- For Spring 2017-18 Quarter coterm matriculation, approved applications must be submitted to the Office of the University Registrar by: March 16, 2018
- For Summer 2017-18 Quarter coterm matriculation, approved applications must be submitted to the Office of the University Registrar by: June 6, 2018

#### Application Fee

Students who accept an offer of admission and are matriculated into the graduate degree program are assessed a \$125 coterm application fee.

#### Application Process

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

- Coterm Application (<https://www.applyweb.com/stanterm>)(online), available mid-September
  - Please see the Coterm Application Information page (<https://registrar.stanford.edu/students/coterminal-degree-programs/applying-coterm/coterm-application-information>) for links to department web sites for additional application requirements
- Statement of purpose
- Preliminary program proposal (<https://stanford.app.box.com/v/propproma>)
- Undergraduate Coterm Application Approval form (<https://stanford.app.box.com/v/ug-coterm-application-approval>) (submitted with online coterm application)
- Two letters of recommendation from Stanford professors
- Current Stanford transcript

*Note:* Graduate Record Examination (GRE) scores and additional requirements may be specified by the prospective program, and may be found in the bulletin and on department websites (links to department websites found on the Registrar's web site (<https://registrar.stanford.edu/students/coterminal-degree-programs/applying-coterm/coterm-application-information>)).

#### Admission Process

Each department is responsible for its admissions/acceptance decisions for coterminal applicants.

Once a coterm application is approved, the departments must create the coterminal application in Axxess (department staff should refer to the Coterminal Resources for Staff (<https://registrar.stanford.edu/staff/coterminal-resources-staff>) page). Additionally, the department must submit the completed and approved coterm application to the Office of the Registrar no later than the quarter prior to the expected completion of the undergraduate degree.

If the coterminal program permits deferral, students may defer admission to the coterminal program and the first graduate quarter to a later quarter as long as their graduate career has not yet been activated and if the later

matriculation will still meet all University and departmental requirements for coterminal admission.

*Note:* This may require postponement of conferral of the undergraduate degree. If the graduate coterm career has been activated, then deferring to a later term is not an option. Deferral is coordinated with the master's degree program, prior to the program submitting the completed application to the Office of the University Registrar.

### First Graduate Quarter

The first graduate quarter is the quarter in which the coterminal student first matriculates into the master's degree program.

The first graduate quarter does not necessarily correspond to the first quarter in which a student enrolls in a course in the graduate career, nor is it affected by course transfer (please see Coterminal Course Transfer (<https://registrar.stanford.edu/students/procedures-coterminal-students/coterm-course-transfer>) for additional information).

Admitted students must have at least one quarter of overlap in the undergraduate and graduate career prior to conferring their undergraduate degree. For example, if the first graduate quarter for the coterminal degree is Spring Quarter, then the earliest that the undergraduate degree can be conferred is the Spring Quarter. Once matriculated, students may enroll in graduate courses, however, enrollment in graduate courses is not required by the University in the overlap quarter. Students must submit a completed Program Proposal (<https://stanford.app.box.com/v/progpropma>) that outlines the graduation/program completion plan by the end of the first graduate quarter.

## Adding or Changing Master's Degree Programs

The bachelor's degree must be conferred before a student may apply to add an additional advanced degree program. Adding or changing a graduate program can be done via the Graduate Program Authorization petition. For additional information, see the "Changes of Degree Programs (<http://exploreddegrees.stanford.edu/graduatedegrees/#degreeprogresstext>)" section of this bulletin, the Graduate Program Authorization section (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-5/subchapter-1/page-5-1-1>) of the Graduate Academic Policies and Procedures site, and the Graduate Program Authorization (<https://registrar.stanford.edu/students/graduate-degree-progress/graduate-program-authorization-petition>) page on the Registrar's web site.

Coterminal students who wish to change from one master's degree to another before conferral of the bachelor's degree must submit an approved request to withdraw from the original degree program using the Request to Permanently Withdraw from Degree Program (pdf) (<https://stanford.box.com/permanent-withdraw>) form, in addition to a completed and approved application for admission to the new program in the same quarter. In this case, all courses, including any prior course transfer from the undergraduate career, remain in the graduate career. The discontinued program is listed on the transcript in a 'Discontinued' status.

*Note:* The new degree program may choose not to approve all courses towards the new master's degree program requirements. The student may elect to transfer courses back to the undergraduate career if the bachelor's degree has not yet been conferred.

## Residency Requirement

Each type of degree offered at Stanford (for example, Bachelor of Arts, Master of Science) has a requirement, called residency for graduate degrees, based on the minimum number of academic units required for the degree. Requirements are described in the Bachelor of Arts (B.A.),

Bachelor of Science (B.S.) (p. 29) and Residency Policy for Graduate Students (p. 57) sections of this bulletin. It is Stanford University's general policy that units are applicable toward only one degree, that is, units may not normally be duplicated or double-counted toward the residency requirement for more than one degree. Courses counted towards the undergraduate degree(s) and graduate degree(s) are separately recorded on the undergraduate and graduate transcripts, respectively.

Students pursuing coterminal bachelor's and master's degrees are expected to meet the minimum requirements for each of the degrees, as follows:

### Undergraduate Degrees

- *Bachelor's degree:* 180 units for the bachelor's degree plus 45 unduplicated units (or higher unit-requirement, as determined by the graduate program) for the master's degree
- *Dual undergraduate degree:* 225 units for the bachelor's degree plus 45 unduplicated units (or higher unit-requirement, as determined by the graduate program) for the master's degree

### Master's Degrees

45 units. All 45 units must be from course work completed at Stanford and must be courses at or above the 100-level. Additionally, at least 50 percent of those must be courses designated primarily for graduate students. Department specifications for the level of course work accepted for a particular master's degree program may be higher than the University's specifications. Students may not petition to change the career for a completed course from the undergraduate to the graduate level.

To a limited extent, coterminal students are permitted to move courses between the undergraduate and graduate careers as described in the "Coterminal Course Transfer (p. 48)" section in the Enrollment and Degree Progress tab of this section of the bulletin.

## Tuition and Tuition Groups

Coterminal students are assigned to either the undergraduate coterminal tuition group or the graduate coterminal tuition group, which dictates whether the student is charged undergraduate or graduate tuition. A student's tuition group also determines many of the applicable undergraduate and graduate policies and procedures, including degree progress standards, as well as access to some University services and benefits. A coterminal student is subject to graduate tuition assessment and adjustment policies once placed in the coterminal graduate tuition group. Coterminal students are not eligible for undergraduate special registration statuses (with the exception of Graduation Quarter, if the student is applying to confer both their undergraduate and graduate degrees in the same quarter). Coterminal students may only be eligible to apply for graduate special registration statuses once their undergraduate degrees have been conferred.

Tuition and fee information is available on the Office of the University Registrar tuition web site (<https://registrar.stanford.edu/students/tuition-and-fees>).

### Undergraduate Coterminal Tuition Group

Coterminal students are normally placed in and remain in the undergraduate coterminal tuition group until the completion of 12 undergraduate full-tuition quarters, or until conferral of the undergraduate degree(s), if that happens earlier. For students with transfer credit (not AP or other test credit), 15 transfer units equals one Stanford quarter. For students with Stanford Summer Session units, 15 units equals one Stanford quarter; units earned in multiple Summer Sessions are not added together in this calculation.



Students in the undergraduate coterminal tuition group are assessed the undergraduate tuition rate, and are subject to the 20 unit maximum enrollment per quarter. Students enrolled in over 20 units are subject to an enrollment hold effective the following quarter.

## Graduate Coterminal Tuition Group

Coterminal students are automatically moved from the undergraduate to the graduate coterminal tuition group in the 13th quarter (or 16<sup>th</sup> quarter for students with two undergraduate degrees) and are then assessed either the standard graduate tuition rate or the graduate Engineering tuition rate. Students are also moved to the graduate coterminal tuition group after the conferral of all undergraduate degrees.

Coterminal students may request to be moved to the graduate coterminal tuition group prior to the 13th quarter (or 16th quarter for students with two undergraduate degrees) in order to enroll for fewer units as permitted for graduate students, or to be eligible for a teaching (CA/TA) or research assistantship (RA) appointment. Students make this request to the Student Services Center through a HelpSU ticket (<https://helpsu.stanford.edu/helpsu/3.0/helpsu-form?pcat=StuAcct&dtag=10772>) by the preliminary study list deadline (first day of classes) for the desired term. Students may request to be moved to the graduate coterminal tuition group under the following conditions:

- Students must have completed 180 undergraduate units, including transfer, Advanced Placement exam, and other external test credit. Students with two undergraduate degrees must have completed 225 units.
- Once students have moved to the graduate coterminal tuition group, they may not move back to the undergraduate coterminal tuition group.

A coterminal student is subject to graduate tuition assessment and adjustment policies once placed in the coterminal graduate tuition group. They may register at the reduced 8-, 9-, or 10-unit tuition rate if their enrollment plans are accepted by the master's degree program. Students whose master's programs are in the School of Engineering are assessed the graduate Engineering rate; all students are assessed additional graduate or Engineering tuition on a per-unit basis beginning with the 19th unit, and are subject to the 24 unit maximum enrollment per quarter. Students holding a 20 hour (50%) teaching or research assistantship may not enroll in more than 10 total units.

Coterminal students are traditionally not eligible for reduced graduate tuition rates below 8 units during Autumn, Winter, and Spring quarters prior to conferral of the undergraduate degree. However, coterminal graduate students with disabilities covered under the Americans with Disabilities Act may enroll in an approved reduced course load as recommended by the Office of Accessible Education (OAE) (<https://oae.stanford.edu>).

## Coterminal Students with Research or Teaching Assistantships

Coterminal students wishing to enroll in fewer units (as permitted for graduate students) or who are eligible for a teaching (CA/TA) or research (RA) assistantship appointment may request to be moved prior to their undergraduate degree conferral or 13th quarter (16th quarter for students pursuing two undergraduate degrees) from the undergraduate coterminal tuition group to the graduate coterminal tuition group. Coterminal students are eligible to be moved to the graduate coterminal tuition group if:

- Students pursuing one bachelor's degree: must have completed 180 a minimum of undergraduate units\*
- Students pursuing two bachelor's degrees: must have completed a minimum of 225 undergraduate units\*

\*Unit count includes transfer credit, Advanced Placement exam, and other external test credit.

Students holding a 20 hour (50%) teaching or research assistantship may not enroll in more than 10 total units. Additionally, once students have moved to the graduate coterminal tuition group, they may not be moved back to the undergraduate coterminal tuition group even if they no longer hold an assistantship appointment. Please see Administrative Guide Memo 10.2.1 Graduate Student Assistantships (<https://adminguide.stanford.edu/chapter-10/subchapter-2/policy-10-2-1>), and GAP 7.3 Assistantships (<http://gap.stanford.edu/7-3.html>), for detailed discussion of assistantship policy.

If interested in moving to the graduate coterminal tuition group, students may submit their request via a HelpSU (<https://helpsu.stanford.edu/helpsu/3.0/helpsu-form?pcat=StuAcct&dtag=10772>) ticket by the preliminary study list deadline of the desired term.

## Enrollment and Degree Progress

Starting with the first graduate quarter, students have an active graduate career and an active undergraduate career. Students are responsible for enrolling in courses each quarter, and assigning them to the appropriate career. Courses assigned to the graduate career count towards the master's degree and courses assigned to the undergraduate career count towards the bachelor's degree. Students in the undergraduate coterminal tuition group may not enroll in more than a total of 20 units for the quarter across both careers. Students in the graduate coterminal tuition group may not enroll in more than a total of 24 units for the quarter across both careers. Students appointed to a 20-hour (50%) teaching and/or research assistantship may not enroll in more than 10 units.

## Academic Progress

Prior to the conferral of the undergraduate degree(s), a coterminal student's academic progress is monitored by the coordinator of coterminal advising in the Undergraduate Advising and Research Office (p. 126) (UAR, a unit of the office of the Vice Provost for Undergraduate Education) in conjunction with the student's advisers and the graduate program. After conferral of the undergraduate degree(s), the student's degree progress is monitored by the graduate adviser and graduate program.

All courses taken during a quarter, whether enrolled in the undergraduate or graduate career, are used to assess whether minimum academic progress standards, including number of units enrolled and number of units earned, have been met.

Students in the undergraduate coterminal tuition group are evaluated according to the undergraduate degree progress standards. These standards are described in the "Academic Progress (p. 74)" section of this bulletin.

Students in the graduate coterminal tuition group are evaluated according to the graduate degree progress standards. These standards are described in the "Minimum Progress Requirements for Graduate Students (p. 55)" section of this bulletin.

Students are expected to maintain an undergraduate grade point average (GPA) which meets the University's undergraduate standards, and a graduate GPA which meets University and program requirements for graduate progress. Courses which have been transferred from the undergraduate to the graduate career are calculated as part of the graduate GPA, and vice versa.

## Coterminal Course Transfer

After accepting admission to a master's degree program, coterminal students may request transfer of Stanford courses from the undergraduate to the graduate career to satisfy requirements for the master's degree and/or from the graduate career to the undergraduate

career to satisfy requirements for the bachelor's degree(s). Transfer of courses between the undergraduate and graduate careers requires review and approval by both the undergraduate and graduate departments.

Unless a master's degree program specifies otherwise in this bulletin, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. Neither Summer Quarter nor quarters spent on approved leave of absence are included in the quarter-back count. In exceptional circumstances, a student may petition the exceptions committee of the Committee on Graduate Studies to transfer courses taken more than three quarters back. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Individual programs have the discretion to set their own policy regarding course transfer for their coterminal master's students, provided that no student counts a course taken earlier than the first quarter of sophomore year. The program's policy is stated in the relevant department or program section of this bulletin.

All course transfer requests must be submitted to the Student Services Center no later than the Final Study List Deadline of the intended bachelor's degree conferral quarter.

Course transfers between careers are not possible after the bachelor's degree has been conferred.

Undergraduate credit from transfer courses or tests may not be transferred to the graduate career.

### Advising, Program Proposal, and Time Limit

In the first graduate quarter, a coterminal student must be assigned an adviser in the master's program for assistance in planning a program of study to meet the requirements for the master's degree. The plan is outlined on the Program Proposal for a Master's Degree (<https://stanford.box.com/v/progpropma>), which is approved by the master's program by the end of the first graduate quarter. The preliminary program proposal from the coterminal application may inform the Program Proposal, but does not satisfy this master's degree requirement.

The course of study for each student's master's degree should be outlined on the student's Program Proposal form. The decision as to which courses a program approves in the student's master's program proposal, including changes from the typical curriculum, is within the purview of the department or program. The conversation between the student and the student's graduate adviser is important in this regard.

The master's program proposal must meet University minimum requirements for the master's degree, including at least 45 units taken at Stanford, all courses at 100-level or above, 50% of units designated primarily for graduate students (typically 200-level or above). All courses must be in the graduate career.

All requirements for a master's degree must be completed within three years after the first graduate quarter. An extension requires review of academic performance by the department or program, and is within the discretion of the program. See policies in the "Master's Degrees (p. 50)" section of this bulletin.

### Leaves of Absence

Coterminal students who wish to take a leave of absence are subject to the Leave of Absence policies for undergraduate and graduate students, as described in the "Leaves of Absence and Reinstatement (Undergraduate) (p. 39)" and "Leaves of Absence (Graduate) (p. 58)" sections of this bulletin. Graduate students, including coterminal students, must obtain permission from the master's degree program. A coterminal student whose undergraduate degree has not been conferred must also obtain permission from the office of Undergraduate Advising and Research, and may not take a leave of

absence unless approved for both the graduate and undergraduate leave. Coterminal students are permitted to request a leave of absence for the first quarter of the graduate program. Leaves of absence are granted for a maximum of one calendar year, or four quarters. An extension of leave, for a maximum of one year or four quarters, is approved only in unusual circumstances. Leaves of absences may not exceed a cumulative total of two years (8 quarters including summer quarters), including both undergraduate and graduate programs.

### Degree Conferral

Students must apply for conferral of each degree separately by filing an Application to Graduate in Axxess by the deadline for the expected graduation term(s). The deadlines are available in the Academic Calendar (<http://studentaffairs.stanford.edu/registrar/academic-calendar>). A separate application must be filed for both the undergraduate and graduate degree program in each respective conferral term(s). Students who wish to confer their undergraduate and graduate degrees in the same quarter must apply for conferral of each degree separately by filing an Application to Graduate in Axxess by the deadline for the expected graduation term. The master's degree must be conferred simultaneously with or after the bachelor's degree. Coterminal students may not confer the master's degree prior to the conferral of the undergraduate degree.

Coterminal students whose first graduate quarter occurred prior to Autumn 2015 are subject to coterminal policies as indicated in the previous version of this bulletin. See the Stanford Bulletin 2014-15 (<http://exploreddegrees.stanford.edu/archive/2014-15/cotermdegrees>).

# GRADUATE DEGREES

## General Requirements

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

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

## Enrollment Requirements

Graduate education at Stanford is a full-time commitment requiring full-time enrollment, typically at least 8 units during Autumn, Winter and Spring quarters. For a complete definition of full-time enrollment, see the "Certification of Enrollment or Degrees (p. 73)" section of this bulletin. Unless permission is granted by the department (for example for field work) enrolled graduate students must maintain a significant physical presence on campus throughout each quarter a student is enrolled.

Requests to enroll for fewer than 8 units during the academic year are approved only in specific circumstances. Students enrolled in the Honors Cooperative or the Master of Liberal Arts programs are permitted part-time enrollment on a regular basis. Graduate students who need only a few remaining units to complete degree requirements or to qualify for TGR status, may register for one quarter on a unit basis (3 to 7 units) to cover the deficiency (see the "Graduate Petition for Part-time Enrollment (p. 60)" section of this bulletin). Students with disabilities covered under the Americans with Disabilities Act may enroll in a reduced course load as recommended by the Office of Accessible Education (<https://oae.stanford.edu>) (OAE). Matriculated and enrolled pregnant graduate students may request up to two quarters of part-time enrollment for an approved Childbirth Academic Accommodation; see the "Childbirth Accommodation Policy (p. 55)" section of this bulletin and the GAP 5.9 Pregnancy, Childbirth, and Adoption. (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-5/subchapter-9>)

Graduate students must enroll in courses for all terms of each academic year (Autumn, Winter, and Spring quarters) from the admission term until conferral of the degree. The only exception to this requirement occurs when the student is granted an official leave of absence. Failure to enroll in courses for a term during the academic year without taking a leave of absence (p. 58) results in denial of further enrollment privileges unless and until reinstatement to the degree program is granted and the reinstatement fee paid. As a general proposition, registration in Summer Quarter is not required and does not substitute for registration during the academic year. Students possessing an F-1 or J-1 student visa may be subject to additional course enrollment requirements in order to retain their student visas.

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

1. In each term during which any official department or University requirement is fulfilled, including qualifying exams or the University oral exam. The period between the last day of final exams of one term and the day prior to the first day of the following term is considered an extension of the earlier term, with the option of considering the two weeks preceding the start of Autumn Quarter as part of Autumn Quarter (rather than as part of Summer Quarter). See details below.

2. In any term in which a University dissertation/thesis is submitted or at the end of which a graduate degree is conferred.
3. Normally, in any term in which the student receives financial support from the University.
4. In any term for which the student needs to use University facilities.
5. For international students, in any term of the academic year (summer may be excluded) for which they have non-immigrant status (i.e., a J-1 or F-1 visa).

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

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

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

## Degree-Specific Requirements (Master's Degrees)

### Master of Arts and Master of Science

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

### Master's Program Proposal

Students pursuing an M.A., M.F.A., M.S., or M.P.P. degree are required to submit an acceptable program proposal to their department during the first quarter of enrollment using the Program Proposal for a Master's Degree (<https://stanford.app.box.com/v/progpropma>) form. Coterminal students must submit the proposal during the first quarter after admission to the coterminal program. The program proposal establishes a student's individual program of study to meet University and department degree requirements. Students must amend the proposal formally if their plans for meeting degree requirements change.

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

of study. Students who fail to submit an acceptable proposal may be dismissed.

### Time Limit for Completion of the Master's Degree

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

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

### Master of Public Policy

The degree of Master of Public Policy (M.P.P.) is a two-year program leading to a professional degree. Enrollment in the M.P.P. program is limited to candidates who have earlier been accepted to another Stanford graduate degree program and to recent (within three years) Stanford graduates. In addition to completing the general requirements for advanced degrees and the program requirements specified in the "Public Policy (p. 704)" section of this bulletin, candidates for the degree of Master of Public Policy (M.P.P.) must outline an acceptable program of study on the Program Proposal for a Master's Degree (<https://stanford.app.box.com/v/progpropma>) form and complete their degrees within the time limit for completion of the master's degree.

### Master of Business Administration

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

### Master of Fine Arts

In addition to completing the general requirements for advanced degrees and the program requirements specified in the "Art and Art History (p. 388)" section of this bulletin, candidates for the degree of Master of Fine Arts (M.F.A.) must outline an acceptable program of study on the Master's Degree Program Proposal and complete their degrees within the time limit for completion of the master's degree.

### Master of Liberal Arts

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

### Engineer

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

#### Candidacy

The Application for Candidacy for Degree of Engineer is an agreement between the student and the department on a specific program of study

to fulfill degree requirements. Students must apply for candidacy by the end of the second quarter of the program. Honors Cooperative students must apply by the end of the fourth quarter of the program. Candidacy is valid for five calendar years.

#### Thesis

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

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

Students must be registered or on graduation quarter in the term in which they submit the thesis; see "Graduation Quarter (p. 60)" section of this bulletin for additional information. At the time the thesis is submitted, an Application to Graduate must be on file, all department requirements must be complete, and candidacy must be valid through the term of degree conferral.

### Master of Legal Studies

The Master of Legal Studies degree (M.L.S.), a nonprofessional degree, is conferred upon candidates who satisfactorily complete courses in law totaling the number of units required under the current Faculty Regulations of the Stanford Law School over not less than one academic year and who otherwise have satisfied the requirements of the University and the Stanford Law School. The Stanford Law School (<http://www.law.stanford.edu/studentlife>) Advanced Degree Programs (<https://law.stanford.edu/education/degrees/advanced-degree-programs>) provides detailed information on degree requirements.

### Master of Laws

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

The degree is designed for foreign graduate students trained in law and is available only to students with a primary law degree earned outside the United States. The L.L.M. program offers students a choice of three areas of specialization: Corporate Governance and Practice; Law, Science, and Technology; or International Economic Law, Business; and Policy. The Stanford Law School (<http://www.law.stanford.edu/studentlife>) Advanced Degree Programs (<https://law.stanford.edu/education/degrees/advanced-degree-programs>) provides detailed information on degree requirements.

## Master of the Science of Law

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

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

## Degree-Specific Requirements (Doctoral Degrees)

### Doctor of Jurisprudence

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

### Doctor of the Science of Law

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

Candidacy is limited to students of exceptional distinction and promise. The Stanford Law School Advanced Degree Programs (<https://law.stanford.edu/education/degrees/advanced-degree-programs>) web site provides detailed information on degree requirements.

### Doctor of Musical Arts

The degree of Doctor of Musical Arts (D.M.A.) is conferred on candidates who have satisfied the general requirements for advanced degrees, the program requirements specified in the "Music (p. 669)" section of this bulletin, and the candidacy requirement as described below in the "Doctor of Philosophy" section.

### Doctor of Medicine

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

### Doctor of Philosophy

The degree of Doctor of Philosophy (Ph.D.) is conferred on candidates who have demonstrated to the satisfaction of their department or school substantial scholarship, high attainment in a particular field of knowledge, and the ability to do independent investigation and present

the results of such research. They must satisfy the general requirements for advanced degrees, the program requirements specified by their departments, and the doctoral requirements described below. The option for a Ph.D. minor is also described below, though it is not a Ph.D. requirement.

## Candidacy

Admission to a doctoral degree program is preliminary to, and distinct from, admission to candidacy. Admission to candidacy for the doctoral degree is a judgment by the faculty in the department or school of the student's potential to successfully complete the requirements of the degree program. Students are expected to complete department qualifying procedures and apply for candidacy by the end of their second year in the Ph.D. program. Honors Cooperative students must apply by the end of their fourth year. A Pregnancy or Parental Leave of Absence automatically extends the pre-candidacy period by one year for a birth mother and three months (one quarter) for a non-birth parent (see GAP 5.9 Pregnancy, Childbirth and Adoption (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-5/subchapter-9/page-5-9-1>)).

Admission to candidacy for the doctoral degree is granted by the major department following a student's successful completion of qualifying procedures as determined by the department. Departmental policy determines procedures for subsequent attempts to become advanced to candidacy in the event that the student does not successfully complete the procedures. Failure to advance to candidacy results in the dismissal of the student from the doctoral program; see "Guidelines for Dismissal of Graduate Students for Academic Reasons (p. 55)" section of this bulletin.

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

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

### Time Limit for Completion of a Degree with Candidacy

Students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. Candidacy is valid for five years unless terminated by the department (for example, for unsatisfactory progress). The time limit is not automatically extended by a student's leave of absence. A Pregnancy or Parental Leave of Absence automatically extends the candidacy period by one year for a birth mother and three months (one quarter) for a non-birth parent (see GAP 5.9 Pregnancy, Childbirth, and Adoption (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-5/subchapter-9/page-5-9-1>)).

Failure to make minimum progress or complete University, department, and program requirements in a timely or satisfactory manner may lead to dismissal; see the guidelines for "Dismissal of Graduate Students for Academic Reasons (p. 55)" section of this bulletin and GAP 5.6 Dismissal for Academic and Professional Reasons (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-5/subchapter-6/page-5-6-1>).

All requests for extension, whether prompted by a leave or some other circumstance, must be filed by the student before the conclusion of the program's time limit. Departments are not obligated to grant an

extension. Students may receive a maximum of one additional year of candidacy per extension. Extensions require review by the department of a dissertation progress report, a timetable for completion of the dissertation, any other factors regarded as relevant by the department, and approval by the department; such approval is at the department's discretion.

## Teaching and Research Requirements

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

## Foreign Language Requirement

Some departments require a reading knowledge of one or more foreign languages as indicated in department sections of this bulletin. Fulfillment of language requirements must be endorsed by the chair of the major department.

## University Oral Examination

Passing a University oral examination is a requirement of the Ph.D. and J.S.D. degrees. The purpose of the examination is to test the candidate's command of the field of study and to confirm fitness for scholarly pursuits. Departments determine when, after admission to candidacy, the oral examination is taken and whether the exam is a test of knowledge of the field, a review of a dissertation proposal, or a defense of the dissertation; see GAP 4.7 Doctoral Degrees: University Oral Examinations and Committees (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-4/subchapter-7/page-4-7-1>) for additional explanation.

### Timing and Process

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

The University Oral Examination (<https://stanford.app.box.com/v/doc-orals>) form must be submitted to the department graduate studies administrator at least two weeks prior to the proposed examination date. The examination is conducted according to the major department's adopted practice, but it should not exceed three hours in length, and it must include a period of private questioning by the examining committee.

### Committee Membership

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

### Out-of-Department Chair

The chair of a Stanford oral examination is appointed for this examination only, to represent the interests of the University for a fair and rigorous process. The chair of the examining committee may not have a full or joint appointment in the adviser's or student's department, but may have a courtesy appointment in the department. The chair can be from the same department as any other member(s) of the examination committee and can be from the student's minor department provided that the student's adviser does not have a full or joint appointment in the minor department.

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

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

### Exceptions

A Petition for Non-Academic Council Doctoral Commitment Members (<https://stanford.app.box.com/v/doc-ctte-non-acad-council>) to appoint an examining committee member who is neither a current or emeritus member of the Academic Council may be approved by the chair of the department if that person contributes an area of expertise that is not readily available from the faculty and holds a Ph.D. or equivalent foreign degree. Exceptions for individuals whose terminal degree is not the Ph.D. or equivalent foreign degree may be granted by the Vice Provost for Graduate Education, upon the request of the student's department chair. The majority of the examiners must be current or emeritus Academic Council members; more specifically, one of four or five examiners or two of six or seven examiners may be appointed to the oral examination committee by means of this petition.

### Reporting

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

## Dissertation

An approved doctoral dissertation is required for the Ph.D. and J.S.D. degrees. The doctoral dissertation must be an original contribution to scholarship or scientific knowledge and must exemplify the highest standards of the discipline. If it is judged to meet this standard, the dissertation is approved for the school or department by the doctoral dissertation reading committee (see GAP 4.8 Doctoral Degrees: Dissertations and Dissertation Reading Committees (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-4/subchapter-8/page-4-8-1>) for more explanation).

### Approval

Each member of the reading committee signs the signature page of the dissertation to certify that the work is of acceptable scope and quality. These signatures must be in ink; proxy or electronic signatures are not permitted. One reading committee member, who must be a member of the Academic Council, reads the dissertation in its final form and certifies on the Certificate of Final Reading that department and University specifications have been met.

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

department. Dissertations written in another language must include an extended summary in English.

## Submission

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

## Enrollment

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

## Doctoral Dissertation Reading Committee

The doctoral dissertation reading committee consists of the principal dissertation adviser and, typically, two other readers. The doctoral dissertation reading committee must have three members and may not have more than five members. All members of the reading committee approve the dissertation. At least one member must be from the student's major department. Normally, all committee members are members of the Stanford University Academic Council or are emeritus Academic Council members. The student's department chair may, in some cases, approve the appointment of a reader who is not a current or emeritus member of the Academic Council, if that person is particularly well qualified to consult on the dissertation topic and holds a Ph.D. or equivalent foreign degree. Exceptions for individuals whose terminal degree is not the Ph.D. or equivalent foreign degree may be granted by the Vice Provost for Graduate Education, upon the request of the student's department chair via the Petition for Non-Academic Council Doctoral Committee Members (<https://stanford.app.box.com/v/doc-ctte-non-acad-council>). Former Stanford Academic Council members and non-Academic Council members may thus, on occasion, serve on a reading committee. A non-Academic Council member (including former Academic Council members) may replace only one of three required members of dissertation reading committees. If the reading committee has four or five members, at least three members (comprising the majority) must be current or emeritus members of the Academic Council.

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

for emeritus Academic Council members who are recalled to active service.

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

## Ph.D. Minor

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

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

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

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

An Application for Ph.D. Minor (<https://stanford.box.com/app-phd-minor>) outlining a program of study must be approved by the major and minor departments and submitted to the Student Services Center. This form is submitted at the time of admission to candidacy and specifies whether representation from the minor department on the University oral examination committee is required.

## Joint Degree Programs

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

An approved JDP includes a set of agreements between the participating programs and schools about matters such as admissions, advising, curricula, and tuition. In a JDP, a specified number of units may be double-counted toward the minimum University residency requirements for both degrees, reducing the total number of residency units required to complete both degrees. Students pursuing a joint degree that includes a Ph.D. may not also count a Stanford master's degree or transfer units towards residency for the Ph.D. degree. Application deadlines for each program or degree apply. Students must be admitted to the JDP no later

than the study list deadline of the term prior to the term of expected degree conferral. In a JDP, both degrees are conferred concurrently since the units required for each degree are linked to the completion of both degrees. The sole exception is the J.D. degree which may be awarded prior to the second degree.

The following joint degree programs, permitting students to complete requirements for two degrees with a reduced number of total residency units, are offered:

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

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

Creation of additional joint degree programs that are combinations of J.D./M.A., J.D./M.S., and Ph.D./M.P.P. degrees have been authorized by the Faculty Senate. New JDPs from among these combinations may double-count up to 45 units towards residency requirements. JDPs from these combinations are proposed by the coordinating programs and schools. Once approvals from the chairs of the programs and deans of the relevant schools are obtained, approval on behalf of the Committee on Graduate Studies is granted by the Office of the Vice Provost for Graduate Education, and final approval is granted by the Office of the University Registrar.

JDPs combining the J.D. and Ph.D. degrees that allow up to the 54-unit reduction of the residency requirement for both degrees separately, following the model of previously approved joint J.D./Ph.D.s listed above, can be approved by the Office of the Vice Provost for Graduate Education and final approval is granted by the Office of the University Registrar.

JDPs combining other degree types or programs may be proposed, but require review by the Faculty Senate Committee on Graduate Studies and must be approved by the Faculty Senate.

## Minimum Progress Requirements for Graduate Students

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

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

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

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

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

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

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

## Graduate Unit Requirements

The University's expectation is that the units counted towards all graduate degrees are primarily in graduate courses. The University has set specific requirements for units applied to the minimum requirement for the M.A., M.S., and M.F.A. degrees: All units must be in courses at or above the 100 level and at least 50 percent of those must be courses designated primarily for graduate students (typically at least the 200 level). Units earned in courses below the 100 level may not be counted towards the minimum unit requirement for the master's degree.



Department specifications for the level of course work accepted for a particular master's degree program may be higher than the University's specifications.

## Changes of Degree Programs

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

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

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

International students changing departments or degree programs must also obtain the approval of the Foreign Student Adviser at the Bechtel International Center (<https://bechtel.stanford.edu>). If the requested change lengthens their stay, they also are required to submit verification of sufficient funding to complete the new degree program.

Students who wish to terminate study in a graduate program should submit a properly endorsed Request to Permanently Withdraw from Degree Program form (<https://stanford.app.box.com/v/permanent-withdraw>) to the Student Services Center (<https://studentservicescenter.stanford.edu>). To return to graduate study thereafter, the student is required to apply for reinstatement (if returning to the same degree program) or admission (if applying to a different program). Both applications require payment of a fee.

## Guidelines for Dismissal of Graduate Students for Academic or Professional Reasons

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

The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of the University, department, and program requirements for the degree, fulfillment of minimum progress requirements, and meeting standards of professional behavior. The guidelines that follow specify procedures for dismissal of graduate students who are not meeting these conditions. In such cases, a departmental committee (hereafter "the committee"), whether the department's committee of the faculty or other committee authorized

to act on the department's behalf such as the departmental graduate studies committee, will:

1. Where possible and as early as possible, warn the student, in writing, of the situation and deficiency. A detailed explanation of the reason for the warning should be provided.
2. Consider extenuating circumstances communicated by the student.
3. Decide the question of dismissal by majority vote of the committee (with at least three faculty members participating in the committee's deliberation), and communicate the decision to the student in writing.
4. Place a summary of department discussions, votes, and decisions in the student's file.
5. Provide students the opportunity to examine their department files, if requested.
6. Provide students with information on their rights to appeal under the Student Academic Grievance Procedure. See the "Student Academic Grievance Procedure (p. 75)" section of this bulletin.

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

## Guidelines for Addressing Graduate Student Professional Conduct

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

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

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

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

## Additional Specifics for Degrees with Candidacy Before the Review for Candidacy

The committee, before review for admission to candidacy, may vote to dismiss a student who is not making minimum progress or completing requirements in a timely and satisfactory way or meeting standards of professional behavior. Before considering dismissal, the committee should communicate with the student (which may include a meeting with the student) concerning his or her academic or professional performance and how to correct deficiencies, where such deficiencies are deemed correctable.

## At the Review for Candidacy

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

## During Candidacy

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

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

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

## Pregnancy, Childbirth, and Adoption Accommodation Policy

Stanford prohibits discrimination on the basis of any characteristic protected by law including discrimination on the basis of pregnancy.

Stanford complies with requirements of California Education Code section 66281.7. Stanford's policy provides that pregnant graduate students be supported either by staying enrolled or taking a pregnancy leave of absence (GAP 5.9 Pregnancy, Childbirth, and Adoption (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-5/subchapter-9/page-5-9-1>)). The policy also provides childbirth accommodations for graduate students giving birth as well as support for non-birth parents who have recently experienced the birth of a child. Questions about the policy can be directed to the Office of the Vice Provost for Graduate Education (VPGE) (<http://vpge.stanford.edu>).

## Residency Policy for Graduate Students

Each type of graduate degree offered at Stanford (for example, Master of Science, Doctor of Philosophy) has a residency requirement based on the number of academic units required for the degree. These residency requirements and the maximum allowable transfer units for each degree type are listed below. Unless permission is granted by the department

(for example, for field work) enrolled graduate students must maintain a significant physical presence on campus throughout each quarter a student is enrolled.

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

Students eligible for Veterans Affairs educational benefits should refer to the "Veterans' Educational Benefits (p. 64)" section of this bulletin.

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

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

Terminal Graduate Registration (TGR) is available to graduate students who have met all of the conditions listed in the "TGR (p. 60)" section of this bulletin.

## University Minimum Residency Requirements for Graduate Degrees <sup>1</sup>

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

<sup>1</sup> The University has authorized the granting of the M.A.T., Ed.S. and Ed.D. degrees, but they are not being offered.

- <sup>2</sup> Up to 45 units completed at Stanford toward a M.A. or M.S. degree or accepted as transfer credit, but not both, in an Engineering discipline may be used toward the 90 unit residency requirement for the Engineer degree. At least 45 units of work at Stanford are necessary to complete the 90 residency units for the Engineer degree.
- <sup>3</sup> Enrollment in the M.P.P. degree program is limited to candidates who have earlier been accepted to another Stanford graduate degree program and to recent (within three years) Stanford graduates.
- <sup>4</sup> Students eligible for Veterans Affairs educational benefits should refer to the Veterans Benefits section of "Admissions and Financial Aid (p. 15)" in this bulletin.
- <sup>5</sup> Up to 45 units completed at Stanford toward a M.A. or M.S. degree or accepted as transfer credit, but not both, may be used toward the 135 unit residency requirement for the Ph.D. or D.M.A. degree. At least 90 units of work at Stanford are necessary to complete the 135 residency units for the Ph.D. or D.M.A. degree.
- <sup>6</sup> Up to 35 units completed at Stanford toward a J.S.M degree may be used toward the 44-unit residency requirement for the J.S.D degree.

## University Minimum Residency Requirements for Graduate Degree Combinations

Students with multiple degree programs must complete the residency requirements for all their degree types. Students enrolled in a joint degree program should see the "Joint Degree Program (p. 54)" section of this Bulletin.

A table of these residency requirements is also available on the Registrar's web site (<https://registrar.stanford.edu/students/graduate-degree-progress/minimum-residency-requirements-graduate-degrees>).

Degree/Degree Combination	Minimum # of Stanford Units Required	Maximum Allowable External Transfer Units	Minimum # of Residency Units Required
MA/MS/MSM	45	0*	45
MA/MS/MSM + MA/MS	90	0*	90

\* Students eligible for Veterans Affairs educational benefits should refer to the "Veterans Benefits" (p. 64) section of this bulletin.

## Graduate Residency Transfer Credit

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

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

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

1. Courses should have comparable Stanford counterparts that are approved by the student's department. A maximum of 12 units of courses with no Stanford counterparts and/or research units may be granted transfer credit.

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

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

## Leaves of Absence (Graduate)

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

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

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

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

## Voluntary Leaves of Absence

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

New graduate students may not take a leave of absence during their first quarter. However, new Stanford students may request a deferment from the department.

Coterminal students who wish to take a leave of absence are subject to the Leave of Absence policies for both undergraduate and graduate students, as described here and in the undergraduate Leaves of Absence and Reinstatement (p. 39) section of this Bulletin. A coterminal student whose undergraduate degree has not been conferred must obtain permission from the master's degree program and the office of Undergraduate Advising and Research, and may not take a leave of absence unless approved for both the graduate and undergraduate leave. Coterminal students are permitted to request a leave of absence for the first quarter of the graduate program.

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

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

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

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

## Mandatory Leaves of Absence

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

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

Students whose circumstances warrant a review under the Dean's Leave of Absence Policy (<https://studentaffairs.stanford.edu/policies/deans-leave-absence>) are apprised, in writing, of University concerns and are provided an opportunity to respond to concerns in writing or in person or via telephone before a review committee convened by the Dean of Student Life. Students placed on mandatory leave of absence can appeal an unfavorable decision to the Vice Provost for Student Affairs. The University can condition a student's return to registered student status on such requirements as the University deems appropriate in the individual case (such as, in the case of a leave for medical reasons, proof of treatment and/or an interview with a health care professional at Vaden Health Center (<http://vaden.stanford.edu>) or Counseling and Psychological Services (<https://vaden.stanford.edu/caps-and-wellness>) or its designee). The Dean of Student Life publishes the full Dean's Leave of Absence Policy (<https://studentaffairs.stanford.edu/policies/deans-leave-absence>) on its web site. Information on tuition refunds is available in the "Refunds (p. 27)" section of this bulletin.

## Discontinuation and Reinstatement

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

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

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

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

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

In the rare circumstance where a student who had been dismissed for academic reasons wishes to return to the same degree program, and

where reinstatement was not precluded at the time of the dismissal, the student should request reinstatement as described above. In this circumstance, the degree program may review such relevant information as course work completed elsewhere or any other factors deemed to be appropriate for consideration.

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

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

## Terminal Graduate Registration (TGR)

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

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

Each quarter, TGR students must enroll in the 801 (for master's and Engineer students) or 802 (for doctoral students) course in their department for zero units, in the appropriate section for their adviser. TGR students register at a special tuition rate. Students in TGR status enrolled in a course numbered 801 or 802 are certified as enrolled full time. TGR students may enroll in up to 3 units of course work per quarter at this tuition rate. Within certain restrictions, TGR students may enroll in additional courses at the applicable unit rate. The additional courses cannot be applied toward degree requirements since all degree requirements must be complete in order to earn TGR status. See the "Minimum Progress Requirements for Graduate Students (p. 55)" of this bulletin for information about satisfactory progress requirements for TGR students.

## Graduate Petition for Part-time Enrollment (formerly Graduate Tuition Adjustment)

Requests to enroll for fewer than eight units during the academic year are approved only in specific circumstances. Graduate students who need fewer than 8 remaining units to complete degree requirements or to qualify for TGR status, may register for one quarter on a unit basis (3 to 7 units) to cover the deficiency. This status may be used only once during a degree program. International students should consult with Bechtel International Center (<https://bechtel.stanford.edu>) prior to requesting part-time enrollment to ensure compliance with visa regulations.

Students with disabilities covered under the Americans with Disabilities Act may enroll in an approved reduced course load as recommended by the Office of Accessible Education (OAE) (<https://oae.stanford.edu>). Matriculated and enrolled pregnant graduate students may request up to two quarters of part-time enrollment for an approved Childbirth Academic Accommodation; see the "Childbirth Accommodation Policy (p. 55)" section of this bulletin and the GAP 5.9, Childbirth Accommodation (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-5/subchapter-9/page-5-9-1>).

All students requesting reduced enrollment need to complete and file the Graduate Petition for Part-time Enrollment (<https://stanford.box.com/tuitadjreq>) form.

## Graduation Quarter Status

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

1. All course work, degree requirements, and residency requirements for all graduate degree programs, including joint degree programs, have been completed prior to the start of the requested Graduation Quarter.
2. The student has formally applied to graduate in Axess.
3. The student has only to defend and/or submit the dissertation, project, or master's thesis by the deadline for submission in the term designated as the graduation quarter.
4. The student has filed all necessary forms regarding graduation quarter before the first day of the term chosen as graduation quarter.

A student who is returning after reinstatement in which all degree requirements are complete, with the exception of the dissertation defense and/or submission, is eligible to reinstate into a Graduation Quarter status.

Students on graduation quarter are registered at Stanford and, therefore, have the rights and privileges of registered students. Graduation Quarter status may be used only once during a degree program. There is a tuition rate of \$150 for the graduation quarter. Students in Graduation Quarter status and enrolled in a course numbered 801 or 802 are certified as enrolled full time.

## Conferral of Degrees

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

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

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

frozen after the final degree conferral, and all subsequent grade change requests or changes to the student record are not permitted.

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

Students who wish to withdraw a request for conferral or make changes to the Application to Graduate should submit the Withdrawal of Application to Graduate form (<https://stanford.box.com/withdraw-app-2-grad>) to the Student Services Center (<https://studentservicescenter.stanford.edu>) by the late application to graduate deadline. Students who withdraw their graduation applications or fail to meet degree requirements must reapply to graduate in a subsequent term.

Stanford University awards no honorary degrees.

## Advising and Credentials

### Advising

Academic advising by Stanford faculty is a critical component of all graduate students' education. By the start of their first term, all graduate students should identify or be paired by the department with a faculty adviser who assists them in planning a program of study to meet degree requirements. The process by which students are matched with faculty advisers varies by department or program.

Departments and programs may establish specific expectations and requirements for academic advising, and should inform graduate students and faculty of these policies. Students are obliged to follow department procedures for identifying advisers and committee members for their dissertation reading and university oral examinations. Departments should make every effort to assist doctoral students who are not yet admitted to candidacy in finding an appropriate adviser. The department should also inform doctoral students in a timely fashion about procedures for selecting a dissertation adviser, reading committee members, and orals committee members.

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

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

In addition to this bulletin and the GAP 3.3. Academic Advising (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-3/subchapter-3>), several University policies apply to all faculty-student advising relationships. The University's Research Policy Handbook 1. Conduct of Research (<https://doresearch.stanford.edu/policies/research-policy-handbook/conduct-research>) outlines policies and practices related to the conduct of research, including obligations to students, staff, and sponsors. The Administrative Guide 1.1.1. University Code of Conduct (<https://adminguide.stanford.edu/chapter-1/subchapter-1/policy-1-1-1>) articulates the policy that all members of the Stanford community are

responsible for sustaining the highest ethical standards and values of the university and of the broader community.

Additional information and resources about advising can be found on the Vice Provost for Graduate Education's Advising & Mentoring web pages (<https://vpge.stanford.edu/academic-guidance/advising-mentoring>).

### Teaching Credentials

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

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

# TRANSFER WORK

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

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

See the "Advanced Placement (p. 36)" section of this Bulletin for information concerning Stanford's policy on credit for Advanced Placement work. Details on how to request credit for advanced placement examinations are available at the Registrar's Advanced Placement site (<http://studentaffairs.stanford.edu/registrar/students/ap>).

## Undergraduate Transfer Work

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

- Credit may be granted for work completed at institutions in the U.S. only if the institutions are regionally accredited.
- Study in institutions outside the U.S., when validated by examination results, tutorial reports, or other official evidence of satisfactory work, may be credited toward a Stanford bachelor's degree, subject to the approval of the credit evaluator and the appropriate departments. See the Registrar's web site (<https://registrar.stanford.edu/students/transfer-credit>) for additional information regarding transfer credit requests for course work completed abroad.
- Credit is officially allowed only after the student has been unconditionally admitted to Stanford.
- Credit is allowed for work completed at institutions in the U.S. only on the basis of an official transcript received by the Registrar at Stanford directly from the institution where the credit was earned. In order for transfer credit to be awarded, students must submit an official transcript that clearly indicates all of the below information for each course:
  - Course codes/numbers
  - Course titles or descriptions
  - Final grades earned
  - Course credits earned
- Credit from another institution may be transferred for courses which are substantially equivalent to those offered at Stanford University on the undergraduate level, subject to the approval of the credit evaluator. A maximum of 20 quarter units may represent courses which do not parallel specific undergraduate courses at Stanford, again, subject to the approval of the credit evaluator as to quality and suitability.
- Course work cannot duplicate, overlap, or regress previous work.
- Transfer course work cannot count towards secondary school diploma and/or graduation requirements.
- For students interested in fulfilling a Ways of Thinking/Doing (Ways) breadth requirement through transfer work, transfer courses are reviewed to determine if courses can be certified to fulfill Ways requirements. Requests for fulfilling Ways requirements in transfer require pre-approval prior to course enrollment and the pre-approval requests must be submitted by the quarterly deadline in the quarter prior to the term in which students intend to enroll in the transfer course, as defined on the Ways (<https://undergrad.stanford.edu/programs/ways/getting-credit/ways-credit-classes-taken-other-us-universities>) web site. Courses must be taken for a minimum of 3 quarter units (2 units in the case of Creative Expression only) and must be taken for a letter grade. For transfer students admitted in 2015-16 and later, a proportion of their Ways requirement must be fulfilled at Stanford. Based on the number of qualified transfer units awarded at matriculation, students must complete a number of Ways courses to fulfill the Ways requirement as outlined in the "Transfer Credit for Ways (p. 33)" section of this bulletin. For students who are subject to the previous GER system in place prior to Autumn 2013-14 who want to fulfill general education requirements through transfer work, a proposed transfer course must match a specific Stanford course that fulfills the same GER requirement; it must be a minimum of 3 quarter units and have been taken for a letter grade.
- Transfer work can be used to satisfy a department major or minor requirement. The transfer work must first be officially accepted into the University through the Office of the University Registrar. After the transfer credit has been approved and posted by the Office of the University Registrar, the departments determine if the approved transfer work can be used to satisfy a department major or minor requirement.
- The credit allowed at Stanford for one quarter's work may not exceed the number of units that would have been permissible for one quarter if the work had been done at Stanford; for work done under a system other than the quarter system, the permissible maximum units are calculated at an appropriate ratio of equivalence.
- Credit is allowed at Stanford for work graded 'C-' (or better) or 'Pass' (where 'Pass' is equivalent to a letter grade of 'C' or above), but not for work graded 'D' or below.
- No more than 45 (90 for transfer students) quarter units of credit for work done elsewhere may be counted toward a bachelor's degree at Stanford (including advanced placement test credit).
- Credit earned in extension, correspondence, and online courses is transferable only if the university offering the courses allows that credit toward its own bachelor's degree. Such credit is limited to a maximum of 45 quarter units for extension courses, a maximum of 15 quarter units for correspondence and online study, and a maximum of 45 quarter units for the combination of extension, correspondence, and online courses. Online and independent study courses are not eligible for Ways credit.
- Credit earned in military training and service is not transferable to Stanford, unless offered by an accredited college or university in the U.S. and evaluated as above by the credit evaluator.

See the Registrar's web site (<https://registrar.stanford.edu/students/transfer-credit-and-advanced-placement/transfer-credit-policies>) for additional information regarding transfer credit policies and procedures.

## Graduate Residency Transfer Credit

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

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

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

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

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



# VETERANS AND MILITARY BENEFITS

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

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

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

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

To comply with federal regulations concerning credit for previous training (38 CFR 21.4253), Stanford University is required to evaluate all previous education and training completed elsewhere to determine what credit, if any, should be granted to students eligible to receive Veterans Affairs educational benefits or DoD tuition assistance. Stanford is required to complete an evaluation; credit is granted when appropriate. Credit is evaluated toward the degree program registered with Veterans Affairs or DoD as determined by the Office of the University Registrar in conjunction with the relevant academic department(s) or program(s). All relevant policies regarding transfer credit apply. In addition, this evaluation occurs each time a student's degree program is changed. Subject to current federal and University guidelines, students eligible for receipt of VA educational benefits or DoD tuition assistance have their prior education and training evaluated up to the credit limits outlined in the "Residency Policy for Graduate Students (p. 50)" and "Undergraduate Degrees and Programs (p. 29)" sections of this bulletin. As an exception to that policy, students in master's programs in the schools of Earth Sciences, Education, Engineering, Humanities and Sciences, Law, Medicine, and Graduate Business are allowed a maximum of 6 transfer (quarter) units.

## VA Status

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

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

- Any official transcripts from other institutions

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

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

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

## Certification

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

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

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

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

## Programs Subject to Restriction

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

- *Certificate programs for non-matriculated students:* The VA defines “matriculated” as having been formally admitted to a college or university. Per the VA, educational benefits cannot be paid to “non-matriculated” college or university students. Hence, any certificate program that does not officially admit its students into Stanford University cannot be certified.
- *Visiting Students Programs:* Stanford cannot certify visiting students unless they meet one of the following conditions:
  1. The student has an approved parent letter from the home institution which guarantees that the courses can be transferred back to original program.
  2. The student is pending admission to a Stanford degree program and is required to take a prerequisite course(s). In that case the student can be certified for two terms.
- *Medical Residencies/Fellowship programs that are not certified by the ACGME:* these residencies are not allowed to be certified as on the job training. This is according to VA guidelines and the Federal Code of Regulations. See the School of Medicine for a full list of the fellowship/residency programs.

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

## Financial Aid

The Post-9/11 GI Bill, also known as Chapter 33, is the most commonly used VA educational benefits program at Stanford. This program provides funding for tuition, required fees, books and housing. The level of an individual student's Chapter 33 benefits is determined by the qualifying veteran's length of military service since 9/11/2001. For the 2015-16 academic year, the base benefit for tuition and fees is capped at \$21,084.89. Eligible students may also receive funds through the Yellow Ribbon Provision.

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

## Yellow Ribbon Provision

Stanford elects on a yearly basis to participate in the Yellow Ribbon Program. Under this provision Stanford provides an annual contribution to supplement the Chapter 33 base tuition benefit. The VA matches Stanford's Yellow Ribbon contribution. For the 2015-16 academic year, Stanford's annual Yellow Ribbon contribution for undergraduate students is \$3,000, with the VA providing a matching amount of \$3,000. For graduate and professional students, the amount of Stanford's Yellow Ribbon contribution varies by school and program; see the Yellow Ribbon information on the University Registrar's web site.

## Undergraduates

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

If the student will be receiving VA educational benefits transferred from a parent, the student will be treated as a dependent student for financial aid purposes. The student's parents' income and asset information will be considered in determining eligibility for need-based aid from Stanford. If the student is a veteran, the student will most likely be treated as an

independent student and will not need to provide parent information. Receipt of VA educational benefits does not impact your eligibility for federal student loan programs.

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

## Graduate Students

Schools and departments are responsible for providing the Yellow Ribbon contribution for eligible graduate students. The Financial Aid Office will coordinate receipt of funds with responsible individuals in each school.

Receipt of VA educational benefits does not impact your eligibility for federal student loan programs.

## Veterans' Educational Benefits

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

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

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

Subject to current federal and University guidelines, students eligible for receipt of VA educational benefits have their prior education and training evaluated up to the credit limits outlined in the "Residency Policy for Graduate Student (p. 57)s" section of this bulletin. As an exception to that policy, students in master's programs in the schools of Earth Sciences, Education, Engineering, Humanities and Sciences, Law, Medicine, and Graduate Business are allowed a maximum of 6 transfer (quarter) units. Students should consult with the Office for Military Affiliated Communities (OMAC) (<https://military.stanford.edu/gi-bill-benefits>) for consideration of optimal use of educational benefits.

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

the amount of institutional contribution varies by school and program at the graduate level.

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

# UNIVERSITY POLICIES AND STATEMENTS

## Compliance with University Policies/Registration Holds

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

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

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

## University Communication with Students

Stanford University uses electronic means (such as email, texts, and the Internet) as a primary method of communication and of providing billing, payment, and enrollment services. Signatures or acknowledgments provided by the student electronically to Stanford via Stanford systems and/or @stanford.edu email are valid and legally binding.

## Notification/Obligation to Read Email

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

## Registration and Study Lists

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

(p. 67)" section of this bulletin. Students will be charged a \$200 late study list fee for submitting their study lists after the quarterly deadline.

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

## Study List Changes

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

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

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

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

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

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

## Repeated Courses

Students may not enroll in courses for credit for which they received either Advanced Placement (AP) or transfer credit. If students enroll in courses at Stanford for which they received equivalent AP unit credit, the duplicating AP unit credit will be removed.

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

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

office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall. When a student completes a course for the third time, grades and units for both the second and third completions count in the cumulative grade point average. The notation 'W' is not counted toward the three-retain maximum.

## Amount of Work

The usual amount of work for undergraduate students is 15 units per quarter; 180 units (225 for dual degree students) are required for graduation. Registration for fewer than 12 units is rarely permitted and may cause the undergraduate to be ineligible for certification as a full-time student. The maximum is 20 units (21 if the program includes a 1-unit activity course). Requests for exception to the maximum may be considered for compelling reasons, the approval of which may include conditions or restrictions. A past superior academic performance is not considered to be sufficient justification for exceeding the maximum. Petitions for programs of fewer than 12 or more than 20 units must be submitted to the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research, Sweet Hall, first floor. For additional information regarding satisfactory academic progress, refer to the "Academic Progress (p. 74)" section of this bulletin.

Matriculated graduate students are expected to enroll for at least eight units during the academic year; schools and departments may set a higher minimum. Petitions for programs of fewer than 8 must be signed by the student's department and submitted for consideration to the Office of the University Registrar. Graduate students are normally expected to enroll in no more than 24 units; registration for more than 24 units must be approved by the department. Under certain circumstances, graduate students may register on a part-time basis. See the "Tuition, Fees, and Housing (p. 22)" section of this bulletin.

Enrollment for coterminal students is determined by their tuition group. See Tuition (p. 47) in the "Coterminal Master's Degrees" section of this bulletin.

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

## Unit of Credit

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

Every unit for which credit is given is understood to represent approximately three hours of actual work per week for the average student. Thus, in lecture or discussion work, for 1 unit of credit, one hour per week may be allotted to the lecture or discussion and two hours for preparation or subsequent reading and study. Where the time is wholly occupied with studio, field, or laboratory work, or in the classroom work of conversation classes, three full hours per week through one quarter are expected of the student for each unit of credit; but, where such work is supplemented by systematic outside reading or experiment under the direction of the instructor, a reduction may be made in the actual studio, field, laboratory, or classroom time as seems just to the department.

## Religious Holidays

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

# Privacy of Students Records

## Notification of Rights Under FERPA

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

1. The right to inspect and review the student's education records within 45 days of the date the University receives a request for access. Current and former students who wish to make a FERPA-related request to view records should submit to the Office of the University Registrar an online request that identifies the record(s) the student wishes to inspect:
  - Request for records by current student and former students who still have an active Stanford ID (<https://web.stanford.edu/dept/registrar/forms/secure/records-request-ferpa.fb>) (typically students who were enrolled within the last five years)
  - Request for records by former students who do not have an active Stanford ID (<https://web.stanford.edu/dept/registrar/forms/records-request-ferpa.fb>)

Students are advised to provide complete information in order to assist the University in following up on the request. Federal law requires that the University provide access to requested extant records within 45 days. A Registrar's Office official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records requested are not under the control of the Registrar's Office, the Registrar's Office will make arrangements for the relevant office to provide the records within the time frame established under the law.

2. The right to request the amendment of the student's education records that the student believes are inaccurate, misleading, or otherwise in violation of the student's privacy rights under FERPA.
  - a. A student may ask the University to amend the record that he or she believes is inaccurate or misleading. The student should write the University official responsible for the record (with a copy to the University Registrar), clearly identify the part of the records he or she wants changed, and specify why it should be changed.
  - b. If the University decides not to amend the record as requested by the student, the University will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment.
  - c. Additional information regarding the hearing procedures is provided to the student when notified of the right to a hearing.
3. The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent. FERPA contains various exceptions to the general rule that the University should not disclose education records without seeking the prior written consent of the student. The following circumstances are representative of those in which education records (and information drawn from education records) may be disclosed without the student's prior written consent:
  - a. Upon request, the University may release Directory Information (see the "Directory Information" section of this bulletin below).
  - b. School officials who have a legitimate educational interest in a student's education record may be permitted to review it. A school official is: a person employed by the University in an administrative, supervisory, academic or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student or volunteer serving on an official committee (or representing a recognized student group), such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks. A school official has a legitimate educational interest if the official

needs to review an education record in order to fulfill his or her responsibility to Stanford or to the student.

- c. The University discloses education records without consent to officials of another school, in which a student seeks or intends to enroll, upon request of officials at that other school.
  - d. The University may choose to disclose education records (and information drawn from education records) to either supporting parent(s) or guardian(s) where the student is claimed as a dependent under the Internal Revenue Code.
  - e. The University may inform persons including either parent(s) or guardian(s) when disclosure of the information is necessary to protect the health or safety of the student or other persons.
  - f. For students under the age of 21, the University may notify either parent(s) or guardian(s) of a violation of any law or policy relating to the use of alcohol or controlled substances.
  - g. The University must provide records in response to lawfully issued subpoenas, or as otherwise compelled by legal process.
4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by the University to comply with the requirements of FERPA.

The name and address of the office that administers FERPA is: Family Policy Compliance Office, U.S. Department of Education, 400 Maryland Avenue, SW, Washington, DC 20202-4605.

## Sharing Information with Parents

Students are encouraged to maintain an ongoing, open dialogue with parents throughout their careers at Stanford about academic progress and personal development. Most student difficulties are resolved at Stanford without involving parents. The University does recognize, however, that there are some exceptional situations where parental involvement may be appropriate to assist a student through a difficult circumstance. Under those circumstances, Stanford may (but is not required to) choose to disclose information to parents if permitted by law.

Under the Family Educational Rights and Privacy Act (FERPA), Stanford is permitted to disclose information drawn from education records to parents if one or more parent claims the student as a dependent for federal tax purposes. Some laws, especially those relating to medical and mental health care, prohibit the disclosure of information without the student's consent, even where the student is a tax dependent.

## Directory Information

The University regards the following items of information as "directory information," that is, information that the University may make available to any person upon specific request (and without student consent):

- Name\*
- Email addresses
- Specific quarters or semesters of registration at Stanford
- Stanford degree(s) awarded and date(s)
- Major(s), minor(s), and field(s)
- University degree honors
- Student theses and dissertations
- Participation in officially recognized sports or activities\*
- Weight and height of members of athletic teams\*
- Institution attended immediately prior to Stanford
- ID card photographs

For more information, see Stanford's FERPA (<http://studentaffairs.stanford.edu/registrar/students/ferpa>) web page.

Students may prohibit the release of any of the items listed above (except those with an asterisk) by designating which items should not be released on the Privacy function of Axxess. Students may prohibit the release of all

directory information listed above after an appointment with the Office of the University Registrar to discuss the ramifications of this action. Student theses and dissertations can be restricted through the publishing options and embargo settings students select during submission.

Students, faculty, and others with questions regarding student records should contact the Office of the University Registrar.

## Consent to Use of Photographic Images

Registration as a student and attendance at or participation in classes and other campus and University activities constitutes an agreement by the student to the University's use and distribution (both now and in the future) of the student's image or voice in photographs, video or audio capture, or electronic reproductions of such classes and other campus and University activities.

If any student in a class where such photographing or recording is to take place does not wish to have his or her image or voice so used, the student should raise the matter in advance with the instructor.

## Examinations

### Midterms

Classes that give midterm examinations outside of regular class hours must:

1. announce the date and time during the first week of the academic quarter, and
2. provide reasonable alternative times to those students who have another class or other University commitment at that time.

According to Honor Code interpretations and applications, different examinations may be given at these alternative times.

## End-Quarter Policy Statement

The End-Quarter Period is a time of reduced social and extracurricular activity preceding final examinations. Its purpose is to permit students to concentrate on academic work and to prepare for final examinations.

In Autumn, Winter, and Spring quarters, End-Quarter starts seven full days (to begin at 12:01 a.m.) prior to the first day of final exams. In Spring Quarter, final examinations begin on Friday; no classes are held on Thursday, the day before. In Summer Quarter, this consists of the weekend and the four class days preceding the final examinations, which take place on Friday and Saturday of the eighth week. (See the Time Schedule for dates.)

During the End-Quarter Period, classes are regularly scheduled and assignments made; this regular class time is used by instructors in whatever way seems best suited to the completion and summation of course material. Instructors should neither make extraordinary assignments nor announce additional course meetings in order to "catch up" in course presentations that have fallen behind. They are free, however, and even encouraged to conduct optional review sessions and to suggest other activities that might seem appropriate for students preparing for final examinations.

No graded homework assignments, mandatory quizzes, or examinations should be given during the End-Quarter Period except:

1. In classes where graded homework assignments or quizzes are routine parts of the instruction process.
2. In classes with laboratories where the final examination will not test the laboratory component. In such a case, the laboratory session(s) during the End-Quarter Period may be used to examine students on that aspect of the course.

Major papers or projects about which the student has had reasonable notice may be called due in the End-Quarter Period.

Take-home final examinations, given in place of the officially scheduled in-class examination, may be distributed in the End-Quarter Period. Although the instructor may ask students to return take-home examinations early in the final examination period, the instructor may not call them due until the end of the regularly scheduled examination time for that course. Such a policy respects the principle that students' final examinations are to be scheduled over a period of several days.

End-quarter examinations may not be held during this period. This policy preserves the instruction time for courses and protects the students' opportunities for extensive review and synthesis of their courses.

During the End-Quarter Period, no musical, dramatic, or athletic events involving student participation may be scheduled, unless approved as exceptions by the Committee on Undergraduate Standards and Policy (C-USP), nor may routine committee meetings be scheduled (such as those of the ASSU, the Senate of the Academic Council, or the committees of the President of the University) when such meetings normally would involve student participation.

Note—Students who believe that there are faculty who are violating End-Quarter policy should contact the Office of the University Registrar (<https://remedyweb.stanford.edu/helpsu/2.0/helpsu-form?pcat=Registrar>).

## End-Quarter Examinations

Examinations are part of the process of education at the same time that they are a means to measure the student's performance in course work. Their structure, content, frequency, and length are to be determined in accordance with the nature of the course and the material presented in it, subject only to the limitations contained herein.

Great flexibility is available regarding the types of examinations that an instructor may choose to employ. Examinations, including final examinations, may be, for example, in-class essay examinations, take-home essay examinations, objective examinations, oral examinations, or appropriate substitutes such as papers or projects. Instructors may use any type of examination, paper, or project, or any combination thereof, guided only by the appropriateness of the types of examinations, papers, or projects for the material upon which the student is being examined.

When the final examination is an in-class examination, the following regulations apply:

1. A three-hour period is reserved during examination week for the final examination in each course of more than 2 units. This examination period must be available for students, but not necessarily in its entirety, if an in-class examination is given. In courses with extraordinary meeting times, such that ambiguity might exist as regards the period reserved for the final examination, the schedule should be clarified and students informed no later than the end of the second week of the quarter.
2. Examinations in 1- or 2-unit courses must be completed by the end of the last class meeting before the End-Quarter Period, except in Summer Quarter when examinations must be completed during the last regularly scheduled class session.

When the final examination or its appropriate substitute is not an in-class examination (for example, when an instructor chooses to employ a take-home examination, paper, or project in lieu of an in-class examination), the following regulations apply:

1. The schedule and format of the final examination or its appropriate substitute are made known not later than the end of the second week of the quarter and, if changed subsequently, may be only an option of the plan originally announced by the instructor.

2. Although the instructor may ask students to return take-home examinations early in the final examination period, the instructor may not call them due until the end of the regularly scheduled examination time for that course.

In submitting official Study Lists, students commit to all course requirements, including the examination procedures chosen and announced by the course instructor. In choosing courses, students should take cognizance of the official schedule of final examinations announced on the Registrar's (<http://studentaffairs.stanford.edu/registrar/final-exams>) web site. Students anticipating conflicts in final examination schedules should seek to resolve these with the instructors involved before the Preliminary Study List deadline at the beginning of the quarter. If accommodation cannot be made at that time, the student should revise his or her Study List before the Final Study List deadline at the end of the third week of the quarter in order to be able to meet the required final examination.

If unforeseen circumstances prevent the student from sitting for the regularly scheduled examination, instructors should make alternative arrangements on an individual basis. Such unforeseen circumstances include illness, personal emergency, or the student's required participation in special events (for example, athletic championships) approved as exceptions by the Committee on Undergraduate Standards and Policy (C-USP). Inquiries regarding these circumstances may be directed to the office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR) (<https://undergrad.stanford.edu/advising/make-appointment>), Sweet Hall.

## Statement Concerning Early Examinations

Students are reminded that taking final examinations earlier than the scheduled time is a privilege, not a right. They should request this privilege only in the event of extraordinary circumstances.

Since the final examination schedule for each quarter (<http://studentaffairs.stanford.edu/registrar/final-exams>) is published annually on the Registrar's web site at the time of course selection and enrollment, students are expected to make their academic plans in light of known personal circumstances that may make certain examination times difficult for them.

In general, faculty members are discouraged from giving final examinations earlier than the published and announced times. If faculty nevertheless decide to administer early examinations, either the questions should be completely different from those on the regularly scheduled examination or the early examination should be administered in a highly controlled setting. An example of such a setting would be a campus seminar room where the examination questions would be collected along with students' work and students would be reminded of their Honor Code (<http://www.stanford.edu/dept/registrar/bulletin/79155.htm>) obligations not to share information about the examination contents. Giving students easy opportunities to abuse the integrity of an examination is unfair to honest students and inconsistent with the spirit of the Honor Code (<http://www.stanford.edu/dept/registrar/bulletin/79155.htm>).

Academic fields differ in the degree to which early examination requests present dilemmas for faculty. If, for example, an examination format consists of a small number of essay questions, where students would be greatly advantaged by knowing the question topics, faculty should be especially reluctant to allow early examinations unless they are willing to offer totally different examinations or a different kind of academic task, for example, a final paper in lieu of an examination.

## Grading Systems

### General University Grading Systems

The general University grading system is applicable to all of Stanford University except the Graduate School of Business, the School of Law, and M.D. students in the School of Medicine. Note that the GPA (grade point average) and rank in class are not computed under the general University grading system. Stanford does use an internal-only GPA which is based on units completed up to the time of conferral of the first bachelor's degree. This information is used for internal purposes only (including academic progress) and is not displayed on the official transcript which is sent outside the University. Most courses are graded according to the general University grading system. However, courses offered through Law, Business, and Medicine are graded according to those schools' grading systems, even in cases where students in other programs are enrolled in their classes. Note also that, as to graduate students, there may be departmental requirements as to grades that must be maintained for purposes of minimum academic progress.

### Definition and Explanation of Grading Systems

All grades/notations for courses taken in 1995-96 or later are to be visible on student transcripts. Effective Summer Quarter 2008-09, the notation \* was changed to GNR (Grade Not Reported).

Grade	Description
A (+,-)	Excellent
B (+,-)	Good
C (+,-)	Satisfactory
D (+,-)	Minimal pass
NP	Not Passed
NC	No Credit (unsatisfactory performance, 'D+' or below equivalent, in a class taken on a satisfactory/no credit basis)
CR	Credit (student-elected satisfactory; A, B, or C equivalent)
S	No-option Satisfactory; A, B, or C equivalent
L	Pass, letter grade to be reported
W	Withdraw
N (-)	Continuing course
I	Incomplete
RP	Repeated Course
*	No grade reported (effective through Spring 2008-09).
GNR	Grade not reported (effective beginning Autumn Quarter 2009-10).

### Explanation

Grade	Description
NC	The notation 'NC' represents unsatisfactory performance in courses taken on a satisfactory/no credit basis. Performance is equivalent to letter grade 'D+' or below.
NP	The notation 'NP' is used by instructors in courses taken for a letter grade that are not passed.
CR	In a course for which some students receive letter grades, the 'CR' represents performance that is satisfactory or better when the student has elected the 'CR' grading option.

**S** For an activity course or a course in which the instructor elects to grade students only on a satisfactory/no credit basis, the 'S' represents performance that is satisfactory or better. For such a course, no letter grades may be assigned for satisfactorily completed work. It should be noted that the Registrar is unable to record course grades submitted when the instructor has not observed the required distinction between 'S' and 'CR.' The 'satisfactory' options are intended to relieve the pressure on students for achievement in grades. The 'satisfactory' options in no way imply fewer or different course work requirements than those required of students who elect evaluation with a letter grade. A department may limit the number of 'satisfactory' courses to count for a major program. No more than 36 units of Stanford course work (including activity courses) in which a 'CR' or 'S' was awarded can be applied toward the 180 (225 if dual degrees are being pursued) units required for a bachelor's degree. Transfer students are limited to 27 'CR' or 'S' units applied to the 180/225 minimum.

**L** The 'L' is a temporary notation that represents creditable completion of a course for which the student will receive a permanent letter grade before the start of the next quarter. The 'L' is given when the instructor needs additional time to determine the specific grade to be recorded, but it is not appropriate if additional work is expected to be submitted by the student. A student receives unit credit for work graded 'L.'

**N** The 'N' indicates satisfactory progress in a course that has not yet reached completion. Continuation courses need not continue at the same number of units, but the grade for all quarters of such a course must be the same.

**N-** The 'N-' grade indicates unsatisfactory progress in a continuing course. The first 'N-' grade constitutes a warning. The adviser, department chair, and student should discuss the deficiencies and agree on the steps necessary to correct them. A second consecutive 'N-' will normally cause the department to deny the student further registration until a written plan for the completion of the degree requirements has been submitted by the student and accepted by the department. Subsequent 'N-' grades are grounds for dismissal from the program.

**I** The 'I' is restricted to cases in which the student has satisfactorily completed a substantial part of the course work. No credit is given until the course is completed and a passing grade received. When a final grade is received, all reference to the initial 'I' is removed. 'I' grades must be changed to a permanent notation or grade within a maximum of one year. If an incomplete grade is not cleared at the end of one year, it is changed automatically by the Office of the University Registrar to an 'NP' (not passed) or 'NC' (no credit) as appropriate for the grading method of the course. Students must request an incomplete grade by the last class meeting. Faculty may determine whether to grant the request or not. Faculty are free to determine the conditions under which the incomplete is made up, including setting a deadline of less than one year (but not more than one year). A leave of absence does not stop the clock on the time limit for resolving incompletes. Graduate students with extenuating circumstances, that may warrant an exception to academic policy, should discuss the need for an extension to the time limit with their advisor and the course instructor. Students may request an extension of the deadline for resolving an incomplete by submitting the Petition to Change Course Enrollment (Graduate Students).



RP	The notation 'RP' (meaning Repeated Course) replaces the original grade recorded for a course when a student retakes a course. (See the "Repeated Courses" section of this bulletin.)
W	The notation 'W' (meaning Withdraw) is recorded when a student withdraws from a course.
*	The '*' symbol appears when no grade has been reported to the Registrar for courses taken prior to 2001-02. The '*' symbol remains on the transcript until a grade has been reported (effective through Spring 2008-09).
GNR	The notation 'GNR' appears when no grade has been reported to the Registrar. The 'GNR' notation remains on the transcript until a grade has been reported. (Effective beginning Autumn Quarter 2009-10.)

### Reporting of Grades

All grades should be reported within 96 hours after the time and day reserved for the final examination, and in no case later than noon of the fourth day (including weekends) after the last day of the final examination period.

In the case of degree candidates in Spring Quarter, final grades should be reported by noon of the day following the end of the final examination period.

### Revision of End-Quarter Grades

When duly filed with the Office of the University Registrar, end-quarter grades are final and not subject to change by reason of a revision of judgment on the instructor's part; nor are grades to be revised on the basis of a second trial (for example, a new examination or additional work undertaken or completed after the end of the quarter). Changes may be made at any time to correct an actual error in computation or transcription, or where some part of the student's work has been unintentionally overlooked; that is, if the new grade is the one that would have been entered on the original report had there been no mistake in computing and had all the pertinent data been before the instructor, the change is a proper one.

If a student questions an end-quarter grade based on the grading of part of a specific piece of work (for example, part of a test) on the basis of one of the allowable factors mentioned in the preceding paragraph (for example, an error in computation or transcription, or work unintentionally overlooked, but not matters of judgment as mentioned below), the instructor may review the entire piece of work in question (for example, the entire test) for the purpose of determining whether the end-quarter grade was a proper one. In general, changing an end-quarter grade is permitted on the basis of the allowable factors already mentioned whether an error is discovered by the student or the instructor; however, changing a grade is not permitted by reason of revision of judgment on the part of the instructor.

In the event that a student disputes an end-quarter grade, the established grievance procedure should be followed (see the "Student Academic Grievance Procedure (<http://www.stanford.edu/dept/registrar/bulletin/4988.htm>)" section of this bulletin).

### Freezing of Grades Upon Graduation

All grades, with the exception of 'I' (Incomplete), 'GNR' (Grade Not Reported), 'L' (Pass, grade to follow), and 'N' (Continuation) grades, are frozen at the time of graduation. Grades of Incomplete become frozen 12 months after the quarter in which they were awarded, either as 'NP' (Not Passed) if the course work has not been successfully completed, or another grade if it has. Grades of 'GNR', 'L', or 'N' also have one year to be updated after which they are frozen as they stand. The Office of the University Registrar evaluates prior to graduation whether the GPA on a transcript bearing grades of Incomplete would meet University requirements for graduation even if all 'I' grades were replaced by 'NP'.

## Graduate School of Business Grades

All courses offered by the Graduate School of Business are graded according to the following five-level scheme:

Grade	Description
H	Honors. Work that is of truly superior quality.
HP	High Pass. A passing performance, and one that falls approximately in the upper quarter of passing grades.
P	Pass. A passing performance that falls in the center of the distribution of all passing grades.
LP	Low Pass. A passing performance that falls approximately in the lower quarter of passing grades.
U	Unsatisfactory. A failing performance. Work that does not satisfy the basic requirements of the course and is deficient in significant ways.
GNR	The notation 'GNR' appears when no grade has been reported to the Registrar. The 'GNR' notation remains on the transcript until a grade has been reported (effective Autumn Quarter 2009-10).

GSB courses may receive grades of "+" (Pass) for courses taken on a Pass-Fail basis, with "U" denoting a failing grade, "I" for Incomplete, and "N" for a continuing grade. The grade of N is recorded in a course that spans more than a single quarter, where the grade in an earlier quarter will be determined only later, after the entire course sequence is complete..

Prior to 2009-10, an asterisk (\*) notation was placed when no grade was reported.

For more information, see the GSB Grades web site (p. 70).

## Stanford Law School Grades

Effective Autumn Quarter 2009-10, units earned in the Stanford Law School are quarter units. Units earned in the Stanford Law School prior to 2009-10 were semester units. The following grading system became effective in Autumn Semester 2008-09. J.D. students who graduated in 2009 remained on the prior grading system but all other students shifted to the new grading system. For more information, see the Stanford Law School Handbook ([http://www.law.stanford.edu/experience/studentlife/SLS\\_Student\\_Handbook.pdf](http://www.law.stanford.edu/experience/studentlife/SLS_Student_Handbook.pdf)).

Grade	Description
H	Honors (exceptional work, significantly superior to the average performance at the school)
P	Pass (representing successful mastery of the course material)
R	Restricted credit (representing work that is unsatisfactory)
F	Fail (representing work that does not show minimally adequate mastery of the material)
MP	Mandatory pass (representing P or better work)
N	Continuing course
I	Incomplete
*	No grade reported
GNR	Grade not reported (effective Autumn Quarter 2009-10).

The grading systems employed at the Stanford Law School September 2001 through Spring 2009 were as follows. Under the numerical system (with letter equivalents), the range of satisfactory grades ran from 4.3 to 2.5 as outlined in the following distribution. Below the grade of 2.5 was one level of restricted credit (2.2) and one level of failure (2.1). The number grades with letter equivalents were as follows:

Numbering	Grade
4.3-4.2	A+
4.1-3.9	A
3.8-3.5	A-
3.4-3.2	B+
3.1-2.9	B
2.8-2.5	B-
2.2	Restricted Credit
2.1	Failure

On this old system, students could elect to take a limited number of courses on a credit/restricted credit/no credit system (K/RK/NK). 'K' was awarded for work that was comparable to numerical grades 4.3 to 2.5, 'RK' for Restricted Credit-level work (2.2), and 'NK' for Failure-level work (2.1). A limited number of courses were offered on a mandatory credit (KM)/no credit (NK) basis.

'N' is a temporary notation used in a continuing course; it is replaced with a final grade upon completion of the course series.

## School of Medicine Grades

In general, the following grades are used in reporting on the performance of students in the M.D. program:

Grade	Description
Pass (+)	Indicates that the student has demonstrated to the satisfaction of the department or teaching group responsible for the course that the student has mastered the material taught in the course.
Fail (-)	Indicates that the student has not demonstrated to the satisfaction of the department or teaching group responsible for the course that the student has mastered the material taught in the course.
Incomplete (I)	Indicates that extenuating medical or personal circumstances have prevented the student from completing the course requirements. This grade is given when requested by the student with the prior approval of an Advising Dean in the School of Medicine.
Continuing (N)	Indicates that the course has not concluded and the student is continuing the course.
Exempt (Ex)	Indicates a course that is exempted by examination. No units are awarded.
GNR	The notation 'GNR' appears when no grade has been reported to the Registrar. The 'GNR' notation remains on the transcript until a grade has been reported (effective Autumn Quarter 2009-10).

In general, a 'Fail' grade can be cleared by repeating and passing the particular course or by other arrangement prescribed by the department or teaching group. An 'Incomplete' grade can be made up in a manner specified by the department or teaching group within a reasonable time; if the deficiency is not made up within the specified time, the 'Incomplete' grade becomes a 'Fail' grade. The opportunity to clear a 'Fail' grade or an 'Incomplete' grade cannot be extended to individuals who are not registered or eligible to register as students in the M.D. program. For more specific information, see the Assessment of Student Academic Performance (<http://med.stanford.edu/md/curriculum/assessment-grading.html>) web site.

## Records

### Transcripts

Transcripts of Stanford records are issued by the Office of the University Registrar upon the student's request when submitted in writing or via the online Axxess system. There is no charge for official transcripts. The

courses taken in one quarter do not appear on any student's transcript until after the final study list deadline. The University reserves the right to withhold transcripts or records of students with unmet obligations to the University.

## Certification of Enrollment or Degrees

The Office of the University Registrar can provide written confirmation of registration, enrollment, or degree status upon request by the student. The printed certification can be used whenever enrollment or degree verification is required for car insurance, loan deferments, medical coverage, scholarship purposes, and so on. Using Axxess, students are able to print an official certification at no charge. Certification of full- or part-time enrollment cannot be provided until after the study list is filed for the quarter in question.

Degrees are conferred quarterly, but diplomas are issued in accordance to the distribution dates listed on the Registrar's Office (<http://studentaffairs.stanford.edu/registrar/students/diplomas>) web site. After conferral, the degree awarded to a student can be verified by contacting the Office of the University Registrar for an official transcript, or official degree certification form. Requests for transcripts or degree certifications must be made by the student in writing or through Axxess.

Stanford University has authorized the National Student Clearinghouse (NSC) to act as its agent for purposes of third party enrollment and degree verification. The NSC will be able to verify degrees and enrollment for only those students who have not placed a privacy block on their academic record. The student's name when enrolled, Social Security Number or Student ID, and date of birth will be required for identification purposes and enrollment or degree verification. All third parties should contact the National Student Clearinghouse by phone or visit their web site for current enrollment and degree verification information, instructions, and fees.

As a general proposition, full-time enrollment for undergraduates is considered to be enrollment in a minimum of 12 units of course work per quarter at Stanford. Work necessary to complete units from previous quarters does not count toward the 12 units necessary for full-time status in the current quarter. Enrollment in 8 to 11 units is considered half-time enrollment. Enrollment in 1 to 7 units is considered less-than-half-time, or part-time enrollment. During Summer Quarter, all graduate students who hold appointments as research or teaching assistants are considered to be enrolled on at least a half-time basis.

For students with disabilities taking a reduced course load, contact the Office of Accessible Education (<http://studentaffairs.stanford.edu/oe>) for additional information.

All undergraduates validly registered at Stanford are considered to be in good standing for the purposes of enrollment certification.

Stanford uses the following definitions (in units) to certify the enrollment status of graduate and professional students each quarter:

Status	Graduate	Business (M.B.A./Sloan)	Law	Medicine (M.D.)
Full time:	8 or more	11 or more	9 or more	9 or more
Half time:	6 or 7	6-10	6-8	6-8
Part time:	5 or fewer	5 or fewer	5 or fewer	5 or fewer

TGR students enrolled in a course numbered 801 or 802 are certified as full time. Graduate students on an approved Graduation Quarter status are certified as full time.

As a general proposition, only information classified by the University as directory information (see the "Directory Information (p. )" section of this bulletin) can be confirmed to inquirers other than the student.

## H-1B Degree Certification

As the H-1B application deadline is April 1 and Winter Quarter degree conferral does not occur until after this date (or just before), the Office of the University Registrar provides an H-1B Degree Certification Letter for eligible students graduating Winter Quarter who are applying for the H-1B visa and have completed all school/department and University degree requirements.

Students conferring degrees in all terms except Winter Quarter should request an official transcript in their student Axxess account after the degree conferral date of their graduation term. The official transcript indicates the results of all work completed and degrees awarded. Students can also request an official degree certification via Axxess, or by completing a Degree Certification Request form. See Certifications and Verifications (<http://studentaffairs.stanford.edu/registrar/students/certifications>) for details on requesting degree verification.

An Enrollment Verification is included with the H-1B Degree Certification Letter. The Enrollment Certification states a student's enrollment history, current program of study, major, expected degree, and expected degree conferral date. This document bears the University seal and signature of the University Registrar. For more information see the Office of the University Registrar H-1B Certification Letter (<http://exploreddegrees.stanford.edu/academicpoliciesandstatements/x-webdoc://D3A5CCDC-66E3-45EE-8E78-2D47E9234AF2/studentaffairs.stanford.edu/registrar/students/h-1b>) web site.

Bechtel International Center organizes H-1B workshops which students are encouraged to attend if they have any questions regarding H-1B issues.

## Posthumous Degrees

Stanford will consider granting a posthumous degree in instances in which a student was in good standing and had completed at least 90% of all graduation requirements at the time of death. Requests must be approved by the chair of the major department or the dean of a professional school and the University Registrar. Requests should be addressed to the University Registrar and generally should take place within 12 months of the student's death.

## Academic Progress

Undergraduates must maintain a minimum 2.0 cumulative GPA and a quantitative unit requirement for satisfactory academic progress. In addition, a minimum 2.0 cumulative GPA is required for conferral of a baccalaureate degree.

Undergraduates normally are expected to plan their academic programs so that they can complete 180 units in four years (twelve quarters), including the requirements for a major and the General Education (p. 33) (Ways/GERs), Writing and Rhetoric (p. ), and Language (p. ) Requirements. Satisfactory academic progress is, on average, 45 units per academic year for four years leading to at least 180 units, a cumulative grade point average of at least 2.0, and a baccalaureate degree.

While undergraduates are expected to register for a minimum of 12 units, they are required to earn at least 9 units each quarter (by the end of the final exam period) and at least 36 units in their most recent three quarters of Stanford enrollment (by the end of the third final exam period). In addition, students are expected to maintain a cumulative grade point average of at least 2.0. Transfer work completed at other institutions is not considered in this calculation.

A student earning fewer than 9 units per quarter or fewer than 36 units in three quarters, or earning less than a 2.0 cumulative grade point average, is placed on probation. (For students with disabilities taking a reduced course load, contact the Office of Accessible Education (<http://studentaffairs.stanford.edu/oe>) for additional information.)

Additionally, a student may be placed directly on provisional registration or suspension (both further defined in this section) without first being placed on probation if the student had a prior probation status. Students on probation (p. ) or provisional registration (p. ) status are required to earn a minimum of 12 units of new course work per quarter (by the end of the final quarter examination period for each quarter) in each quarter for three quarters of consecutive enrollment (excluding Summer), and achieve and maintain a cumulative grade point average of at least 2.0 to attain a satisfactory academic progress status. The C-USP Subcommittee on Academic Progress may stipulate otherwise by acting upon a request for fewer units (i.e. reduced course load).

A Stanford Summer Session quarter may count (upon request) toward the three quarter consecutive enrollment requirement if 11 or more units are earned.

Full-time enrollment is considered to be enrollment in a minimum of 12 units of course work per quarter at Stanford. Under extenuating circumstances, students may submit a request to the C-USP Subcommittee on Academic Progress to take fewer units. As a general proposition, work necessary to complete units from previous quarters does not count toward the 12 units necessary for full-time enrollment in the current quarter. All students registering for fewer than 12 units should consider the effects of that registration on their degree progress, visas, residency requirements, varsity athlete status, and their eligibility for financial aid and awards as well as eligibility for or deferment of student loans.

All undergraduates validly registered at Stanford are considered to be in good standing for the purposes of enrollment certification and athletic participation.

Units are granted for courses completed with grades 'A,' 'B,' 'C,' 'D,' 'Satisfactory' ('CR' or 'S'), and 'L.' Courses graded 'N' are counted provisionally as units earned, provided the student enrolls in the continuing segment of that course the following quarter. When the course is completed satisfactorily, the student receives the units for which he or she enrolled. No units are granted for a course in which the student receives an 'I' or a 'GNR' ('GNR' replaced the '\*' effective Autumn Quarter 2009-10) until the course is completed satisfactorily and the final grade reported. No units are granted for a course in which the student receives a 'W'. (See the "Grading Systems (p. 70)" section of this bulletin).

Students who receive all 'W's as the result of a Leave of Absence (either voluntary or involuntary) are subject to Academic Progress policies.

The C-USP Subcommittee on Academic Progress, in its discretion, is empowered to place conditions on students with an academic progress status (e.g., probation, provisional registration, etc.) with regard to enrollment and participation in programs and activities. In addition, students on probation require approval in advance from Undergraduate Advising and Research (<https://undergrad.stanford.edu/advising/make-appointment>), Residential Education (<http://studentaffairs.stanford.edu/resed>), and the Overseas Studies Program (<http://bosp.stanford.edu>) office or Stanford in Washington Program (<http://siw.stanford.edu>) office or Stanford in New York (p. 129) or Stanford at Sea (<http://stanford.sea.edu>) in order to participate in Stanford's Overseas Studies Program or Stanford in Washington Program or Stanford in New York or Stanford at Sea; while students on other statuses (e.g., provisional registration, etc.) are ineligible to participate in these programs.

Degree Progress standards for coterminal students are described in the coterminal bachelor's and master's degrees section of the Bulletin.

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

## Probation

A student who fails to earn at least 36 units of work (by the end of the third final exam period) in his or her most recent three quarters of enrollment at the University (excluding Summer), or who fails to earn by the end of the final examination period at least 9 quarter units of work in his or her most recent quarter of enrollment at the University (excluding Summer), or who has a cumulative grade point average of less than 2.0, may be placed on probation.

A student shall be removed from probation if, in each of three subsequent quarters of consecutive enrollment at the University (excluding Summer), he or she earns a minimum of 12 units of new course work by the end of the final examination period and achieves and maintains a cumulative grade point average of at least 2.0. A student may also be removed from probation at the discretion of the C-USP Subcommittee on Academic Progress or its designees as a result of a review of individual records.

## Provisional Registration

A student who, while on probation, fails in any quarter of registration (excluding Summer) to earn a minimum of 12 units of new course work by the end of the final examination period or fails to achieve and maintain a cumulative grade point average of at least 2.0, may be placed on provisional registration status. In addition, and on occasion, a student may also be placed directly on provisional registration without first being placed on probation if the student has had a prior probation status.

A student shall be removed from provisional registration if, in each of three subsequent quarters of enrollment at the University (excluding summer), he or she earns a minimum of 12 units of new course work by the end of the final examination period and achieves and maintains a cumulative grade point average of at least 2.0. A student may also be removed from provisional registration at the discretion of the C-USP Subcommittee on Academic Progress or its designees as a result of a review of individual records.

## Suspension

A student who, while on provisional registration, fails in any quarter of registration (excluding Summer) to earn a minimum of 12 units of new course work by the end of the final examination period or fails to achieve and maintain a cumulative grade point average of at least 2.0, may be suspended. In addition, and on occasion, a student may also be suspended directly from probation; or may be suspended without first being placed on probation or provisional registration if the student has had a prior probation status.

While students suspended for the first time are suspended for one year, students suspended a subsequent time may be suspended for up to three years.

Students suspended for one year are not eligible to enroll for four quarters (including Summer Quarter) following the quarter in which the suspension was issued. Students suspended for up to three years are not eligible to enroll for up to twelve quarters (including Summer Quarter) following the quarter in which the suspension was issued.

As well, until re-enrollment, students who are suspended are ineligible for the privileges associated with registration, privileges that include living in University housing, participating in voluntary student organizations, and involvement in any activity for which enrollment is a requirement.

The C-USP Subcommittee on Academic Progress or its designees, in its discretion, may impose conditions of the suspension, and/or to a return from the suspension.

## Reconsideration of Academic Suspension

Students who receive an academic suspension and believe they have information that presents relevant and compelling material previously unknown to the subcommittee or its designees, such that reconsideration

for immediate continuation of their studies without a break in enrollment is suitable, should meet with an adviser from the office of Undergraduate Advising and Research (UAR) in VPUE to discuss their circumstances. Students with such relevant circumstances may submit a Request for Reconsideration of Academic Suspension. Granting such requests is at the discretion of the subcommittee or its designees, and may be based on factors or considerations regarded as relevant including the demonstrated or perceived likelihood for immediate academic success. Requests for reconsideration submitted after the deadline are not accepted. A student may also grieve an academic suspension under the Student Academic Grievance Procedure (p. 75).

Students are expected to complete their academic suspension in full. An academic suspension may not be substituted, in part or in whole, by a Leave of Absence.

## Returning from Suspension

Students are required to submit a properly endorsed application for reinstatement to request reenrollment after the suspension period has been completed. Instructions including deadlines for requesting to return should be obtained from the Office of the Vice Provost for Undergraduate Education, via the office of Undergraduate Advising and Research (UAR), Sweet Hall. The C-USP Subcommittee on Academic Progress, or those designated by the subcommittee, acts upon all requests concerning academic progress and its statuses, including requests to return after academic suspension. The subcommittee or its designees may determine whether the application for reinstatement to return will be approved or not, and/or the conditions a student must meet in order to return. Request to return decisions are at the discretion of the University and may be based on activities while away from campus, the perceived potential for successful completion of the program, as well as any other factors or considerations regarded as relevant to the Vice Provost for Undergraduate Education or the subcommittee or its designees.

Students who return from an academic suspension are given the academic progress status "provisional registration", and must adhere to and comply with the policies above and elsewhere related to that status upon their return. Questions concerning academic progress or requests to return should be directed to the office of Undergraduate Advising and Research (UAR), Sweet Hall.

Students returning from suspension should also contact appropriate campus offices, such as Housing and Financial Aid, regarding those deadlines and procedures.

## Notification (Academic Progress)

Written notification that a student is on probation, provisional registration, or suspension is sent to the student, to the student's academic adviser(s), and to other relevant university offices and individuals as soon as possible after the close of the quarter. Students also receive written notification of the outcome of their Request for Reconsideration of Academic Suspension or request to return after suspension. Current student status, such as whether a student is enrolled or not, is considered Directory Information for FERPA purposes at Stanford, and Stanford may provide either parent(s) or guardian(s) written notification of a change in student status. Provided that a student consents, or the student is a dependent for income tax purposes, Stanford may also provide either parent(s) or guardian(s) written notification that the student is on probation, provisional registration, suspension, or leave of absence (either voluntary or involuntary). Other FERPA exceptions may also apply.

## Student Academic Grievance Procedure

The following policy is subject to periodic review and modification.

1. Coverage

- a. Any Stanford undergraduate or graduate student who believes that he or she has been subjected to an improper decision on an academic matter is entitled to file a grievance to obtain an independent review of the allegedly improper decision, followed by corrective action if appropriate. A grievance is a complaint in writing made to an administrative officer of the University concerning an academic decision, made by a person or group of persons acting in an official University capacity, that directly and adversely affects the student as an individual in his or her academic capacity.
- b. This grievance procedure applies only in those cases involving a perceived academic impropriety arising from a decision taken by: (1) an individual instructor or researcher; (2) a school, department, or program; (3) a committee charged to administer academic policies of a particular school, department, or program; or (4) the University Registrar, the Vice Provost for Undergraduate Education, the C-USP Subcommittee on Academic Progress, or a Senate committee or subcommittee charged to administer academic policies of the Senate of the Academic Council. This procedure does not apply to: (1) complaints expressing dissatisfaction with a University policy of general application challenged on the grounds that the policy is unfair or inadvisable; (2) individual school, department, or program academic policies, as long as those policies are not inconsistent with general University policy; (3) matters proceeding or addressed through the Office of Community Standards; or (4) involuntary leave decisions.
- c. Individuals should be aware that the University Ombuds Office is available to all Stanford students, faculty, and staff to discuss and advise on any matter of University concern and frequently helps expedite resolution of such matters. Although it has no decision-making authority, the University Ombuds Office has wide powers of inquiry, including into student complaints against instructors.
2. **Grievance and Appeal Procedures**
- a. **Informal Attempts at Resolution:** the student first should discuss the matter, orally or in writing, with the individual(s) most directly responsible. If no resolution results, the student should then consult with the individual at the next administrative level, for example, the chair or director of the relevant department or program, or, for those cases in which there is none, with the school dean. At this stage, the department chair or program director, if any, may inform the dean that the consultation is taking place and may solicit his or her advice on how to ensure that adequate steps are taken to achieve a fair result. Efforts should be made to resolve the issues at an informal level without the complaint escalating to the status of a formal grievance.
- b. **The Filing of the Grievance:**
- If informal means of resolution prove unsatisfactory, the student should set forth in writing a statement of the decision that constitutes the subject matter of the dispute, the grounds on which it is being challenged, and the reasons why the grievant believes that the decision was improperly taken. The statement should also include a description of the remedy sought and the informal efforts taken to date to resolve the matter. It is at this point that the complaint becomes a formal grievance. The written grievance should specifically address the matters set forth in the Standards for Review, as stated in Section 4 below. The grievance should include an allegation of any adverse effects on the grievant, known to the grievant at the time of filing.
  - The grievance document should be submitted to the dean of the school in which the grievance arose; for a grievance concerning a decision of the University Registrar, the Vice Provost for Undergraduate Education, or of a Senate committee or subcommittee, the procedures set forth herein for grievances and appeals shall be modified as stated in Section 3 below. A grievance must be filed in a timely fashion, that is, no later than 30 days after the end of the academic quarter in which the adverse decision occurred or should reasonably have been discovered. Except in extraordinary circumstances, delay in filing a grievance will constitute grounds for rejection of the grievance.
- c. **The Response to the Grievance:**
- The relevant dean will consider the grievance. The dean may attempt to resolve the matter informally or make whatever disposition of the grievance that he or she deems appropriate. The dean may, in appropriate cases, remand the grievance to a lower administrative level (including to the level at which the grievance arose) for further consideration.
  - The dean may also refer the grievance, or any issue therein, to any person (the "grievance officer") who will consider the matter and report to the dean as the latter directs. The dean will inform the grievant (and the party against whose decision the grievance has been filed) in writing of any referral of the matter and will specify the matters referred, the directions to the person or persons to whom the referral is made (including the time frame within which the person is to report back to the dean), and the name of that person.
  - In undertaking the review, the dean or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information considered relevant, including faculty, staff, and students.
  - Should attempts to resolve the matter informally not be successful, the dean will decide the grievance, and will notify the grievant (and the party against whose decision the grievance has been filed) in writing of the disposition made of the grievance and the grounds for the disposition at the earliest practicable date after his or her receipt of the grievance.
  - Normally, no more than 60 days should elapse between the filing of a grievance and the disposition by the dean. If, because of absence of key persons from the campus or other circumstances or exigencies (including those due to breaks in the academic calendar), the dean decides that disposition on that schedule is not possible, he or she shall inform the grievant (and the party against whose decision the grievance has been filed) of that in writing, giving the grounds therefore and an estimate of when a disposition can be expected. During summers and the winter closure, this time frame will nearly always be extended.
- d. **The Filing of an Appeal:**
- If the grievant is dissatisfied with the disposition of the grievance at the decanal level, either on substantive or on procedural grounds, he or she may appeal in writing to the Provost.
  - The appeal must specify the particular substantive or procedural bases of the appeal (that is, the appeal must be made on grounds other than general dissatisfaction with the disposition) and must be directed only to issues raised in the grievance as filed or to procedural errors in the grievance process itself, and not to new issues. The appeal must contain the following:
    - A copy of the original grievance and any other documents submitted by the grievant in connection therewith.
    - A copy of the determination made by the dean on that grievance.
    - A statement of why the reasons for the determination of the dean are not satisfactory to the grievant. This statement should specifically address the matters set forth in the Standards for Review in Section 4 below.

- iii The grievant will file his or her appeal at the earliest practicable date after the grievant's receipt of the determination by the dean. Normally, no more than 30 days should elapse between the transmittal of the dean's decision on the grievance and the filing of the appeal. Except in extraordinary circumstances, delay in filing an appeal will constitute grounds for rejection of the appeal.
- e. The Response to the Appeal:
- i The Provost may attempt to resolve the matter informally, or refer the appeal, or any issue thereof, to any person (the "grievance appeal officer") who shall consider the matter and report to the Provost as the latter directs. The Provost may also, in appropriate cases, remand the matter to a lower administrative level (including to the level at which the grievance arose) for further consideration.
  - ii The Provost will inform the grievant (and the party against whose decision the grievance has been filed) in writing of any referral of the matter and will specify the matters referred, the directions to the person to whom the referral is made (including the time frame within which the person is to report back to the Provost), and the name of that person.
  - iii Should attempts be made to resolve the matter informally not be successful, the Provost will decide the appeal, and will notify the grievant (and the party against whose decision the grievance has been filed) in writing of the disposition made of the grievance and the grounds for the disposition at the earliest practicable date after his or her receipt of the appeal. The decision of the Provost shall be final, unless the grievant requests a further appeal to the President pursuant to subsection 2f below, and the President agrees to entertain this further appeal.
  - iv Normally no more than 45 days should elapse between the filing of the appeal and the disposition by the Provost. If, because of absence of key persons from the campus or other circumstances or exigencies (including those due to breaks in the academic calendar), the Provost judges that disposition on that schedule is not possible, he or she will inform the grievant (and the party against whose decision the grievance has been filed) of the fact in writing, giving the grounds therefore and an estimate of when a disposition can be expected. During summers and the winter closure, this time frame will nearly always be extended.
- f. The Request to the President: if the student is dissatisfied with the disposition of the appeal by the Provost, he or she may write to the President of the University giving reasons why he or she believes the grievance result to be wrong (following the general format set forth in subsection 2d.2 above). No more than 30 days should elapse between the transmittal of the Provost's disposition and the written statement to the President urging further appeal. In any case, the President may agree or decline to entertain this further appeal. If the President declines to entertain the further appeal, the decision of the Provost is final. If the President decides to entertain the further appeal, he or she will follow the general procedures set forth in Section 2e above, and the decision of the President will be final.
3. Grievances Concerning Decisions of the University Registrar, the Vice Provost for Undergraduate Education, or of a Senate Committee or Subcommittee
- a. For a grievance concerning a decision of the University Registrar, the Vice Provost for Undergraduate Education, the C-USP Subcommittee on Academic Progress, or of a Senate committee or subcommittee, the grievant will file his or her grievance with the Provost, rather than with the dean, and the Provost will handle that grievance in accordance with the procedures set forth in Section 2c above.
    - b. There is no appeal of the Provost's disposition of that grievance, except as may be available under Section 2f above.
  4. Standards for Review and Procedural Matters
    - a. The review of grievances or appeals will usually be limited to the following considerations:
      - i Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
      - ii Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
      - iii Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?
    - b. The time frames set forth herein are guidelines. They may be extended by the relevant administrative officer in his or her discretion for good cause.
    - c. Questions concerning the filing and appeal of grievances should be directed to the Office of the Provost.

## Stanford University ID Number

The Stanford University ID Number is assigned to each student's academic record for unique identification. It is printed on the Stanford University ID card and on documents distributed by the Office of the University Registrar and other administrative offices. It is a violation of University policy to use another's Stanford University ID Number to misrepresent yourself in any way; such use can result in loss of student privileges or other disciplinary action.

## SUNet ID

The SUNet ID provides access to the Stanford University Network (SUNet) and its services, and identifies authorized users of these services. Each member of the Stanford electronic community creates a unique SUNet ID and SUNet ID password for him/herself. SUNet IDs provide:

- Access services
- Email service
- Storage space within Stanford's distributed file system
- Usenet newsgroups
- World wide web services, including serving of personal web pages on the Leland system and access to Stanford Web Resources

The SUNet ID together with SUNet ID password may serve in place of a signature on electronic forms. The SUNet ID password must remain confidential; it is a violation of University policy to permit another person to use your SUNet ID or password. It is a violation of University policy to use another's SUNet ID or SUNet ID password to misrepresent yourself in any way; such use can result in loss of student privileges or other disciplinary action.

## Identification Cards

The ID card serves as an identification card, an electronic key, and a debit card, allowing cardholders to use services for which they have privileges, to enter certain facilities, and to make purchases.

ID cards are available to registered students, faculty, academic staff, and regular staff. Students obtain their ID cards at the Student Services Center, Tresidder Union, 459 Lagunita Drive, 2nd Floor (650) 498-CARD. Faculty and staff obtain ID cards at George Forsythe Hall, 275 Panama Street, Room 190 (650-498-CARD).

Courtesy ID cards are available for spouses and domestic partners of the Stanford professoriate, academic staff, regular staff, and students. These

cards may be obtained from the Stanford Card ID Office at Forsythe Hall. The spouse/partner courtesy ID card enables use of some campus services during terms for which the student is registered.

Visiting Scholars who are on campus for a minimum of one quarter and contribute to Stanford's mission by teaching or collaborating on Stanford research also receive ID cards and campus privileges during their stay on campus. These cards may be obtained from the Stanford Card ID Office at Forsythe Hall.

Library access and borrowing privileges are reserved for the Stanford professoriate, academic staff, regular staff, students, and others associated with the University with a need for such access.

ID cards bear a photograph of the cardholder. This photograph is maintained in an online database and, as stated in the "Directory Information (p. )" section of this bulletin, is available for classroom, student residence, and other use upon specific request and without student consent unless the student has designated that the photograph not be released. Photographs can be designated as private using the Privacy function of Axxess.

Misuse of the ID card may result in discipline or administrative action.

For more information, see the Campus Card Service (<http://campuscard.stanford.edu>) web site. For the complete policy on Stanford Identification Cards, see the Administrative Guide, 28-4 ([http://adminguide.stanford.edu/28\\_4.pdf](http://adminguide.stanford.edu/28_4.pdf)) (pdf).

## Auditing

No person shall attend any class unless he or she is a fully registered student enrolled in the course or meets the criteria for auditors. Auditors are not permitted in courses that involve direct participation such as language or laboratory science courses, field work, art courses with studio work, or other types of individualized instruction (i.e., labs, seminars, case study, language, and activity courses are not permitted). Auditors are expected to be observers rather than active participants in the courses they attend, unless the instructors request attendance on a different basis. Stanford does not confer credit for auditing, nor is a permanent record kept of courses audited. Students who have been suspended are not permitted to audit.

Auditors may not join classes for the first time after the University's final study list deadline. Auditors are not eligible for other University services or privileges including housing, health insurance (Cardinal Care), Vaden clinical services, and the University health plan. The University Registrar reviews for approval any other services or privileges that may be sought.

The Auditor status is available to Stanford faculty or staff members for no fee. Otherwise, the Permit to Attend ([https://studentaffairs.stanford.edu/registrar/students/tuition-fees\\_15-16](https://studentaffairs.stanford.edu/registrar/students/tuition-fees_15-16)) fee is assessed. The Application for Auditor or Permit to Attend (PTA) Status (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/PTA-Auditor.pdf>) is required. In all cases of auditing, the instructor, department administrator, and the Office of the University Registrar's prior approvals are required. Further information is available from the Office of the University Registrar or the Student Services Center (<http://studentservicescenter.stanford.edu>).

# NONACADEMIC REGULATIONS

The Bulletin publishes the following nonacademic policies which are applicable to all Stanford students. Each policy is published on its own page, viewable in the left-hand menu or linked in the list below. All the policies published in the Bulletin are also collected on this page and available for download (<http://exploreddegrees.stanford.edu/nonacademicregulations/nonacademicregulations.pdf>) (pdf).

The University reserves the right to make changes at any time without prior notice. Nonacademic policies as published on this site are the currently applicable policies.

For other policy information applicable to members of the Stanford community, see Student Activities and Leadership (<https://sal.stanford.edu/policies>) (student organizations, programs, and events), the "GAP" (<https://gap.stanford.edu>) (Graduate Academic Policies and Procedures), the Office of Special Events and Protocols (<https://web.stanford.edu/dept/Events/policies>) (University Event Policies), and the Administrative Guide (<https://adminguide.stanford.edu>) ("guidelines for non-research University activities that govern workplace interactions, approaches, procedures, and processes").

Students with questions about nonacademic policies should submit a HelpSU ticket to the Bulletin (<https://remedyweb.stanford.edu/helpsu/helpsu?pcat=ssawebsites>).

- Nondiscrimination Policy (p. 98)
- Alcohol Policy (p. 98)
- Age Discrimination Act of 1975 (p. 100)
- Americans with Disabilities Act (ADA) (p. 101)
- Campus Disruptions (p. 102)
- Campus Safety and Criminal Statistics (p. 103)
- Computer and Network Policy (p. 103)
- Copyright (p. 103)
- Dangerous Weapons on Campus (p. 104)
- Domestic Partners (p. 104)
- Grievances (p. 104)
- Hazing Policy (p. 104)
- Main Quadrangle • Memorial Court • Oval • White Plaza (p. 105)
- No Camping (p. 106)
- Noise and Amplified Sound (p. 106)
- Online Accessibility Policy (p. 106)
- Peer-to-Peer File Sharing (p. 107)
- Protection of Sensitive Data (p. 107)
- Political Activities (p. 108)
- Recording Lectures (p. 109)
- Sexual Harassment and Consensual Sexual or Romantic Relationships (p. 110)
- Sexual Misconduct and Sexual Assault (p. 113)
- Smoke-Free Environment (p. 114)
- Stanford Name and Trademarks (p. 115)
- Student Non-Academic Grievance Procedure (p. 115)
- Title VI of the Civil Rights Act of 1964 (p. 117)
- Title IX of the Education Amendments of 1972 (p. 117)
- Visitor Policy • University Statement on Privacy (p. 117)

## Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, veteran status, or marital status to all the rights, privileges,

programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, marital status or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence.

The following person has been designated to handle inquiries regarding this nondiscrimination policy: Stanford's Director of the Diversity and Access Office, Rosa Gonzalez, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email). Stanford's Title IX Coordinator, Catherine Glaze, has been designated to handle inquiries regarding sexual harassment and sexual violence: Kingscote Gardens (2nd floor), 419 Lagunita Drive, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), [titleix@stanford.edu](mailto:titleix@stanford.edu) (email).

Individuals may also file complaints directly with the Office for Civil Rights, within the United States Department of Education, by following the information on this web site: <https://www2.ed.gov/about/offices/list/ocr/complaintintro.html>

## ADA (Americans with Disabilities Act)/ Section 504 Grievance Procedure (Student)

For information more generally concerning policies and procedures for students with disabilities, see the Diversity & Access Office (<http://www.stanford.edu/dept/diversityaccess>) web site, or the ADA/Section 504 Compliance Officer, Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email); see also the Office for Accessible Education (OAE) (<http://studentaffairs.stanford.edu/oae>) web site.

### Policy

The following is the policy:

#### I. Policy

Stanford University, in compliance with state and federal laws and regulations, including the Americans with Disabilities Act of 1990 (ADA; as amended 2008) and Section 504 of the Rehabilitation Act of 1973 (Section 504), does not discriminate on the basis of disability in administration of its education-related programs and activities, and has an institutional commitment to provide equal educational opportunities for disabled students who are otherwise qualified.

Students who believe they have been subjected to unlawful discrimination on the basis of disability, or have been denied access to services or accommodations required by law, have the right to use this grievance procedure.

#### II. Applicability

As a general proposition, the grievance procedure set forth below is applicable to undergraduate and graduate students of the University. In general, it is designed to address disputes concerning the following:

1. Disagreements regarding a requested service, accommodation, or modification of a University practice or requirement;
2. Inaccessibility of a program or activity;
3. Harassment or discrimination on the basis of disability;
4. Violation of privacy in the context of disability.

As a general proposition, this grievance procedure supplants the Student Academic Grievance Procedure (p. 75) and the Student Non-Academic Grievance Procedure (p. ) (both of which are set forth in this



bulletin) for disability-related grievances. Questions of applicability will be decided by the Director of the Diversity and Access Office.

### III. Compliance Officers

Stanford University's Compliance Officers are responsible for administering this grievance procedure as well as ensuring compliance with applicable laws. The Director of the Diversity and Access Office is the designated ADA / Section 504 Compliance Officer. That office is located in Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email).

Additional Compliance Officers may be designated from time to time by the Provost from those faculty and staff members knowledgeable concerning disability issues and the legal mandates of state and federal disability statutes.

### IV. Informal Resolution

Prior to initiating the formal complaint procedure set forth below, the student should, in general, first discuss the matter orally or in writing with the individual(s) most directly responsible. If no resolution results, or if direct contact is inappropriate under the circumstances, the student should then consult with the Compliance Officer at the Diversity and Access Office who will attempt to facilitate a resolution. (The informal resolution process may involve consultation with the Associate Vice Provost for Student and Academic Services and University Registrar.)

If the Compliance Officer is not successful in quickly achieving a satisfactory resolution (that is, generally within seven calendar days), the Compliance Officer will inform the student of his or her efforts and the student's right to file a formal complaint.

### V. Formal Complaint

If the procedure set forth above for informal resolution does not yield a successful resolution, then the student may file a formal complaint in the following manner:

1. **When to File Complaint:** Complaints must be filed as soon as possible, but in no event later than 10 days after the end of the quarter in which the concern arose.
2. **What to File:** A complaint must be in writing and include the following:
  - a. The grievant's name, address, email address and phone number;
  - b. A full description of the problem;
  - c. A description of what efforts have been made to resolve the issue informally;
  - d. A statement of the remedy requested.
3. **Where to File Complaint:** the complaint is to be filed with the Compliance Officer at the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email).
4. **Notice of Receipt:** upon receipt of the complaint, the Compliance Officer reviews the complaint for timeliness and appropriateness for this grievance procedure, and provides the grievant with written notice acknowledging its receipt.
5. **Investigation:** the Compliance Officer will promptly initiate an investigation and may refer the matter (or any part of it) to a grievance officer or other designee, who will look into and/or address the matter as the Compliance Officer directs. In undertaking the investigation, the Compliance Officer or grievance officer may interview, consult with, and/or request a written response to the issues raised in the grievance from any individual the grievance officer believes to have relevant information, including faculty, staff, and students.
6. **Representation:** the grievant and the party against whom the grievance is directed each have the right to have a representative. The party shall indicate whether he or she is to be assisted by

a representative and, if so, the name of that representative. For purposes of this procedure, an attorney is not an appropriate representative.

7. **Findings and Notification:** upon completion of the investigation, the grievance officer will prepare and transmit to the student, and to the party against whom the grievance is directed, a final report containing a summary of the investigation, written findings, and a proposed disposition. This transmission will be expected within 60 calendar days of the filing of the formal complaint. The deadline may be extended by the Compliance Officer for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure. The final report may also be provided, where appropriate, to any University officer whose authority will be needed to carry out the proposed disposition or to determine whether any personnel action is appropriate.
8. **Final Disposition:** the disposition proposed by the Compliance Officer will be put into effect promptly. The grievant or any party against whom the grievance or the proposed disposition is directed may appeal. The appeal to the Provost (as set forth below) will not suspend the implementation of the disposition proposed by the grievance officer, except in those circumstances where the Provost decides that good cause exists making the suspension of implementation appropriate.

### VI. Urgent Matters

Whenever the application of any of the time deadlines or procedures set forth in this grievance procedure creates a problem due to the nature of the complaint, the urgency of the matter, or the proximity of the upcoming event, the Compliance Officer will, at the request of the grievant, determine whether an appropriate expedited procedure can be fashioned.

### VII. Remedies

Possible remedies under this grievance procedure include corrective steps, actions to reverse the effects of discrimination or to end harassment, and measures to provide a reasonable accommodation or proper ongoing treatment. As stated above, a copy of the Compliance Officer's report may, where appropriate, be sent to University officer(s) to determine whether any personnel action should be pursued.

### VIII. Appeal

Within ten calendar days of the issuance of the final report, the grievant or the party against whom the grievance is directed may appeal to the Provost the grievance officer's determination.

An appeal is taken by filing a written request for review with the Compliance Officer at the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email).

The written request for review must specify the particular substantive and/or procedural basis for the appeal, and must be made on grounds other than general dissatisfaction with the proposed disposition. Furthermore, the appeal must be directed only to issues raised in the formal complaint as filed or to procedural errors in the conduct of the grievance procedure itself, and not to new issues.

The Compliance Officer will forward the appeal to the Provost, and also provide copies to the other party or parties. If the grievance involves a decision that is being challenged, the review by the Provost or his or her designee usually will be limited to the following considerations:

1. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?

2. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
3. Given the proper facts, criteria, and procedures, was the decision a reasonable one?

A copy of the Provost's written decision will be expected within 30 calendar days of the filing of the appeal and will be sent to the parties, the Compliance Officer and, if appropriate, to the University officer whose authority will be needed to carry out the disposition. The deadline may be extended by the Provost for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure. The decision of the Provost on the appeal is final.

## Title IX of the Education Amendments of 1972

It is the policy of Stanford University to comply with Title IX of the Education Amendment of 1972 and its regulations, which prohibit unlawful discrimination on the basis of sex. The Title IX Compliance Officer is Catherine Glaze, who has been appointed to coordinate the University's efforts to comply with the law. Anyone who believes that Stanford is not in compliance with Title IX and its regulations should contact the Title IX Coordinator, 419 Lagunita Street, Suite 240, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), [titleix@stanford.edu](mailto:titleix@stanford.edu) (email). (See also the following section for addressing Title IX Concerns relating to sexual harassment.)

## Title IX Concerns Relating to Sexual Harassment and the Violence Against Women Reauthorization Act of 2013

Catherine Glaze has been appointed Stanford's Title IX Coordinator to respond to matters of sexual assault, relationship (dating) violence and stalking (prohibited conduct). The Title IX Coordinator serves as a resource to review allegations of prohibited conduct and may provide interim accommodations relating to housing, academics, or no-contact letters while a matter is being reviewed. When prohibited conduct has been confirmed by a preponderance of the evidence, the Title IX Coordinator will provide long term accommodations and services to students to address the effects of sexual harassment and sexual violence. The Title IX Student Policy ([https://titleix.stanford.edu/sites/default/files/title\\_ix\\_student\\_policy\\_ay\\_2013-14\\_faculty\\_staff\\_may\\_2014\\_final\\_0.pdf](https://titleix.stanford.edu/sites/default/files/title_ix_student_policy_ay_2013-14_faculty_staff_may_2014_final_0.pdf)) provides the grievance procedure and appeal mechanism to review the University's actions relating to a Title IX concern involving Prohibited Conduct; see the Title IX web site (<https://titleix.stanford.edu>) for additional information. Additional resources are available the Sexual Assault Support and Resources (<https://notalone.stanford.edu>) web site. Ms. Glaze's contact information is [titleix@stanford.edu](mailto:titleix@stanford.edu); (650) 497-4955. An individual may contact the U.S. Department of Education, Office for Civil Rights (OCR). See also Administrative Guide Memos 2.1.2 Recruiting and Hiring of Regular Staff (<https://adminguide.stanford.edu/chapter-2/subchapter-1/policy-2-1-2>), 1.7.1 Sexual Harassment (<https://adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-1>), 1.7.2, Consensual Sexual or Romantic Relationships (<https://adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-2>), and 1.7.3, Sexual Misconduct and Sexual Assault (<https://adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-3>).

## Title VI of the Civil Rights Act of 1964

It is the policy of Stanford University to comply with Title VI of the Civil Rights Act of 1964 and its regulations, which prohibit unlawful discrimination on the basis of race, color, and national origin. The Title VI Compliance Officer is the Director of the Diversity and Access Office, who has been appointed to coordinate the University's efforts

to comply with the law. Anyone who believes that Stanford is not in compliance with Title VI and its regulations should contact the Director of the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email). Grievance procedures to address complaints of discrimination on the basis of race, color, and national origin are set forth in the "Student Non-Academic Grievance Procedure (p. )." See also Administrative Guide Memo 2.2.1 General Personnel Policies (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-1>).

## Grievances

A Stanford undergraduate or graduate student who believes that he or she has been subject to an improper decision on an academic matter may file a grievance pursuant to the Student Academic Grievance Procedure (p. 75). For other types of grievances, students should review the section that follows on the Student Non-Academic Grievance Procedure (p. ), and consult concerning applicable procedures with the Director of the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email).

An individual whose matter has been substantially addressed through one of Stanford's grievance procedures (including but not limited to the Student Academic Grievance Procedure, the Student ADA/Section 504 Grievance Procedure, the Grievance Resolution Procedure for Postdoctoral Scholars, the Student-Athlete Grievance Procedure, or the Student Non-Academic Grievance Procedure) may not raise and seek redress of the same matter under a different Stanford grievance procedure. The University retains discretion to determine when a matter has been substantially addressed.

### California Dept of Consumer Affairs Complaint Procedure

An individual may contact the Bureau for Private Postsecondary Education for review of a complaint. The bureau may be contacted online (<http://www.bppe.ca.gov>) or at 2535 Capitol Oaks Drive, Suite 400, Sacramento, CA 95833; phone: (916) 431-6924; fax: (916) 263-1897.

## Student Non-Academic Grievance Procedure Policy

The following is the policy:

1. Applicability
  - a. It is perhaps inevitable in any university that some students may at times feel improperly treated, and that concerns about unfairness (including potential discrimination and harassment) may also at times arise.

In this regard (and although this grievance procedure is not limited to concerns of discrimination), Stanford University's Nondiscrimination Policy provides in part: "Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence. "

b. At Stanford, there are a number of grievance procedures through which students can raise and seek redress for what they believe to be unfair, improper or discriminatory decisions, actions, or treatment. For example:

- i If the matter involves an academic decision, the Student Academic Grievance Procedure may be the applicable procedure.
- ii If the matter involves a disability-related concern, the Student ADA/Section 504 Grievance Procedure may be applicable.
- iii If the matter involves a student-athlete and his or her sport, the Student-Athlete Grievance Procedure may be applicable.

c. The purpose of the Student Non-Academic Grievance Procedure is to provide a process for students to seek resolution of disputes and grievances that may not fall within the scope of one of the other grievance processes, including those which may arise in a student's capacity as a student-employee.

d. As a general proposition, this procedure is available to undergraduates and graduate students at Stanford University. It is designed to address individual decisions or individual actions that affect the grievant personally in his or her capacity as a student, but it does not apply to matters proceeding or addressed through the Office of Community Standards or through the Dean's leave policy. This is likewise not a grievance procedure to address the concerns of student groups. Similarly and as a general proposition, dissatisfaction with a departmental, school, or University policy or practice of broad or general application is not grounds for a grievance under this procedure; the Director of the Diversity and Access Office (hereafter "the Director") may, in his or her discretion, entertain such a grievance in exceptional circumstances, such as where (for example) the policy or practice is alleged to be contrary to law. In the same way, the Director may entertain a grievance under this procedure brought by an individual who is not an undergraduate or graduate student, in an appropriate case or as required by law.

e. The Director is responsible for administering this Student Non-Academic Grievance Procedure.

- i The Director may be contacted at: Director of the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email), <http://www.stanford.edu/dept/ocr>.
- ii The Director in his or her sole discretion can decide whether to refer a grievance brought under this procedure to another grievance process. In cases involving allegations of sexual harassment in particular, the Director may wish to consult with the Director of the Sexual Harassment Policy Office as to the most appropriate way to proceed; see Section 5.d below. In cases involving student employment, the Director may wish to consult with the University's Department of Human Resources.

## 2. Informal Resolution

- a. As a general proposition (and although particular circumstances may warrant an exception), the student should first discuss the problem and seek a solution with the individual(s) most directly involved.
- b. If no resolution results (or if circumstances make discussion inappropriate with the person most directly involved), the student should then consult with the individual at the next (higher) administrative level in the department, school, residence or University administrative unit. Serious efforts should be made to resolve the issue locally at an informal level without resort to a

formal grievance; such efforts may continue even after the formal process is underway.

## 3. Formal Grievance

- a. If informal means of resolution prove inadequate, the student should set forth in writing the substance of the complaint, the grounds for it and the evidence on which it is based, and the efforts taken to date to resolve the matter. It is at this stage that the complaint becomes a formal grievance.
- b. The grievance document should be submitted to the Director. A grievance should be filed in a timely fashion, i.e., normally no later than thirty days after the end of the academic quarter in which the action that is the subject of the grievance occurred. Except in extraordinary circumstances, delay in filing a grievance will be grounds for rejection of that grievance.
- c. The Director will promptly initiate a review, which should normally be completed within sixty days. The Director may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance officer or other designee, who will look into and/or address the matter as the Director directs. The Director may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
- d. In undertaking this review, either the Director, his or her designee, or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information the reviewer considers relevant, including faculty, staff and students.
- e. The Director (or his or her designee) will issue his or her decision in writing, and take steps to initiate such corrective action as is called for (if any). Conduct meriting discipline will be brought to the attention of the appropriate disciplinary process.

## 4. Appeal

- a. If the student is dissatisfied with the disposition by the Director (or his or her designee), he or she may appeal to the Provost (Office of the President and Provost, Building 10, Stanford, CA 94305-2061; phone 650-725-4075; fax 650-725-1347). The appeal should be filed in writing with the Provost within ten days of the issuance of the decision by the Director (or his or her designee); a delay in filing the appeal may be grounds for rejection of that appeal.
- b. The Provost may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance appeal officer, who will review the matter at the Provost's direction. The Provost may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
- c. The Provost should normally complete his or her review of the appeal and issue his or her decision in writing within forty-five days. That decision is final.

## 5. General Provisions

- a. Time Guidelines—The time frames set forth herein are guidelines. They may be extended by the Director or Provost, as applicable, in his or her discretion for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure.
- b. Advisers—A student initiating or participating in a grievance under this procedure may be accompanied by an adviser in any

- discussion with the Director, the Provost or their designees, or a grievance or grievance appeal officer under this procedure; any adviser must be a current Stanford faculty, staff member or student.
- c. Ombuds—Students should be aware that the University Ombuds (<http://www.stanford.edu/dept/ocr/ombuds>) is available to discuss and advise on any matters of University concern and frequently help expedite resolution of such matters. Although it has no decision making authority, the Ombuds' Office has wide powers of inquiry.
  - d. Sexual Harassment and Sexual Misconduct and Sexual Assault—For information and resources concerning sexual harassment, students should refer to the web page of the Sexual Harassment Policy Office at <http://harass.stanford.edu>. For information and resources concerning sexual assault and relationship abuse, students should refer to the web page of the Sexual Violence Advisory Board at <http://www.stanford.edu/group/svab/help.shtml>.
  - e. No retaliation—Stanford University prohibits retaliation or reprisals against individuals based on their pursuit in good faith of a grievance under this procedure, or their participation in good faith in the grievance process.
  - f. Standards for Review—If the grievance involves a decision that is being challenged, the review by the Director, as well as the review by the Provost on appeal, usually will be limited to the following considerations:
    - i. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
    - ii. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
    - iii. Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?
- b. The grievance document should be submitted to the Director. A grievance should be filed in a timely fashion, i.e., normally no later than thirty days after the end of the academic quarter in which the action that is the subject of the grievance occurred. Except in extraordinary circumstances, delay in filing a grievance will be grounds for rejection of that grievance.
  - c. The Director will promptly initiate a review, which should normally be completed within sixty days. The Director may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance officer or other designee, who will look into and/or address the matter as the Director directs. The Director may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
  - d. In undertaking this review, either the Director, his or her designee, or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information the reviewer considers relevant, including faculty, staff and students.
  - e. The Director (or his or her designee) will issue his or her decision in writing, and take steps to initiate such corrective action as is called for (if any).

### 3. Appeal

- a. If the grievant is dissatisfied with the disposition by the Director (or his or her designee), he or she may appeal to the Provost (Office of the President and Provost, Building 10, Stanford, CA 94305-2061; phone 650-725-4075; fax 650-725-1347). The appeal should be filed in writing with the Provost within ten days of the issuance of the decision by the Director (or his or her designee); a delay in filing the appeal may be grounds for rejection of that appeal.
- b. The Provost may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance appeal officer, who will review the matter at the Provost's direction. The Provost may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
- c. The Provost should normally complete his or her review of the appeal and issue his or her decision in writing within forty-five days. That decision is final.

### 4. General Provisions

- a. Time Guidelines—The time frames set forth herein are guidelines. They may be extended by the Director or Provost, as applicable, in his or her discretion for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure.
- b. No Retaliation—Stanford University prohibits retaliation or reprisals against individuals based on their pursuit in good faith of a grievance under this procedure, or their participation in good faith in the grievance process.
- c. Standards for Review—If the grievance involves a decision that is being challenged, the review by the Director, as well as the review by the Provost on appeal, usually will be limited to the following considerations:
  - i. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria

## Age Discrimination Act of 1975

The following is the policy:

### 1. Policy

It is the policy of Stanford University to comply with the Age Discrimination Act of 1975 and its regulations, which prohibit unlawful discrimination on the basis of age. The Age Discrimination Act Compliance Officer is the Director of the Diversity and Access Office ("the Director"), who has been appointed to coordinate the University's efforts to comply with the law. Anyone who believes that Stanford is not in compliance with the Age Discrimination Act and its regulations ("the Act") should contact the Director at the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email).

### 2. Grievance Procedure

- a. An individual who believes that Stanford is not acting in compliance with the Act and who wishes to file a grievance should set forth in writing the substance of his or her complaint, the grounds for it and the evidence on which it is based, and the efforts (if any) taken to date to resolve the matter. It is at this stage that the complaint becomes a formal grievance.

brought to bear that substantially affected the decision to the detriment of the grievant?

- ii Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
- iii Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?

## Ownership and Use of Stanford Name and Trademarks

Stanford registered marks, as well as other names, seals, logos, and other symbols and marks that are representative of Stanford, may be used solely with permission of Stanford. Merchandise bearing Stanford's names and marks, such as t-shirts, glassware, and notebooks, must be licensed. For complete text of the currently applicable policy, including the University officers authorized to grant permission to use the Stanford name and marks, see Administrative Guide Memo 1.5.4 Ownership and Use of Stanford Name and Trademarks (<https://adminguide.stanford.edu/chapter-1/subchapter-5/policy-1-5-4>).

## Copyright

Copyright laws protect original works of authorship and give the owners of copyrights the exclusive right to do and to authorize others to do certain things in regard to a copyrighted work, including: make copies, distribute the work, display or perform the work publicly, and create derivative works. Copyright laws apply to nearly all forms of captured content, including traditional works like books, photographs, music, drama and sculpture. The laws also adapt to changes in technologies, and include in their scope modern forms of works like motion pictures, web sites, electronic media, software, multimedia works and some databases. Registration is not required to obtain a copyright, so if in doubt, assume a copyright applies.

Unless an exception to the copyright owner's exclusive rights applies, you must obtain permission from the copyright owner to copy, distribute, display or perform a copyrighted work in any medium for any purpose. Be especially mindful of copyright principles when using the Internet. Just because a work is posted on the Internet does not mean that the owner of the copyright has given you permission to use it. In general, do not post material onto the Internet without copyright clearance.

Stanford University Libraries have licenses with many publishers, which permit copying of materials in accordance with the educational, research or administrative functions of the University. In addition, there are four major exceptions to the copyright owner's exclusive rights, which (if applicable) permit limited use without permission. These are: the fair use exception, the library exception, the face-to-face teaching exception, and the distance-learning exception. For a more detailed explanation of these exceptions, the copyright laws and Stanford's copyright policies, please review the University's Copyright Reminder ([http://www.sul.stanford.edu/libraries\\_collections/copyright\\_reminders](http://www.sul.stanford.edu/libraries_collections/copyright_reminders)) web site. It is each person's responsibility to be aware of and abide by copyright law; violation may result in civil or criminal liability, and constitutes grounds for University discipline, up to and including discharge, dismissal and expulsion.

## Peer-to-Peer File Sharing

The use of file-sharing networks and software to download and share copyrighted works like software, music, movies, television programs, and books can violate copyright laws. Both the person who makes an illegal copy of a copyrighted work available and the person who receives or downloads an illegal copy have violated the law and Stanford policies. Many file-sharing programs have default settings that share copyrighted

files, such as music and movies, through the Internet. Before enabling any of these programs students, faculty, or staff must read the fine print, make sure to understand the program itself, and only use such programs lawfully. Under the Digital Millennium Copyright Act (DMCA), copyright owners are entitled to notify Internet service providers, such as Stanford, that IP addresses linked to the Stanford network are sharing copies of music, movies, or other content without authorization. The law requires the University to respond to such complaints by eliminating access to the infringing materials. Stanford will disconnect students who fail to respond to a DMCA complaint promptly. Furthermore, the University also will suspend or terminate computer access to the Stanford network, including termination of the SUNet ID, to members of the community who continue to violate copyright laws. Finally, the University will take action through the student, employee, or faculty disciplinary processes if necessary. Beyond University consequences, copyright holders may file civil lawsuits against copyright infringers seeking extensive monetary damages. If compelled by a lawful subpoena, Stanford may be required to identify students, faculty, staff, or others who have violated copyright law. For more information about file-sharing, refer to Residential Computing's online resource, File-Sharing and Copyright Law (<http://rescomp.stanford.edu/info/dmca>) web site.

## Recording Lectures

Except with permission from the Office of Accessible Education (<http://studentaffairs.stanford.edu/oea>) or the instructor in question, students may not audio- or video-record lectures. Even with permission, students may only use such recordings for personal use; no posting or further distribution or use is permitted.

## Domestic Partners

In October 1990, Stanford University adopted a domestic partners policy. This policy, which implements the University's nondiscrimination policy, makes services that have historically been available to married students available on an equal basis to students with same-sex or opposite-sex domestic partners. These services include access to student housing, a courtesy card that provides access to University facilities, and the ability to purchase medical care at Vaden Health Service. A domestic partnership is defined as an established long-term partnership with an exclusive mutual commitment in which the partners share the necessities of life and ongoing responsibility for their common welfare.

## Sexual Harassment and Consensual Sexual or Romantic Relationships

For the complete text of the currently applicable version of this policy, see Administrative Guide Memo 2.2.4 Sexual Harassment and Consensual Sexual or Romantic Relationships (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-4>). It is also available from the Sexual Harassment Policy Office (<http://harass.stanford.edu>) homepage.

## Summary

Stanford University strives to provide a place of work and study free of sexual harassment, intimidation or exploitation. Where sexual harassment is found to have occurred, the University will act to stop the harassment, prevent its recurrence, and discipline and/or take other appropriate action against those responsible.

## Policy

The following is quoted from the policy:

1. In General
  - a. Applicability and Sanctions for Policy Violations—This policy applies to all students, faculty and staff of Stanford University, as well as to others who participate in Stanford programs

and activities. Its application includes Stanford programs and activities both on and off-campus, including overseas programs. Individuals who violate this policy are subject to discipline up to and including discharge, expulsion, and/or other appropriate sanction or action.

- b. **Respect for Each Other**—Stanford University strives to provide a place of work and study free of sexual harassment, intimidation or exploitation. It is expected that students, faculty, staff and other individuals covered by this policy will treat one another with respect.
- c. **Prompt Attention**—Reports of sexual harassment are taken seriously and will be dealt with promptly. The specific action taken in any particular case depends on the nature and gravity of the conduct reported, and may include intervention, mediation, investigation and the initiation of grievance and disciplinary processes as discussed more fully below. Where sexual harassment is found to have occurred, the University will act to stop the harassment, prevent its recurrence, and discipline and/or take other appropriate action against those responsible.
- d. **Confidentiality**—The University recognizes that confidentiality is important. Sexual harassment advisers and others responsible to implement this policy will respect the confidentiality and privacy of individuals reporting or accused of sexual harassment to the extent reasonably possible. Examples of situations where confidentiality cannot be maintained include circumstances when the University is required by law to disclose information (such as in response to legal process) and when disclosure is required by the University's outweighing interest in protecting the rights of others.
- e. **Protection Against Retaliation**—Retaliation and/or reprisals against an individual who in good faith reports or provides information in an investigation about behavior that may violate this policy are against the law and will not be tolerated. Intentionally making a false report or providing false information, however, is grounds for discipline.
- f. **Relationship to Freedom of Expression**—Stanford is committed to the principles of free inquiry and free expression. Vigorous discussion and debate are fundamental to the University, and this policy is not intended to stifle teaching methods or freedom of expression generally, nor will it be permitted to do so. Sexual harassment, however, is neither legally protected expression nor the proper exercise of academic freedom; it compromises the integrity of the University, its tradition of intellectual freedom and the trust placed in its members.

## 2. What Is Sexual Harassment?

Unwelcome sexual advances, requests for sexual favors, and other visual, verbal or physical conduct of a sexual nature constitute sexual harassment when:

- a. It is implicitly or explicitly suggested that submission to or rejection of the conduct will be a factor in academic or employment decisions or evaluations, or permission to participate in a University activity; or
- b. The conduct has the purpose or effect of unreasonably interfering with an individual's academic or work performance or creating an intimidating or hostile academic, work or student living environment.

Determining what constitutes sexual harassment depends upon the specific facts and the context in which the conduct occurs.

Sexual harassment may take many forms—subtle and indirect, or blatant and overt. For example,

- i It may be conduct toward an individual of the opposite sex or the same sex.
  - ii It may occur between peers or between individuals in a hierarchical relationship.
  - iii It may be aimed at coercing an individual to participate in an unwanted sexual relationship or it may have the effect of causing an individual to change behavior or work performance.
  - iv It may consist of repeated actions or may even arise from a single incident if sufficiently egregious.
- c. The University's Policy on Sexual Assault (see Guide Memo 23.3, Sexual Assault ([http://adminguide.stanford.edu/23\\_3.pdf](http://adminguide.stanford.edu/23_3.pdf))) may also apply when sexual harassment involves physical contact.

## 3. What To Do About Sexual Harassment

Individuals seeking further information are directed to the following resources:

- The Sexual Harassment Policy Office (Mariposa House, 585 Capistrano Way, Room 208-209, Stanford University, Stanford, CA, 94305-8230; (650) 723-1583; email: [harass@stanford.edu](mailto:harass@stanford.edu) for information, consultation, advice, or to lodge a complaint. Note that anonymous inquiries can be made to the SHPO by phone during business hours.
- The Sexual Harassment Policy Office web page at <http://harass.stanford.edu>.
- Any designated Sexual Harassment Adviser or resource person listed in 3.a or 5.a.

The following are the primary methods for dealing with sexual harassment at Stanford. They are not required to be followed in any specific order. However, early informal methods are often effective in correcting questionable behavior.

- a. **Consultation**—Consultation about sexual harassment is available from the Sexual Harassment Policy Office, Sexual Harassment Advisers (including residence deans), human resources officers, employee relations specialists, counselors at Counseling and Psychological Services (CAPS) or the Help Center, chaplains at Memorial Church, ombudspersons and others. A current list of Sexual Harassment Advisers is available from the Sexual Harassment Policy Office and at <http://harass.stanford.edu/SHadvisers.html>. Consultation is available for anyone who wants to discuss issues related to sexual harassment, whether or not "harassment" actually has occurred, and whether the person seeking information is a complainant, a person who believes his or her own actions may be the subject of criticism (even if unwarranted), or a third party.

Often there is a desire that a consultation be confidential or "off the record." This can usually be achieved when individuals discuss concerns about sexual harassment without identifying the other persons involved, and sometimes even without identifying themselves. Confidential consultations about sexual harassment also may be available from persons who, by law, have special professional status, such as:

- i Counselors at Counseling and Psychological Services (CAPS), <http://caps.stanford.edu>

ii Counselors at the Help Center, <http://www.stanford.edu/dept/helpcenter>

iii Chaplains at Memorial Church

iv The University Ombudsperson, <http://www.stanford.edu/dept/ombuds>

In these latter cases, the level of confidentiality depends on what legal protections are held by the specific persons receiving the information and should be addressed with them before specific facts are disclosed. For more information see <http://harass.stanford.edu/confidential.html>.

For further information on confidentiality, see Section 1(d) above.

- b. Direct Communication—An individual may act on concerns about sexual harassment directly, by addressing the other party in person or writing a letter describing the unwelcome behavior and its effect and stating that the behavior must stop. A Sexual Harassment Adviser can help the individual plan what to say or write, and likewise can counsel persons who receive such communications. Reprisals against an individual who in good faith initiates such a communication violate this policy.
- c. Third Party Intervention—Depending on the circumstances, third party intervention in the workplace, student residence or academic setting may be attempted. Third party intervenors may be the Sexual Harassment Advisers, human resources professionals, the ombudspersons, other faculty or staff, or sometimes mediators unrelated to the University.

When third party intervention is used, typically the third party (or third parties) will meet privately with each of the persons involved, try to clarify their perceptions and attempt to develop a mutually acceptable understanding that can insure that the parties are comfortable with their future interactions. Other processes, such as a mediated discussion among the parties or with a supervisor, may also be explored in appropriate cases.

Possible outcomes of third party intervention include explicit agreements about future conduct, changes in workplace assignments, substitution of one class for another, or other relief, where appropriate.

- d. Formal Grievance, Appeal, and Disciplinary Processes—Grievance, appeal, or disciplinary processes may be pursued as applicable.
- i Grievances and Appeals—The applicable procedure depends on the circumstances and the status of the person bringing the charge and the person against whom the charge is brought. Generally, the process consists of the individual's submission of a written statement, a process of fact-finding or investigation by a University representative, followed by a decision and, in some cases, the possibility of one or more appeals, usually to Stanford administrative officers at higher levels. The relevant procedure (see below) should be read carefully, since the procedures vary considerably.

If the identified University fact-finder or grievance officer has a conflict of interest, an alternate will be arranged, and the Director of the Sexual Harassment Policy Office or the Director of Employee and Labor Relations can help assure that this occurs.

In most cases, grievances and appeals must be brought within a specified time after the action complained of. While informal resolution efforts will not automatically extend the time limits for filing a grievance or appeal, in appropriate

circumstances the complainant and the other relevant parties may mutually agree in writing to extend the time for filing a grievance or appeal.

A list of the established grievance and appeal procedures is located at [http://hrweb.stanford.edu/elf/policies/list\\_grievance\\_procedures.html](http://hrweb.stanford.edu/elf/policies/list_grievance_procedures.html). Copies may also be obtained from the Sexual Harassment Policy Office, <http://www.stanford.edu/group/SexHarass>.

Copies of the following may be obtained from Employee and Labor Relations, 651 Serra Street:

1. "Solving Workplace Problems at Stanford: Understanding the Staff Dispute Resolution Policy" (also at <http://hrweb.stanford.edu/forms/staffresolution.pdf>.)
2. "Solving Workplace Problems at Stanford: Information for Academic Staff – Librarians and Academic Staff – Research Associates"
3. "The Dispute Resolution Process (A User's Guide)"

- ii Disciplinary Procedures—In appropriate cases, disciplinary procedures may be initiated. The applicable disciplinary procedure depends on the status of the individual whose conduct is in question. For example, faculty are subject to the Statement on Faculty Discipline (<http://www.stanford.edu/dept/provost/faculty/policies/handbook/ch4.html#statementonfacultydiscipline>), and students to the Fundamental Standard. For additional information related to student disciplinary procedures, see the Office of Community Standards (<http://studentaffairs.stanford.edu/communitystandards>).

The individuals referenced in this section are available to discuss these options and differing methods for dealing with sexual harassment.

#### 4. Procedural Matters

- a. Investigations—If significant facts are contested, an investigation may be undertaken. The investigation will be conducted in a way that respects, to the extent possible, the privacy of all of the persons involved. In appropriate cases, professional investigators may be asked to assist in the investigation. The results of the investigation may be used in the third party intervention process or in a grievance or disciplinary action.
- b. Recordkeeping—The Sexual Harassment Policy Office will track reports of sexual harassment for statistical purposes and report at least annually to the University President concerning their number, nature and disposition.

The Sexual Harassment Policy Office may keep confidential records of reports of sexual harassment and the actions taken in response to those reports, and use them for purposes such as to identify individuals or departments likely to benefit from training so that training priorities can be established. No identifying information will be retained in cases where the individual accused was not informed that there was a complaint.

- c. Indemnification and Costs—The question sometimes arises as to whether the University will defend and indemnify a Stanford employee accused of sexual harassment. California law provides, in part, "An employer shall indemnify [its] employee for all that the employee necessarily expends or loses in direct consequence of the discharge of his [or her] duties as such." The issue of indemnification depends on the facts and circumstances of each situation. Individuals who violate this policy, however, should be

aware that they and/or their schools, institutes, or other units may be required to pay or contribute to any judgments, costs and expenses incurred as a result of behavior that is wrongful and/or contrary to the discharge of the employee's duties. In general, see Administrative Guide Memo 2.4.6 Indemnification (<https://adminguide.stanford.edu/chapter-2/subchapter-4/policy-2-4-6>).

## 5. Resources for Dealing with Sexual Harassment

- a. Advice—Persons who have concerns about sexual harassment should contact the Sexual Harassment Policy Office, any Sexual Harassment Adviser at <http://harass.stanford.edu/SHadvisers.html> or one of the other individuals listed below. Reports should be made as soon as possible: the earlier the report, the easier it is to investigate and take appropriate remedial action. When reports are long delayed, the University will try to act to the extent it is reasonable to do so, but it may be impossible to achieve a satisfactory result after much time has passed.

Likewise, anyone who receives a report or a grievance involving sexual harassment should promptly consult with the Sexual Harassment Policy Office or with a Sexual Harassment Adviser.

There are a number of individuals specially trained and charged with specific responsibilities in the area of sexual harassment. In brief, they are:

- i Sexual Harassment Advisers (<http://harass.stanford.edu/SHadvisers.html>) serve as resources to individuals who wish to discuss issues of sexual harassment, either because they have been harassed or because they want information about the University's policy and procedures. There is usually at least one Adviser assigned to each of the schools at the University and to each large work unit; most of the residence deans also have been appointed as Sexual Harassment Advisers. Advisers are also authorized to receive complaints.
  - ii The Director of the Sexual Harassment Policy Office is responsible for the implementation of this policy. The Director's Office also provides advice and consultation to individuals when requested; receives complaints and coordinates their handling; supervises the other Advisers; encourages and assists prevention education for students, faculty and staff; keeps records showing the disposition of complaints; and generally coordinates matters arising under this policy. Because education and awareness are the best ways to prevent sexual harassment; developing awareness, education and training programs and publishing informational material are among the most important functions of the Sexual Harassment Policy Office (<http://harass.stanford.edu>).
  - iii As stated above, individuals with concerns about sexual harassment may also discuss their concerns informally with psychological counselors (for example through CAPS or the HELP Center), chaplains (through the Memorial Chapel), or the University ombudsperson. For more information, see <http://harass.stanford.edu/resources.html>.
- b. External Reporting—Sexual harassment is prohibited by state and federal law. In addition to the internal resources described above, individuals may pursue complaints directly with the government agencies that deal with unlawful harassment and discrimination claims, e.g., the U.S. Equal Employment Opportunity Commission (EEOC), the Office for Civil Rights (OCR) of the U.S. Department of Education, and the State of California Department of Fair Employment and Housing (DFEH). These agencies are listed in the Government section of the telephone book. A violation of this

policy may exist even where the conduct in question does not violate the law.

## 6. Consensual Sexual or Romantic Relationships

- a. In General—There are special risks in any sexual or romantic relationship between individuals in inherently unequal positions, and parties in such a relationship assume those risks. In the University context, such positions include (but are not limited to) teacher and student, supervisor and employee, senior faculty and junior faculty, mentor and trainee, adviser and advisee, teaching assistant and student, coach and athlete, and the individuals who supervise the day-to-day student living environment and student residents. Because of the potential for conflict of interest, exploitation, favoritism, and bias, such relationships may undermine the real or perceived integrity of the supervision and evaluation provided, and the trust inherent particularly in the teacher-student context. They may, moreover, be less consensual than the individual whose position confers power or authority believes. The relationship is likely to be perceived in different ways by each of the parties to it, especially in retrospect.

Moreover, such relationships may harm or injure others in the academic or work environment. Relationships in which one party is in a position to review the work or influence the career of the other may provide grounds for complaint by third parties when that relationship gives undue access or advantage, restricts opportunities, or creates a perception of these problems. Furthermore, circumstances may change, and conduct that was previously welcome may become unwelcome. Even when both parties have consented at the outset to a romantic involvement, this past consent does not remove grounds for a charge based upon subsequent unwelcome conduct.

Where such a relationship exists, the person in the position of greater authority or power will bear the primary burden of accountability, and must ensure that he or she—and this is particularly important for teachers—does not exercise any supervisory or evaluative function over the other person in the relationship. Where such recusal is required, the recusing party must also notify his or her supervisor, department chair or dean, so that such chair, dean or supervisor can exercise his or her responsibility to evaluate the adequacy of the alternative supervisory or evaluative arrangements to be put in place. Staff members may notify their local human resources officers. To reiterate, the responsibility for recusal and notification rests with the person in the position of greater authority or power. Failure to comply with these recusal and notification requirements is a violation of this policy, and therefore grounds for discipline. The University has the option to take any action necessary to insure compliance with the spirit of this recusal policy, including transferring either or both employees in order to minimize disruption of the work group. In those extraordinarily rare situations where it is programmatically infeasible to provide alternative supervision or evaluation, the cognizant Dean or Director must approve all evaluative and compensation actions.

- b. With Students—At a university, the role of the teacher is multifaceted, including serving as intellectual guide, counselor, mentor and adviser; the teacher's influence and authority extend far beyond the classroom. Consequently and as a general proposition, the University believes that a sexual or romantic relationship between a teacher and a student, even where consensual and whether or not the student would otherwise be subject to supervision or evaluation by the teacher, is inconsistent with the proper role of the teacher, and should be avoided. The University therefore very strongly discourages such relationships.



7. Policy Review and Evaluation—This policy went into effect on October 6, 1993, and was amended on November 30, 1995, and on May 30, 2002. It is subject to periodic review, and any comments or suggestions should be forwarded to the Director of the Sexual Harassment Policy Office.

## Resources

The following is a summary of resources concerning sexual harassment available to members of the Stanford Community:

A brochure containing the policy, a list of current sexual harassment advisers, confidential resources, and other helpful information is available online at the Sexual Harassment Policy Office (<http://harass.stanford.edu>) web site, and in printed form from the Sexual Harassment Policy Office at Mariposa House, 585 Capistrano Way, Room 208-209, Stanford University, Stanford, CA, 94305-8230; (650) 723-1583; email: [harass@stanford.edu](mailto:harass@stanford.edu). Copies of the University policy on sexual assault, which complements this sexual harassment policy, as well as all other documents mentioned in this section, are also available at the Sexual Harassment Policy Office.

All faculty, staff, and students who have questions regarding this policy and its enforcement can consult with a Sexual Harassment Adviser or can be directed to the local Personnel Officer or Regional Human Resources Manager. Faculty members should contact their dean or department chair, and students should contact the Director of the Sexual Harassment Policy Office or the Dean of Student Affairs.

Sexual Harassment Policy Office—telephone: (650) 723-1583; email: [harass@stanford.edu](mailto:harass@stanford.edu).

*Director:* Laraine Zappert (Clinical Professor, Psychiatry and Behavioral Sciences)

*Assistant Director:* Nanette Andrews

## Sexual Misconduct and Sexual Assault

The University's Policy on Sexual Misconduct and Sexual Assault is published in complete form in the Administrative Guide Memo 2.2.4 Sexual Harassment and Consensual Sexual or Romantic Relationships (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-4>).

### Summary

The following summarizes the policy on Sexual Assault and provides information on resources available to members of the Stanford community.

### Policy

Under Title IX, sexual violence (sexual misconduct and sexual assault) is a severe form of sexual harassment. Sexual misconduct and sexual assault are unacceptable and is not tolerated at Stanford University. All University employees (including student residence staff employees) have a duty to report claims of sexual misconduct or sexual assault to Cathy Glaze, Title IX Coordinator at (650) 497-4955 (voice), [titleix@stanford.edu](mailto:titleix@stanford.edu), <https://titleix.stanford.edu/>. For students, report claims to the Title IX Coordinator or the Office of Sexual Assault and Relationship Abuse (SARA) at (650) 725-1056 or [saraoffice@stanford.edu](mailto:saraoffice@stanford.edu).

The University urges an individual who has been subjected to sexual misconduct or sexual assault to make an official report. A report of the matter will be dealt with promptly. Confidentiality will be maintained to the extent possible.

The University is committed to providing information regarding on- and off-campus services and resources to all parties involved.

Students, faculty and staff found to be in violation of this policy will be subject to discipline up to and including termination, expulsion or other appropriate institutional sanctions; affiliates and program participants may be removed from University programs and/or prevented from returning to campus.

A comprehensive web site dedicated to sexual violence awareness, prevention and support can be found at Office of Sexual Assault & Relationship Abuse Education & Response (SARA) (<http://studentaffairs.stanford.edu/sara>). The site contains a list of resources and describes reporting options.

## Definitions

### **What is Sexual Misconduct?**

Sexual misconduct is the commission of an unwanted sexual act, whether by an acquaintance or by a stranger, that occurs without indication of consent.

### **What is Sexual Assault?**

Sexual assault is the actual, attempted or threatened unwanted sexual act, whether by an acquaintance or by a stranger, accomplished (1) against a person's will by means of force (express or implied), violence, duress, menace, fear or fraud, or (2) when a person is incapacitated or unaware of the nature of the act, due to unconsciousness, sleep and/or intoxicating substances.

### **What is Consent?**

Consent is informed, freely given, and mutually understood. Consent requires an affirmative act or statement by each participant. If coercion, intimidation, threats and/or physical force are used, there is no consent. If a person is mentally or physically incapacitated or impaired so that the person cannot understand the fact, nature or extent of the sexual situation, there is no consent; this includes conditions due to alcohol or drug consumption or being asleep or unconscious. Whether one has taken advantage of a position of influence over another may be a factor in determining consent.

## Notification

With the consent of the victim, allegations of sexual assault received by University offices or personnel shall be communicated promptly to the Department of Public Safety, 711 Serra Street, telephone 9-911 for emergency response or (650) 723-9633 during normal business hours.

## Emergency Services Available to Victims

Victims of sexual assault are urged to seek immediate attention from emergency police, medical, and counseling services. On the Stanford campus and in the immediate vicinity, the following provide 24-hour response and will arrange for police assistance, medical assistance, emotional support services, and advocacy and support:

- "911" Emergency Network: dial 9-911 from University phones or 911 from outside phones
- Santa Clara Valley Medical Center, 751 South Bascom Avenue, San Jose, telephone (408) 885-5000
- YWCA Stanford Hotline, for students, telephone (650) 725-9955
- Stanford Hospital and Clinics, 300 Pasteur Drive, Stanford, telephone (650) 723-5111
- Residence and Graduate Life Deans, page through 723-8222, extension 25085

## Non-Emergency Resources

Office of Sexual Assault & Relationship Abuse Education & Response (SARA) (725-1056) provides comprehensive and consistent response

to incidents of sexual and relationship violence to the campus community. SARA provides case consultation to students and staff, case management for reported assaults and information and referrals to services on and off campus. The office also assists with educational outreach and training to increase awareness, sensitivity, and community accountability in the prevention of these acts. Online information is available at the Sexual Assault & Relationship Abuse Education & Response (SARA) (<http://studentaffairs.stanford.edu/sara.html>) web site.

Additional resources for students are available at Vaden Health Service at (650) 723-3785, including short-term counseling, referral to long-term therapy, follow-up pregnancy testing, and testing and treatment for sexually transmitted diseases. Additional services for faculty and staff are available at the University's HELP Center, Galvez House (723-4577), including general counseling, information, support, and referral. The University ombuds (723-3682) is available to all in the Stanford community for general counseling, advice, and advocacy. Cathy Glaze, Title IX Coordinator, Mariposa House, 585 Capistrano Way, Stanford University, Stanford CA, 94305-8230, (650) 497-4955, (650) 497-9257, [titleix@stanford.edu](mailto:titleix@stanford.edu), <https://titleix.stanford.edu/>, is available to assist students to address the effects of sexual harassment and sexual violence

## Confidentiality of Information

The University will make reasonable and appropriate efforts to preserve an individual's privacy and protect the confidentiality of information. However, because of laws relating to reporting and other state and federal laws, the University cannot guarantee confidentiality to those who report incidents of sexual violence except where those reports are privileged communications with those in legally protected roles (set forth below). The professional being consulted should, if possible, make these limits clear before any disclosure of facts.

An individual can speak confidentially with certain individuals in legally protected roles. They include sexual assault counselors such as those at the YWCA Sexual Assault Center at Stanford, the Help Center, Counseling and Psychological Services (CAPS) and clergy. Exceptions to maintaining confidentiality are set by law; for example, physicians and nurses who treat any physical injury sustained during a sexual assault are required to report it to law enforcement. In addition, physicians, nurses, psychologists, psychiatrists, teachers and social workers must report a sexual assault committed against a person under age 18.

Information shared with other individuals is not legally protected from being disclosed. Considerations with respect to a complainant's request for confidentiality include factors such as the University's ability to respond effectively, to prevent further harassment or to ensure the safety of the University community. For example, an advisor, the Dean of Student Life, a Residence Dean or a Resident Assistant may need to inform other individuals to protect their safety or rights, in fairness to the persons involved, or in response to legal requirements. As required by law, all disclosures to any University employee of an on-campus sexual assault must be reported for statistical purposes only (without personal identifiers) to the Stanford University Department of Public Safety, which has the responsibility for tabulating and annually publishing sexual assault and other crime statistics. Such reports are for statistical purposes and do not include individual identities.

State law permits law enforcement authorities to keep confidential the identity of a person officially reporting a sexual assault. The Stanford University Department of Public Safety policy is to maintain such confidentiality. However, if the District Attorney files a criminal charge, confidentiality might not be maintained.

If a complaint is filed with the Office of Judicial Affairs then the accused student must be provided with the name of the alleged victim and witnesses, if applicable. However, accommodations can be made to

protect the victim's privacy, as described on the website for the Office of Judicial Affairs.

## Information about Options

The University offices responding to allegations of sexual misconduct or sexual assault will inform affected individuals, at a minimum, of the options of: criminal prosecution, civil prosecution, the disciplinary process, the appropriate Title IX grievance procedure, alternative housing assignments, and academic assistance alternatives.

## Political Activities

For the complete text of the currently applicable version of this policy, see Administrative Guide Memo 1.5.1 Political Activities (<https://adminguide.stanford.edu/chapter-1/subchapter-5/policy-1-5-1>).

## Summary

The following summarizes the policy on Political Activities:

Stanford University, as a charitable entity, is subject to federal, state, and local laws and regulations regarding political activities: campaign activities, lobbying, and the giving of gifts to public officials.

While all members of the University community are naturally free to express their political opinions and engage in political activities to whatever extent they wish, it is very important that they do so only in their individual capacities and avoid even the appearance that they are speaking or acting for the University in political matters.

In the limited circumstances where individuals must speak or act on behalf of the University in the political arena, they must do so in accordance with the provisions of this Guide Memo.

### Policy

The following is quoted from the policy:

1. Summary of Legal Requirements and Restrictions
  - a. Campaign Activities: contributions of money, goods, or services to candidates for political office and in support of or opposition to ballot measure campaigns are subject to a wide variety of political laws. Depending on the jurisdiction and the campaign, political contributions may be prohibited or limited and, in nearly all cases, are subject to a complicated series of disclosure rules. Because of the University's tax-exempt status, the University is legally prohibited from endorsing candidates for political office or making any contribution of money, goods, or services to candidates. It is important, therefore, that no person inadvertently cause the University to make such a contribution.
  - b. Lobbying: lobbying can generally be described as any attempt to influence the action of any legislative body (for example, Congress, state legislatures, county boards, city councils, and their staffs) or any federal, state, or local government agency. Laws regulating lobbying exist at the federal, state, and local levels but can differ widely in scope, depending on the jurisdiction. Some laws, for example, only regulate lobbying of the legislative branch. Others, however, also cover lobbying of administrative agencies and officers in the executive branch (for example, lobbying for federally-funded grants). To one degree or another, however, most lobbying laws require registration and reporting by individuals engaged in attempts to influence governmental action.

Tax-exempt organizations are permitted to lobby, and the University engages in lobbying on a limited number of issues, mostly those affecting education, research, and related activities. There is usually some threshold of time or money spent on

lobbying that triggers registration and reporting requirements. Regardless of thresholds, however, no University employee—other than the following individuals, on matters under their jurisdiction—may lobby on behalf of the University without specific authorization:

- President
- Provost
- Deans of the Seven Schools
- Vice Provost and Dean of Research
- Vice President for Business Affairs and Chief Financial Officer
- Executive Director of Human Resources
- Director of the Stanford Linear Accelerator Center
- Director of the Hoover Institution
- General Counsel
- Vice President for Public Affairs

The Vice Provost and Dean of Research may grant permission to faculty members to lobby on behalf of the University for specific purposes. The Director of Government and Community Relations may grant permission to staff members to lobby on behalf of the University for specific purposes. All lobbying on behalf of the University should be coordinated with the Director of Government and Community Relations.

- c. Giving of Gifts to Public Officials and Staff: almost all jurisdictions have strict rules on the extent to which gifts and honoraria may be given to public officials (both elected and non-elected officials and, often, staff). In some cases gifts and honoraria are prohibited; in others they are limited; and in most cases they are subject to detailed disclosure. In addition, in some jurisdictions such as California, gifts to both state and local public officials can result in a public official's disqualification from participation in any governmental action affecting the interests of the donor. Meals, travel, and entertainment are the most common types of gifts, but gift rules can also apply in cases where public officials attend a reception or receive tickets to sporting or other events.

As a non-profit organization, the University generally does not give gifts to public officials and, in those limited cases where it does give such gifts, it must do so in accordance with all applicable laws and regulations. Therefore, any University employee who, on behalf of the University, wishes to make a gift to a public official must receive prior approval from the Director of Government and Community Relations before making such a gift.

- d. Reporting of Political Activities: the University must report most of its political activities above certain thresholds. Therefore, any University employee engaging in such activities on behalf of the University should carefully review the remainder of this Guide Memo and should discuss the relevant activities in advance with the Director of Government and Community Relations.

## 2. Prohibited and Restricted Political Activities

### a. In General:

- i No person may, on behalf of the University, engage in any political activity in support of or opposition to any candidate for elective public office (including giving or receiving funds

or endorsements), nor shall any University resources be used for such purpose.

- ii No person may, on behalf of the University, lobby (or use University resources to lobby) any federal, state, or local legislative or administrative official or staff member unless specifically authorized to do so. Any lobbying activity, even when authorized, must be conducted in compliance with this Guide Memo, other applicable University policies, and applicable law.
- iii No person may, on behalf of the University, give a gift (or use any University resources to give a gift) to any federal, state, or local official or staff member, except in compliance with this Guide Memo, other applicable University policies, and applicable law.
- iv No person supporting candidates for public office or engaging in other political activities may use University space or facilities or receive University support, except in the limited ways described in section 3A, below.
- v No person may use for lobbying activities federally-funded contract or grant money received by the University.

Even the foregoing activities that are only restricted, rather than prohibited, may be subject to limitations imposed by law. Therefore, any person engaging in the activity, or contemplating doing so, should consult with the Director of Government and Community Relations.

- b. Guidelines for Avoiding Prohibited Partisan Political Activities: the following guidelines should assist in preventing the involvement or apparent involvement of the University in political activities in support of or opposition to any candidate for elective public office, that is, partisan political activities. Except in the limited circumstances set forth in section 3.b., below:

i Use of Name and Seal: neither the name nor seal of the University or of any of its schools, departments, or institutions should be used on letters or other materials intended for partisan political purposes.

ii Use of Address and Telephones: no University office should be used as a return mailing address for partisan political mailings, and telephone service that is paid by the University, likewise, should not be used for partisan political purposes. (Obviously, a student's dormitory room and telephone service that are personal to the student may be used for these purposes.)

iii Use of Title: the University title of a faculty or staff member or other person should be used only for identification and should be accompanied by a statement that the person is speaking as an individual and not as a representative of the University.

iv Use of Services and Equipment: University services, such as Interdepartmental Mail; equipment, such as duplicating machines, computers, and telephones; and supplies should not be used for partisan political purposes.

v Use of Personnel: no University employee may, as part of his or her job, be requested to perform tasks in any way related to partisan political purposes.

## 3. Permissible Activities

- a. In General: as noted above, the federal, state, and local laws which limit the partisan political activities that can take place in University facilities and with University support in no way inhibit

the expression of personal political views by any individual in the University community. Nor do they forbid faculty, students, or staff from joining with others in support of candidates for office or in furtherance of political causes. There is no restriction on discussion of political issues or teaching of political techniques. Academic endeavors which address public policy issues are in no way affected.

Because the University encourages freedom of expression, political activities which do not reasonably imply University involvement or identification may be undertaken so long as regular University procedures are followed for use of facilities. Examples of permissible activities are:

- i Use of areas, such as White Plaza, for tables, speeches, and similar activities.
- ii Use of auditoriums for speeches by political candidates, but subject to rules of the Internal Revenue Service, the Federal Election Commission, and the California Fair Political Practices Commission, and other applicable laws. Arrangements must be made with University Events and Services. (See also Guide Memo 82.1, Public Events ([http://adminguide.stanford.edu/82\\_1.pdf](http://adminguide.stanford.edu/82_1.pdf)), for more information.)

To reiterate, because tax and political compliance laws impose restrictions, and even prohibitions, on certain political activities and on the use of buildings and equipment at a non-profit institution such as the University, any such activities must be in compliance with these legal requirements. Individuals taking political positions for themselves or groups with which they are associated, but not as representatives of the University, should clearly indicate, by words and actions, that their positions are not those of the University and are not being taken in an official capacity on behalf of the University.

- b. Limited University Political Activities: limited activities relating to specific federal, state, or local legislation or ballot initiatives are permissible where (1) the subject matter is directly related to core interests of the University's activities; (2) the President has determined that the University should take a position; and (3) the individuals who speak or write on the University's behalf are specifically authorized to do so.
4. Research Involving Political Campaigns: Any Stanford researcher considering doing research involving political campaigns should consult with the General Counsel's Office for any legal restrictions, and should submit the research proposal in advance to Stanford's Institutional Review Board as appropriate under its policies and procedures.
  5. Responsibility for Interpretation: the Director of Government and Community Relations, in consultation with the General Counsel, is the administrative officer responsible for interpretation and application of the above guidelines. Questions on whether planned student activities are consistent with the University's obligations should be directed to the Dean of Students, who will consult with the Director of Government and Community Relations and/or the General Counsel. All other questions on whether planned activities are consistent with the University's obligations should be addressed directly to the Director of Government and Community Relations or the General Counsel.

## Campus Disruptions

The Policy on Campus Disruptions was promulgated in 1967, and states that:

## Policy

The following is quoted from the policy:

Because the rights of free speech and peaceable assembly are fundamental to the democratic process, Stanford firmly supports the rights of all members of the University community to express their views or to protest against actions and opinions with which they disagree.

All members of the University also share a concurrent obligation to maintain on the campus an atmosphere conducive to scholarly pursuits, to preserve the dignity and seriousness of University ceremonies and public exercises, and to respect the rights of all individuals.

The following regulations are intended to reconcile these objectives.

It is a violation of University policy for a member of the faculty, staff, or student body to:

1. prevent or disrupt the effective carrying out of a University function or approved activity, such as lectures, meetings, interviews, ceremonies, the conduct of University business in a University office, and public events.
2. obstruct the legitimate movement of any person about the campus or in any University building or facility.

Members of the faculty, staff, and student body have an obligation to leave a University building or facility when asked to do so in the furtherance of the above sections by a member of the University community acting in an official role and identifying himself or herself as such; members of the faculty, staff, or student body also have an obligation to identify themselves, when requested to do so by such a member of the University community who has reasonable grounds to believe that the person(s) has violated section (1) or (2) of this policy and who has so informed the person(s).

The policy has been applied to the following actions: refusal to leave a building which has been declared closed; obstructing the passage into or out of buildings by sitting in front of doorways; preventing University employees from entering their workplace; preventing members of a class from hearing a lecture or taking an examination, or preventing the instructor from giving a lecture, by means of shouts, interruptions, or chants; refusing to leave a closed meeting when unauthorized to attend; and intruding upon or refusing to leave a private interview.

It should be understood that while the above are examples of extraordinarily disruptive behavior, the application of the Policy also takes situational factors into consideration. Thus, for example, conduct appropriate at a political rally might constitute a violation of the Policy on Campus Disruption if it occurred within a classroom.

There is no "ordinary" penalty which attaches to violations of the Policy on Campus Disruption. In the past, infractions have led to penalties ranging from censure to expulsion. In each case, the gravity of the offense and prior conduct of the student are considered; however, the more serious the offense, the less it matters that a student has otherwise not done wrong.

## Use of the Main Quadrangle and Memorial Court Policy

The following is quoted from the policy:

The Main Quadrangle and Memorial Court are part of Stanford University's academic preserve due to their locations at the heart of the campus. To protect and enhance their historic status, University policy

limits activities primarily to established or traditional ceremonies and events.

To schedule an event, approval must be obtained in advance from the Office of Stanford Events (see below). Unscheduled events, protests, or activities are prohibited.

Requests for waivers to this policy must be submitted in advance and in writing to the Office of Stanford Events. Exceptions may be granted only in extraordinary cases.

## Resources

The following is a summary of resources available:

For instructions on use of the Main Quadrangle/Memorial Court, contact the Office of Special Events and Protocol (OSEP) at (650) 724-1387, or at the OSEP (<https://osep.stanford.edu>) web site.

Note: White Plaza is made available to Stanford students, faculty, and staff for events other than scheduled "established or traditional ceremonies and events" including those that may involve amplified sound. For further information on the use of such other venues, students should contact Student Activities and Leadership (SAL) at (650) 723-2733, or at the SAL (<http://studentaffairs.stanford.edu/sal>) web site. Faculty and staff should contact the Office of Special Events and Protocol (OSEP) (<https://osep.stanford.edu>).

## Oval Policy

The Oval is considered to be the initial and official visual entrance to the Stanford University campus. Given this historic and aesthetic status, it is in the best interests of the University community and visiting members of the public to maintain its open and pristine space, to help preserve its natural beauty and environmental integrity. The Oval also presents the formal academic image of the University, leading directly to departments, classrooms and other academic space, and faculty and graduate student offices, and thus is subject to the University's Noise Policy.

The University prohibits formal or informal events of any kind to take place in the Oval. Gatherings of Stanford students, faculty, and staff such as demonstrations, rallies, or dances may take place in White Plaza, which can be reserved through the Office of Student Activities. Weddings also are not allowed in the Oval but are in certain circumstances allowed in Memorial Church (refer to Memorial Church wedding ceremony guidelines (<http://www.stanford.edu/group/religiouslife/servicesWeddings.html>)).

The Oval is considered a pedestrian zone and appropriate use of its space includes walking, running, reading, relaxing, and other limited recreational use of the lawn area (such as quiet, very small picnics and Frisbee), unless or until such use damages or otherwise harms the property.

Cooking food or use of any grill/barbecue or open flame is strictly prohibited. Fireworks or the use of other incendiary devices represent a safety hazard to the area and are therefore prohibited. Amplified sound from items such as boom boxes, musical instruments, or the use of bullhorns or amplified speakers is also prohibited. Only authorized Stanford service vehicles are permitted inside the Oval areas.

As the official entrance to the University, the Oval offers public access to general parking spaces in the marked areas surrounding the outer perimeter of the Oval; drivers are expected to obey all traffic signs and limitations. Buses are subject to additional restrictions.

For further information regarding this policy, contact the Executive Director of Special Events and Protocol, 724-1387 or see the Office of Special Events & Protocol (<http://osep.stanford.edu/policies/oval.html>) web site.

## White Memorial Plaza

White Plaza is a Stanford University space available for programs, speeches, rallies, information tables, banners and posters. It is considered a "free speech area" on campus. Students should follow the policy outlined on the Student Activities and Leadership (<https://sal.stanford.edu/plan-event/venues/outdoor-spaces/white-memorial-plaza>) web site to engage in student programmatic activity. Due to Stanford's non-profit status, for-profit commercial activity or corporate promotion of any kind is strictly regulated.

White Plaza is in the center of campus, so event planners should take particular care to avoid disruptive impact on classes, business, or events in the surrounding buildings. Events in White Plaza must be organized by University entities (student groups, departments, and programs) and require prior approval from Student Activities and Leadership (SAL) (<https://sal.stanford.edu>).

## Noise and Amplified Sound Policy

The following is quoted from the policy:

Stanford is not only an academic institution but a residential community as well. It is the responsibility of all faculty, students, and staff to moderate noise especially during an event or activity held on campus. Supporting the mission of the University and respecting those who are studying, researching, or otherwise carrying out academic-related activities is a Stanford priority. The campus must require a conducive atmosphere to ensure these endeavors are accomplished and supported. Disturbing noise in or around a residence or other campus buildings which infringe on the rights of other residents or members of the University community is considered a violation of this policy. As part of the event planning process, the event sponsor must obtain all appropriate approvals regarding the use of amplified sound during an event or activity.

In addition to University policy on noise and amplified sound, the County of Santa Clara also has a county ordinance on sound and all members of the Stanford community and visitors to campus are subject to and must comply with this order. For more information, see the Santa Clara Ordinance Code, Control of Noise and Vibration ([https://www.municode.com/library/ca/santa\\_clara\\_county/codes/code\\_of\\_ordinances?nodid=TITBRE\\_DIVB11ENHE\\_CHVIIIICONOVI](https://www.municode.com/library/ca/santa_clara_county/codes/code_of_ordinances?nodid=TITBRE_DIVB11ENHE_CHVIIIICONOVI)) web site.

## Resources

Information regarding whether and how the use of amplified sound is permitted is available from the following sources, which must be consulted for prior approval:

1. The Office of Student Activities: phone: 723-2733, or see <http://studentaffairs.stanford.edu/sal/policies/noise>
2. Registrar's Scheduling Office: email [reg-events@stanford.edu](mailto:reg-events@stanford.edu), or see <http://studentaffairs.stanford.edu/registrar/faculty/events>.
3. Office of Special Events and Protocol (OSEP) at (650) 724-1387, or see <http://stanfordevents.stanford.edu>.

## No Camping

Camping (that is, staying outside overnight on University property) is not permitted without University permission. Permission is granted through the Office of the Provost or the Provost's designee.

## Prohibition of the Possession of Dangerous Weapons on Campus

The University's policy prohibiting weapons on campus ([https://police.stanford.edu/pdf/stanford\\_university\\_prohibited\\_weapons\\_policy.pdf](https://police.stanford.edu/pdf/stanford_university_prohibited_weapons_policy.pdf)) (pdf) is available on the Resources tab of the Department of Public Safety (<https://police.stanford.edu/#resources>) web site.

### Policy

## Prohibition of the Possession of Dangerous Weapons on Campus

The University's policy prohibiting weapons on campus ([https://police.stanford.edu/pdf/stanford\\_university\\_prohibited\\_weapons\\_policy.pdf](https://police.stanford.edu/pdf/stanford_university_prohibited_weapons_policy.pdf)) (pdf) is available on the Resources tab of the Department of Public Safety (<https://police.stanford.edu/#resources>) web site.

### Policy

Stanford University prohibits the possession of any of the following weapons on the Stanford campus: firearm, dirk, dagger, ice pick, knife having a blade longer than 2 1/2 inches (except for lawful use in food preparation or consumption), folding knife with a blade that locks into place, razor with an unguarded blade, taser, stun gun, instrument that expels a metallic projectile (such as a BB or a pellet), spot marker gun, or any other weapons prohibited by California Penal Code Sections 626.10 and 626.9.

For purposes of this policy, the term "Stanford campus" shall include all the lands, buildings, and facilities of Leland Stanford Junior University, whether owned, leased, and controlled, and whether located in the United States or abroad (excluding the privately owned, managed, or leased residences of faculty or staff that are located on the main Stanford campus in unincorporated Santa Clara County). In addition to the prohibited weapons, ammunition is not allowed to be stored or possessed in university owned, leased, and controlled buildings (excluding the privately owned, managed, or leased residences of faculty or staff that are located on the main Stanford campus in unincorporated Santa Clara County). In the event a federal or state law or a county ordinance is more restrictive than this policy, federal or state law or the county ordinance shall apply.

Requests for an exemption from this policy for academic purposes may be requested in writing to the Director of the Stanford University Department of Public Safety. Each request will be considered on a case-by-case basis and be evaluated by the Office of Risk Management and the Department of Public Safety. A written letter will be provided by the Director of the Department of Public Safety in the event an exemption is granted.

The Stanford University Department of Public Safety does not provide facilities for the storage of firearms.

## Student Alcohol Policy

This document clarifies the University's expectations and approach related to the use of alcohol by students. The University's Controlled Substances and Alcohol Policy is also applicable. The full text is contained in the Controlled Substance and Alcohol ([http://adminguide.stanford.edu/23\\_6.pdf](http://adminguide.stanford.edu/23_6.pdf)) policy.

### Preamble

The Fundamental Standard has set the standard of conduct for students at Stanford since 1896. It states: "Students at Stanford are expected to show both within and without the University such respect for order, morality, personal honor and the rights of others as is demanded of good

citizens." Implicit in the Standard is the understanding that students are responsible for making their own decisions and accepting the consequences of those decisions.

The University is committed to the health, safety and well-being of each member of the Stanford community. In order to further student learning, development and success and to promote the University's academic mission, Stanford fosters an environment of personal and collective responsibility and respectful citizenship. This means that all members of the university community—students, faculty and staff—have a role in safeguarding a healthy learning environment free of the consequences of alcohol misuse. The University also strives to create a culture that supports students who do not use alcohol and students who use alcohol in a safe, legal and responsible fashion.

### Legal Background

Members of the Stanford community are expected to abide by all federal, state and local laws, including those governing alcohol consumption and distribution. Under California law, it is illegal for anyone under the age of 21 to purchase alcohol or to possess alcohol in a public space. It is also illegal for anyone to furnish alcohol to an individual under the age of 21. Other state laws governing the use of alcohol are listed below.

While it is not the responsibility of most Stanford officials to enforce state law, it is the responsibility of the University's Department of Public Safety, and accordingly they enforce all state alcohol laws when they encounter violations. All community members should understand the law and, as individuals, ensure that they themselves do not violate it.

In addition, it is the responsibility of all community members to ensure that the University does not, through their actions, violate the law. Accordingly, official University functions, including events held by registered student groups, are not allowed to provide alcohol to those under 21, and no University funds may be used to purchase alcohol for that purpose. Violations of this requirement can result in both criminal prosecution and University administrative action, including dismissal from the University.

### Responsible Alcohol Use

Stanford students are expected to behave responsibly, both in the classroom and outside, both on campus and off. In particular, the University does not tolerate reckless drinking and its consequent harmful behaviors. The University is especially concerned about the misuse of distilled alcohol products ("hard alcohol"), and the dangers that arise from that misuse.

All students should understand the physical and behavioral effects of alcohol misuse, and should avoid such misuse themselves. In addition, they are expected to do their part to ensure the safety of fellow students whom they perceive to be engaged in reckless drinking behavior or to be suffering from its consequences.

The University provides educational resources to assure that students understand the effects of alcohol misuse and know how to respond when they perceive others to be engaged in dangerous behavior.

Reckless drinking and encouraging reckless drinking are violations of University policy, and may be subject to disciplinary action. Extreme or repeated violations may result in dismissal from the University.

More generally, students are expected to make legal, healthy, responsible choices concerning their personal use of alcohol and the University supports them in this endeavor through education and other resources. The University sponsors activities and programs focused on students who choose not to drink or to drink lightly, as well as resources and services to assist students who need help for themselves or others related to alcohol use.

## Authority, Application, and Enforcement

Responsibility for application of the Student Alcohol Policy resides with the Vice Provost for Student Affairs. The Office of Alcohol Policy and Education reports to the Vice Provost for Student Affairs and is expected to coordinate and implement alcohol programs. (The University's Controlled Substances and Alcohol Policy is also applicable. The full text is contained at the Controlled Substances and Alcohol web site (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-8>).

The Stanford University Department of Public Safety enforces federal, state and local laws among students, other community members, guests and visitors.

## Alcohol Policy Violations

The Office of Alcohol Policy and Education will work with the following offices to address violations of the University's alcohol policy as determined by the specifics of each situation.

- The Office of Residential Education (<http://studentaffairs.stanford.edu/resed>) for undergraduate students, residential groups, fraternities and sororities
- Graduate Life Office (GLO) (<http://glo.stanford.edu>) for graduate students
- Student Activities and Leadership (SAL) (<http://studentaffairs.stanford.edu/sal>) for voluntary student organizations
- Department of Athletics, Physical Education and Recreation (DAPER) (<http://www.gostanford.com/school-bio/stan-administration.html>) for student athletes and athletic groups
- Such other offices as are appropriate under particular circumstances

Violations may be referred to the Office of Judicial Affairs (<http://judicialaffairs.stanford.edu>) (for individual students) and the Organization Conduct Board (<http://studentaffairs.stanford.edu/studentlife/ocb>) (for student groups). The Dean of Student Life (<http://studentaffairs.stanford.edu/studentlife>) may take action as well in certain circumstances.

## Getting Help: Resources Available to Students

Students have access to a variety of University resources (<http://alcohol.stanford.edu/resources.html>).

## Additional University Regulations

- Students living in University residences sign a residence agreement ([http://www.stanford.edu/dept/rde/shs/res\\_agree.htm](http://www.stanford.edu/dept/rde/shs/res_agree.htm)) that outlines housing policies and expectations for conduct. Violations of the residence agreement can lead to loss of housing. [[http://www.stanford.edu/dept/rde/shs/res\\_agree.htm](http://www.stanford.edu/dept/rde/shs/res_agree.htm)]
- All parties must be registered with the University, and availability of alcohol is regulated by party planning guidelines coordinated by the Office of Student Activities and Leadership. [<http://studentaffairs.stanford.edu/sal/planning/party>]

Other restrictions apply to particular circumstances

- Frosh Housing—Alcoholic beverages are prohibited at all-frosh house events in common area spaces.
- University Funds and the Purchase of Alcohol—No University funds or funds collected by the University may be used in a way that violates the alcohol policy. In student residences, house funds (funds collected by Student Financial Services or other University offices) may not be used to buy alcohol. Any decision to use student-collected funds to buy alcohol must be made lawfully, thoughtfully,

fairly and in a way that respects the views of all students. Students must not be required to contribute to the purchase of alcohol.

- Dining Hall—Students may not possess or consume alcoholic beverages in Stanford Dining Halls during meal times and food service. University Dining staff can deny admission, access or meal service to anyone who is believed to be intoxicated by the Dining Management staff.
- White Plaza—Alcoholic beverages in White Plaza are prohibited.
- End of Quarter Period and Finals Week—No registered parties (with or without alcohol) can occur during the End of the Quarter Period (dead week) or Finals Week.
- Athletic Facilities—No alcohol is permitted inside Stanford athletic facilities public spaces during athletic events.
- Stanford Conferences and University Facilities—The University requires that event sponsors and student groups wishing to offer alcoholic beverages at their programs and events operate within state and local laws as provided by the Department of Alcohol and Beverage Control (ABC). Alcohol service is not allowed in classrooms.
- Admit Weekend—Stanford students are prohibited from providing, serving or in anyway making alcohol available to any prospective frosh (ProFro). All student groups/organizations and residences may host only alcohol-free parties or events during Admit Weekend. This specifically means that no alcohol is to be present, served or consumed at any student group/organization and/or dorm function during Admit Weekend.
- New Student Orientation (NSO) Period—At no time should any Stanford student provide, serve or in any way make alcohol available to any new, incoming undergraduate student (freshman or transfer). All undergraduate student groups/organizations and residences will host only alcohol-free parties or events during Orientation. This specifically means that no alcohol is to be present, served, or consumed at any student group/organization and/or dorm function during NSO.

## California State Laws

Students should be familiar with California laws governing the consumption of alcohol. The following summarizes those laws most relevant to individuals.

- It is illegal for persons under the age of 21 to possess an alcoholic beverage in any public place or any place open to the public (CA Business and Professions Code 25662).
- Any person who furnishes, gives or sells any alcoholic beverage to someone under the age of 21 is guilty of a misdemeanor (CA Business and Professions Code 25658(a)).
- Any person under the age of 21 who attempts to purchase an alcoholic beverage is guilty of an infraction (CA Business and Professions Code 25658.5).
- Any person under the influence of alcohol in a public place and unable to exercise care for one's own safety or that of others is guilty of a misdemeanor (CA Penal Code 647(f)).
- It is illegal for persons to operate a motor vehicle while under the influence of alcohol or other intoxicants or with a blood alcohol level of .08% or higher (CA Vehicle Code Section 23152). NOTE: A golf cart is a motor vehicle.

- It is unlawful for a person under the age of 21 years who has 0.05 percent or more, by weight, of alcohol in his or her blood to drive a vehicle (CA Vehicle Code Section 23140(a)).
- It is illegal for a person under the age of 21 to drive a vehicle when he or she has a blood alcohol concentration (BAC) of .01% or higher (CA Vehicle Code Section 23136).
- It is a misdemeanor to ride a bicycle under the influence of alcohol, drugs or both (CA Vehicle Code Section 21200.5).
- It is an infraction to possess an open container of an alcoholic beverage while in a motor vehicle (CA Vehicle Code Section 23223).
- It is an infraction for an owner or driver of a motor vehicle to allow an open container of alcohol in the passenger area (CA Vehicle Code Section 23225).

## Hazing Policy

Hazing is not permitted at Stanford University. No individual, recognized student organization, club, team, or any other Stanford-affiliated student group is permitted to plan, engage in, or condone hazing, on or off the Stanford campus.

### Definition of Hazing at Stanford University

Hazing includes any activity done in connection with a student organization, regardless of whether the organization is officially recognized at Stanford, that causes or is reasonably likely to cause another student to suffer bodily danger, physical harm, or significant personal degradation or humiliation, even if no bodily danger, physical harm, or significant degradation or humiliation in fact results. Hazing might occur during initiation or pre-initiation into a student organization, but is not limited to these time frames. Any individual who plans or intentionally assists in hazing activity has engaged in hazing, regardless of whether that individual is present when the hazing activity occurs.

### Consequences of a Violation

Stanford University expects its students to conduct themselves in socially responsible and respectful ways. Thus, participation in hazing, either as an individual or as part of any student group, may result in serious individual and organizational consequences including, but not limited to: disciplinary action up to and including expulsion; permanent loss of organizational recognition; and loss of eligibility to remain a member of any club, team, or other Stanford-affiliated student group. Consent, implied or expressed, is not a defense to any complaint or charge alleging a hazing violation.

A number of University offices may take institutional action, including: the Organizational Conduct Board; Office of Community Standards; or other University offices, such as the Vice Provost for Student Affairs or the Department of Athletics.

### Applications

Stanford's hazing policy is distinct from and broader than California Penal Code section 245.6, which prohibits: "any method of initiation or pre-initiation into a student organization or student body, whether or not the organization or body is officially recognized by an educational institution, which is likely to cause serious bodily injury to any former, current, or prospective student of any school, community college, college, university or other educational institution in this state." A violation of Penal Code Section 245.6 that does not result in serious bodily injury is punishable as a misdemeanor, while a violation that results in death or injury is punishable as a felony or a misdemeanor.

Nothing in this hazing policy prevents Stanford from taking institutional action against hazing activity that falls outside the narrower definition of Penal Code section 245.6.

Stanford's hazing policy is not intended to prohibit student recruitment or new or continuing member activities that are positive and educational in nature, designed to instill a group ethos or unity. Its intent is to deter those behaviors that cause or are likely to cause danger, harm or humiliation to another student.

Stanford's hazing policy is not intended to apply to customary athletic events or other similar institutionally-approved contests or competitions.

Questions regarding hazing policies related to fraternities and sororities should be directed to the Office of Fraternity and Sorority Life at (650) 723-0778. For all other student groups, contact Student Activities and Leadership at (650) 723-2445.

## Smoke-Free Environment

The University's policy on a smoke-free environment is published in its complete form in the Administrative Guide Memo 2.2.6 Smoke-Free Environment (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-6>).

### Applicability

Applies to all academic and administrative units of Stanford University, including SLAC and all campus student housing. This policy does not supersede more restrictive policies that may be in force to comply with federal, state, or local laws or ordinances. The President must approve more restrictive policies not required by law.

### 1. Policy

It is the policy of Stanford University that all smoking, including but not limited to tobacco products and the use of electronic smoking devices, is prohibited in enclosed buildings and facilities and during indoor or outdoor events on the campus.

### 2. Definition

"Smoke-free" refers to an environment that is free of smoke from, among other things, tobacco products and/or vapors from electronic smoking devices.

### 3. Guidelines

#### a. Smoking-Prohibited Areas

Specifically, smoking is prohibited in classrooms and offices, all enclosed buildings and facilities, in covered walkways, in University vehicles, during indoor or outdoor athletic events, during other University sponsored or designated indoor or outdoor events and in outdoor areas designated by signage as "smoking prohibited" areas.

- Ashtrays will not be provided in any enclosed University building or facility.
- "Smoking Prohibited" signs will be posted.

#### b. Outdoor Smoking Areas

Except where otherwise posted as a "smoking prohibited area," smoking is generally permitted in outdoor areas, except during organized events. Outdoor smoking in non-prohibited areas must be at least 30 feet away from doorways, open windows, covered walkways, and ventilation systems to prevent smoke from entering enclosed buildings and facilities. To accommodate faculty, staff, and students who smoke, Vice Presidents, Vice Provosts, and Deans may designate certain areas of existing courtyards and patios as smoking areas, and must provide ashtrays. The specific academic or administrative unit(s) will be responsible for absorbing all costs associated with providing designated smoking areas and ashtrays.



## 4. Enforcement

This policy relies on the consideration and cooperation of smokers and non-smokers. It is the responsibility of all members of the University community to observe and follow this policy and its guidelines.

### a. Smoking Cessation Information

Smoking cessation programs are available for faculty and staff through the Center for Research in Disease Prevention, Health Improvement Program (HIP). Students may contact the Health Promotion Program (HPP) through the Student Health Center for smoking cessation information or programs.

### b. Repeated Violations

Faculty, staff and, students repeatedly violating this policy may be subject to appropriate action to correct any violation(s) and prevent future occurrences.

## 5. Implementation and Distribution

This policy will be disseminated to all faculty, staff and students and to all new members of the University Community.

## Visitor Policy/University Statement on Privacy

Stanford University has an interest in ensuring that the privacy of its students, faculty, and staff is respected, and that no activities interfere with education, research, or residential life.

The University is private property; however, some areas of the campus typically are open to visitors. These areas include White Plaza, public eating areas (such as those at Tresidder Union), outdoor touring areas, and locations to which the public has been invited by advertised notice (such as for public educational, cultural, or athletic events). Even in these locations, visitors must not interfere with the privacy of students, faculty, and staff, or with educational, research, and residential activities. The University may revoke at any time permission to be present in these, or any other areas. Visitors should not be in academic or residential areas unless they have been invited for appropriate business or social purposes by the responsible faculty member, student, or staff member.

No commercial activity, including taking photos or similar audio or visual recordings that are sold to others or otherwise used for commercial purposes, may occur on the campus or in University programs without the University's permission. Requests for permission should be submitted to the Director of University Communications or, as appropriate, the Dean of Students, the Department of Athletics, or the Office of Public Events. Recognized student groups and official units of the University will be granted such permission so long as they do not violate privacy or property interests of others; so long as any sale of their products is predominantly on campus to students, faculty, and staff; and so long as they comply with applicable University policies and procedures.

Violators of this policy may be subject to criminal and/or civil liability, as well as University disciplinary action.

## Computer and Network Usage

For a complete text of the currently applicable version of this policy, see Administrative Guide Memo 6.2.1 Computer and Network Usage Policy (<https://adminguide.stanford.edu/chapter-6/subchapter-2/policy-6-2-1>).

### Policy

The following is quoted from the policy:

Users of Stanford network and computer resources have a responsibility not to abuse the network and resources. This policy provides guidelines for the appropriate and inappropriate use of information technologies.

### Summary

The following summarizes the policy on Computer and Network Usage:

In particular, the policy provides that users of University information resources must respect software copyrights and licenses, respect the integrity of computer-based information resources, refrain from seeking to gain or permitting others to gain unauthorized access, including by sharing passwords, and respect the rights of other computer users.

This policy covers appropriate use of computers, networks, and information contained therein. As to political, personal and commercial use, the University is a non-profit, tax-exempt organization and, as such, is subject to specific federal, state, and local laws regarding sources of income, political activities, use of property, and similar matters. It also is a contractor with government and other entities, and thus must assure proper use of property under its control and allocation of overhead and similar costs. For these reasons, University information resources must not be used for partisan political activities where prohibited by federal, state, or other applicable laws, and may be used for other political activities only when in compliance with federal, state, and other laws, and in compliance with applicable University policies. Similarly, University information resources should not be used for personal activities not related to appropriate University functions, except in a purely incidental manner. In addition, University information resources should not be used for commercial purposes, except in a purely incidental manner or except as permitted under other written policies of the University or with the written approval of a University officer having the authority to give such approval. Any such commercial use should be properly related to University activities, take into account proper cost allocations for government and other overhead determinations, and provide for appropriate reimbursement to the University for taxes and other costs the University may incur by reason of the commercial use. Users also are reminded that the .edu domain on the Internet has rules restricting or prohibiting commercial use, and thus activities not appropriately within the .edu domain and which otherwise are permissible within the University computing resources should use one or more other domains, as appropriate.

The University's Information Security Officer is authorized in appropriate circumstances to inspect or monitor private data (including email), such as when there is a reasonable cause to suspect improper use of computer or network resources.

For further information on the topic of peer-to-peer file sharing, see the section above on Copyright.

## Stanford University Online Accessibility Policy

Stanford University will make Stanford Websites and web#based applications accessible to its students, faculty, staff and participants in the University's programs and activities who have disabilities. All personnel who are involved in the procurement, preparation and maintenance of University Websites and web#based applications should adopt this goal, with the assistance of campus resources dedicated to supporting web accessibility. Stanford Websites and web#based applications must either conform to WCAG 2.0 Level AA (<http://www.w3.org/TR/WCAG20>) or their content and functionality be made available to Users on request (such as by a student request to the Office of Accessible Education) in an equally effective and accessible alternative manner.

## Applicability

Stanford's online accessibility policy applies to all Stanford academic and administrative units that create and maintain web sites and web#based applications used in the programs and activities of the University. See the Stanford University Online Accessibility Policy (<http://ucomm.stanford.edu/policies/accessibility-policy>) web site for the full policy.

## Definitions

### Stanford Website

Any website or web#based application within the Stanford University (stanford.edu) domain used in the programs or activities of the University.

### Users

Stanford Website users are defined as current Stanford students and applicants for admission, Stanford staff and faculty, and participants in the University's programs and activities.

### Accessible

Refers to the concept that people with disabilities are able to independently and timely access and use a product or system, including with the benefit of assistive technologies. Assistive technologies include adaptive hardware and/or software and other devices that are used to increase, maintain, or improve the functional capabilities of individuals with disabilities.

### Stanford Online Accessibility Program ("SOAP") Office

The SOAP Office (<http://soap.stanford.edu>) provides resources and services for Stanford web designers, developers and content creators to assist them in producing accessible materials. Services include Website accessibility testing and guidance regarding universal design and web standards compliance. The SOAP Office is also the campus resource designated to facilitate online accessibility for Users. To report and seek assistance on web accessibility issues, Users may contact the SOAP Office by email at [web-accessibility@stanford.edu](mailto:web-accessibility@stanford.edu) or submit a HelpSU ticket through the SOAP Office website.

### Office of Accessible Education ("OAE")

The Office of Accessible Education (<http://oae.stanford.edu>) is the campus office designated to work with Stanford students with disabilities. OAE provides support services, accommodations, and programs to remove barriers to full participation of students with disabilities in the programs or activities of the University.

### Diversity and Access Office ("D&A")

The Diversity and Access Office (<http://diversityandaccess.stanford.edu>) oversees compliance with state and federal anti#discrimination laws including the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. D&A provides disability#related access information, and assists faculty, staff and other non#student participants in University programs and activities with disabilities who may need accommodations and/or auxiliary aids to obtain equal access to Stanford facilities, programs and activities. D&A also oversees the ADA/Section 504 Grievance Procedure for students who believe they have been subjected to unlawful discrimination based on a disability or denied access to services or accommodations which the ADA and/or Section 504 require Stanford to provide. Read more about the ADA/Section 504 Grievance Procedure (p. ).

## Accessibility Standard

Stanford University has adopted the Worldwide Web Consortium Web Content Accessibility Guidelines (<http://www.w3.org/TR/WCAG20>) version 2.0, Level AA Conformance (WCAG 2.0 Level AA) as its goal for accessible Stanford Websites. The guidelines and success criteria of WCAG 2.0 Level AA are organized around the following four principles which lay the foundation for users with disabilities to access and use web

content. For a Stanford Website to be accessible under these principles, its content must be:

1. Perceivable – Information and user interface components must be presentable to users in ways they can perceive.
2. Operable – User interface components and navigation must be operable.
3. Understandable – Information and the operation of user interface must be understandable.
4. Robust – Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

## Implementation Guidelines

1. All personnel responsible for existing Stanford Websites must use good faith efforts, subject to the requirements and exceptions of the applicable laws, to bring those Websites into conformance with WCAG Level 2.0 AA.
2. New Stanford Website development and purchases, including development and purchases for major revisions and updates of existing Stanford Websites, should conform to WCAG 2.0 Level AA.
3. Vendors seeking to develop or provide Websites or web-based applications for Stanford are to demonstrate that their products satisfy WCAG 2.0 Level AA Success Criteria, unless undue burden or fundamental alteration can be demonstrated (see below). Preferred standards for demonstrating satisfaction of WCAG 2.0 Level AA Success Criteria, and accessibility language for Stanford Website vendor contracts, as well as for other types of Electronic Information Technology vendor contracts, may be obtained from University Procurement (Purchasing and Payment Services) (<http://web.stanford.edu/group/fms/fingate/contact/#procure>) or from the SOAP Office (<https://soap.stanford.edu>).
4. Each Stanford Website should contain "Accessibility" contact information for the site's webmaster and/or the SOAP Office. The contact information may take a variety of forms, such as an email address, a link to a HelpSU page, or a contact form on the site. The recommended location for this information is the Website's "Contact" or "About Us" page.
5. The SOAP Office will continue to test Stanford Websites for accessibility and report accessibility issues to the webmaster for that website.
6. OAE will continue to seek input from Stanford students regarding accessibility issues.
7. Conformance to WCAG 2.0 Level AA guidelines may be an undue burden due to the nature of the content, the purpose of the resource, the lack of accessible solutions, or an unreasonably high administrative or financial cost necessary to make the resource meet that goal. However, these difficulties do not relieve University programs or activities from meeting applicable legal obligations to provide reasonable accommodations to Users in regard to access to the content and services provided on Stanford Websites. Managers of University programs and activities must be prepared to provide content and/or services in a suitable alternative format (e.g., electronic text file or audio description) or manner upon request (such as by a student to the OAE).

## Implementation Assistance

Guidelines and best practices are available from the SOAP Office (<http://soap.stanford.edu>). In addition, on-campus assistance is available for designing and implementing websites that meet accessibility guidelines and for evaluating the accessibility of existing sites and those under development. If such assistance is needed, visit the SOAP web site (<http://soap.stanford.edu>) or email the SOAP Office at [web-accessibility@stanford.edu](mailto:web-accessibility@stanford.edu).

## Responding to Accessibility Issues

Recognizing the ongoing evolution of current web content and technologies, the designated webmaster for a particular site, upon being made aware of an accessibility issue on that site, should proceed as follows:

- Acknowledge receipt of the issue in writing (via email) to the User raising the issue, with a copy to the SOAP Office.
- Open an accessibility case for recording the issue and resulting action taken.
- Verify that the issue is an authentic accessibility issue.
- Treat all issues as important. Address any time-sensitive need of the User promptly (generally within a period of no greater than two business days), unless technology or work involved requires more effort, in which case the User will be promptly notified in writing of expected delivery.

Upon receiving a report of an accessibility issue, the SOAP Office shall notify the site's webmaster, as well as OAE (for reports from students) or D&A (for reports from non-students.) If the SOAP Office, in consultation with the site's webmaster, determines that the information or service provided on the Stanford Website cannot be made accessible, or that doing so would constitute an undue burden or fundamental alteration, OAE or D&A will engage in an interactive process with the User about alternative methods for providing the information or service and will provide an equally effective alternative format or service. In the event that an alternative format or service cannot be provided or the user is not satisfied with the results, he or she may contact the ADA/Section 504 Compliance Officer at D&A by telephone at (650) 723-0755 or by email at [equalopportunity@stanford.edu](mailto:equalopportunity@stanford.edu) for assistance in resolving the issue.

For questions about the policy, please contact the SOAP Office (<https://soap.stanford.edu/about/contact>).

## Protection of Sensitive Data

Stanford University maintains sensitive non-public data protected by laws and agreements, including Social Security numbers, financial information, health information, and student records. It is incumbent on every member of the Stanford community with access to such data to be familiar with and abide by Stanford's data classifications requirements provided at the Data Classification, Access, Transmittal and Storage ([http://www.stanford.edu/group/security/securecomputing/dataclass\\_chart.html](http://www.stanford.edu/group/security/securecomputing/dataclass_chart.html)) web site. Members of the Stanford community should also familiarize themselves with applicable laws and University policies on privacy as provided by the University, including Administrative Guide Memos 6.3.1 Information Security (<https://adminguide.stanford.edu/chapter-6/subchapter-3/policy-6-3-1>), 6.4.1 Identification and Authentication Systems (<https://adminguide.stanford.edu/chapter-6/subchapter-4/policy-6-4-1>), 6.6.1 Information Security Incident Response (<https://adminguide.stanford.edu/chapter-6/subchapter-6/policy-6-6-1>), and 3.4.2 Card and Payment Account Acceptance and Processing (<https://adminguide.stanford.edu/chapter-3/subchapter-4/policy-3-4-2>). For information on best practices for securing mobile computing devices, see the Guidelines for Securing Mobile Computing Devices ([http://www.stanford.edu/group/security/securecomputing/mobile\\_devices.html](http://www.stanford.edu/group/security/securecomputing/mobile_devices.html)) web site.

## Campus Safety and Criminal Statistics

Stanford University complies with the Jeanne Clery Disclosure of Campus Security Policy and Crime Statistics Act. A copy of Stanford's policies and statistics under this act are posted on the Department of Public Safety (<http://stanford.edu/group/SUDPS/safety-report.shtml>) web site. A paper copy can be obtained by calling the Stanford Department of Public Safety at (650) 723-9633.

# Nondiscrimination Policy

## Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, veteran status, or marital status to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, marital status or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence.

The following person has been designated to handle inquiries regarding this nondiscrimination policy: Stanford's Director of the Diversity and Access Office, Rosa Gonzalez, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email). Stanford's Title IX Coordinator, Catherine Glaze, has been designated to handle inquiries regarding sexual harassment and sexual violence: Kingscote Gardens (2nd floor), 419 Lagunita Drive, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), [titleix@stanford.edu](mailto:titleix@stanford.edu) (email).

Individuals may also file complaints directly with the Office for Civil Rights, within the United States Department of Education, by following the information on this web site: <https://www2.ed.gov/about/offices/list/ocr/complaintintro.html>

## Student Alcohol Policy

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This document clarifies the University's expectations and approach related to the use of alcohol by students. The University's Controlled Substances and Alcohol Policy is also applicable. The full text is contained in the Controlled Substance and Alcohol ([http://adminguide.stanford.edu/23\\_6.pdf](http://adminguide.stanford.edu/23_6.pdf)) policy.

### Preamble

The Fundamental Standard has set the standard of conduct for students at Stanford since 1896. It states: "Students at Stanford are expected to show both within and without the University such respect for order, morality, personal honor and the rights of others as is demanded of good citizens." Implicit in the Standard is the understanding that students are responsible for making their own decisions and accepting the consequences of those decisions.

The University is committed to the health, safety and well-being of each member of the Stanford community. In order to further student learning, development and success and to promote the University's academic mission, Stanford fosters an environment of personal and collective responsibility and respectful citizenship. This means that all members of the university community—students, faculty and staff—have a role in safeguarding a healthy learning environment free of the consequences of alcohol misuse. The University also strives to create a culture that supports students who do not use alcohol and students who use alcohol in a safe, legal and responsible fashion.

### Legal Background

Members of the Stanford community are expected to abide by all federal, state and local laws, including those governing alcohol consumption and distribution. Under California law, it is illegal for anyone under the age of 21 to purchase alcohol or to possess alcohol in a public space. It is also

illegal for anyone to furnish alcohol to an individual under the age of 21. Other state laws governing the use of alcohol are listed below.

While it is not the responsibility of most Stanford officials to enforce state law, it is the responsibility of the University's Department of Public Safety, and accordingly they enforce all state alcohol laws when they encounter violations. All community members should understand the law and, as individuals, ensure that they themselves do not violate it.

In addition, it is the responsibility of all community members to ensure that the University does not, through their actions, violate the law. Accordingly, official University functions, including events held by registered student groups, are not allowed to provide alcohol to those under 21, and no University funds may be used to purchase alcohol for that purpose. Violations of this requirement can result in both criminal prosecution and University administrative action, including dismissal from the University.

## Responsible Alcohol Use

Stanford students are expected to behave responsibly, both in the classroom and outside, both on campus and off. In particular, the University does not tolerate reckless drinking and its consequent harmful behaviors. The University is especially concerned about the misuse of distilled alcohol products ("hard alcohol"), and the dangers that arise from that misuse.

All students should understand the physical and behavioral effects of alcohol misuse, and should avoid such misuse themselves. In addition, they are expected to do their part to ensure the safety of fellow students whom they perceive to be engaged in reckless drinking behavior or to be suffering from its consequences.

The University provides educational resources to assure that students understand the effects of alcohol misuse and know how to respond when they perceive others to be engaged in dangerous behavior.

Reckless drinking and encouraging reckless drinking are violations of University policy, and may be subject to disciplinary action. Extreme or repeated violations may result in dismissal from the University.

More generally, students are expected to make legal, healthy, responsible choices concerning their personal use of alcohol and the University supports them in this endeavor through education and other resources. The University sponsors activities and programs focused on students who choose not to drink or to drink lightly, as well as resources and services to assist students who need help for themselves or others related to alcohol use.

## Authority, Application, and Enforcement

Responsibility for application of the Student Alcohol Policy resides with the Vice Provost for Student Affairs. The Office of Alcohol Policy and Education reports to the Vice Provost for Student Affairs and is expected to coordinate and implement alcohol programs. (The University's Controlled Substances and Alcohol Policy is also applicable. The full text is contained at the Controlled Substances and Alcohol web site (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-8>).

The Stanford University Department of Public Safety enforces federal, state and local laws among students, other community members, guests and visitors.

## Alcohol Policy Violations

The Office of Alcohol Policy and Education will work with the following offices to address violations of the University's alcohol policy as determined by the specifics of each situation.

- The Office of Residential Education (<http://studentaffairs.stanford.edu/resed>) for undergraduate students, residential groups, fraternities and sororities
- Graduate Life Office (GLO) (<http://glo.stanford.edu>) for graduate students
- Student Activities and Leadership (SAL) (<http://studentaffairs.stanford.edu/sal>) for voluntary student organizations
- Department of Athletics, Physical Education and Recreation (DAPER) (<http://www.gostanford.com/school-bio/stan-administration.html>) for student athletes and athletic groups
- Such other offices as are appropriate under particular circumstances

Violations may be referred to the Office of Judicial Affairs (<http://judicialaffairs.stanford.edu>) (for individual students) and the Organization Conduct Board (<http://studentaffairs.stanford.edu/studentlife/ocb>) (for student groups). The Dean of Student Life (<http://studentaffairs.stanford.edu/studentlife>) may take action as well in certain circumstances.

## Getting Help: Resources Available to Students

Students have access to a variety of University resources (<http://alcohol.stanford.edu/resources.html>).

## Additional University Regulations

- Students living in University residences sign a residence agreement ([http://www.stanford.edu/dept/rde/shs/res\\_agree.htm](http://www.stanford.edu/dept/rde/shs/res_agree.htm)) that outlines housing policies and expectations for conduct. Violations of the residence agreement can lead to loss of housing. [[http://www.stanford.edu/dept/rde/shs/res\\_agree.htm](http://www.stanford.edu/dept/rde/shs/res_agree.htm)]
- All parties must be registered with the University, and availability of alcohol is regulated by party planning guidelines coordinated by the Office of Student Activities and Leadership. [<http://studentaffairs.stanford.edu/sal/planning/party>]

Other restrictions apply to particular circumstances

- Frosh Housing—Alcoholic beverages are prohibited at all-frosh house events in common area spaces.
- University Funds and the Purchase of Alcohol—No University funds or funds collected by the University may be used in a way that violates the alcohol policy. In student residences, house funds (funds collected by Student Financial Services or other University offices) may not be used to buy alcohol. Any decision to use student-collected funds to buy alcohol must be made lawfully, thoughtfully, fairly and in a way that respects the views of all students. Students must not be required to contribute to the purchase of alcohol.
- Dining Hall—Students may not possess or consume alcoholic beverages in Stanford Dining Halls during meal times and food service. University Dining staff can deny admission, access or meal service to anyone who is believed to be intoxicated by the Dining Management staff.
- White Plaza—Alcoholic beverages in White Plaza are prohibited.
- End of Quarter Period and Finals Week—No registered parties (with or without alcohol) can occur during the End of the Quarter Period (dead week) or Finals Week.
- Athletic Facilities—No alcohol is permitted inside Stanford athletic facilities public spaces during athletic events.

- Stanford Conferences and University Facilities—The University requires that event sponsors and student groups wishing to offer alcoholic beverages at their programs and events operate within state and local laws as provided by the Department of Alcohol and Beverage Control (ABC). Alcohol service is not allowed in classrooms.
- Admit Weekend—Stanford students are prohibited from providing, serving or in anyway making alcohol available to any prospective frosh (ProFro). All student groups/organizations and residences may host only alcohol-free parties or events during Admit Weekend. This specifically means that no alcohol is to be present, served or consumed at any student group/organization and/or dorm function during Admit Weekend.
- New Student Orientation (NSO) Period—At no time should any Stanford student provide, serve or in any way make alcohol available to any new, incoming undergraduate student (freshman or transfer). All undergraduate student groups/organizations and residences will host only alcohol-free parties or events during Orientation. This specifically means that no alcohol is to be present, served, or consumed at any student group/organization and/or dorm function during NSO.

## California State Laws

Students should be familiar with California laws governing the consumption of alcohol. The following summarizes those laws most relevant to individuals.

- It is illegal for persons under the age of 21 to possess an alcoholic beverage in any public place or any place open to the public (CA Business and Professions Code 25662).
- Any person who furnishes, gives or sells any alcoholic beverage to someone under the age of 21 is guilty of a misdemeanor (CA Business and Professions Code 25658(a)).
- Any person under the age of 21 who attempts to purchase an alcoholic beverage is guilty of an infraction (CA Business and Professions Code 25658.5).
- Any person under the influence of alcohol in a public place and unable to exercise care for one's own safety or that of others is guilty of a misdemeanor (CA Penal Code 647(f)).
- It is illegal for persons to operate a motor vehicle while under the influence of alcohol or other intoxicants or with a blood alcohol level of .08% or higher (CA Vehicle Code Section 23152). NOTE: A golf cart is a motor vehicle.
- It is unlawful for a person under the age of 21 years who has 0.05 percent or more, by weight, of alcohol in his or her blood to drive a vehicle (CA Vehicle Code Section 23140(a)).
- It is illegal for a person under the age of 21 to drive a vehicle when he or she has a blood alcohol concentration (BAC) of .01% or higher (CA Vehicle Code Section 23136).
- It is a misdemeanor to ride a bicycle under the influence of alcohol, drugs or both (CA Vehicle Code Section 21200.5).
- It is an infraction to possess an open container of an alcoholic beverage while in a motor vehicle (CA Vehicle Code Section 23223).
- It is an infraction for an owner or driver of a motor vehicle to allow an open container of alcohol in the passenger area (CA Vehicle Code Section 23225).

# Age Discrimination Act of 1975

## Age Discrimination Act of 1975

The following is the policy:

### 1. Policy

It is the policy of Stanford University to comply with the Age Discrimination Act of 1975 and its regulations, which prohibit unlawful discrimination on the basis of age. The Age Discrimination Act Compliance Officer is the Director of the Diversity and Access Office ("the Director"), who has been appointed to coordinate the University's efforts to comply with the law. Anyone who believes that Stanford is not in compliance with the Age Discrimination Act and its regulations ("the Act") should contact the Director at the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email).

### 2. Grievance Procedure

- An individual who believes that Stanford is not acting in compliance with the Act and who wishes to file a grievance should set forth in writing the substance of his or her complaint, the grounds for it and the evidence on which it is based, and the efforts (if any) taken to date to resolve the matter. It is at this stage that the complaint becomes a formal grievance.
- The grievance document should be submitted to the Director. A grievance should be filed in a timely fashion, i.e., normally no later than thirty days after the end of the academic quarter in which the action that is the subject of the grievance occurred. Except in extraordinary circumstances, delay in filing a grievance will be grounds for rejection of that grievance.
- The Director will promptly initiate a review, which should normally be completed within sixty days. The Director may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance officer or other designee, who will look into and/or address the matter as the Director directs. The Director may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.
- In undertaking this review, either the Director, his or her designee, or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information the reviewer considers relevant, including faculty, staff and students.
- The Director (or his or her designee) will issue his or her decision in writing, and take steps to initiate such corrective action as is called for (if any).

### 3. Appeal

- If the grievant is dissatisfied with the disposition by the Director (or his or her designee), he or she may appeal to the Provost (Office of the President and Provost, Building 10, Stanford, CA 94305-2061; phone 650-725-4075; fax 650-725-1347). The appeal should be filed in writing with the Provost within ten days of the issuance of the decision by the Director (or his or her designee); a delay in filing the appeal may be grounds for rejection of that appeal.
- The Provost may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance appeal officer, who will review the matter at the Provost's direction. The Provost may also, in appropriate cases, remand the matter to the

appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.

- c. The Provost should normally complete his or her review of the appeal and issue his or her decision in writing within forty-five days. That decision is final.

#### 4. General Provisions

- a. **Time Guidelines**—The time frames set forth herein are guidelines. They may be extended by the Director or Provost, as applicable, in his or her discretion for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure.
- b. **No Retaliation**—Stanford University prohibits retaliation or reprisals against individuals based on their pursuit in good faith of a grievance under this procedure, or their participation in good faith in the grievance process.
- c. **Standards for Review**—If the grievance involves a decision that is being challenged, the review by the Director, as well as the review by the Provost on appeal, usually will be limited to the following considerations:
  - i. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
  - ii. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
  - iii. Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?

an institutional commitment to provide equal educational opportunities for disabled students who are otherwise qualified.

Students who believe they have been subjected to unlawful discrimination on the basis of disability, or have been denied access to services or accommodations required by law, have the right to use this grievance procedure.

### II. Applicability

As a general proposition, the grievance procedure set forth below is applicable to undergraduate and graduate students of the University. In general, it is designed to address disputes concerning the following:

1. Disagreements regarding a requested service, accommodation, or modification of a University practice or requirement;
2. Inaccessibility of a program or activity;
3. Harassment or discrimination on the basis of disability;
4. Violation of privacy in the context of disability.

As a general proposition, this grievance procedure supplants the Student Academic Grievance Procedure (p. 75) and the Student Non-Academic Grievance Procedure (p. ) (both of which are set forth in this bulletin) for disability-related grievances. Questions of applicability will be decided by the Director of the Diversity and Access Office.

### III. Compliance Officers

Stanford University's Compliance Officers are responsible for administering this grievance procedure as well as ensuring compliance with applicable laws. The Director of the Diversity and Access Office is the designated ADA / Section 504 Compliance Officer. That office is located in Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email).

Additional Compliance Officers may be designated from time to time by the Provost from those faculty and staff members knowledgeable concerning disability issues and the legal mandates of state and federal disability statutes.

### IV. Informal Resolution

Prior to initiating the formal complaint procedure set forth below, the student should, in general, first discuss the matter orally or in writing with the individual(s) most directly responsible. If no resolution results, or if direct contact is inappropriate under the circumstances, the student should then consult with the Compliance Officer at the Diversity and Access Office who will attempt to facilitate a resolution. (The informal resolution process may involve consultation with the Associate Vice Provost for Student and Academic Services and University Registrar.)

If the Compliance Officer is not successful in quickly achieving a satisfactory resolution (that is, generally within seven calendar days), the Compliance Officer will inform the student of his or her efforts and the student's right to file a formal complaint.

### V. Formal Complaint

If the procedure set forth above for informal resolution does not yield a successful resolution, then the student may file a formal complaint in the following manner:

1. **When to File Complaint:** Complaints must be filed as soon as possible, but in no event later than 10 days after the end of the quarter in which the concern arose.
2. **What to File:** A complaint must be in writing and include the following:
  - a. The grievant's name, address, email address and phone number;
  - b. A full description of the problem;
  - c. A description of what efforts have been made to resolve the issue informally;
  - d. A statement of the remedy requested.

## ADA (Americans with Disabilities Act)/Section 504 Grievance Procedure (Student)

### ADA (Americans with Disabilities Act)/Section 504 Grievance Procedure (Student)

For information more generally concerning policies and procedures for students with disabilities, see the Diversity & Access Office (<http://www.stanford.edu/dept/diversityaccess>) web site, or the ADA/Section 504 Compliance Officer, Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email); see also the Office for Accessible Education (OAE) (<http://studentaffairs.stanford.edu/oae>) web site.

## Policy

The following is the policy:

### I. Policy

Stanford University, in compliance with state and federal laws and regulations, including the Americans with Disabilities Act of 1990 (ADA; as amended 2008) and Section 504 of the Rehabilitation Act of 1973 (Section 504), does not discriminate on the basis of disability in administration of its education-related programs and activities, and has

3. **Where to File Complaint:** the complaint is to be filed with the Compliance Officer at the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email).
4. **Notice of Receipt:** upon receipt of the complaint, the Compliance Officer reviews the complaint for timeliness and appropriateness for this grievance procedure, and provides the grievant with written notice acknowledging its receipt.
5. **Investigation:** the Compliance Officer will promptly initiate an investigation and may refer the matter (or any part of it) to a grievance officer or other designee, who will look into and/or address the matter as the Compliance Officer directs. In undertaking the investigation, the Compliance Officer or grievance officer may interview, consult with, and/or request a written response to the issues raised in the grievance from any individual the grievance officer believes to have relevant information, including faculty, staff, and students.
6. **Representation:** the grievant and the party against whom the grievance is directed each have the right to have a representative. The party shall indicate whether he or she is to be assisted by a representative and, if so, the name of that representative. For purposes of this procedure, an attorney is not an appropriate representative.
7. **Findings and Notification:** upon completion of the investigation, the grievance officer will prepare and transmit to the student, and to the party against whom the grievance is directed, a final report containing a summary of the investigation, written findings, and a proposed disposition. This transmission will be expected within 60 calendar days of the filing of the formal complaint. The deadline may be extended by the Compliance Officer for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure. The final report may also be provided, where appropriate, to any University officer whose authority will be needed to carry out the proposed disposition or to determine whether any personnel action is appropriate.
8. **Final Disposition:** the disposition proposed by the Compliance Officer will be put into effect promptly. The grievant or any party against whom the grievance or the proposed disposition is directed may appeal. The appeal to the Provost (as set forth below) will not suspend the implementation of the disposition proposed by the grievance officer, except in those circumstances where the Provost decides that good cause exists making the suspension of implementation appropriate.

## VI. Urgent Matters

Whenever the application of any of the time deadlines or procedures set forth in this grievance procedure creates a problem due to the nature of the complaint, the urgency of the matter, or the proximity of the upcoming event, the Compliance Officer will, at the request of the grievant, determine whether an appropriate expedited procedure can be fashioned.

## VII. Remedies

Possible remedies under this grievance procedure include corrective steps, actions to reverse the effects of discrimination or to end harassment, and measures to provide a reasonable accommodation or proper ongoing treatment. As stated above, a copy of the Compliance Officer's report may, where appropriate, be sent to University officer(s) to determine whether any personnel action should be pursued.

## VIII. Appeal

Within ten calendar days of the issuance of the final report, the grievant or the party against whom the grievance is directed may appeal to the Provost the grievance officer's determination.

An appeal is taken by filing a written request for review with the Compliance Officer at the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), equal.opportunity@stanford.edu (email).

The written request for review must specify the particular substantive and/or procedural basis for the appeal, and must be made on grounds other than general dissatisfaction with the proposed disposition. Furthermore, the appeal must be directed only to issues raised in the formal complaint as filed or to procedural errors in the conduct of the grievance procedure itself, and not to new issues.

The Compliance Officer will forward the appeal to the Provost, and also provide copies to the other party or parties. If the grievance involves a decision that is being challenged, the review by the Provost or his or her designee usually will be limited to the following considerations:

1. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
2. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
3. Given the proper facts, criteria, and procedures, was the decision a reasonable one?

A copy of the Provost's written decision will be expected within 30 calendar days of the filing of the appeal and will be sent to the parties, the Compliance Officer and, if appropriate, to the University officer whose authority will be needed to carry out the disposition. The deadline may be extended by the Provost for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure. The decision of the Provost on the appeal is final.

# Campus Disruptions

## Campus Disruptions

The Policy on Campus Disruptions was promulgated in 1967, and states that:

### Policy

The following is quoted from the policy:

Because the rights of free speech and peaceable assembly are fundamental to the democratic process, Stanford firmly supports the rights of all members of the University community to express their views or to protest against actions and opinions with which they disagree.

All members of the University also share a concurrent obligation to maintain on the campus an atmosphere conducive to scholarly pursuits, to preserve the dignity and seriousness of University ceremonies and public exercises, and to respect the rights of all individuals.

The following regulations are intended to reconcile these objectives.

It is a violation of University policy for a member of the faculty, staff, or student body to:

1. prevent or disrupt the effective carrying out of a University function or approved activity, such as lectures, meetings, interviews, ceremonies, the conduct of University business in a University office, and public events.
2. obstruct the legitimate movement of any person about the campus or in any University building or facility.

Members of the faculty, staff, and student body have an obligation to leave a University building or facility when asked to do so in the furtherance of the above sections by a member of the University community acting in an official role and identifying himself or herself as such; members of the faculty, staff, or student body also have an obligation to identify themselves, when requested to do so by such a member of the University community who has reasonable grounds to believe that the person(s) has violated section (1) or (2) of this policy and who has so informed the person(s).

The policy has been applied to the following actions: refusal to leave a building which has been declared closed; obstructing the passage into or out of buildings by sitting in front of doorways; preventing University employees from entering their workplace; preventing members of a class from hearing a lecture or taking an examination, or preventing the instructor from giving a lecture, by means of shouts, interruptions, or chants; refusing to leave a closed meeting when unauthorized to attend; and intruding upon or refusing to leave a private interview.

It should be understood that while the above are examples of extraordinarily disruptive behavior, the application of the Policy also takes situational factors into consideration. Thus, for example, conduct appropriate at a political rally might constitute a violation of the Policy on Campus Disruption if it occurred within a classroom.

There is no "ordinary" penalty which attaches to violations of the Policy on Campus Disruption. In the past, infractions have led to penalties ranging from censure to expulsion. In each case, the gravity of the offense and prior conduct of the student are considered; however, the more serious the offense, the less it matters that a student has otherwise not done wrong.

## Campus Safety and Criminal Statistics

### Campus Safety and Criminal Statistics

Stanford University complies with the Jeanne Clery Disclosure of Campus Security Policy and Crime Statistics Act. A copy of Stanford's policies and statistics under this act are posted on the Department of Public Safety (<http://stanford.edu/group/SUDPS/safety-report.shtml>) web site. A paper copy can be obtained by calling the Stanford Department of Public Safety at (650) 723-9633.

## Computer and Network Usage

### Computer and Network Usage

For a complete text of the currently applicable version of this policy, see Administrative Guide Memo 6.2.1 Computer and Network Usage Policy (<https://adminguide.stanford.edu/chapter-6/subchapter-2/policy-6-2-1>).

#### Policy

The following is quoted from the policy:

Users of Stanford network and computer resources have a responsibility not to abuse the network and resources. This policy provides guidelines for the appropriate and inappropriate use of information technologies.

#### Summary

The following summarizes the policy on Computer and Network Usage:

In particular, the policy provides that users of University information resources must respect software copyrights and licenses, respect the integrity of computer-based information resources, refrain from seeking

to gain or permitting others to gain unauthorized access, including by sharing passwords, and respect the rights of other computer users.

This policy covers appropriate use of computers, networks, and information contained therein. As to political, personal and commercial use, the University is a non-profit, tax-exempt organization and, as such, is subject to specific federal, state, and local laws regarding sources of income, political activities, use of property, and similar matters. It also is a contractor with government and other entities, and thus must assure proper use of property under its control and allocation of overhead and similar costs. For these reasons, University information resources must not be used for partisan political activities where prohibited by federal, state, or other applicable laws, and may be used for other political activities only when in compliance with federal, state, and other laws, and in compliance with applicable University policies. Similarly, University information resources should not be used for personal activities not related to appropriate University functions, except in a purely incidental manner. In addition, University information resources should not be used for commercial purposes, except in a purely incidental manner or except as permitted under other written policies of the University or with the written approval of a University officer having the authority to give such approval. Any such commercial use should be properly related to University activities, take into account proper cost allocations for government and other overhead determinations, and provide for appropriate reimbursement to the University for taxes and other costs the University may incur by reason of the commercial use. Users also are reminded that the .edu domain on the Internet has rules restricting or prohibiting commercial use, and thus activities not appropriately within the .edu domain and which otherwise are permissible within the University computing resources should use one or more other domains, as appropriate.

The University's Information Security Officer is authorized in appropriate circumstances to inspect or monitor private data (including email), such as when there is a reasonable cause to suspect improper use of computer or network resources.

For further information on the topic of peer-to-peer file sharing, see the section above on Copyright.

## Copyright

Copyright laws protect original works of authorship and give the owners of copyrights the exclusive right to do and to authorize others to do certain things in regard to a copyrighted work, including: make copies, distribute the work, display or perform the work publicly, and create derivative works. Copyright laws apply to nearly all forms of captured content, including traditional works like books, photographs, music, drama and sculpture. The laws also adapt to changes in technologies, and include in their scope modern forms of works like motion pictures, web sites, electronic media, software, multimedia works and some databases. Registration is not required to obtain a copyright, so if in doubt, assume a copyright applies.

Unless an exception to the copyright owner's exclusive rights applies, you must obtain permission from the copyright owner to copy, distribute, display or perform a copyrighted work in any medium for any purpose. Be especially mindful of copyright principles when using the Internet. Just because a work is posted on the Internet does not mean that the owner of the copyright has given you permission to use it. In general, do not post material onto the Internet without copyright clearance.

Stanford University Libraries have licenses with many publishers, which permit copying of materials in accordance with the educational, research or administrative functions of the University. In addition, there are four major exceptions to the copyright owner's exclusive rights, which (if applicable) permit limited use without permission. These are: the fair use



exception, the library exception, the face-to-face teaching exception, and the distance-learning exception. For a more detailed explanation of these exceptions, the copyright laws and Stanford's copyright policies, please review the University's Copyright Reminder ([http://www.sul.stanford.edu/libraries\\_collections/copyright\\_reminders](http://www.sul.stanford.edu/libraries_collections/copyright_reminders)) web site. It is each person's responsibility to be aware of and abide by copyright law; violation may result in civil or criminal liability, and constitutes grounds for University discipline, up to and including discharge, dismissal and expulsion.

## Dangerous Weapons on Campus

### Prohibition of the Possession of Dangerous Weapons on Campus

The University's policy prohibiting weapons on campus ([https://police.stanford.edu/pdf/stanford\\_university\\_prohibited\\_weapons\\_policy.pdf](https://police.stanford.edu/pdf/stanford_university_prohibited_weapons_policy.pdf)) (pdf) is available on the Resources tab of the Department of Public Safety (<https://police.stanford.edu/#resources>) web site.

#### Policy

### Prohibition of the Possession of Dangerous Weapons on Campus

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#### Policy

Stanford University prohibits the possession of any of the following weapons on the Stanford campus: firearm, dirk, dagger, ice pick, knife having a blade longer than 2 1/2 inches (except for lawful use in food preparation or consumption), folding knife with a blade that locks into place, razor with an unguarded blade, taser, stun gun, instrument that expels a metallic projectile (such as a BB or a pellet), spot marker gun, or any other weapons prohibited by California Penal Code Sections 626.10 and 626.9.

For purposes of this policy, the term "Stanford campus" shall include all the lands, buildings, and facilities of Leland Stanford Junior University, whether owned, leased, and controlled, and whether located in the United States or abroad (excluding the privately owned, managed, or leased residences of faculty or staff that are located on the main Stanford campus in unincorporated Santa Clara County). In addition to the prohibited weapons, ammunition is not allowed to be stored or possessed in university owned, leased, and controlled buildings (excluding the privately owned, managed, or leased residences of faculty or staff that are located on the main Stanford campus in unincorporated Santa Clara County). In the event a federal or state law or a county ordinance is more restrictive than this policy, federal or state law or the county ordinance shall apply.

Requests for an exemption from this policy for academic purposes may be requested in writing to the Director of the Stanford University Department of Public Safety. Each request will be considered on a case-by-case basis and be evaluated by the Office of Risk Management and the Department of Public Safety. A written letter will be provided by the Director of the Department of Public Safety in the event an exemption is granted.

The Stanford University Department of Public Safety does not provide facilities for the storage of firearms.

## Domestic Partners

### Domestic Partners

In October 1990, Stanford University adopted a domestic partners policy. This policy, which implements the University's nondiscrimination policy, makes services that have historically been available to married students available on an equal basis to students with same-sex or opposite-sex domestic partners. These services include access to student housing, a courtesy card that provides access to University facilities, and the ability to purchase medical care at Vaden Health Service. A domestic partnership is defined as an established long-term partnership with an exclusive mutual commitment in which the partners share the necessities of life and ongoing responsibility for their common welfare.

## Grievances

### Grievances

A Stanford undergraduate or graduate student who believes that he or she has been subject to an improper decision on an academic matter may file a grievance pursuant to the Student Academic Grievance Procedure (p. 75). For other types of grievances, students should review the section that follows on the Student Non-Academic Grievance Procedure (p. ), and consult concerning applicable procedures with the Director of the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email).

An individual whose matter has been substantially addressed through one of Stanford's grievance procedures (including but not limited to the Student Academic Grievance Procedure, the Student ADA/Section 504 Grievance Procedure, the Grievance Resolution Procedure for Postdoctoral Scholars, the Student-Athlete Grievance Procedure, or the Student Non-Academic Grievance Procedure) may not raise and seek redress of the same matter under a different Stanford grievance procedure. The University retains discretion to determine when a matter has been substantially addressed.

### California Dept of Consumer Affairs Complaint Procedure

An individual may contact the Bureau for Private Postsecondary Education for review of a complaint. The bureau may be contacted online (<http://www.bppe.ca.gov>) or at 2535 Capitol Oaks Drive, Suite 400, Sacramento, CA 95833; phone: (916) 431-6924; fax: (916) 263-1897.

## Hazing Policy

### Hazing Policy

Hazing is not permitted at Stanford University. No individual, recognized student organization, club, team, or any other Stanford-affiliated student group is permitted to plan, engage in, or condone hazing, on or off the Stanford campus.

### Definition of Hazing at Stanford University

Hazing includes any activity done in connection with a student organization, regardless of whether the organization is officially recognized at Stanford, that causes or is reasonably likely to cause another student to suffer bodily danger, physical harm, or significant personal degradation or humiliation, even if no bodily danger, physical harm, or significant degradation or humiliation in fact results. Hazing might occur during initiation or pre-initiation into a student organization, but is not limited to these time frames. Any individual who plans or intentionally assists in hazing activity has engaged in hazing, regardless of whether that individual is present when the hazing activity occurs.

## Consequences of a Violation

Stanford University expects its students to conduct themselves in socially responsible and respectful ways. Thus, participation in hazing, either as an individual or as part of any student group, may result in serious individual and organizational consequences including, but not limited to: disciplinary action up to and including expulsion; permanent loss of organizational recognition; and loss of eligibility to remain a member of any club, team, or other Stanford-affiliated student group. Consent, implied or expressed, is not a defense to any complaint or charge alleging a hazing violation.

A number of University offices may take institutional action, including: the Organizational Conduct Board; Office of Community Standards; or other University offices, such as the Vice Provost for Student Affairs or the Department of Athletics.

## Applications

Stanford's hazing policy is distinct from and broader than California Penal Code section 245.6, which prohibits: "any method of initiation or pre-initiation into a student organization or student body, whether or not the organization or body is officially recognized by an educational institution, which is likely to cause serious bodily injury to any former, current, or prospective student of any school, community college, college, university or other educational institution in this state." A violation of Penal Code Section 245.6 that does not result in serious bodily injury is punishable as a misdemeanor, while a violation that results in death or injury is punishable as a felony or a misdemeanor.

Nothing in this hazing policy prevents Stanford from taking institutional action against hazing activity that falls outside the narrower definition of Penal Code section 245.6.

Stanford's hazing policy is not intended to prohibit student recruitment or new or continuing member activities that are positive and educational in nature, designed to instill a group ethos or unity. Its intent is to deter those behaviors that cause or are likely to cause danger, harm or humiliation to another student.

Stanford's hazing policy is not intended to apply to customary athletic events or other similar institutionally-approved contests or competitions.

Questions regarding hazing policies related to fraternities and sororities should be directed to the Office of Fraternity and Sorority Life at (650) 723-0778. For all other student groups, contact Student Activities and Leadership at (650) 723-2445.

## Main Quadrangle • Memorial Court • Oval • White Plaza

### Use of the Main Quadrangle and Memorial Court Policy

The following is quoted from the policy:

The Main Quadrangle and Memorial Court are part of Stanford University's academic preserve due to their locations at the heart of the campus. To protect and enhance their historic status, University policy limits activities primarily to established or traditional ceremonies and events.

To schedule an event, approval must be obtained in advance from the Office of Stanford Events (see below). Unscheduled events, protests, or activities are prohibited.

Requests for waivers to this policy must be submitted in advance and in writing to the Office of Stanford Events. Exceptions may be granted only in extraordinary cases.

## Resources

The following is a summary of resources available:

For instructions on use of the Main Quadrangle/Memorial Court, contact the Office of Special Events and Protocol (OSEP) at (650) 724-1387, or at the OSEP (<https://osep.stanford.edu>) web site.

Note: White Plaza is made available to Stanford students, faculty, and staff for events other than scheduled "established or traditional ceremonies and events" including those that may involve amplified sound. For further information on the use of such other venues, students should contact Student Activities and Leadership (SAL) at (650) 723-2733, or at the SAL (<http://studentaffairs.stanford.edu/sal>) web site. Faculty and staff should contact the Office of Special Events and Protocol (OSEP) (<https://osep.stanford.edu>).

## Oval Policy

The Oval is considered to be the initial and official visual entrance to the Stanford University campus. Given this historic and aesthetic status, it is in the best interests of the University community and visiting members of the public to maintain its open and pristine space, to help preserve its natural beauty and environmental integrity. The Oval also presents the formal academic image of the University, leading directly to departments, classrooms and other academic space, and faculty and graduate student offices, and thus is subject to the University's Noise Policy.

The University prohibits formal or informal events of any kind to take place in the Oval. Gatherings of Stanford students, faculty, and staff such as demonstrations, rallies, or dances may take place in White Plaza, which can be reserved through the Office of Student Activities. Weddings also are not allowed in the Oval but are in certain circumstances allowed in Memorial Church (refer to Memorial Church wedding ceremony guidelines (<http://www.stanford.edu/group/religiouslife/servicesWeddings.html>)).

The Oval is considered a pedestrian zone and appropriate use of its space includes walking, running, reading, relaxing, and other limited recreational use of the lawn area (such as quiet, very small picnics and Frisbee), unless or until such use damages or otherwise harms the property.

Cooking food or use of any grill/barbecue or open flame is strictly prohibited. Fireworks or the use of other incendiary devices represent a safety hazard to the area and are therefore prohibited. Amplified sound from items such as boom boxes, musical instruments, or the use of bullhorns or amplified speakers is also prohibited. Only authorized Stanford service vehicles are permitted inside the Oval areas.

As the official entrance to the University, the Oval offers public access to general parking spaces in the marked areas surrounding the outer perimeter of the Oval; drivers are expected to obey all traffic signs and limitations. Buses are subject to additional restrictions.

For further information regarding this policy, contact the Executive Director of Special Events and Protocol, 724-1387 or see the Office of Special Events & Protocol (<http://osep.stanford.edu/policies/oval.html>) web site.

## White Memorial Plaza

White Plaza is a Stanford University space available for programs, speeches, rallies, information tables, banners and posters. It is considered a "free speech area" on campus. Students should follow the policy outlined on the Student Activities and Leadership (<https://sal.stanford.edu/plan-event/venues/outdoor-spaces/white-memorial->

plaza) web site to engage in student programmatic activity. Due to Stanford's non-profit status, for-profit commercial activity or corporate promotion of any kind is strictly regulated.

White Plaza is in the center of campus, so event planners should take particular care to avoid disruptive impact on classes, business, or events in the surrounding buildings. Events in White Plaza must be organized by University entities (student groups, departments, and programs) and require prior approval from Student Activities and Leadership (SAL) (<https://sal.stanford.edu>).

## No Camping

## No Camping

Camping (that is, staying outside overnight on University property) is not permitted without University permission. Permission is granted through the Office of the Provost or the Provost's designee.

## Under Construction

## Online Accessibility Policy

### Stanford University Online Accessibility Policy

Stanford University will make Stanford Websites and web#based applications accessible to its students, faculty, staff and participants in the University's programs and activities who have disabilities. All personnel who are involved in the procurement, preparation and maintenance of University Websites and web#based applications should adopt this goal, with the assistance of campus resources dedicated to supporting web accessibility. Stanford Websites and web#based applications must either conform to WCAG 2.0 Level AA (<http://www.w3.org/TR/WCAG20>) or their content and functionality be made available to Users on request (such as by a student request to the Office of Accessible Education) in an equally effective and accessible alternative manner.

### Applicability

Stanford's online accessibility policy applies to all Stanford academic and administrative units that create and maintain web sites and web#based applications used in the programs and activities of the University. See the Stanford University Online Accessibility Policy (<http://ucomm.stanford.edu/policies/accessibility-policy>) web site for the full policy.

### Definitions

#### Stanford Website

Any website or web#based application within the Stanford University ([stanford.edu](http://stanford.edu)) domain used in the programs or activities of the University.

#### Users

Stanford Website users are defined as current Stanford students and applicants for admission, Stanford staff and faculty, and participants in the University's programs and activities.

#### Accessible

Refers to the concept that people with disabilities are able to independently and timely access and use a product or system, including with the benefit of assistive technologies. Assistive technologies include adaptive hardware and/or software and other devices that are used to

increase, maintain, or improve the functional capabilities of individuals with disabilities.

### Stanford Online Accessibility Program ("SOAP") Office

The SOAP Office (<http://soap.stanford.edu>) provides resources and services for Stanford web designers, developers and content creators to assist them in producing accessible materials. Services include Website accessibility testing and guidance regarding universal design and web standards compliance. The SOAP Office is also the campus resource designated to facilitate online accessibility for Users. To report and seek assistance on web accessibility issues, Users may contact the SOAP Office by email at [web-accessibility@stanford.edu](mailto:web-accessibility@stanford.edu) or submit a HelpSU ticket through the SOAP Office website.

### Office of Accessible Education ("OAE")

The Office of Accessible Education (<http://oae.stanford.edu>) is the campus office designated to work with Stanford students with disabilities. OAE provides support services, accommodations, and programs to remove barriers to full participation of students with disabilities in the programs or activities of the University.

### Diversity and Access Office ("D&A")

The Diversity and Access Office (<http://diversityandaccess.stanford.edu>) oversees compliance with state and federal anti#discrimination laws including the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. D&A provides disability#related access information, and assists faculty, staff and other non#student participants in University programs and activities with disabilities who may need accommodations and/or auxiliary aids to obtain equal access to Stanford facilities, programs and activities. D&A also oversees the ADA/Section 504 Grievance Procedure for students who believe they have been subjected to unlawful discrimination based on a disability or denied access to services or accommodations which the ADA and/or Section 504 require Stanford to provide. Read more about the ADA/Section 504 Grievance Procedure (p. ).

### Accessibility Standard

Stanford University has adopted the Worldwide Web Consortium Web Content Accessibility Guidelines (<http://www.w3.org/TR/WCAG20>) version 2.0, Level AA Conformance (WCAG 2.0 Level AA) as its goal for accessible Stanford Websites. The guidelines and success criteria of WCAG 2.0 Level AA are organized around the following four principles which lay the foundation for users with disabilities to access and use web content. For a Stanford Website to be accessible under these principles, its content must be:

1. Perceivable – Information and user interface components must be presentable to users in ways they can perceive.
2. Operable – User interface components and navigation must be operable.
3. Understandable – Information and the operation of user interface must be understandable.
4. Robust – Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

### Implementation Guidelines

1. All personnel responsible for existing Stanford Websites must use good faith efforts, subject to the requirements and exceptions of the applicable laws, to bring those Websites into conformance with WCAG Level 2.0 AA.
2. New Stanford Website development and purchases, including development and purchases for major revisions and updates of existing Stanford Websites, should conform to WCAG 2.0 Level AA.
3. Vendors seeking to develop or provide Websites or web-based applications for Stanford are to demonstrate that their products satisfy WCAG 2.0 Level AA Success Criteria, unless undue burden

or fundamental alteration can be demonstrated (see below).

Preferred standards for demonstrating satisfaction of WCAG 2.0 Level AA Success Criteria, and accessibility language for Stanford Website vendor contracts, as well as for other types of Electronic Information Technology vendor contracts, may be obtained from University Procurement (Purchasing and Payment Services) (<http://web.stanford.edu/group/fms/fingate/contact/#procure>) or from the SOAP Office (<https://soap.stanford.edu>).

4. Each Stanford Website should contain "Accessibility" contact information for the site's webmaster and/or the SOAP Office. The contact information may take a variety of forms, such as an email address, a link to a HelpSU page, or a contact form on the site. The recommended location for this information is the Website's "Contact" or "About Us" page.
5. The SOAP Office will continue to test Stanford Websites for accessibility and report accessibility issues to the webmaster for that website.
6. OAE will continue to seek input from Stanford students regarding accessibility issues.
7. Conformance to WCAG 2.0 Level AA guidelines may be an undue burden due to the nature of the content, the purpose of the resource, the lack of accessible solutions, or an unreasonably high administrative or financial cost necessary to make the resource meet that goal. However, these difficulties do not relieve University programs or activities from meeting applicable legal obligations to provide reasonable accommodations to Users in regard to access to the content and services provided on Stanford Websites. Managers of University programs and activities must be prepared to provide content and/or services in a suitable alternative format (e.g., electronic text file or audio description) or manner upon request (such as by a student to the OAE).

## Implementation Assistance

Guidelines and best practices are available from the SOAP Office (<http://soap.stanford.edu>). In addition, on-campus assistance is available for designing and implementing websites that meet accessibility guidelines and for evaluating the accessibility of existing sites and those under development. If such assistance is needed, visit the SOAP web site (<http://soap.stanford.edu>) or email the SOAP Office at [web-accessibility@stanford.edu](mailto:web-accessibility@stanford.edu).

## Responding to Accessibility Issues

Recognizing the ongoing evolution of current web content and technologies, the designated webmaster for a particular site, upon being made aware of an accessibility issue on that site, should proceed as follows:

- Acknowledge receipt of the issue in writing (via email) to the User raising the issue, with a copy to the SOAP Office.
- Open an accessibility case for recording the issue and resulting action taken.
- Verify that the issue is an authentic accessibility issue.
- Treat all issues as important. Address any time-sensitive need of the User promptly (generally within a period of no greater than two business days), unless technology or work involved requires more effort, in which case the User will be promptly notified in writing of expected delivery.

Upon receiving a report of an accessibility issue, the SOAP Office shall notify the site's webmaster, as well as OAE (for reports from students) or D&A (for reports from non-students.) If the SOAP Office, in consultation with the site's webmaster, determines that the information or service provided on the Stanford Website cannot be made accessible, or that doing so would constitute an undue burden or fundamental alteration, OAE or D&A will engage in an interactive process with the User about alternative methods for providing the information or service and will

provide an equally effective alternative format or service. In the event that an alternative format or service cannot be provided or the user is not satisfied with the results, he or she may contact the ADA/Section 504 Compliance Officer at D&A by telephone at (650) 723-0755 or by email at [equalopportunity@stanford.edu](mailto:equalopportunity@stanford.edu) for assistance in resolving the issue.

For questions about the policy, please contact the SOAP Office (<https://soap.stanford.edu/about/contact>).

## Peer-to-Peer File Sharing

### Peer-to-Peer File Sharing

The use of file-sharing networks and software to download and share copyrighted works like software, music, movies, television programs, and books can violate copyright laws. Both the person who makes an illegal copy of a copyrighted work available and the person who receives or downloads an illegal copy have violated the law and Stanford policies. Many file-sharing programs have default settings that share copyrighted files, such as music and movies, through the Internet. Before enabling any of these programs students, faculty, or staff must read the fine print, make sure to understand the program itself, and only use such programs lawfully. Under the Digital Millennium Copyright Act (DMCA), copyright owners are entitled to notify Internet service providers, such as Stanford, that IP addresses linked to the Stanford network are sharing copies of music, movies, or other content without authorization. The law requires the University to respond to such complaints by eliminating access to the infringing materials. Stanford will disconnect students who fail to respond to a DMCA complaint promptly. Furthermore, the University also will suspend or terminate computer access to the Stanford network, including termination of the SUNet ID, to members of the community who continue to violate copyright laws. Finally, the University will take action through the student, employee, or faculty disciplinary processes if necessary. Beyond University consequences, copyright holders may file civil lawsuits against copyright infringers seeking extensive monetary damages. If compelled by a lawful subpoena, Stanford may be required to identify students, faculty, staff, or others who have violated copyright law. For more information about file-sharing, refer to Residential Computing's online resource, File-Sharing and Copyright Law (<http://rescomp.stanford.edu/info/dmca>) web site.

## Protection of Sensitive Data

### Protection of Sensitive Data

Stanford University maintains sensitive non-public data protected by laws and agreements, including Social Security numbers, financial information, health information, and student records. It is incumbent on every member of the Stanford community with access to such data to be familiar with and abide by Stanford's data classifications requirements provided at the Data Classification, Access, Transmittal and Storage ([http://www.stanford.edu/group/security/securecomputing/dataclass\\_chart.html](http://www.stanford.edu/group/security/securecomputing/dataclass_chart.html)) web site. Members of the Stanford community should also familiarize themselves with applicable laws and University policies on privacy as provided by the University, including Administrative Guide Memos 6.3.1 Information Security (<https://adminguide.stanford.edu/chapter-6/subchapter-3/policy-6-3-1>), 6.4.1 Identification and Authentication Systems (<https://adminguide.stanford.edu/chapter-6/subchapter-4/policy-6-4-1>), 6.6.1 Information Security Incident Response (<https://adminguide.stanford.edu/chapter-6/subchapter-6/policy-6-6-1>), and 3.4.2 Card and Payment Account Acceptance and Processing (<https://adminguide.stanford.edu/chapter-3/subchapter-4/policy-3-4-2>). For information on best practices for securing mobile computing devices, see the Guidelines for Securing Mobile Computing Devices ([http://www.stanford.edu/group/security/securecomputing/mobile\\_devices.html](http://www.stanford.edu/group/security/securecomputing/mobile_devices.html)) web site.

# Political Activities

## Political Activities

For the complete text of the currently applicable version of this policy, see Administrative Guide Memo 1.5.1 Political Activities (<https://adminguide.stanford.edu/chapter-1/subchapter-5/policy-1-5-1>).

### Summary

The following summarizes the policy on Political Activities:

Stanford University, as a charitable entity, is subject to federal, state, and local laws and regulations regarding political activities: campaign activities, lobbying, and the giving of gifts to public officials.

While all members of the University community are naturally free to express their political opinions and engage in political activities to whatever extent they wish, it is very important that they do so only in their individual capacities and avoid even the appearance that they are speaking or acting for the University in political matters.

In the limited circumstances where individuals must speak or act on behalf of the University in the political arena, they must do so in accordance with the provisions of this Guide Memo.

### Policy

The following is quoted from the policy:

#### 1. Summary of Legal Requirements and Restrictions

- a. Campaign Activities: contributions of money, goods, or services to candidates for political office and in support of or opposition to ballot measure campaigns are subject to a wide variety of political laws. Depending on the jurisdiction and the campaign, political contributions may be prohibited or limited and, in nearly all cases, are subject to a complicated series of disclosure rules. Because of the University's tax-exempt status, the University is legally prohibited from endorsing candidates for political office or making any contribution of money, goods, or services to candidates. It is important, therefore, that no person inadvertently cause the University to make such a contribution.
- b. Lobbying: lobbying can generally be described as any attempt to influence the action of any legislative body (for example, Congress, state legislatures, county boards, city councils, and their staffs) or any federal, state, or local government agency. Laws regulating lobbying exist at the federal, state, and local levels but can differ widely in scope, depending on the jurisdiction. Some laws, for example, only regulate lobbying of the legislative branch. Others, however, also cover lobbying of administrative agencies and officers in the executive branch (for example, lobbying for federally-funded grants). To one degree or another, however, most lobbying laws require registration and reporting by individuals engaged in attempts to influence governmental action.

Tax-exempt organizations are permitted to lobby, and the University engages in lobbying on a limited number of issues, mostly those affecting education, research, and related activities. There is usually some threshold of time or money spent on lobbying that triggers registration and reporting requirements. Regardless of thresholds, however, no University employee—other than the following individuals, on matters under their jurisdiction—may lobby on behalf of the University without specific authorization:

- President

- Provost
- Deans of the Seven Schools
- Vice Provost and Dean of Research
- Vice President for Business Affairs and Chief Financial Officer
- Executive Director of Human Resources
- Director of the Stanford Linear Accelerator Center
- Director of the Hoover Institution
- General Counsel
- Vice President for Public Affairs

The Vice Provost and Dean of Research may grant permission to faculty members to lobby on behalf of the University for specific purposes. The Director of Government and Community Relations may grant permission to staff members to lobby on behalf of the University for specific purposes. All lobbying on behalf of the University should be coordinated with the Director of Government and Community Relations.

- c. Giving of Gifts to Public Officials and Staff: almost all jurisdictions have strict rules on the extent to which gifts and honoraria may be given to public officials (both elected and non-elected officials and, often, staff). In some cases gifts and honoraria are prohibited; in others they are limited; and in most cases they are subject to detailed disclosure. In addition, in some jurisdictions such as California, gifts to both state and local public officials can result in a public official's disqualification from participation in any governmental action affecting the interests of the donor. Meals, travel, and entertainment are the most common types of gifts, but gift rules can also apply in cases where public officials attend a reception or receive tickets to sporting or other events.

As a non-profit organization, the University generally does not give gifts to public officials and, in those limited cases where it does give such gifts, it must do so in accordance with all applicable laws and regulations. Therefore, any University employee who, on behalf of the University, wishes to make a gift to a public official must receive prior approval from the Director of Government and Community Relations before making such a gift.

- d. Reporting of Political Activities: the University must report most of its political activities above certain thresholds. Therefore, any University employee engaging in such activities on behalf of the University should carefully review the remainder of this Guide Memo and should discuss the relevant activities in advance with the Director of Government and Community Relations.

#### 2. Prohibited and Restricted Political Activities

##### a. In General:

- i No person may, on behalf of the University, engage in any political activity in support of or opposition to any candidate for elective public office (including giving or receiving funds or endorsements), nor shall any University resources be used for such purpose.
- ii No person may, on behalf of the University, lobby (or use University resources to lobby) any federal, state, or local legislative or administrative official or staff member unless specifically authorized to do so. Any lobbying activity, even when authorized, must be conducted in compliance with

this Guide Memo, other applicable University policies, and applicable law.

- iii No person may, on behalf of the University, give a gift (or use any University resources to give a gift) to any federal, state, or local official or staff member, except in compliance with this Guide Memo, other applicable University policies, and applicable law.
- iv No person supporting candidates for public office or engaging in other political activities may use University space or facilities or receive University support, except in the limited ways described in section 3A, below.
- v No person may use for lobbying activities federally-funded contract or grant money received by the University.

Even the foregoing activities that are only restricted, rather than prohibited, may be subject to limitations imposed by law. Therefore, any person engaging in the activity, or contemplating doing so, should consult with the Director of Government and Community Relations.

- b. Guidelines for Avoiding Prohibited Partisan Political Activities: the following guidelines should assist in preventing the involvement or apparent involvement of the University in political activities in support of or opposition to any candidate for elective public office, that is, partisan political activities. Except in the limited circumstances set forth in section 3.b., below:
  - i Use of Name and Seal: neither the name nor seal of the University or of any of its schools, departments, or institutions should be used on letters or other materials intended for partisan political purposes.
  - ii Use of Address and Telephones: no University office should be used as a return mailing address for partisan political mailings, and telephone service that is paid by the University, likewise, should not be used for partisan political purposes. (Obviously, a student's dormitory room and telephone service that are personal to the student may be used for these purposes.)
  - iii Use of Title: the University title of a faculty or staff member or other person should be used only for identification and should be accompanied by a statement that the person is speaking as an individual and not as a representative of the University.
  - iv Use of Services and Equipment: University services, such as Interdepartmental Mail; equipment, such as duplicating machines, computers, and telephones; and supplies should not be used for partisan political purposes.
  - v Use of Personnel: no University employee may, as part of his or her job, be requested to perform tasks in any way related to partisan political purposes.

### 3. Permissible Activities

- a. In General: as noted above, the federal, state, and local laws which limit the partisan political activities that can take place in University facilities and with University support in no way inhibit the expression of personal political views by any individual in the University community. Nor do they forbid faculty, students, or staff from joining with others in support of candidates for office or in furtherance of political causes. There is no restriction on discussion of political issues or teaching of political techniques. Academic endeavors which address public policy issues are in no way affected.

Because the University encourages freedom of expression, political activities which do not reasonably imply University involvement or identification may be undertaken so long as regular University procedures are followed for use of facilities. Examples of permissible activities are:

- i Use of areas, such as White Plaza, for tables, speeches, and similar activities.
- ii Use of auditoriums for speeches by political candidates, but subject to rules of the Internal Revenue Service, the Federal Election Commission, and the California Fair Political Practices Commission, and other applicable laws. Arrangements must be made with University Events and Services. (See also Guide Memo 82.1, Public Events ([http://adminguide.stanford.edu/82\\_1.pdf](http://adminguide.stanford.edu/82_1.pdf)), for more information.)

To reiterate, because tax and political compliance laws impose restrictions, and even prohibitions, on certain political activities and on the use of buildings and equipment at a non-profit institution such as the University, any such activities must be in compliance with these legal requirements.

Individuals taking political positions for themselves or groups with which they are associated, but not as representatives of the University, should clearly indicate, by words and actions, that their positions are not those of the University and are not being taken in an official capacity on behalf of the University.

- b. Limited University Political Activities: limited activities relating to specific federal, state, or local legislation or ballot initiatives are permissible where (1) the subject matter is directly related to core interests of the University's activities; (2) the President has determined that the University should take a position; and (3) the individuals who speak or write on the University's behalf are specifically authorized to do so.
- 4. Research Involving Political Campaigns: Any Stanford researcher considering doing research involving political campaigns should consult with the General Counsel's Office for any legal restrictions, and should submit the research proposal in advance to Stanford's Institutional Review Board as appropriate under its policies and procedures.
- 5. Responsibility for Interpretation: the Director of Government and Community Relations, in consultation with the General Counsel, is the administrative officer responsible for interpretation and application of the above guidelines. Questions on whether planned student activities are consistent with the University's obligations should be directed to the Dean of Students, who will consult with the Director of Government and Community Relations and/or the General Counsel. All other questions on whether planned activities are consistent with the University's obligations should be addressed directly to the Director of Government and Community Relations or the General Counsel.

## Recording Lectures

### Recording Lectures

Except with permission from the Office of Accessible Education (<http://studentaffairs.stanford.edu/oe>) or the instructor in question, students may not audio- or video-record lectures. Even with permission, students may only use such recordings for personal use; no posting or further distribution or use is permitted.

# Sexual Harassment and Consensual Sexual or Romantic Relationships

## Sexual Harassment and Consensual Sexual or Romantic Relationships

For the complete text of the currently applicable version of this policy, see Administrative Guide Memo 2.2.4 Sexual Harassment and Consensual Sexual or Romantic Relationships (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-4>). It is also available from the Sexual Harassment Policy Office (<http://harass.stanford.edu>) homepage.

### Summary

Stanford University strives to provide a place of work and study free of sexual harassment, intimidation or exploitation. Where sexual harassment is found to have occurred, the University will act to stop the harassment, prevent its recurrence, and discipline and/or take other appropriate action against those responsible.

### Policy

The following is quoted from the policy:

#### 1. In General

- a. **Applicability and Sanctions for Policy Violations**—This policy applies to all students, faculty and staff of Stanford University, as well as to others who participate in Stanford programs and activities. Its application includes Stanford programs and activities both on and off-campus, including overseas programs. Individuals who violate this policy are subject to discipline up to and including discharge, expulsion, and/or other appropriate sanction or action.
- b. **Respect for Each Other**—Stanford University strives to provide a place of work and study free of sexual harassment, intimidation or exploitation. It is expected that students, faculty, staff and other individuals covered by this policy will treat one another with respect.
- c. **Prompt Attention**—Reports of sexual harassment are taken seriously and will be dealt with promptly. The specific action taken in any particular case depends on the nature and gravity of the conduct reported, and may include intervention, mediation, investigation and the initiation of grievance and disciplinary processes as discussed more fully below. Where sexual harassment is found to have occurred, the University will act to stop the harassment, prevent its recurrence, and discipline and/or take other appropriate action against those responsible.
- d. **Confidentiality**—The University recognizes that confidentiality is important. Sexual harassment advisers and others responsible to implement this policy will respect the confidentiality and privacy of individuals reporting or accused of sexual harassment to the extent reasonably possible. Examples of situations where confidentiality cannot be maintained include circumstances when the University is required by law to disclose information (such as in response to legal process) and when disclosure is required by the University's outweighing interest in protecting the rights of others.
- e. **Protection Against Retaliation**—Retaliation and/or reprisals against an individual who in good faith reports or provides information in an investigation about behavior that may violate this policy are against the law and will not be tolerated.

Intentionally making a false report or providing false information, however, is grounds for discipline.

- f. **Relationship to Freedom of Expression**—Stanford is committed to the principles of free inquiry and free expression. Vigorous discussion and debate are fundamental to the University, and this policy is not intended to stifle teaching methods or freedom of expression generally, nor will it be permitted to do so. Sexual harassment, however, is neither legally protected expression nor the proper exercise of academic freedom; it compromises the integrity of the University, its tradition of intellectual freedom and the trust placed in its members.

#### 2. What Is Sexual Harassment?

Unwelcome sexual advances, requests for sexual favors, and other visual, verbal or physical conduct of a sexual nature constitute sexual harassment when:

- a. It is implicitly or explicitly suggested that submission to or rejection of the conduct will be a factor in academic or employment decisions or evaluations, or permission to participate in a University activity; or
- b. The conduct has the purpose or effect of unreasonably interfering with an individual's academic or work performance or creating an intimidating or hostile academic, work or student living environment.

Determining what constitutes sexual harassment depends upon the specific facts and the context in which the conduct occurs. Sexual harassment may take many forms—subtle and indirect, or blatant and overt. For example,

- i It may be conduct toward an individual of the opposite sex or the same sex.
  - ii It may occur between peers or between individuals in a hierarchical relationship.
  - iii It may be aimed at coercing an individual to participate in an unwanted sexual relationship or it may have the effect of causing an individual to change behavior or work performance.
  - iv It may consist of repeated actions or may even arise from a single incident if sufficiently egregious.
- c. The University's Policy on Sexual Assault (see Guide Memo 23.3, Sexual Assault ([http://adminguide.stanford.edu/23\\_3.pdf](http://adminguide.stanford.edu/23_3.pdf))) may also apply when sexual harassment involves physical contact.

#### 3. What To Do About Sexual Harassment

Individuals seeking further information are directed to the following resources:

- The Sexual Harassment Policy Office (Mariposa House, 585 Capistrano Way, Room 208-209, Stanford University, Stanford, CA, 94305-8230; (650) 723-1583; email: [harass@stanford.edu](mailto:harass@stanford.edu) for information, consultation, advice, or to lodge a complaint. Note that anonymous inquiries can be made to the SHPO by phone during business hours.
- The Sexual Harassment Policy Office web page at <http://harass.stanford.edu>.
- Any designated Sexual Harassment Adviser or resource person listed in 3.a or 5.a.

The following are the primary methods for dealing with sexual harassment at Stanford. They are not required to be followed in any specific order. However, early informal methods are often effective in correcting questionable behavior.

- a. **Consultation**—Consultation about sexual harassment is available from the Sexual Harassment Policy Office, Sexual Harassment Advisers (including residence deans), human resources officers, employee relations specialists, counselors at Counseling and Psychological Services (CAPS) or the Help Center, chaplains at Memorial Church, ombudspersons and others. A current list of Sexual Harassment Advisers is available from the Sexual Harassment Policy Office and at <http://harass.stanford.edu/SHadvisers.html>. Consultation is available for anyone who wants to discuss issues related to sexual harassment, whether or not "harassment" actually has occurred, and whether the person seeking information is a complainant, a person who believes his or her own actions may be the subject of criticism (even if unwarranted), or a third party.

Often there is a desire that a consultation be confidential or "off the record." This can usually be achieved when individuals discuss concerns about sexual harassment without identifying the other persons involved, and sometimes even without identifying themselves. Confidential consultations about sexual harassment also may be available from persons who, by law, have special professional status, such as:

- i Counselors at Counseling and Psychological Services (CAPS), <http://caps.stanford.edu>
- ii Counselors at the Help Center, <http://www.stanford.edu/dept/helpcenter>
- iii Chaplains at Memorial Church
- iv The University Ombudsperson, <http://www.stanford.edu/dept/ombuds>

In these latter cases, the level of confidentiality depends on what legal protections are held by the specific persons receiving the information and should be addressed with them before specific facts are disclosed. For more information see <http://harass.stanford.edu/confidential.html>.

For further information on confidentiality, see Section 1(d) above.

- b. **Direct Communication**—An individual may act on concerns about sexual harassment directly, by addressing the other party in person or writing a letter describing the unwelcome behavior and its effect and stating that the behavior must stop. A Sexual Harassment Adviser can help the individual plan what to say or write, and likewise can counsel persons who receive such communications. Reprisals against an individual who in good faith initiates such a communication violate this policy.
- c. **Third Party Intervention**—Depending on the circumstances, third party intervention in the workplace, student residence or academic setting may be attempted. Third party intervenors may be the Sexual Harassment Advisers, human resources professionals, the ombudspersons, other faculty or staff, or sometimes mediators unrelated to the University.

When third party intervention is used, typically the third party (or third parties) will meet privately with each of the persons involved, try to clarify their perceptions and attempt to develop a mutually acceptable understanding that can insure that the parties are comfortable with their future interactions. Other

processes, such as a mediated discussion among the parties or with a supervisor, may also be explored in appropriate cases.

Possible outcomes of third party intervention include explicit agreements about future conduct, changes in workplace assignments, substitution of one class for another, or other relief, where appropriate.

- d. **Formal Grievance, Appeal, and Disciplinary Processes**—Grievance, appeal, or disciplinary processes may be pursued as applicable.

- i **Grievances and Appeals**—The applicable procedure depends on the circumstances and the status of the person bringing the charge and the person against whom the charge is brought. Generally, the process consists of the individual's submission of a written statement, a process of fact-finding or investigation by a University representative, followed by a decision and, in some cases, the possibility of one or more appeals, usually to Stanford administrative officers at higher levels. The relevant procedure (see below) should be read carefully, since the procedures vary considerably.

If the identified University fact-finder or grievance officer has a conflict of interest, an alternate will be arranged, and the Director of the Sexual Harassment Policy Office or the Director of Employee and Labor Relations can help assure that this occurs.

In most cases, grievances and appeals must be brought within a specified time after the action complained of. While informal resolution efforts will not automatically extend the time limits for filing a grievance or appeal, in appropriate circumstances the complainant and the other relevant parties may mutually agree in writing to extend the time for filing a grievance or appeal.

A list of the established grievance and appeal procedures is located at [http://hrweb.stanford.edu/elr/policies/list\\_grievance\\_procedures.html](http://hrweb.stanford.edu/elr/policies/list_grievance_procedures.html). Copies may also be obtained from the Sexual Harassment Policy Office, <http://www.stanford.edu/group/SexHarass>.

Copies of the following may be obtained from Employee and Labor Relations, 651 Serra Street:

1. "Solving Workplace Problems at Stanford: Understanding the Staff Dispute Resolution Policy" (also at <http://hrweb.stanford.edu/forms/staffresolution.pdf>.)
2. "Solving Workplace Problems at Stanford: Information for Academic Staff – Librarians and Academic Staff – Research Associates"
3. "The Dispute Resolution Process (A User's Guide)"

- ii **Disciplinary Procedures**—In appropriate cases, disciplinary procedures may be initiated. The applicable disciplinary procedure depends on the status of the individual whose conduct is in question. For example, faculty are subject to the Statement on Faculty Discipline (<http://www.stanford.edu/dept/provost/faculty/policies/handbook/ch4.html#statementonfacultydiscipline>), and students to the Fundamental Standard. For additional information related to student disciplinary procedures, see the Office of Community Standards (<http://studentaffairs.stanford.edu/communitystandards>).



The individuals referenced in this section are available to discuss these options and differing methods for dealing with sexual harassment.

#### 4. Procedural Matters

- a. Investigations—If significant facts are contested, an investigation may be undertaken. The investigation will be conducted in a way that respects, to the extent possible, the privacy of all of the persons involved. In appropriate cases, professional investigators may be asked to assist in the investigation. The results of the investigation may be used in the third party intervention process or in a grievance or disciplinary action.
- b. Recordkeeping—The Sexual Harassment Policy Office will track reports of sexual harassment for statistical purposes and report at least annually to the University President concerning their number, nature and disposition.

The Sexual Harassment Policy Office may keep confidential records of reports of sexual harassment and the actions taken in response to those reports, and use them for purposes such as to identify individuals or departments likely to benefit from training so that training priorities can be established. No identifying information will be retained in cases where the individual accused was not informed that there was a complaint.

- c. Indemnification and Costs—The question sometimes arises as to whether the University will defend and indemnify a Stanford employee accused of sexual harassment. California law provides, in part, "An employer shall indemnify [its] employee for all that the employee necessarily expends or loses in direct consequence of the discharge of his [or her] duties as such." The issue of indemnification depends on the facts and circumstances of each situation. Individuals who violate this policy, however, should be aware that they and/or their schools, institutes, or other units may be required to pay or contribute to any judgments, costs and expenses incurred as a result of behavior that is wrongful and/or contrary to the discharge of the employee's duties. In general, see Administrative Guide Memo 2.4.6 Indemnification (<https://adminguide.stanford.edu/chapter-2/subchapter-4/policy-2-4-6>).

#### 5. Resources for Dealing with Sexual Harassment

- a. Advice—Persons who have concerns about sexual harassment should contact the Sexual Harassment Policy Office, any Sexual Harassment Adviser at <http://harass.stanford.edu/SHadvisers.html> or one of the other individuals listed below. Reports should be made as soon as possible: the earlier the report, the easier it is to investigate and take appropriate remedial action. When reports are long delayed, the University will try to act to the extent it is reasonable to do so, but it may be impossible to achieve a satisfactory result after much time has passed.

Likewise, anyone who receives a report or a grievance involving sexual harassment should promptly consult with the Sexual Harassment Policy Office or with a Sexual Harassment Adviser.

There are a number of individuals specially trained and charged with specific responsibilities in the area of sexual harassment. In brief, they are:

- i Sexual Harassment Advisers (<http://harass.stanford.edu/SHadvisers.html>) serve as resources to individuals who wish to discuss issues of sexual harassment, either because they have been harassed or because they want information about the University's policy and procedures. There is usually at least one Adviser assigned to each of the schools at the

University and to each large work unit; most of the residence deans also have been appointed as Sexual Harassment Advisers. Advisers are also authorized to receive complaints.

- ii The Director of the Sexual Harassment Policy Office is responsible for the implementation of this policy. The Director's Office also provides advice and consultation to individuals when requested; receives complaints and coordinates their handling; supervises the other Advisers; encourages and assists prevention education for students, faculty and staff; keeps records showing the disposition of complaints; and generally coordinates matters arising under this policy. Because education and awareness are the best ways to prevent sexual harassment; developing awareness, education and training programs and publishing informational material are among the most important functions of the Sexual Harassment Policy Office (<http://harass.stanford.edu>).

- iii As stated above, individuals with concerns about sexual harassment may also discuss their concerns informally with psychological counselors (for example through CAPS or the HELP Center), chaplains (through the Memorial Chapel), or the University ombudsperson. For more information, see <http://harass.stanford.edu/resources.html>.

- b. External Reporting—Sexual harassment is prohibited by state and federal law. In addition to the internal resources described above, individuals may pursue complaints directly with the government agencies that deal with unlawful harassment and discrimination claims, e.g., the U.S. Equal Employment Opportunity Commission (EEOC), the Office for Civil Rights (OCR) of the U.S. Department of Education, and the State of California Department of Fair Employment and Housing (DFEH). These agencies are listed in the Government section of the telephone book. A violation of this policy may exist even where the conduct in question does not violate the law.

#### 6. Consensual Sexual or Romantic Relationships

- a. In General—There are special risks in any sexual or romantic relationship between individuals in inherently unequal positions, and parties in such a relationship assume those risks. In the University context, such positions include (but are not limited to) teacher and student, supervisor and employee, senior faculty and junior faculty, mentor and trainee, adviser and advisee, teaching assistant and student, coach and athlete, and the individuals who supervise the day-to-day student living environment and student residents. Because of the potential for conflict of interest, exploitation, favoritism, and bias, such relationships may undermine the real or perceived integrity of the supervision and evaluation provided, and the trust inherent particularly in the teacher-student context. They may, moreover, be less consensual than the individual whose position confers power or authority believes. The relationship is likely to be perceived in different ways by each of the parties to it, especially in retrospect.

Moreover, such relationships may harm or injure others in the academic or work environment. Relationships in which one party is in a position to review the work or influence the career of the other may provide grounds for complaint by third parties when that relationship gives undue access or advantage, restricts opportunities, or creates a perception of these problems. Furthermore, circumstances may change, and conduct that was previously welcome may become unwelcome. Even when both parties have consented at the outset to a romantic involvement, this past consent does not remove grounds for a charge based upon subsequent unwelcome conduct.

Where such a relationship exists, the person in the position of greater authority or power will bear the primary burden of accountability, and must ensure that he or she—and this is particularly important for teachers—does not exercise any supervisory or evaluative function over the other person in the relationship. Where such recusal is required, the recusing party must also notify his or her supervisor, department chair or dean, so that such chair, dean or supervisor can exercise his or her responsibility to evaluate the adequacy of the alternative supervisory or evaluative arrangements to be put in place. Staff members may notify their local human resources officers. To reiterate, the responsibility for recusal and notification rests with the person in the position of greater authority or power. Failure to comply with these recusal and notification requirements is a violation of this policy, and therefore grounds for discipline. The University has the option to take any action necessary to insure compliance with the spirit of this recusal policy, including transferring either or both employees in order to minimize disruption of the work group. In those extraordinarily rare situations where it is programmatically infeasible to provide alternative supervision or evaluation, the cognizant Dean or Director must approve all evaluative and compensation actions.

- b. With Students—At a university, the role of the teacher is multifaceted, including serving as intellectual guide, counselor, mentor and adviser; the teacher's influence and authority extend far beyond the classroom. Consequently and as a general proposition, the University believes that a sexual or romantic relationship between a teacher and a student, even where consensual and whether or not the student would otherwise be subject to supervision or evaluation by the teacher, is inconsistent with the proper role of the teacher, and should be avoided. The University therefore very strongly discourages such relationships.

7. Policy Review and Evaluation—This policy went into effect on October 6, 1993, and was amended on November 30, 1995, and on May 30, 2002. It is subject to periodic review, and any comments or suggestions should be forwarded to the Director of the Sexual Harassment Policy Office.

## Resources

The following is a summary of resources concerning sexual harassment available to members of the Stanford Community:

A brochure containing the policy, a list of current sexual harassment advisers, confidential resources, and other helpful information is available online at the Sexual Harassment Policy Office (<http://harass.stanford.edu>) web site, and in printed form from the Sexual Harassment Policy Office at Mariposa House, 585 Capistrano Way, Room 208-209, Stanford University, Stanford, CA, 94305-8230; (650) 723-1583; email: [harass@stanford.edu](mailto:harass@stanford.edu). Copies of the University policy on sexual assault, which complements this sexual harassment policy, as well as all other documents mentioned in this section, are also available at the Sexual Harassment Policy Office.

All faculty, staff, and students who have questions regarding this policy and its enforcement can consult with a Sexual Harassment Adviser or can be directed to the local Personnel Officer or Regional Human Resources Manager. Faculty members should contact their dean or department chair, and students should contact the Director of the Sexual Harassment Policy Office or the Dean of Student Affairs.

Sexual Harassment Policy Office—telephone: (650) 723-1583; email: [harass@stanford.edu](mailto:harass@stanford.edu).

*Director:* Laraine Zappert (Clinical Professor, Psychiatry and Behavioral Sciences)

*Assistant Director:* Nanette Andrews

# Sexual Misconduct and Sexual Assault

## Sexual Misconduct and Sexual Assault

The University's Policy on Sexual Misconduct and Sexual Assault is published in complete form in the Administrative Guide Memo 2.2.4 Sexual Harassment and Consensual Sexual or Romantic Relationships (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-4>).

### Summary

The following summarizes the policy on Sexual Assault and provides information on resources available to members of the Stanford community.

### Policy

Under Title IX, sexual violence (sexual misconduct and sexual assault) is a severe form of sexual harassment. Sexual misconduct and sexual assault are unacceptable and is not tolerated at Stanford University. All University employees (including student residence staff employees) have a duty to report claims of sexual misconduct or sexual assault to Cathy Glaze, Title IX Coordinator at (650) 497-4955 (voice), [titleix@stanford.edu](mailto:titleix@stanford.edu), <https://titleix.stanford.edu/>. For students, report claims to the Title IX Coordinator or the Office of Sexual Assault and Relationship Abuse (SARA) at (650) 725-1056 or [saraoffice@stanford.edu](mailto:saraoffice@stanford.edu).

The University urges an individual who has been subjected to sexual misconduct or sexual assault to make an official report. A report of the matter will be dealt with promptly. Confidentiality will be maintained to the extent possible.

The University is committed to providing information regarding on- and off-campus services and resources to all parties involved.

Students, faculty and staff found to be in violation of this policy will be subject to discipline up to and including termination, expulsion or other appropriate institutional sanctions; affiliates and program participants may be removed from University programs and/or prevented from returning to campus.

A comprehensive web site dedicated to sexual violence awareness, prevention and support can be found at Office of Sexual Assault & Relationship Abuse Education & Response (SARA) (<http://studentaffairs.stanford.edu/sara>). The site contains a list of resources and describes reporting options.

## Definitions

### **What is Sexual Misconduct?**

Sexual misconduct is the commission of an unwanted sexual act, whether by an acquaintance or by a stranger, that occurs without indication of consent.

### **What is Sexual Assault?**

Sexual assault is the actual, attempted or threatened unwanted sexual act, whether by an acquaintance or by a stranger, accomplished (1) against a person's will by means of force (express or implied), violence, duress, menace, fear or fraud, or (2) when a person is incapacitated or unaware of the nature of the act, due to unconsciousness, sleep and/or intoxicating substances.

**What is Consent?**

Consent is informed, freely given, and mutually understood. Consent requires an affirmative act or statement by each participant. If coercion, intimidation, threats and/or physical force are used, there is no consent. If a person is mentally or physically incapacitated or impaired so that the person cannot understand the fact, nature or extent of the sexual situation, there is no consent; this includes conditions due to alcohol or drug consumption or being asleep or unconscious. Whether one has taken advantage of a position of influence over another may be a factor in determining consent.

**Notification**

With the consent of the victim, allegations of sexual assault received by University offices or personnel shall be communicated promptly to the Department of Public Safety, 711 Serra Street, telephone 9-911 for emergency response or (650) 723-9633 during normal business hours.

**Emergency Services Available to Victims**

Victims of sexual assault are urged to seek immediate attention from emergency police, medical, and counseling services. On the Stanford campus and in the immediate vicinity, the following provide 24-hour response and will arrange for police assistance, medical assistance, emotional support services, and advocacy and support:

- "911" Emergency Network: dial 9-911 from University phones or 911 from outside phones
- Santa Clara Valley Medical Center, 751 South Bascom Avenue, San Jose, telephone (408) 885-5000
- YWCA Stanford Hotline, for students, telephone (650) 725-9955
- Stanford Hospital and Clinics, 300 Pasteur Drive, Stanford, telephone (650) 723-5111
- Residence and Graduate Life Deans, page through 723-8222, extension 25085

**Non-Emergency Resources**

Office of Sexual Assault & Relationship Abuse Education & Response (SARA) (725-1056) provides comprehensive and consistent response to incidents of sexual and relationship violence to the campus community. SARA provides case consultation to students and staff, case management for reported assaults and information and referrals to services on and off campus. The office also assists with educational outreach and training to increase awareness, sensitivity, and community accountability in the prevention of these acts. Online information is available at the Sexual Assault & Relationship Abuse Education & Response (SARA) (<http://studentaffairs.stanford.edu/sara.html>) web site.

Additional resources for students are available at Vaden Health Service at (650) 723-3785, including short-term counseling, referral to long-term therapy, follow-up pregnancy testing, and testing and treatment for sexually transmitted diseases. Additional services for faculty and staff are available at the University's HELP Center, Galvez House (723-4577), including general counseling, information, support, and referral. The University ombuds (723-3682) is available to all in the Stanford community for general counseling, advice, and advocacy. Cathy Glaze, Title IX Coordinator, Mariposa House, 585 Capistrano Way, Stanford University, Stanford CA, 94305-8230, (650) 497-4955, (650) 497-9257, [titleix@stanford.edu](mailto:titleix@stanford.edu), <https://titleix.stanford.edu/>, is available to assist students to address the effects of sexual harassment and sexual violence

**Confidentiality of Information**

The University will make reasonable and appropriate efforts to preserve an individual's privacy and protect the confidentiality of information. However, because of laws relating to reporting and other state and federal laws, the University cannot guarantee confidentiality to those who report incidents of sexual violence except where those reports are privileged communications with those in legally protected roles (set forth below). The professional being consulted should, if possible, make these limits clear before any disclosure of facts.

An individual can speak confidentially with certain individuals in legally protected roles. They include sexual assault counselors such as those at the YWCA Sexual Assault Center at Stanford, the Help Center, Counseling and Psychological Services (CAPS) and clergy. Exceptions to maintaining confidentiality are set by law; for example, physicians and nurses who treat any physical injury sustained during a sexual assault are required to report it to law enforcement. In addition, physicians, nurses, psychologists, psychiatrists, teachers and social workers must report a sexual assault committed against a person under age 18.

Information shared with other individuals is not legally protected from being disclosed. Considerations with respect to a complainant's request for confidentiality include factors such as the University's ability to respond effectively, to prevent further harassment or to ensure the safety of the University community. For example, an advisor, the Dean of Student Life, a Residence Dean or a Resident Assistant may need to inform other individuals to protect their safety or rights, in fairness to the persons involved, or in response to legal requirements. As required by law, all disclosures to any University employee of an on-campus sexual assault must be reported for statistical purposes only (without personal identifiers) to the Stanford University Department of Public Safety, which has the responsibility for tabulating and annually publishing sexual assault and other crime statistics. Such reports are for statistical purposes and do not include individual identities.

State law permits law enforcement authorities to keep confidential the identity of a person officially reporting a sexual assault. The Stanford University Department of Public Safety policy is to maintain such confidentiality. However, if the District Attorney files a criminal charge, confidentiality might not be maintained.

If a complaint is filed with the Office of Judicial Affairs then the accused student must be provided with the name of the alleged victim and witnesses, if applicable. However, accommodations can be made to protect the victim's privacy, as described on the website for the Office of Judicial Affairs.

**Information about Options**

The University offices responding to allegations of sexual misconduct or sexual assault will inform affected individuals, at a minimum, of the options of: criminal prosecution, civil prosecution, the disciplinary process, the appropriate Title IX grievance procedure, alternative housing assignments, and academic assistance alternatives.

**Smoke-Free Environment**

The University's policy on a smoke-free environment is published in its complete form in the Administrative Guide Memo 2.2.6 Smoke-Free Environment (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-6>).

**Applicability**

Applies to all academic and administrative units of Stanford University, including SLAC and all campus student housing. This policy does not supersede more restrictive policies that may be in force to comply with

federal, state, or local laws or ordinances. The President must approve more restrictive policies not required by law.

## 1. Policy

It is the policy of Stanford University that all smoking, including but not limited to tobacco products and the use of electronic smoking devices, is prohibited in enclosed buildings and facilities and during indoor or outdoor events on the campus.

## 2. Definition

"Smoke-free" refers to an environment that is free of smoke from, among other things, tobacco products and/or vapors from electronic smoking devices.

## 3. Guidelines

### a. Smoking-Prohibited Areas

Specifically, smoking is prohibited in classrooms and offices, all enclosed buildings and facilities, in covered walkways, in University vehicles, during indoor or outdoor athletic events, during other University sponsored or designated indoor or outdoor events and in outdoor areas designated by signage as "smoking prohibited" areas.

- Ashtrays will not be provided in any enclosed University building or facility.
- "Smoking Prohibited" signs will be posted.

### b. Outdoor Smoking Areas

Except where otherwise posted as a "smoking prohibited area," smoking is generally permitted in outdoor areas, except during organized events. Outdoor smoking in non-prohibited areas must be at least 30 feet away from doorways, open windows, covered walkways, and ventilation systems to prevent smoke from entering enclosed buildings and facilities. To accommodate faculty, staff, and students who smoke, Vice Presidents, Vice Provosts, and Deans may designate certain areas of existing courtyards and patios as smoking areas, and must provide ashtrays. The specific academic or administrative unit(s) will be responsible for absorbing all costs associated with providing designated smoking areas and ashtrays.

## 4. Enforcement

This policy relies on the consideration and cooperation of smokers and non-smokers. It is the responsibility of all members of the University community to observe and follow this policy and its guidelines.

### a. Smoking Cessation Information

Smoking cessation programs are available for faculty and staff through the Center for Research in Disease Prevention, Health Improvement Program (HIP). Students may contact the Health Promotion Program (HPP) through the Student Health Center for smoking cessation information or programs.

### b. Repeated Violations

Faculty, staff and, students repeatedly violating this policy may be subject to appropriate action to correct any violation(s) and prevent future occurrences.

### 5. Implementation and Distribution

This policy will be disseminated to all faculty, staff and students and to all new members of the University Community.

## Stanford Name and Trademarks Ownership and Use of Stanford Name and Trademarks

Stanford registered marks, as well as other names, seals, logos, and other symbols and marks that are representative of Stanford, may be used solely with permission of Stanford. Merchandise bearing Stanford's names and marks, such as t-shirts, glassware, and notebooks, must be licensed. For complete text of the currently applicable policy, including the University officers authorized to grant permission to use the Stanford name and marks, see Administrative Guide Memo 1.5.4 Ownership and Use of Stanford Name and Trademarks (<https://adminguide.stanford.edu/chapter-1/subchapter-5/policy-1-5-4>).

## Student Non-Academic Grievance Procedure

### Student Non-Academic Grievance Procedure Policy

The following is the policy:

1. Applicability
  - a. It is perhaps inevitable in any university that some students may at times feel improperly treated, and that concerns about unfairness (including potential discrimination and harassment) may also at times arise.
 

In this regard (and although this grievance procedure is not limited to concerns of discrimination), Stanford University's Nondiscrimination Policy provides in part: "Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, and gender identity to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence. "
  - b. At Stanford, there are a number of grievance procedures through which students can raise and seek redress for what they believe to be unfair, improper or discriminatory decisions, actions, or treatment. For example:
    - i If the matter involves an academic decision, the Student Academic Grievance Procedure may be the applicable procedure.
    - ii If the matter involves a disability-related concern, the Student ADA/Section 504 Grievance Procedure may be applicable.
    - iii If the matter involves a student-athlete and his or her sport, the Student-Athlete Grievance Procedure may be applicable.
  - c. The purpose of the Student Non-Academic Grievance Procedure is to provide a process for students to seek resolution of disputes and grievances that may not fall within the scope of one of the other grievance processes, including those which may arise in a student's capacity as a student-employee.

d. As a general proposition, this procedure is available to undergraduates and graduate students at Stanford University. It is designed to address individual decisions or individual actions that affect the grievant personally in his or her capacity as a student, but it does not apply to matters proceeding or addressed through the Office of Community Standards or through the Dean's leave policy. This is likewise not a grievance procedure to address the concerns of student groups. Similarly and as a general proposition, dissatisfaction with a departmental, school, or University policy or practice of broad or general application is not grounds for a grievance under this procedure; the Director of the Diversity and Access Office (hereafter "the Director") may, in his or her discretion, entertain such a grievance in exceptional circumstances, such as where (for example) the policy or practice is alleged to be contrary to law. In the same way, the Director may entertain a grievance under this procedure brought by an individual who is not an undergraduate or graduate student, in an appropriate case or as required by law.

e. The Director is responsible for administering this Student Non-Academic Grievance Procedure.

i. The Director may be contacted at: Director of the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email), <http://www.stanford.edu/dept/ocr>.

ii. The Director in his or her sole discretion can decide whether to refer a grievance brought under this procedure to another grievance process. In cases involving allegations of sexual harassment in particular, the Director may wish to consult with the Director of the Sexual Harassment Policy Office as to the most appropriate way to proceed; see Section 5.d below. In cases involving student employment, the Director may wish to consult with the University's Department of Human Resources.

## 2. Informal Resolution

a. As a general proposition (and although particular circumstances may warrant an exception), the student should first discuss the problem and seek a solution with the individual(s) most directly involved.

b. If no resolution results (or if circumstances make discussion inappropriate with the person most directly involved), the student should then consult with the individual at the next (higher) administrative level in the department, school, residence or University administrative unit. Serious efforts should be made to resolve the issue locally at an informal level without resort to a formal grievance; such efforts may continue even after the formal process is underway.

## 3. Formal Grievance

a. If informal means of resolution prove inadequate, the student should set forth in writing the substance of the complaint, the grounds for it and the evidence on which it is based, and the efforts taken to date to resolve the matter. It is at this stage that the complaint becomes a formal grievance.

b. The grievance document should be submitted to the Director. A grievance should be filed in a timely fashion, i.e., normally no later than thirty days after the end of the academic quarter in which the action that is the subject of the grievance occurred. Except in extraordinary circumstances, delay in filing a grievance will be grounds for rejection of that grievance.

c. The Director will promptly initiate a review, which should normally be completed within sixty days. The Director may attempt to

resolve the matter informally, and may refer the matter (or any part of it) to a grievance officer or other designee, who will look into and/or address the matter as the Director directs. The Director may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.

d. In undertaking this review, either the Director, his or her designee, or the grievance officer may request a response to the issues raised in the grievance from any individuals believed to have information the reviewer considers relevant, including faculty, staff and students.

e. The Director (or his or her designee) will issue his or her decision in writing, and take steps to initiate such corrective action as is called for (if any). Conduct meriting discipline will be brought to the attention of the appropriate disciplinary process.

## 4. Appeal

a. If the student is dissatisfied with the disposition by the Director (or his or her designee), he or she may appeal to the Provost (Office of the President and Provost, Building 10, Stanford, CA 94305-2061; phone 650-725-4075; fax 650-725-1347). The appeal should be filed in writing with the Provost within ten days of the issuance of the decision by the Director (or his or her designee); a delay in filing the appeal may be grounds for rejection of that appeal.

b. The Provost may attempt to resolve the matter informally, and may refer the matter (or any part of it) to a grievance appeal officer, who will review the matter at the Provost's direction. The Provost may also, in appropriate cases, remand the matter to the appropriate administrator (including to the administrative level at which the grievance arose) for further consideration.

c. The Provost should normally complete his or her review of the appeal and issue his or her decision in writing within forty-five days. That decision is final.

## 5. General Provisions

a. **Time Guidelines**—The time frames set forth herein are guidelines. They may be extended by the Director or Provost, as applicable, in his or her discretion for good cause (including for reasons relating to breaks in the academic calendar), and will nearly always be extended during summers and the winter closure.

b. **Advisers**—A student initiating or participating in a grievance under this procedure may be accompanied by an adviser in any discussion with the Director, the Provost or their designees, or a grievance or grievance appeal officer under this procedure; any adviser must be a current Stanford faculty, staff member or student.

c. **Ombuds**—Students should be aware that the University Ombuds (<http://www.stanford.edu/dept/ocr/ombuds>) is available to discuss and advise on any matters of University concern and frequently help expedite resolution of such matters. Although it has no decision making authority, the Ombuds' Office has wide powers of inquiry.

d. **Sexual Harassment and Sexual Misconduct and Sexual Assault**—For information and resources concerning sexual harassment, students should refer to the web page of the Sexual Harassment Policy Office at <http://harass.stanford.edu>. For information and resources concerning sexual assault and relationship abuse, students should refer to the web page of the Sexual

Violence Advisory Board at <http://www.stanford.edu/group/svab/help.shtml>.

- e. No retaliation—Stanford University prohibits retaliation or reprisals against individuals based on their pursuit in good faith of a grievance under this procedure, or their participation in good faith in the grievance process.
- f. Standards for Review—If the grievance involves a decision that is being challenged, the review by the Director, as well as the review by the Provost on appeal, usually will be limited to the following considerations:
  - i. Were the proper facts and criteria brought to bear on the decision? Were improper or extraneous facts or criteria brought to bear that substantially affected the decision to the detriment of the grievant?
  - ii. Were there any procedural irregularities that substantially affected the outcome of the matter to the detriment of the grievant?
  - iii. Given the proper facts, criteria, and procedures, was the decision one which a person in the position of the decision maker might reasonably have made?

violence and stalking (prohibited conduct). The Title IX Coordinator serves as a resource to review allegations of prohibited conduct and may provide interim accommodations relating to housing, academics, or no-contact letters while a matter is being reviewed. When prohibited conduct has been confirmed by a preponderance of the evidence, the Title IX Coordinator will provide long term accommodations and services to students to address the effects of sexual harassment and sexual violence. The Title IX Student Policy ([https://titleix.stanford.edu/sites/default/files/title\\_ix\\_student\\_policy\\_ay\\_2013-14\\_faculty\\_staff\\_may\\_2014\\_final\\_0.pdf](https://titleix.stanford.edu/sites/default/files/title_ix_student_policy_ay_2013-14_faculty_staff_may_2014_final_0.pdf)) provides the grievance procedure and appeal mechanism to review the University's actions relating to a Title IX concern involving Prohibited Conduct; see the Title IX web site (<https://titleix.stanford.edu>) for additional information. Additional resources are available the Sexual Assault Support and Resources (<https://notalone.stanford.edu>) web site. Ms. Glaze's contact information is [titleix@stanford.edu](mailto:titleix@stanford.edu); (650) 497-4955. An individual may contact the U.S. Department of Education, Office for Civil Rights (OCR). See also Administrative Guide Memos 2.1.2 Recruiting and Hiring of Regular Staff (<https://adminguide.stanford.edu/chapter-2/subchapter-1/policy-2-1-2>), 1.7.1 Sexual Harassment (<https://adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-1>), 1.7.2, Consensual Sexual or Romantic Relationships (<https://adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-2>), and 1.7.3, Sexual Misconduct and Sexual Assault (<https://adminguide.stanford.edu/chapter-1/subchapter-7/policy-1-7-3>).

## Title VI

### Title VI of the Civil Rights Act of 1964

It is the policy of Stanford University to comply with Title VI of the Civil Rights Act of 1964 and its regulations, which prohibit unlawful discrimination on the basis of race, color, and national origin. The Title VI Compliance Officer is the Director of the Diversity and Access Office, who has been appointed to coordinate the University's efforts to comply with the law. Anyone who believes that Stanford is not in compliance with Title VI and its regulations should contact the Director of the Diversity and Access Office, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email). Grievance procedures to address complaints of discrimination on the basis of race, color, and national origin are set forth in the "Student Non-Academic Grievance Procedure (p. )." See also Administrative Guide Memo 2.2.1 General Personnel Policies (<https://adminguide.stanford.edu/chapter-2/subchapter-2/policy-2-2-1>).

## Title IX

### Title IX of the Education Amendments of 1972

It is the policy of Stanford University to comply with Title IX of the Education Amendment of 1972 and its regulations, which prohibit unlawful discrimination on the basis of sex. The Title IX Compliance Officer is Catherine Glaze, who has been appointed to coordinate the University's efforts to comply with the law. Anyone who believes that Stanford is not in compliance with Title IX and its regulations should contact the Title IX Coordinator, 419 Lagunita Street, Suite 240, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), [titleix@stanford.edu](mailto:titleix@stanford.edu) (email). (See also the following section for addressing Title IX Concerns relating to sexual harassment.)

### Title IX Concerns Relating to Sexual Harassment and the Violence Against Women Reauthorization Act of 2013

Catherine Glaze has been appointed Stanford's Title IX Coordinator to respond to matters of sexual assault, relationship (dating)

## Visitor Policy • University Statement on Privacy

### Visitor Policy/University Statement on Privacy

Stanford University has an interest in ensuring that the privacy of its students, faculty, and staff is respected, and that no activities interfere with education, research, or residential life.

The University is private property; however, some areas of the campus typically are open to visitors. These areas include White Plaza, public eating areas (such as those at Tresidder Union), outdoor touring areas, and locations to which the public has been invited by advertised notice (such as for public educational, cultural, or athletic events). Even in these locations, visitors must not interfere with the privacy of students, faculty, and staff, or with educational, research, and residential activities. The University may revoke at any time permission to be present in these, or any other areas. Visitors should not be in academic or residential areas unless they have been invited for appropriate business or social purposes by the responsible faculty member, student, or staff member.

No commercial activity, including taking photos or similar audio or visual recordings that are sold to others or otherwise used for commercial purposes, may occur on the campus or in University programs without the University's permission. Requests for permission should be submitted to the Director of University Communications or, as appropriate, the Dean of Students, the Department of Athletics, or the Office of Public Events. Recognized student groups and official units of the University will be granted such permission so long as they do not violate privacy or property interests of others; so long as any sale of their products is predominantly on campus to students, faculty, and staff; and so long as they comply with applicable University policies and procedures.

Violators of this policy may be subject to criminal and/or civil liability, as well as University disciplinary action.

# UNDERGRADUATE EDUCATION (VPUE)

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Established in 1995, the Office of the Vice Provost for Undergraduate Education (VPUE) comprises the Bing Overseas Studies Program, Residential Programs, Stanford Introductory Studies, and Undergraduate Advising and Research. VPUE fosters innovation, integration, and pedagogical advancement of the Stanford undergraduate journey. Working with our partners, we prepare Stanford students to be engaged citizens with the creative confidence to tackle the world's most complex challenges.

VPUE programs for first- and second-year students include New Student Orientation/Approaching Stanford, the Leland Scholars Program, Thinking Matters, Program in Writing and Rhetoric, Introductory Seminars, and Sophomore College. Programs for more advanced students include the Bing Overseas Studies Program, Writing in the Major, Undergraduate Research, Arts Intensive, Leadership Intensive, and Bing Honors College. Undergraduate Advising and the Hume Center for Writing and Speaking serve undergraduates throughout their time at Stanford. The office of the VPUE works closely with the office of the Vice Provost for Student Affairs and the Admissions Office. The Vice Provost for Undergraduate Education reports to the Provost.

Policies governing undergraduate education are formulated by Faculty Senate committees and voted into legislation by the Faculty Senate. The Committee on Undergraduate Standards and Policy (C-USP) addresses such topics as general education requirements, grading, awards, advising, and teaching evaluation. The Committee on Review of Undergraduate Majors (C-RUM) oversees the initiation and review of undergraduate degree programs. Committee members include the Vice Provost for Undergraduate Education or his delegated staff (ex-officio) and representatives from the faculty at large, administration (such as the Office of the University Registrar), and students. The Associated Students of Stanford University (ASSU) nominations committee selects student members. The VPUE also maintains, by rule of the Faculty Senate, the Thinking Matters Governance Board, the Writing and Rhetoric Governance Board, and the Breadth Governance Board to oversee these university degree requirements. Finally, the Undergraduate Advisory Council (UGAC) was established by the provost in 1996 to serve as the main faculty advisory body for the Vice Provost for Undergraduate Education.

*Vice Provost for Undergraduate Education:* Harry J. Elam, Jr.  
(Senior Vice Provost for Education, Vice President for the Arts, Freeman-Thornton Vice Provost for Undergraduate Education, and the Olive H. Palmer Professor in Humanities)

*Senior Associate Vice Provost for Undergraduate Education:* Liz Hadly  
Professor of Biology

*Associate Vice Provost for Undergraduate Education:* Sharon Palmer

*Associate Vice Provost for Finance and Administration:* Charles Litchfield

# STANFORD INTRODUCTORY STUDIES

## Stanford Introductory Studies

*Program Directors:* Marvin Diogenes, Ellen Woods  
 Offices: Sweet Hall  
 Email: stanfordintrostudies@stanford.edu  
 Web Site: <https://undergrad.stanford.edu/programs>

Stanford Introductory Studies (SIS) offers courses taught by faculty from across the seven Schools of the University and by SIS Lecturers. Some of these courses satisfy University Requirements (THINK, WAYS, and the Writing and Rhetoric Requirement) while others are electives especially designed for first- and second-year students, including Introductory Seminars. September Seminars (Sophomore College, Arts Intensive) and Bing Honors College expand SIS curricular opportunities for students. The Hume Center for Writing and Speaking, which manages writing and oral communication services such as tutorials and workshops for all students, also resides in SIS, along with the Oral Communication Program and the Stanford Storytelling Project.

## Thinking Matters

*Faculty Director:* Russell A. Berman, Comparative Literature and German Studies

*Director, Stanford Introductory Studies for Thinking Matters :* Ellen Woods

*Associate Director:* Parna Sengupta

*Affiliated Faculty:* Julie Baker (Genetics), Chris Bobonich (Philosophy), Gordon Chang (History), Cari Costanzo (Anthropology), Mark Cullens (School of Medicine), Adrian Daub (German Studies), Larry Diamond (FSI and Hoover), Russ Fernald (Biology), Shelley Fisher Fishkin (English), James Fishkin (Communications), Marisa Galvez (French and Italian), Margot Gerritsen (Energy Resource Engineering), Robert Harrison (French and Italian), Allyson Hobbs (History), Adam Johnson (English), Pam Karlan (School of Law), Ari Kelman (School of Education), Jeff Kosseff (Civil and Environmental Engineering), Joseph Lipsick (School of Medicine), David Lummus (French and Italian), David Magnus (School of Medicine), Peter Michelson (Physics), Ian Morris (Classics), Josiah Ober (Political Science), Rob Reich (Political Science), Thomas Ryckman (Philosophy), Gabriella Safran (Slavic), Scott Sagan (Political Science), Anna Schulz (Music), Jane Shaw (Religious Studies), Abraham Verghese (School of Medicine), Blakey Vermeule (English), Bang Wan (East Asian Languages and Cultures), Allen Weiner (School of Law).

*Lecturers:* Marie Burks, Justin Clardy, Risa Cromer, Tara Dosumu Diener, Kyle Fruh, Rob Furrow, Nicole Gounalis, Sean Hollowell, Kristyn Hara, Angela Harris, Sarah Hillenbrand, Lauren Hirshberg, Arezoo Islami, Erin Johnston, Zenia Kish, Katie Lennard, Minh Ly, Tiffany Naiman, Joey Nelson, Jehnna Ronan, Lupita Ruiz-Jones, Saumya Sankaran, Elise Stickles, Tim Wiser, Chenshu Zhou, Ian Zuckerman.

Offices: Sweet Hall, Second Floor  
 Mail code: 3068  
 Phone: (650) 723-0944  
 Email: [thinkingmatters@stanford.edu](mailto:thinkingmatters@stanford.edu)  
 Web Site: <https://undergrad.stanford.edu/programs/thinking-matters>

Thinking Matters courses are listed under the subject code THINK (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=20172018&q=THINK&collapse=on>) on the Stanford Bulletin's ExploreCourses web site .

Thinking Matters offers courses that satisfy the one quarter freshman requirement. Taught by faculty from a wide range of disciplines and fields, the Thinking Matters (THINK) requirement helps students develop the ability to ask rigorous and genuine questions that can lead to scientific experimentation or literary interpretation or social policy analysis. Through the study of these questions and problems, students develop critical skills in interpretation, reasoning, and analysis as well as enhance capacities for writing and discussion. The THINK requirement may be satisfied in one of three ways:

1. Thinking Matters courses:
  - a one quarter, 4-unit course taught by Academic Council faculty.
2. Education as Self-Fashioning courses: ESF
  - a one quarter (Autumn), 7-unit course that satisfies both the Thinking Matters Requirement and the first-year Writing Requirement. For information on the program, faculty, and instructors, see the "ESF (p. 121)" section of this bulletin.
3. Integrated Learning Environments: ITALIC, and SLE
  - a three quarter, residence-based learning experience, which satisfies the THINK requirement, two of the University Writing and Rhetoric requirements, and selected General Education Requirements. For information regarding the three residence-based programs, faculty, and instructors, see the "ILE (p. )" section of this bulletin.

## Thinking Matters Courses Offered in 2017-18

- All Thinking Matters Courses (<https://undergrad.stanford.edu/programs/thinking-matters/courses/thinking-matters-course-listings>) Offered in 2017-18 on the Thinking Matters web site
- Autumn Quarter on ExploreCourses (<https://explorecourses.stanford.edu/search?q=THINK&view=catalog&page=0&academicYear=20172018&filter-term-Autumn=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-THINK=on>)
- Winter Quarter on ExploreCourses (<https://explorecourses.stanford.edu/search?q=THINK&view=catalog&page=0&academicYear=20172018&filter-term-Winter=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-THINK=on&filter-catalognumber-THINK=on>)
- Spring Quarter on ExploreCourses (<https://explorecourses.stanford.edu/search?q=THINK&view=catalog&page=0&academicYear=20172018&filter-term-Spring=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-THINK=on&filter-catalognumber-THINK=on>)

## Program in Writing and Rhetoric (PWR)

*Faculty Director:* Adam Banks

*Director, Stanford Introductory Studies for PWR:* Marvin Diogenes

*Associate Director:* Christine Alfano

*Director, Hume Center for Writing & Speaking:* Zandra Jordan

*Associate Director, Hume Center for Writing & Speaking:* Sarah Pittock

*Director, Oral Communication Program:* Doree Allen

*Director, Stanford Storytelling Project:* Jonah Willihnganz

*Lecturers:* Christine Alfano, Paul Bator, Angela Becerra Videgar, Shaleen Brawn, Tessa Brown, Russ Carpenter, Erica Cirillo-McCarthy, Kevin DiPirro, Erik Ellis, Norah Fahim, Megan Formato, Thomas Freeland (Oral Comm), Wendy Goldberg, Alex Greenhough (ITALIC), Arturo Heredia, Shannon Hervey, Donna Hunter, Jennifer Johnson, Chris Kamrath, Valerie Kinsey, Clara Lewis, Helen Lie (Oral Comm), Kimberly Moekle, Gabrielle Moyer, Ashley Newby, John Peterson, Sarah Pittock, Emily Polk,



Becky Richardson, Carolyn Ross, Kim Savelson, Tesla Schaeffer, Selby Schwartz, Ruth Starkman, Jennifer Stonaker, Mary Stroud, Lisa Swan, Kathleen Tarr, Jake Warga (Storytelling), Ann Watters, Cassie Wright.

*Fellows:* Jakeya Caruthers, Samah Elbelazi, Lindsey Felt, Mark Gardiner, Brian Kim, Andrea Kortenhoven, Raechel Lee, Lauren Oakes, Jamie O'Keeffe, Mackenzie Russell, Irena Yamboliev.

Offices: Sweet Hall, Third Floor

Mail Code: 94305-3069

Phone: (650) 723-2631

Email: [pwrcourses@stanford.edu](mailto:pwrcourses@stanford.edu)

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

Courses offered by the Program in Writing and Rhetoric are listed under the subject code PWR on the Stanford Bulletin's ExploreCourses web site. Courses offered by the Oral Communication Program within PWR are listed under the subject code ORALCOMM. Please see below for more information about the Oral Communication Program.

The Program in Writing and Rhetoric (PWR) designs and teaches courses that meet the Writing and Rhetoric requirement for undergraduates at Stanford as well as intermediate and advanced writing and rhetoric classes. For more information on the requirement, see the "Writing and Rhetoric Requirement" page on the PWR website.

PWR courses engage students in rhetorical analysis of texts and research-based argument. Students in PWR courses learn and practice time-tested rhetorical principles to gain increasing control over the intellectual and stylistic elements of their writing; they learn to analyze the persuasive strategies of others and to apply those insights to their own writing.

Toward these ends, PWR 1 focuses on elements of academic argument: understanding a writer's stance; developing an argumentative thesis; discovering, developing, and deploying cogent proofs; making appropriate organizational and stylistic choices; and understanding the expectations of varied audiences. The course emphasizes research-based writing, including the effective use of primary and secondary sources and data based on fieldwork. Students enrolled in PWR 1 carry out significant research and use it as the basis for a persuasive research-based argument.

PWR 2 further develops students' skills in writing and the oral presentation of research, emphasizing the ongoing development of content, organization, and style. The course addresses the dynamic interdependence of writing and speaking, as well as the importance of visual and multimedia elements in the effective presentation of research. Students enrolled in PWR 2 have opportunities to draft and revise written assignments and oral presentations as well as opportunities to present the results of scholarly inquiry, with an emphasis on how to work purposefully and well with a variety of presentation media.

As a general rule, students complete a minimum of three major assignments in both PWR 1 and 2. Written assignments vary from 5 to 15 pages in length, and students work intensively on revising each piece of writing. Oral presentation assignments vary from 3 to 10 minutes in duration, and students have an opportunity to rehearse and revise major presentations. All assignments involve analyzing a range of texts as well as identifying, evaluating, and using multiple sources in support of research-based arguments. In-class work focuses on how to read with an increasingly critical eye, how to utilize a range of generative writing and revision activities, and how to identify, evaluate, integrate, and cite sources effectively.

Writing and Rhetoric classes enroll no more than 15 students; consistent participation is crucial. In-class activities include close reading and analysis of texts, drafting and revising parts of assignments, and responding to the writing of peers; in-class workshops are augmented by

a minimum of three individual or small group conferences with the PWR instructor during the quarter.

## Courses

The Writing and Rhetoric requirement includes courses at three levels.

1. The first-level course, taken in the first year, can be completed in PWR or Integrated Learning Environments, including Structural Liberal Education (SLE) and Immersion in the Arts: Living in Culture (ITALIC), or by completion of the Education as Self-Fashioning (ESF) course; the curriculum emphasizes analysis and research-based argument.
2. The second-level course, to be completed by the end of the sophomore year, is a writing and oral/multimedia presentation course taught by the Program in Writing and Rhetoric. Completion of Structured Liberal Education also fulfills this requirement. Introductory Seminars certified by the Writing and Rhetoric Governance Board satisfy the second-level Writing and Rhetoric Requirement (WRITE 2). Courses offered as Introductory Seminars require an additional application form; see the Introductory Seminars web site (<https://undergrad.stanford.edu/programs/introsems>).
3. The third-level course is a Writing in the Major (WIM) course taught in each major, providing students with systematic opportunities to develop skills for writing in their chosen fields. A list of certified WIM courses may be found in the table of "Undergraduate Major Unit Requirements (p. 41)" of this bulletin. WIM course descriptions may be found under individual department and program sections.

The sequence of required courses provides a coordinated approach responsive to how students mature as writers, researchers, and presenters during their undergraduate years. At each level, students develop greater sophistication in conducting inquiry and producing scholarly work in progressively more specific disciplinary contexts.

Before the term in which students enroll in the first two levels of the requirement, they review course descriptions on the PWR Courses webpage. After reviewing the offerings, students submit a list of top choices, and the PWR office assigns students to courses based on these preferences.

Students wishing to pursue advanced work in Writing and Rhetoric may enroll in electives offered by PWR. Topics vary; further information may be found in the PWR section of the Stanford Bulletin's ExploreCourses web site or on the PWR advanced courses web page. PWR also offers courses culminating in a Notation in Science Communication. For more information, visit the webpage.

## Hume Center for Writing and Speaking

Location: Building 250

Mail Code: 2085

Phone: (650) 723-0045

Email: [humecenter@stanford.edu](mailto:humecenter@stanford.edu)

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

The Hume Center for Writing and Speaking (Hume Center) works with all Stanford writers to help them develop rich and varied abilities in every aspect of writing and oral communication. In one-to-one sessions, Hume writing consultants help students get started on assignments; address and overcome writer's block or performance anxiety; learn strategies for revising and editing; and understand academic conventions in their fields. Hume emphasizes support for students' writing, oral presentations, and multimedia compositions for PWR, Thinking Matters, and Introductory Seminars while also serving all Stanford undergraduates through individual and group tutorials, workshops, and seminars. The Hume Center also works with students in Writing in the Major (WIM) courses and students writing Honors theses. Other events hosted by the Center include performances for Parents Weekend and Admit Weekend.

For further details, see the Hume Center for Writing and Speaking web site.

## Oral Communication Program

Email: [speakinghelp@stanford.edu](mailto:speakinghelp@stanford.edu)

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

The Oral Communication Program provides opportunities for undergraduates and graduate students to develop or improve their oral communication skills. Courses and workshops offer a comprehensive approach to speech communication, including training in the fundamental principles of public speaking and the effective delivery of oral presentations. The goal is to enhance students' general facility and confidence in oral expression. The program also provides innovative discipline-based instruction to help students refine their personal speaking styles in small groups and classroom settings.

## Student Writing and Oral Communication Tutors

Students with a passion for writing and/or public speaking are encouraged to apply to become writing or oral communication tutors (OCTs); the application process takes place each January, and for those students chosen to serve as writing tutors or OCTs, we offer a required training practicum in Spring Quarter.

## PWR Courses Offered in 2017-18

- PWR 1 Courses
  - Autumn Quarter ([https://explorecourses.stanford.edu/search?q=pwr\\*&view=catalog&filter-component-SEM=on&filter-term-Autumn=on&filter-ger-Writing1=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018](https://explorecourses.stanford.edu/search?q=pwr*&view=catalog&filter-component-SEM=on&filter-term-Autumn=on&filter-ger-Writing1=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018))
  - Winter Quarter
  - Spring Quarter ([https://explorecourses.stanford.edu/search?q=pwr\\*&view=catalog&filter-component-SEM=on&filter-ger-Writing1=on&filter-term-Spring=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018](https://explorecourses.stanford.edu/search?q=pwr*&view=catalog&filter-component-SEM=on&filter-ger-Writing1=on&filter-term-Spring=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018))
- PWR 2 Courses ([https://explorecourses.stanford.edu/search?q=pwr\\*&filter-ger-Writing2=on&view=catalog&filter-term-Winter=on&filter-component-SEM=on&filter-term-Autumn=on&filter-term-Spring=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018](https://explorecourses.stanford.edu/search?q=pwr*&filter-ger-Writing2=on&view=catalog&filter-term-Winter=on&filter-component-SEM=on&filter-term-Autumn=on&filter-term-Spring=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018))
  - Autumn Quarter ([https://explorecourses.stanford.edu/search?q=pwr\\*&filter-ger-Writing2=on&view=catalog&filter-component-SEM=on&filter-term-Autumn=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018](https://explorecourses.stanford.edu/search?q=pwr*&filter-ger-Writing2=on&view=catalog&filter-component-SEM=on&filter-term-Autumn=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018))
  - Winter Quarter ([https://explorecourses.stanford.edu/search?q=pwr\\*&filter-ger-Writing2=on&view=catalog&filter-term-Winter=on&filter-component-SEM=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018](https://explorecourses.stanford.edu/search?q=pwr*&filter-ger-Writing2=on&view=catalog&filter-term-Winter=on&filter-component-SEM=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018))
  - Spring Quarter ([https://explorecourses.stanford.edu/search?q=pwr\\*&filter-ger-Writing2=on&view=catalog&filter-component-SEM=on&filter-term-Spring=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018](https://explorecourses.stanford.edu/search?q=pwr*&filter-ger-Writing2=on&view=catalog&filter-component-SEM=on&filter-term-Spring=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018))

## Oral Communication Courses Offered in 2017-18

- Oral Communication Courses
  - Autumn Quarter
  - Winter Quarter
  - Spring Quarter ([https://explorecourses.stanford.edu/search?q=oralcomm\\*&view=catalog&filter-term-Spring=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018](https://explorecourses.stanford.edu/search?q=oralcomm*&view=catalog&filter-term-Spring=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018))
  - Summer Quarter (<https://explorecourses.stanford.edu/search?q=oralcomm&view=catalog&filter-term-Summer=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018>)

[term-Summer=on&page=0&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018](https://explorecourses.stanford.edu/search?q=pwr*&view=catalog&filter-coursestatus-Active=on&collapse=%2c5%2c6%2c&academicYear=20172018))

## Advanced PWR Courses

Prerequisites: PWR 1 and PWR 2.

		Units
Courses in the Social and Racial Justice track		
PWR 91MC	Intermediate Writing : Activist Rhetoric	4
PWR 194KT	Topics in Writing & Rhetoric: The Last Hopi On Earth: The Rhetoric of Entertainment Inequity	4
PWR 194SS	Topics in Writing & Rhetoric: Making Rhetoric Matter: Human Rights at Home	4
Courses in the Science Communication track		
PWR 91NSC	Intermediate Writing: Introduction to Science Communication	4
PWR 91EC	Intermediate Writing: Farmers, Scientists, & Activists: Public Discourse of Food Economies	4
PWR 91CL	Intermediate Writing: Self & Science	4
PWR 194MF	Topics in Writing & Rhetoric: In the Margins: Race, Gender and the Rhetoric of Science	4
PWR 99A	Portfolio Preparation I	1
PWR 99B	Portfolio Preparation II	2
Other courses		
PWR 5	Independent Writing	1-5
PWR 6	Writing Workshop	1-3

## Education as Self-Fashioning

*Director:* Dan Edelstein (French and Italian)

*Faculty:* Dan Edelstein (French and Italian), Margot Gerritsen (Energy Resource Engineering), Andrew Hall (Political Science), Robert Harrison (French and Italian), Blair Hoxby (English), Caroline Hoxby (Economics), Andrea Nightingale (Classics), Ken Taylor (Philosophy).

*Writing Instructor:* Brandon Bark, Megan Formato, Biliana Kassabova, Valerie Kinsey, Friederike Kneuepling, Sarah Perkins, Ruth Starkman, Ian Tewksbury.

Offices: Sweet Hall, Second Floor

Mail Code: 94305-3068

Phone: (650) 723-0944

Email: [thinkingmatters@stanford.edu](mailto:thinkingmatters@stanford.edu)

Web Site: <https://undergrad.stanford.edu/programs/education-self-fashioning-esf>

Education as Self-Fashioning (ESF) is a unique opportunity offered only in the autumn quarter, since its aim is to introduce entering students to a liberal education. The six courses provide you with an opportunity to work closely with a faculty member in a seminar-style setting while simultaneously completing your first-year writing requirement. In ESF, we consider writings about education by intellectuals working in various fields, with the aim of articulating different ways that education can be used to structure one's thinking, one's self, and ultimately one's life as a whole. You will grapple with this issue in dialogue with fellow students and faculty from across a wide range of disciplines — from the humanities and social sciences through the natural sciences and mathematics.

The ESF program satisfies both the Thinking Matters and the PWR1 requirement. ESF is a set of linked seminars related to the general theme expressed in the course title. Six seminars, each with a different focus, meet separately as discussion classes led by the faculty; all ESF students also come together for a plenum session or large lecture each week.

Each seminar coordinates writing instruction with the course theme in specially designated writing sections.

The three components of ESF are described below. ESF counts as a 7-unit course.

1. A seminar with a faculty member that meets once per week for at least 75 minutes.
2. A section with a writing instructor that meets for sessions of 110 minutes twice per week.
3. A lecture series that will meet once-a-week featuring prominent intellectuals. These lectures are required for students enrolled in ESF.

## ESF Courses Offered in Autumn 2017-18

- All ESF Courses Offered in 2017-18 (<https://explorecourses.stanford.edu/search?q=ESF&view=catalog&page=0&academicYear=20172018&filter-term-Autumn=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-ESF=on>)

## Introductory Seminars

*Faculty Director:* Russell Berman, Comparative Literature and German Studies

*Director, Stanford Introductory Studies for Introductory Seminars:* Ellen Woods

*Associate Director:* Dayo Mitchell

*Faculty:* More than 200 faculty from the Schools of Humanities & Sciences; Engineering; Law; Medicine; Earth, Energy & Environmental Sciences; and the Graduate Schools of Business and Education

Offices: Second Floor, Sweet Hall  
Mail Code: 3069  
Phone: (650) 724-2405  
Email: [introsems@stanford.edu](mailto:introsems@stanford.edu)  
Web Site: <http://introsems.stanford.edu>

The Introductory Seminars program offers more than 200 small classes for first- and second-year students taught by faculty from across the seven Schools of the University. Professors teach subjects drawn from their research and scholarship and engage students in deep investigation of important questions and issues. Seminars require little or no formal background, and welcome first-year students and sophomores to Stanford's intellectual community.

Many seminars satisfy the Ways Breadth Requirements, and several meet the second-level Writing and Rhetoric Requirement (Writing 2). There is no limit on the total number of seminars a student may take. Most seminars are filled through an online selection and pre-enrollment process. Seminars that have space available are open for self-enrollment in Axxess, with preference to first- and second-year students. For information about online sign-up and enrollment, see the Introductory Seminars (<https://undergrad.stanford.edu/programs/introsems>) web site.

Sign-up deadlines for each quarter are at 11:59 p.m. on:

- Autumn Quarter: August 30, 2017
- Winter Quarter: October 15, 2017
- Spring Quarter: January 28, 2018

## Introductory Seminars Courses Offered in 2017-18

- Frosh Introductory Seminars
  - Autumn Quarter
  - Winter Quarter
  - Spring Quarter

- Sophomore Introductory Seminars
  - Autumn Quarter
  - Winter Quarter
  - Spring Quarter

## Sophomore College

Offices: Sweet Hall, Second Floor  
Mail code: 3069  
Phone: (650) 724-4667  
Email: [sophcollege@stanford.edu](mailto:sophcollege@stanford.edu)  
Web Site: <http://soco.stanford.edu>

Sophomore College (SoCo) offers rising sophomores who share a passion for an area of study an opportunity to meet daily in seminar-size classes with Stanford faculty for lecture and discussion; students may also work in labs, participate in community-based learning, go on field trips, and engage in a range of other activities that facilitate in-depth mentoring relationships. Held before the start of students' sophomore year, this residential program encourages academic and social connections and transforms classes into intellectual communities, helping participants establish rich relationships with peers and faculty that extend beyond graduation. Seminars are for 2 credits; the Sophomore College program fee covers tuition, room, board, books, and class-required travel arranged by the program. Financial assistance is available. You can view the on-line catalog and learn more about SoCo at the Sophomore College (<https://undergrad.stanford.edu/programs/sophomore-college>) web site.

## Arts Intensive

Offices: Sweet Hall, Second Floor  
Mail code: 3069  
Phone: (650) 724-4667  
Email: [artsintensive@stanford.edu](mailto:artsintensive@stanford.edu)  
Web Site: <http://artsintensive.stanford.edu>

The Arts Intensive (AI) Program offers rising sophomores, juniors, and seniors the opportunity to study intensively with Stanford arts faculty and small groups of other Stanford students. The Arts Intensive program takes place over three weeks in September before the start of Autumn Quarter.

Arts Intensive courses engage students in the theory and practice of a particular artistic discipline. Courses often include field trips, workshops, film screenings, studio sessions, or other arts events in the afternoons, evenings, and on weekends. Courses are taught by Stanford arts faculty and often include contributions from professional visiting artists. Arts Intensive students live together in a Stanford residence during the program, making for a rich immersion into a creative community. This unique opportunity allows students to focus on their art practice without the constraints of other coursework. Enrollment is by application and takes place in Spring Quarter for the upcoming September program. Each Arts Intensive course enrolls 10 to 20 students and offers 2 units of academic credit. For more information or to apply, see the Arts Intensive (<http://artsintensive.stanford.edu>) web site.

## Bing Honors College

Offices: Hume Center for Writing and Speaking (Building 250)  
Mail code: 2085  
Phone: (650) 723-0045  
Email: [binghonorscollege@stanford.edu](mailto:binghonorscollege@stanford.edu)  
Web Site: Bing Honors College ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/00\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/00_honors_BingHonors.html))

Bing Honors College brings students working on the early phases of their honors theses back to campus in early September, and gives them three

weeks before the start of Autumn Quarter during which they can think, read, plan, research, and write.

With the support of faculty leaders and graduate students from participating departments and programs, students work on what they need, such as narrowing down a topic, improving research skills, making a timeline, writing a literature review, starting a chapter, collecting or sorting data, etc. This opportunity to focus solely on their theses helps the students to begin their senior year with a sense of direction and intellectual purpose, a commitment to their scholarship, and concrete progress on their projects. The College provides room and board. It also sponsors cross-disciplinary forums, such as writing workshops and faculty-led research panels, as well as residential activities and a closing celebratory event for all the students and their faculty leaders.

If you are a prospective honors student interested in joining Bing Honors College, please contact your department to find out whether it is participating. If your department is not participating but your adviser is willing to nominate you, the College will try to place you with a BHC leader who will provide you with the necessary support and guidance.

# OVERSEAS STUDIES

## Bing Overseas Studies Program

The Bing Overseas Studies Program (BOSP) provides opportunities for Stanford students to broaden their undergraduate education through study in another country and exposure to its culture. Regular quarter-length programs in Australia, Beijing, Berlin, Cape Town, Florence, Istanbul, Kyoto, Madrid, Oxford, Paris, and Santiago offer courses in social and natural sciences, humanities, engineering, and earth sciences with full Stanford credit. Many courses also count toward major requirements and/or fulfill University breadth requirements. Students may enroll for one or more quarters at most locations. Academic or paid internships are available at certain program locations. Research opportunities are available in various formats at different centers. Community-engaged learning and community-based research opportunities are available in Cape Town. Minimum academic and language prerequisites are specific to each program. See the BOSP (<http://bosp.stanford.edu>) web site for information on these prerequisites.

While studying overseas through BOSP, students remain registered at Stanford and pay regular tuition, along with an overseas fee, which is based on Stanford on-campus room and board rates. Regular financial aid applies, and may be adjusted to cover additional costs. At many centers, students live in a homestay or a dormitory setting with local and other students.

In addition to the programs offered through BOSP for enrolled Stanford students, the University is a member of the Kyoto Consortium for Japanese Studies (KCJS), where students may enroll while remaining registered at Stanford. Overseas Studies also offers three-week faculty-led overseas seminars in various locations during Summer Quarter, two faculty-initiated programs in Oaxaca, Mexico focusing on community health and biocultural diversity, and occasional other such programs in various locations.

Located on the ground floor of Sweet Hall, Overseas Studies has full-time staff members and student ambassadors to assist in advising and planning for overseas study. Course information, while accurate at the time of publication, is subject to change. Consult the BOSP (<http://bosp.stanford.edu>) web site for updated information.

## Locations

Courses offered by the Overseas Studies Program are listed on the Stanford Bulletin's (<http://explorecourses.stanford.edu>) ExploreCourses (<http://explorecourses.stanford.edu>) web site under subject codes beginning with OSP. Each BOSP location has its own subject code. Those subject codes, by location, are:

- Australia [OSPAUSTL]
- Beijing [OSPBEIJ]
- Berlin [OSPBER]
- Cape Town [OSPCPTWN]
- Florence [OSPFLOR]
- Istanbul [OSPISTAN] (<https://explorecourses.stanford.edu/search?view=catalog&catalog=&page=0&q=OSPISTAN&filter-catalognumber=OSPISTAN=on>)
- Kyoto [OSPKYOTO]
- Kyoto Consortium for Japanese Studies [OSPKYOCT]
- Madrid [OSPMADRDR]
- Oxford [OSPOXFRD]
- Paris [OSPPARIS]
- Santiago [OSPSANTG].

## Program Director

*Program Director:* Ramón Saldivar

## Stanford Program in Australia

*Director:* Ian Tibbetts, School of Biological Sciences, University of Queensland

*Faculty-in-Residence:* Kevin Arrigo

*Program Faculty:* Claire Baker, Catherine Lovelock, Brian McIntosh, Christopher Salisbury, Selina Ward

## Stanford Program in Berlin

*Director:* Karen Kramer

*Faculty-in-Residence:* Stephen Monismith, Janice Ross, Matthew Smith

*Program Faculty:* Maria Biege, Diana Boebe, Ulrich Brückner, Martin Jander, Wolf-Dietrich Junghanns, Ingo Klein, Sylvia Kloetzer, Matthias Pabsch, Sylke Tempel, Jochen Wohlfeil

## Stanford Program in Cape Town

*Director:* Adelene Africa

*Faculty-in-Residence:* Marie-Louise Catsalis, Grant Parker

*Program Faculty:* Mohamed Adhikari, Adelene Africa, June Bam, Ronelle Carolissen, Stephan Klingebiel, Ruenda Loots, Nomusa Makhubu, Wamuwi Mbaob, John Parkington, Helen Scanlon, Mills Soko, Nolubabalo Tyam, Joseph Warren, Quentin Williams

## Stanford Program in Florence

*Director:* Ermelinda Campani

*Faculty-in-Residence:* Tomas Jimenez, Katherine Jolluck, Norman Naimark, Jack Rakove

*Program Faculty:* Elena Baracani, Nigel Bennet, Varusca Costenaro, Veronica De Romanis, Paolo Galluzzi, John Hooper, Michele Papa, Patrizia Pedrini, Fiorenza Quercioli, Filippo Rossi, Augusto Valeriani, Timothy Verdon

## Stanford Program in Istanbul

*Program suspended for 2017-2018 academic year.*

## Stanford Program in Kyoto

*Director:* Mike Hugh

*Program Faculty:* Paul DeMarinis, Hideo Mabuchi

*Program Faculty:* William Bradley, Yuka Kanno, Yuko Kawahara, Catherine Ludvik, Yasue Numaguchi, Naoyuki Ogino, Tsukasa Otani, Naoko Shiotani, Kiyoko Tanaka, Jun Tomita, Rie Tsujino, Douglas Woodruff

## Stanford Program in Madrid

*Director:* Pedro Perez-Leal

*Faculty-in-Residence:* Thomas Fingar, Scott Rozelle, Lisa Surwillo

*Program Faculty:* María Almudena Ariza Armada, Alberto Bosco, Aida Esther Bueno Sarduy, Miguel Buñuel, María Teresa Cambler Portilla, Pablo Campos Calvo Sotelo, Bernat Castany Prado, Jean Castejon Gilabert, Raul de la Fuente Marcos, Andrés Díez Herrero, Julia Doménech López, Sylvia Hilton, Sheila Klaiber, Miguel Larrañaga Zulueta, Laura

Luceño Casals, Eduardo Manzano Moreno, Irene Martin, Antonio Muñoz Carrión, Laura Murcia Cánovas, Alicia Pérez Blanco, Beatriz Perez Galan, Roshan Samtani, Oscar Sánchez Fuster, Isidro Yerba Prada

## Stanford Program in Oxford

*Director:* Stephanie Solywoda

*Faculty-in-Residence:* Hank Greely, Karen Jusko, Julie Parsonnet, Dean Winslow

*Program Faculty:* Vanessa Burns, James Forder, Matthew Landrus, Robert McMahon, Amanda Palmer, Scot Peterson, Sebastian Petzolt, Emma Plaskitt, Olivia Reilly

## Stanford Program in Paris

*Director:* Estelle Halévi

*Faculty-in-Residence:* Markus Covert, Helen Longino, Valerie Miner, David Palumbo-Liu, Dmitri Petrov

*Program Faculty:* Marie-Fleur Albecker, Nicolas Baudouin, Jean-Marie Fessler, Benedicte Gady, Sarah Grandin, Patrick Guédon, Choukri Hmed, Tiphaine Karsenti, Louise Lartigot-Hervier, Eloi Laurent, Florence Leca, Jacques Le Cacheux, Elizabeth Molkou, Pauline Prat, Gregoire Quenault, Marie-Christine Ricci, Klaus-Peter Sick, Sylvie Strudel, Fabrice Virgili

## Stanford Program in Santiago

*Director:* Iván Jaksic

*Faculty-in-Residence:* Eran Bendavid, Hans Gumbrecht

*Program Faculty:* Mabel Abad, Felipe Agüero, César Albornoz, Andrés Bobbert, Germán Correa, Rolf Lüders, Sergio Missana, Thomas O'Keefe, Iván Poduje, Hernan Pons, Sharon Reid, Pablo Rivano, Gloria Toledo

# UNDERGRADUATE ADVISING AND RESEARCH

## Undergraduate Advising and Research

UAR (Central Office): Sweet Hall, first floor  
 Phone: (650) 723-2426  
 Fax: (650) 725-1436  
 Web Site: <http://undergrad.stanford.edu>  
 Email: [advising@stanford.edu](mailto:advising@stanford.edu) ([vpue-advising@stanford.edu](mailto:vpue-advising@stanford.edu)), [vpue-research@stanford.edu](mailto:vpue-research@stanford.edu)  
 Appointments: (650) 723-2426

Undergraduate Advising and Research upholds the mission, standards, and requirements of the University, introduces students to the full intellectual richness of undergraduate study at Stanford, supports students in their academic and intellectual pursuits, and instills within them a sense of identity within and belonging to our community of scholars at Stanford. UAR is responsible for facilitating new students' transition to Stanford, academic advising, academic policy and progress, and undergraduate research opportunities.

## Transitioning New Students

UAR is responsible for the Approaching Stanford program, which guides new students through the process of coming to Stanford from their admission to the University until the first day of class. This process culminates in New Student Orientation which is required for all new freshmen and transfer students. See the Approaching Stanford (<https://approaching.stanford.edu>) web site for additional information.

## First-Year and Transfer Student Policies

Stanford values the transition process as the foundation for thriving both academically and personally in our community. The following policies support this principle and apply to freshmen and new transfer students:

- All first-year and new transfer students are required to attend New Student Orientation and must be in residence by 5:00 p.m. on the first day of NSO, Tuesday, September 19, 2017.
- First-year and new transfer students are required to live on campus in University housing for three consecutive quarters in their first year. Should behavior warrant a first-year student's removal from the residences, that student cannot enroll in classes until he or she has returned to the residential community.
- When circumstances arise which make it advisable for a first-year to take a leave absence at any time during the first year, he or she is required to wait until Autumn Quarter of the following year to return to Stanford.
- First-year and new transfer students cannot enroll in the Summer Quarter prior to their first year unless they are participating in a VPUE-sponsored program. Exceptions are very rarely granted.

## Advising

UAR pairs each first-year with two advisers: a pre-major adviser (faculty and academic staff) and an academic advising director in the residences. First-years are matched with their pre-major advisers according to their preliminary academic interests and residence. Pre-major advisers are well suited to help students understand the University and are the first of many mentors students find at Stanford. The UAR academic advising directors in the undergraduate residences complement the role of the assigned pre-major advisers with a comprehensive understanding of the curriculum. They advise students broadly on their courses of study and long-term goals and can answer questions about academic policy. The UAR advising staff also includes professional advisers in Sweet Hall who are both general and specialized academic advisers

in the areas of research and fellowships, pre-professional advising, returning student and transfer student advising, or coterminal advising, as well as advisers in the Athletics Academic Resource Center (<https://undergrad.stanford.edu/advising/about-advising/advising-student-athletes>) (AARC) who are general and specialized academic advisers for varsity student-athletes.

See the Advising web site (<https://undergrad.stanford.edu/advising>) for more information about academic advising, programming, and support for undergraduates.

## Academic Policy

UAR oversees the implementation of University academic policies pertaining to undergraduates, including requests for exceptions to academic policy (i.e., petitions) and monitoring academic progress. All UAR advisers support students with an academic status (e.g., probation, provisional registration, or suspension). For more information about academic policies that UAR advisers help students navigate, see the Academic Policies (<https://undergrad.stanford.edu/planning/academic-policies>) web site.

## Undergraduate Research and Fellowships

UAR encourages undergraduates to work with faculty on independent projects in research, the arts, and senior synthesis. UAR facilitates these close relationships by providing advising and funding to undergraduates across all disciplines and at all stages of developing an idea into a research project. See the Research and Independent Projects (<https://undergradresearch.stanford.edu>) web site for more information. For current deadlines, grant types, and program details, see the Student Grants (<https://studentgrants.stanford.edu>) page. Faculty or departments interested in applying for funding to support undergraduates in their working groups can learn more on the For Faculty (<https://undergrad.stanford.edu/opportunities/research/faculty>) page.

Together with advisers at the Overseas Resource Center (<http://stanford.edu/dept/icenter/orc>) and the Haas Center for Public Service (<http://haas.stanford.edu>), UAR advisers help prepare students to compete for nationally competitive fellowships. UAR also administers the campus nomination process for several U.S.-based fellowships. See the Fellowships (<https://undergrad.stanford.edu/opportunities-research/fellowships>) web site for more information on fellowship opportunities.

UAR offers workshops and individual consultations on planning for graduate or professional studies (e.g., business, education, law, and medicine) and on general application procedures, including how to write personal statements, how to solicit letters of recommendation, and how to prepare for interviews. See the Planning for Graduate and Professional School (<https://undergrad.stanford.edu/opportunities-research/steps-planning-graduate-and-professional-school>) web site for more information.

# RESIDENTIAL PROGRAMS

## Residential Programs

*Program Director:* Warren Chiang

*Office:* Sweet Hall, Garden Level

Residential Programs (ResProg) focuses on providing educational coherence for residential based programs, students and faculty. Integrated Learning Environment (ILE) and Summer Cohort Program are two primary areas that we integrate academic and residential experience. Immersion in the Arts: Living in Culture (ITALIC) and Structured Liberal Education (SLE) are two of the ILE programs that are academic year, immersive programs held in themed based dorms. Leland Scholars Program (LSP), is a four-week summer cohort intensive program also held in the residence. It facilitates the transition to college for incoming freshmen through carefully crafted activities, course work, discussions, and trips.

## Structured Liberal Education

*Director:* Joshua Landy (French and Comparative Literature)

*Associate Director:* Greg Watkins

*Lecturers:* Michaela Hulstyn, Katerine Kretler, Jeremy Sabol, Ery Shin, Greg Watkins, Mary Garcia, Peter Mann

*Offices:* Sweet Hall, Second Floor, and Florence Moore Hall

*Mail Code:* 94305-8581

*Phone:* (650) 725-4790

*Email:* sle-program@stanford.edu

*Web Site:* <http://sle.stanford.edu>

The Program in Structured Liberal Education (SLE) is a year-long residence-based great works course that satisfies several requirements at once: Thinking Matters, Writing and Rhetoric (both PWR1 and PWR2), and four of the Ways requirements. The curriculum includes works of philosophy, literature, art, and music from the ancient world to the present. The program is interdisciplinary in approach; it emphasizes intellectual rigor and individualized contact between faculty and students.

SLE has two fundamental purposes: to develop a student's ability to ask effective questions of texts, teachers, the culture, and themselves; and to develop intellectual skills in critical reading, expository writing, logical reasoning, and group discussion. SLE encourages students to live a life of ideas in an atmosphere that stresses critical thinking and a tolerance for ambiguity. Neither the instructors nor the curriculum provides ready-made answers to the questions being dealt with; rather, SLE encourages a sense of intellectual challenge, student initiative, and originality.

The residence hall is the setting for lectures and small group discussions. SLE enhances the classroom experience with other educational activities, including a weekly film series, writing tutorials, occasional special events and field trips, and a student-produced play each quarter.

Freshmen interested in enrolling in SLE should indicate this preference for their Thinking Matters assignment. SLE is designed as a three quarter sequence, and students are expected to make a commitment for the entire year (8 units each quarter).

### SLE Courses Offered in 2017-18

		Units
SLE 91	Structured Liberal Education	8
SLE 92	Structured Liberal Education	8
SLE 93	Structured Liberal Education	8

SLE 299 Structured Liberal Education Capstone Seminar 1

## Immersion in the Arts: Living in Culture

*Faculty Director:* Karla Oeler (Art and Art History)

*Associate Director:* Kim Beil

*Faculty:* Nicholas Jenkins (English)

*Lecturer:* James Steichen

*Program in Writing and Rhetoric Lecturer:* Alexander Greenhough

*Offices:* Sweet Hall, Garden Level, and Stern Hall

*Mail Code:* 94305-7000

*Phone:* (650) 724-3163

*Email:* italic\_ile@stanford.edu

*Web Site:* <https://undergrad.stanford.edu/programs/residential-programs/italic/overview>

ITALIC is an arts-minded, residence-based academic program for first-year students. Using art as the frame for discussing big ideas, frosh who participate in this yearlong academic program are part of a tight-knit community, living together, attending classes, and making art in Stern Hall's Burbank House residence.

ITALIC is built around a series of big questions about the historical, critical, and practical purposes of art. The yearlong experience also fosters close exchanges between students and faculty, guest artists and scholars outside of class over meals, in hands-on arts-making workshops, and on excursions to arts events.

In ITALIC, students look closely at the integration of arts across the University and in the world outside, examining how art can illuminate or challenge existing categories of knowledge, including history, politics, and culture, particularly since the 19th century. Immersed in the arts, they analyze major works of the visual, performing, and filmic arts, sharpen perceptual skills, and tap into their own channels of creative expression. Turning an aesthetic lens on life's ordinary and exceptional features, ITALIC asks: How do the arts provide new ways of thinking about our world and ourselves?

### ITALIC Courses Offered in 2017-18

		Units
ITALIC 91	Immersion in the Arts: Living in Culture	4
ITALIC 92	Immersion in the Arts: Living in Culture	4
ITALIC 93	Immersion in the Arts: Living in Culture	4
ITALIC 95W	Immersion in the Arts: Living in Culture, Writing Section	4

## Leland Scholars Program

*Offices:* Sweet Hall, Garden Level

*Mail code:* 94305-3092

*Email:* lelandscholars@stanford.edu

*Web Site:* <http://lelandscholars.stanford.edu>

In recognizing the need to prepare first year students for the academic, intellectual, social, and personal challenges they will face at Stanford, the Leland Scholars Program (LSP) facilitates the transition to college for incoming freshmen who may be the first in their family to attend college or attended under-resourced schools or communities. Scholars will participate in a four-week residential program in the summer prior to arrival on campus. This fully-funded program has a carefully crafted schedule of activities, coursework, discussions, and trips designed to support the transition to Stanford. During the academic year, Leland Scholars will have access to additional advising and freshman seminars



that sustain the community and reinforce the skills and strategies acquired during the program.

# STANFORD IN NEW YORK

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Stanford in New York presents students with distinctive opportunities for engagement within one of the world's most dynamic cities. Through an intensive academic quarter of study, reflective practice, and experiential learning in New York, students hone their intellectual skills and capacities, develop their abilities as adaptive learners, and enlarge their creative confidence.

Stanford in New York features guided internships in fields such as the arts, urban studies, media, and finance for which New York offers unparalleled opportunities. Through supportive mentoring, participants translate their academic knowledge and skills into potential career paths.

The program is offered during the following quarters:

- Autumn, Winter, and Spring quarters

Areas of study for both course work and internships are organized by quarter.

- Autumn Quarter focus: The Arts, Architecture, Design, and Urban studies
- Winter Quarter focus: Finance and Media
- Spring Quarter: The Global City

*Program Director:* Rosina Miller

*Faculty-in-Residence:* Autumn Quarter: Maurice Rush Rehm. Winter Quarter: Jonathan Berger. Spring Quarter: Jamie Meltzer.

*Program Faculty:* Autumn Quarter: Arthur Cohen, Nina Freedman, Danielle Jackson, Julie Orringer

*Winter Quarter:* Tony Haile, Bill Grueskin, Danielle Jackson, Mark Oldman, Allen Thorpe

*Spring Quarter:* tba

# ROTC

## Reserve Officers' Training Corps (ROTC)

### Cross-Enrollment Agreements for ROTC

Stanford has cross-enrollment agreements for the Reserve Officers' Training Corps (ROTC) with the Navy and Marine Corps ROTC program at the University of California at Berkeley, the Army ROTC program at Santa Clara University, and the Air Force ROTC program at San Jose State University. These agreements allow Stanford students to engage in military training while working on their degrees from Stanford. Courses taken in ROTC programs are offered by and through UC Berkeley, Santa Clara, and San Jose State. Most courses count for academic or activity credit and count toward the 12-unit requirement for full-time registration status and satisfactory academic progress requirements for Stanford undergraduates.

Normally, students who participate in ROTC training complete a four-year course of instruction at the respective institution that consists of two years of basic courses during the freshmen and sophomore years, and an advanced course of instruction during the junior and senior years. Students who accept ROTC scholarships are generally subject to a service obligation, depending on the regulations of the particular service.

Stanford students who are enrolled in ROTC programs under the cross-enrollment agreements are eligible to compete for various scholarships that provide up to full tuition and a monthly stipend. Students normally compete for national scholarships as high school seniors, although current Stanford students may be eligible to enroll in ROTC on a non-scholarship basis. Non-scholarship ROTC students are eligible to compete for scholarships, and individual services may offer additional scholarship programs to current qualifying undergraduate and graduate students. Interested students should contact the appropriate military branch at the host institution to obtain information on these programs and to initiate application procedures.

Students who satisfactorily complete an ROTC program and are awarded a Stanford degree qualify for a commission as a Second Lieutenant in the U.S. Army, an Ensign in the U.S. Navy, a Second Lieutenant in the U.S. Marines, or a Second Lieutenant in the U.S. Air Force.

For additional questions concerning the ROTC programs, Stanford students should consult with one of the host units.

### Academic Credit

All three service programs have a mandatory lab course each quarter which carries 1 unit of activity credit for satisfactory completion of work. Although there is no limitation on the number of activity classes in which a student may enroll, no more than 8 units of these activity classes (and/or other university activity classes) may be applied toward undergraduate graduation requirements (see the Undergraduate Degrees (p. 35) section of this bulletin).

Upper level ROTC academic courses carry two units of credit for satisfactory completion of work and are graded on a credit/no credit basis. No more than 36 units without a letter grade may be applied toward undergraduate graduation requirements (see the Undergraduate Degrees (p. 35) section of this bulletin).

### Air Force ROTC

*Commanding Officer:* Lieutenant Colonel Michael E. Pecher

Air Force ROTC courses are offered at San Jose State University. See also the SJSU website (<http://www.sjsu.edu/afrotc>).

Courses in the freshman year focus on the foundation of the United States Air Force and introduce students to the Air Force and AFROTC.

Topics include the characteristics, missions, and organization of the Air Force, the qualities of an officer and professionalism, career opportunities, military customs and courtesies, and communication skills.

Courses in the sophomore year focus on the evolution of the United States air and space power. Students study air and space power through historical analysis and examine the capabilities, function, and doctrinal employment of aerospace forces. The course emphasizes oral and written communication skills.

Courses in the junior year focus on Air Force leadership studies. Topics include leadership, management fundamentals, professional knowledge, Air Force personnel system, ethics, and communications. Students apply knowledge and skills required of junior Air Force officers through case studies, practical exercises, and seminar discussion.

Senior year courses cover two subjects, national security affairs and preparation for active duty. Students learn about national security process, international and regional relations, advanced leadership ethics, Air Force doctrine with focus on the military as a profession, military justice, civilian control of the military, and current issues affecting the military. Preparation for active duty focuses on the role of the Air Force officer in contemporary society emphasizing skills to facilitate a smooth transition from civilian to military life.

The leadership laboratory is required for all students every quarter. Students participate in hands-on exercises to learn drill and ceremony; Air Force customs and courtesies; leadership and followership skills; and they hear from guest speakers on a variety of Air Force topics.

### Army ROTC

*Commanding Officer:* Lieutenant Colonel John Tiedeman

Some Army ROTC courses are offered at Santa Clara University and some are offered on Stanford's campus. See also the Army ROTC web site (<http://www.scu.edu/rotc>).

Freshman year courses introduce students to leadership and personal development and provide foundations for leadership. Course topics include personal challenges and competencies for effective leadership, goal setting, time management, physical fitness, and stress management related to leadership and officership. Students develop a personal fitness program under the guidance of an Army master fitness trainer. In addition, they learn leadership fundamentals such as setting direction, problem solving, listening, presenting briefs, providing feedback, and effective writing skills in the context of practical and interactive exercises.

Army courses taught in the sophomore year look at leadership through a variety of lenses using case study and interactive exercises. Topics include creative and innovative leadership strategies and styles, challenges of leading in contemporary operational environments along with crosscultural challenges, and team leading procedures.

In the junior year, students learn adaptive team leadership and situational leadership. They develop skills including decision making, persuading, and motivating team members when under fire in small-unit tactical operations scenarios.

Courses for seniors provide capstone leadership instruction and experiences in a practical and current event driven context. Students plan, execute, and assess complex operations, function as a member of staff, and provide leadership performance feedback to subordinates. They use case studies, scenarios, and exercises to prepare for their first unit assignment and the transition to commissioned officer in a modern world.

All students are also required to take a military history course focused on leadership. This course may be taken any year. The leadership laboratory is required for all students every quarter. In addition, students complete a four-day weekend field training exercise away from the University in the Autumn and Spring quarters, and a formal military dinner during an evening in the Winter Quarter.

## Naval ROTC

*Commanding Officer:* Captain William Koyama

Naval ROTC courses are offered at the University of California at Berkeley. See also the Naval ROTC web site.

Courses in the freshman year introduce students to the Navy and Marine Corps and to the NROTC program. They also study sea power from a historical and United States centered perspective.

In the sophomore year, students take their first leadership class with a focus on management and their first navigation class with a focus on the fundamentals of nautical navigation. Courses include case studies, student presentations, and practical exercises.

Juniors study introductory naval engineering with a focus on ship systems and modern weapons systems. Example topics include gas turbine propulsion systems, nuclear reactors, and radar and sonar theory.

During their senior year, students study advanced leadership topics within an ethics framework and advanced navigation and naval operations.

Students pursuing a commission in the Marine Corps do not take the two engineering courses or the two navigation courses. Marine option students take two Marine Corps specific courses that examine the history of littoral warfare and the evolution of warfare.

All students are required to take the weekly professional development laboratory course (drill) at UC Berkeley every quarter.

# GRADUATE EDUCATION (VPGE)

The Office of the Vice Provost for Graduate Education (VPGE) works collaboratively to ensure that every graduate student has the best possible education. VPGE's initiatives and resources enrich students' academic experiences at Stanford, advancing diversity, preparing leaders, and positioning Stanford at the forefront of innovation in graduate education. VPGE serves Stanford's doctoral, master's, and professional degree students from all seven Stanford schools. VPGE plays a leadership role in initiating and managing policies and programs that enhance and complement the offerings of the departments and programs that have primary responsibility for organizing and delivering graduate education.

In addition to providing University-wide graduate policy direction, the VPGE office has five primary areas of program activity: administering University-wide graduate fellowship programs; advancing graduate student diversity; providing professional development programs and events; promoting interdisciplinary and cross-school learning; and encouraging innovation in graduate programs. The Vice Provost for Graduate Education reports to the Provost.

## Graduate Policy

The Faculty Senate Committee on Graduate Studies (<https://registrar.stanford.edu/faculty/academic-senate-committees/committee-graduate-studies-c-gs>) (C-GS) formulates policy governing the substance and process of graduate education, including dissertation committees, joint degree programs, candidacy issues, and the academic calendar. C-GS is also charged to review graduate interdisciplinary programs (IDPs) in order to recommend renewals or discontinuation of the IDPs and to receive proposals for new IDPs. Committee members include the Vice Provost for Graduate Education or delegated staff (*ex officio*) and representatives from the faculty at large appointed by the Faculty Senate, administration such as the Office of the University Registrar (*ex officio*), and students. The Graduate Student Council and the Nominations Committee of the Associated Students of Stanford University (ASSU) choose student members.

## Academic Policies

VPGE recommends, promulgates, and interprets University policies related to graduate education. The Graduate Academic Policies and Procedures (<http://gap.stanford.edu>) (GAP) handbook is the primary source for policies affecting all Stanford graduate students, including policies recommended by C-GS and approved by the Faculty Senate. Several policies referenced frequently include:

### General Requirements, Progress and Milestones

Policies related to registration, enrollment, residency, academic milestones and advising; see GAP 3. General Requirements, Progress and Milestones (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-3>).

### Degree-Specific Requirements, Progress and Milestones

Policies specifically related to master's, coterminal, professional, doctoral, and joint degrees including doctoral dissertation policies; see GAP 4. Degree-Specific Requirements, Progress and Milestones (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-4>).

### Changes of Enrollment Status

Policies related to degree or enrollment changes, degree conferral, leaves of absence or discontinuations, exchange programs, and pregnancy, childbirth and adoption; see GAP 5. Changes of Enrollment Status (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-5>).

## Graduate Student Funding

Policies related to graduate student funding including fellowships and research and teaching assistantships; see GAP 7. Graduate Student Funding (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-7>).

## Academic Advising

The University policies on advising and the conduct of research listed below apply to all faculty and the graduate students they advise. In addition, departments and programs may establish specific expectations and requirements for academic advising, and should inform graduate students and faculty of these policies. Additional information and resources about advising can be found on the VPGE's Advising & Mentoring web pages (<https://vpge.stanford.edu/academic-guidance/advising-mentoring>).

Policy specifying that all matriculated graduate students must be advised by a faculty member, to be designated within students' first quarter of enrollment; see GAP 3.3. Academic Advising (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-3/subchapter-3>).

Stanford's policies and practices related to the conduct of research, including obligations to students, staff, and sponsors; see Research Policy Handbook 1. Conduct of Research (<https://doresearch.stanford.edu/policies/research-policy-handbook/conduct-research>).

Policy articulating that all members of the Stanford community are responsible for sustaining the University's highest ethical standards and values; see Administrative Guide 1.1.1. University Code of Conduct (<https://adminguide.stanford.edu/chapter-1/subchapter-1/policy-1-1-1>).

Elaboration of the GAP Academic Advising policy, including change of adviser procedures; see Stanford Bulletin: Graduate Degrees. Advising and Credentials (<http://exploreddegrees.stanford.edu/graduatedegrees/#advisingandcredentialstext>).

The ExploreDegrees section of this bulletin outlines University-level policies guiding admissions, financial aid, enrollment, degree progress, and graduation. The graduate programs sections of each department's listing outlines specific department degree requirements. Additional information on professional school programs is available from the Graduate School of Business, the School of Law, and the School of Medicine.

Graduate students must also follow the University's Honor Code and Fundamental Standard (<https://communitystandards.stanford.edu/student-conduct-process/honor-code-and-fundamental-standard>), which establish the conditions for academic work and set the standard of conduct for students at Stanford, respectively. The interpretations and applications of the Honor Code, the Student Judicial Charter of 1997, the Student Conduct Penalty Code, statistics, and other documents are available through the Office of Community Standards (<https://communitystandards.stanford.edu>).

## Research Policies

Graduate education and research are interrelated enterprises. Many Stanford graduate students conduct research under the guidance and sponsorship of Stanford faculty members. The Research Policy Handbook (<https://doresearch.stanford.edu/policies>) (RPH), overseen by the Office of the Vice Provost and Dean of Research, articulates policies governing research. Several policies that are most relevant to graduate education include:

### Academic Authorship

Guidelines related to academic authorship, such as the allocation of responsibility and credit for scholarly publications; see Research Policy Handbook memo 1.5, On Academic Authorship (<http://>

doresearch.stanford.edu/policies/research-policy-handbook/conduct-research/academic-authorship).

### Intellectual Property

Policies on copyrights and patents resulting from University work. Graduate students and postdoctoral scholars, as well as all faculty, staff, and visitors engaged in research, must sign the Stanford University Patent and Copyright Agreement (SU-18). For complete text of the currently applicable versions of these policies, see Research Policy Handbook chapter 9, Intellectual Property (<http://doresearch.stanford.edu/policies/research-policy-handbook/intellectual-property>).

### Openness in Research

Policy on openness in research, such as the principle of freedom of access by all interested persons to the underlying data, processes, and final results of research. Stanford University does not accept funding for research projects that require secrecy. For complete text of the currently applicable version of this policy, see Research Policy Handbook memo 1.4, Openness in Research (<http://doresearch.stanford.edu/policies/research-policy-handbook/conduct-research/openness-research>).

### Relationships between Students and Outside Organizations

Summary of policies on the establishment of relationships between students and outside entities, such as private companies or nonprofit organizations, as part of or outside the student's academic program at Stanford. This covers open versus proprietary nature of the work, ownership of intellectual property, and possible conflicts of commitment and interest. For complete text of the currently applicable versions of these policies, see Research Policy Handbook memo 10.6, Relationships Between Students (Including Postdoctoral Scholars) and Outside Entities (<http://doresearch.stanford.edu/policies/research-policy-handbook/non-faculty-research-appointments/relationships-between-students>).

### Research Compliance

Several administrative panels review and approve research projects to safeguard the rights and welfare of all human research subjects, ensure the humane care and use of laboratory animals, and protect the safety of personnel and the general public in the areas of biosafety and radiological safety. For more information, contact the Research Compliance Office (<http://researchcompliance.stanford.edu>).

### Research Misconduct

Policy on allegations, investigations, and reporting of research misconduct. Each member of the University community has a responsibility to foster an environment which promotes intellectual honesty and integrity, and which does not tolerate misconduct in any aspect of research or scholarly endeavor. For complete text of the currently applicable version of this policy, see Research Policy Handbook memo 1.7, Research Misconduct: Policy on Allegations, Investigations and Reporting (<http://doresearch.stanford.edu/policies/research-policy-handbook/conduct-research/research-misconduct-policy-allegations>).

## Graduate Fellowships

Several University-wide graduate fellowship programs are administered by VPGE.

The Stanford Graduate Fellowship in Science and Engineering (<http://sgf.stanford.edu>) (SGF) program awards approximately 100 two- and three-year fellowships providing tuition support and stipend to exceptional incoming and continuing doctoral students in the natural and social sciences, education, engineering, and the basic sciences in the School of Medicine.

The Stanford Interdisciplinary Graduate Fellowship (<http://sigf.stanford.edu>) (SIGF) program awards fellowships on a competitive basis to doctoral students engaged in interdisciplinary research that

crosses traditional disciplinary boundaries. Students in the first three years of their doctoral program are eligible to apply.

VPGE also administers several smaller University-wide fellowships programs to new and continuing doctoral students, either by application or by nomination by faculty or deans.

## Graduate Student Diversity

VPGE works to diversify the graduate student population by supporting recruitment and retention programs in collaboration with faculty and staff in each of the schools. VPGE funds recruitment activities to expand the pool of qualified applicants, such as visits to campus and travel grants.

The EDGE (Enhancing Diversity in Graduate Education) Doctoral Fellowship (<https://vpge.stanford.edu/fellowships-funding/enhancing-diversity-graduate>) program supports the recruitment and academic success of outstanding doctoral students who have the potential to enhance the diversity, broadly defined, of their academic disciplines and fields.

VPGE also works collaboratively to develop programs that improve retention in graduate school and cultivate interest in academic careers and diversify the pipeline for future faculty.

The DARE (Diversifying Academia, Recruiting Excellence) Doctoral Fellowship Program (<https://vpge.stanford.edu/fellowships-funding/dare>) awards two-year fellowships to advanced doctoral students who want to investigate and prepare for academic careers and whose presence will help diversify the professoriate.

## Professional Development

Leadership, pedagogy, communication, working in teams, career development, and entrepreneurship are topics of interest to graduate students across the University. VPGE collaborates with many campus partners to raise the visibility and expand the breadth of offerings to support graduate students' professional development and academic success. VPGE developed the interactive Graduate Professional Development Framework (<https://vpge.stanford.edu/professional-development/framework>) to help graduate students navigate graduate school and locate resources for acquiring the skills and experiences they need to succeed at Stanford and in their future careers.

## Interdisciplinary Learning

VPGE provides seed funding to initiatives that foster interdisciplinary and cross-school learning opportunities and networking for graduate students. The Stanford Graduate Summer Institute (<http://sgsi.stanford.edu>) (SGSI) offers noncredit interdisciplinary short courses exclusively for Stanford graduate students and postdoctoral scholars. VPGE also seeks to facilitate enrollment in courses outside of students' home departments and schools.

## Innovation in Graduate Programs

Academic departments and programs are foundational to graduate education at Stanford. VPGE supports faculty- and student-initiated innovations within and across degree-granting programs.

SCORE (Strengthening the Core) Academic Innovation Funds (<https://vpge.stanford.edu/fellowships-funding/score>) support one-year, faculty-led projects that explore and experiment with new approaches to graduate education.

Student Projects for Intellectual Community Enhancement (<https://vpge.stanford.edu/fellowships-funding/student-projects-intellectual>) (SPICE) funds allow graduate students to develop projects

and activities that promote intellectual community in their departments and beyond.

The Diversity and Inclusion Innovation Fund (<https://vpge.stanford.edu/fellowships-funding/diversity-innovation-funds>) (DIF) supports Stanford graduate students and postdoctoral scholars in the development of projects that advance diversity within those populations.

*Vice Provost for Graduate Education:* Patricia J. Gumpert

*Associate Vice Provosts for Graduate Education:* John Boothroyd, Helen J. Doyle

*Director of Finance, Fellowships, and Operations:* Rebecca Jantzen

*Assistant Vice Provosts:* Chris Gonzalez Clarke, Anika Green

# TEACHING AND LEARNING (VPTL)

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The Office of the Vice Provost for Teaching and Learning (VPTL) promotes and advances the vibrant, intellectual endeavor of teaching and learning at Stanford.

VPTL provides essential resources and learning support services to Stanford students through its student learning center at Lathrop Library, including:

- peer tutoring (<https://undergrad.stanford.edu/tutoring-support/tutoring>) in subjects
- support for language instruction in the Digital Language Lab (<https://vptl.stanford.edu/teaching-and-learning-innovation/learning-environments/physical-classroom-and-labs/digital-language>)
- academic skills coaching (<http://exploreddegrees.stanford.edu/teachingandlearning/academicskills.stanford.edu>)
- student study space
- equipment check out and media consulting through the Tech Desk (<https://vptl.stanford.edu/student-resources/computers-printing/tech-desk-lathrop-library>) and Media Studio (<https://vptl.stanford.edu/student-resources/computers-printing/lathrop-media-studio>)
- 3D printing in create:space (<https://vptl.stanford.edu/createspace>).

In addition, VPTL provides residential computing (<https://vptl.stanford.edu/teaching-and-learning-innovation/learning-environments/physical-classroom-and-labs/residential>) and networking support (<https://vptl.stanford.edu/student-resources/computers-printing/network-connections>) through Resident Computer Consultants (RCCs), and computing and printing (<https://vptl.stanford.edu/printing-resources>) services in clusters located throughout campus. VPTL offers a range of student jobs (<https://vptl.stanford.edu/job-listings>) and internships, and credit-bearing courses to enrolled Stanford students.

In addition to student services, VPTL staff members collaborate (<https://vptl.stanford.edu/teaching-innovation-and-practice>) with faculty, instructors, and departments to enrich the depth and range of Stanford learning experiences, from classroom practice to classroom technology adoption, from course design to curriculum transformation, and from digital learning initiatives to research-driven learning innovation. VPTL is developing new learning spaces (<https://vptl.stanford.edu/learning-spaces>), from flexible classrooms and laboratories to online platforms. It also helps faculty develop new modes of learning and learning content, for example online, flipped, and blended courses that are made available to Stanford students through the SUClass (<https://suclass.stanford.edu>) instance of the Lagunita online learning platform.

VPTL supports Canvas (<http://exploreddegrees.stanford.edu/teachingandlearning/canvas.stanford.edu>), Stanford's learning management system, as well as Stanford's new course evaluation (<https://vptl.stanford.edu/stanford-s-new-course-evaluations>) system. It provides orientation and mentoring for Teaching Assistants (<https://teachingcommons.stanford.edu/ta-support/grad-teaching-stanford>).

## Instructors

*Senior Director of Learning Experience Design:* Robyn Wright Dunbar

*Director of Educational Programs:* Mariatte Denman

*Director of Faculty Teaching Programs:* Jennifer Randall Crosby

*Associate Director of Graduate Teaching & Peer Learning Programs:* Tim Randazzo



# GRADUATE SCHOOL OF BUSINESS

The mission of the Stanford Graduate School of Business is to create ideas that deepen and advance the understanding of management, and with these ideas, develop innovative, principled, and insightful leaders who change the world.

The two-year Master of Business Administration (M.B.A.) degree program prepares change agents to make a meaningful impact in the world through leadership of business, government, and social-sector organizations. The general management curriculum rests on a foundation of social science principles and management functions, tailored to each student's background and aspirations. Interdisciplinary themes of critical analytical thinking, creativity and innovation, and personal leadership development differentiate the Stanford M.B.A. experience. Each M.B.A. student undertakes a global experience to provide direct exposure to the world's opportunities. A Joint Degree Program (p. 54) allows Stanford students to combine the M.B.A. with degrees in the Graduate School of Education (M.A.), the School of Engineering (M.S. in C.S., M.S. in E.E.), the Stanford Law School (J.D.) as well as interdisciplinary degrees in Public Policy (M.P.P.) and in Environment and Resources (M.S.). Dual Degree programs are offered with the School of Medicine (M.D./M.B.A) and the program in International Policy Studies (M.A. in IPS/M.B.A).

The primary criteria for admission are intellectual vitality, demonstrated leadership potential, and personal qualities and contributions. No specific undergraduate major or courses are required for admission, but experience with analytic and quantitative concepts is important. Almost all students obtain one or more years of work experience before entering, but a few students enroll directly following undergraduate study.

The Stanford Master of Science in Management for Experienced Leaders Program (MSx) is an intensive, one-year course of study for middle-management executives leading to the degree of Master of Science in management. Participants generally have eight or more years of work experience, with at least five years of management experience. Some students are sponsored by their company, but most are self-sponsored.

The Doctor of Philosophy (Ph.D) degree program is designed to develop outstanding scholars for careers in research and teaching in various fields of study associated with business education. Students focus on one of seven discrete areas of study including accounting, economic analysis and policy, finance, marketing, operations information and technology, organizational behavior, and political economy.

For detailed information on programs, curricula, and faculty, see the School's (<http://gsb.stanford.edu>) web site.

*Emeriti: (Professors)* David P. Baron, William H. Beaver, Charles P. Bonini, Paul Brest\*\*, Alain C. Enthoven, Robert J. Flanagan\*, Michael T. Hannan\*, J. Michael Harrison, Charles A. Holloway, James E. Howell, Robert K. Jaedicke, Robert L. Joss\*, James G. March, Joanne Martin, Arjay Miller, James R. Miller III, David B. Montgomery, George G. C. Parker\*, James Patell\*, Jerry I. Porras, Evan L. Porteus, Michael L. Ray, D. John Roberts, Myron S. Scholes\*, William F. Sharpe, George P. Shultz, A. Michael Spence, Venkataraman Srinivasan, Myra Strober\*\*, James C. Van Horne, Robert B. Wilson\*, (Associate Professor) Andrea Shepard; (Senior Lecturers) David L. Bradford\*, Steven Brandt, Kirk O. Hanson

*Dean:* Jonathan D. Levin

*Senior Associate Deans:* Yossi Feinberg, Maureen McNichols, Paul Pfleiderer, Sarah A. Soule

*Associate Deans:* Rajkumar Chellaraj, Stephanie Frost, Page Hetzel, Ranga Jayaraman, Dave Weinstein

*Assistant Deans:* Margaret Hayes, Maeve Richard, Charlotte Toksvig, Wendy York-Fess

*Professors:* Jennifer L. Aaker, Anat R. Admati, Susan Athey, William P. Barnett, Mary E. Barth, Jonathan Bendor, Lanier Benkard, Jonathan B. Berk, David W. Brady, Bartholomeus Bronnenberg, Jeremy I. Bulow, Robert A. Burgelman, Steven Callander, Glenn R. Carroll, Peter M. DeMarzo, J. Darrell Duffie, Yossi Feinberg, Francis J. Flynn, George Foster, Steven R. Grenadier, Deborah H. Gruenfeld, Wesley Hartmann, Chip Heath, Guido Imbens, Charles I. Jones, Ron Kasznik, Daniel P. Kessler, Roderick M. Kramer, Keith Krehbiel, David M. Kreps, Arvind Krishnamurthy, David F. Larcker, James M. Lattin, Edward P. Lazear, Charles M.C. Lee, Hau L. Lee, Jonathan D. Levin, Brian S. Lowery, Hanno Lustig, Neil Malhotra, John G. McDonald, Maureen F. McNichols, Haim Mendelson, Dale T. Miller, Benoit Monin, Harikesh Nair, Margaret A. Neale, Charles A. O'Reilly III, Michael Ostrovsky, Paul Oyer, Jeffrey Pfeffer, Paul C. Pfleiderer, Joseph D. Piotroski, Erica L. Plambeck, Hayagreeva Rao, Joshua Rauh, Stefan J. Reichelstein, Peter C. Reiss, Condoleezza Rice, Garth Saloner, Yuliy Sannikov, Amit Seru, Kathryn L. Shaw, Baba Shiv, Kenneth W. Shotts, Itamar Simonson, Kenneth J. Singleton, Andrzej Skrzypacz, Jesper Sørensen, Sarah A. Soule, Ilya Strebulaev, Zakary Tormala, Lawrence W. Wein, Seungjin Whang, S. Christian Wheeler, Stefanos Zenios, Jeffrey H. Zwiebel

*Associate Professors:* Mohsen Bayati, Shai B. Bernstein, Anne Beyer, Konstantinos Bimpikis, Elizabeth Blankespoor, Katherine Casey, Lisa De Simone, Pedro Gardete, Amir Goldberg, Lindred Greer, Nir Halevy, Szu-chi Huang, Dan Iancu, Saumitra Jha, Peter Koudijs, Jonathan Levav, Ivan Marinovic, Sridhar Narayanan, Navdeep Sahni, Stephan Seiler, Takuo Sugaya, Christopher Tonetti, Gabriel Weintraub, Ali Yurukoglu

*Assistant Professors:* Mohammad Akbarpour, Stephen Anderson-Macdonald, Julianne Begenau, Justin Berg, David Broockman, Svetlana Bryzgalova, Jung Ho Choi, Sebastian Di Tella, Rebecca Diamond, John-Paul Ferguson, Octavia D. Foarta, Brandon Gipper, Yonatan Gur, Benjamin Hebert, Michal Kosinski, Nicholas S. Lambert, Rebecca Lester, Timothy McQuade, Aruna Ranganathan, Daniela Saban, Paulo Somaini, Adina Sterling, Victoria Vanasco, Stefan Wager, Kuang Xu

*Courtesy Professors:* Eric P. Bettinger, Nicholas Bloom, Timothy F. Bresnahan, John H. Cochrane, Geoffrey L. Cohen, Shelley J. Correll, Jens Hainmueller, Takeo Hoshi, Ronald A. Howard, Carolyn M. Hoxby, Daniel McFarland, Paul R. Milgrom, Monika Piazzesi, Walter W. Powell, Balaji Prabhakar, Martin Schneider, Ilya Segal, Sara Singer, Robb Willer

*Lecturers:* Douglas Abbey, Magid Abraham, Matthew Abrahams, Richard Abramson, Burton Alper, Federico Antoni, Laura K. Arrillaga-Andreessen, Naomi Bagdonas, Tyra Banks, Matthew Bannick, Ed Batista, Sven Beiker, Kirk D. Bowman, Scott Brady, Melissa Briggs, Denise Brosseau, Jeffrey Brown, Anne Marie Burgoyne, Dikla Carmel-Hurwitz, R.E. Anne Casscells, Bryna Chang, Robert B. Chess, Leslie Chin, Stephen J. Ciesinski, George Cogan, Susan Colby, Andrea Corney, Stuart Coulson, Geoffrey Cox, Richard Cox, John Cronkite, Stephen Davis, David Demarest, Gary Dexter, Collin Dobbs, David M. Dodson, Nicholas Donatiello, Marissa Duswalt, R. James Ellis, Charles Ewald, Peter Francis, Richard P. Francisco, Ricki Frankel, Douglas Galen, Sadiq Gillani, Matthew Glickman, John Glynn, Theresia Gouw, Ann Grimes, William Guttentag, Kristin Hansen, Laura Hattendorf, Keith Hennessey, Samuel Hinkie, David Hornik, John Hurley, Mary Ittelson, Sujay Jaswa, Franklin Johnson, Stephen Johnson, Kimberly Jonker, Efrat Kasznik, David Kaval, Hugh Keelan, Peter B. Kelly, Dan Klein, Stuart Klein, Allison Kluger, Glenn Kramon, Christopher Krubert, Andrus Laats, Margaret Laws, Thomas H. Layton, Gloria Lee, Mark Leslie, Jane Leu, Aaron Levie, Peter Levine, John Lilly, Leo E. Linbeck III, Robert J. Lisbonne, Christopher Mahowald, Kevin Mak, Fern Mandelbaum, Paraag Marathe, Christine McCanna, Kelly McGonigal, William L. McLennan, William F. Meehan III, Lisa Monzon, Patricia Nakache,

Raymond Nasr, Allison O'Hair, Abhishek Pani, Heidi Patel, Robert Pearl, Giovanna Prennushi, Andrew Rachleff, Anne Raimondi, Alyssa Rapp, Alan Rappaport, Dan Reicher, Barry Rhein, Joshua Richman, Gerald Risk, Dennis M. Rohan, Howard Rosen, JD Schramm, Heiner Schulz, Yifat Sharabi Levine, Robert Siegel, Russell Siegelman, Stephanie Soler, Mike Speiser, F. Victor Stanton, Kevin Taweel, Mark Thurber, Robert Urstein, Michelangelo Volpi, Jay Watkins, John G. Watson, Graham Weaver, Lauren Weinstein, Leah Weiss, Peter C. Wendell, Maxwell Wessel, Amy Wilkinson, Norman Winarsky, Donald Wood, Thomas Wurster, Peter Ziebelman

*Adjunct Professors:* H. Irving Grousbeck, Joel C. Peterson, Mark A. Wolfson

*Visiting Professors:* Henri-Claude De Bettignies, Joao de Figueiredo

*Adjunct Lecturer:* Kathryn Kostopoulos Amarotico

\* Recalled to active duty. \*\* Emeritus Professor from another SU department recalled to active duty.

# SCHOOL OF EARTH, ENERGY AND ENVIRONMENTAL SCIENCES

The School of Earth, Energy and Environmental Sciences (formerly the School of Earth Sciences) lists courses under the subject code EARTH on the Stanford Bulletin's ExploreCourses web site. Courses offered by the School's departments and inter-departmental programs are linked on their separate sections, and are available at the ExploreCourses (<http://explorecourses.stanford.edu>) web site.

The School of Earth, Energy and Environmental Sciences includes the departments of Geological Sciences, Geophysics, Energy Resources Engineering (formerly Petroleum Engineering), and Earth System Science; and three interdisciplinary programs: the Earth Systems undergraduate B.S. and coterminal M.A. and M.S. programs, the Emmett Interdisciplinary Program in Environment and Resources (E-IPER) with Ph.D. and joint M.S. and the Sustainability and Science Practice Program with coterminal M.A. and M.S. programs.

The aims of the school and its programs are:

1. to prepare students for careers in the fields of agricultural science and policy, biogeochemistry, climate science, energy resource engineering, environmental science and policy, environmental communications, geology, geobiology, geochemistry, geomechanics, geophysics, geostatistics, sustainability science, hydrogeology, land science, oceanography, paleontology, petroleum engineering, and petroleum geology;
2. to conduct disciplinary and interdisciplinary research on a range of questions related to Earth, its resources and its environment;
3. to provide opportunities for Stanford undergraduate and graduate students to learn about the planet's history, to understand the energy and resource bases that support humanity, to address the geological and geophysical, and human-caused hazards that affect human societies, and to understand the challenges and develop solutions related to environment and sustainability.

To accomplish these objectives, the school offers a variety of programs adaptable to the needs of the individual student:

- four-year undergraduate programs leading to the degree of Bachelor of Science (B.S.)
- five-year programs leading to the coterminal Bachelor of Science and Master of Science (M.S.)
- five-year programs leading to the coterminal Bachelor of Science and Master of Arts (M.A.)
- graduate programs offering the degrees of Master of Science, Engineer, and Doctor of Philosophy.

Details of individual degree programs are found in the section for each department or program.

## Undergraduate Programs in the School of Earth, Energy and Environmental Sciences

Any undergraduate admitted to the University may declare a major in one of the school's departments or the Earth Systems Program by contacting the appropriate department or program office.

Requirements for the B.S. degree are listed in each department or program section. Departmental academic advisers work with students to define a career or academic goal and assure that the student's curricular choices are appropriate to the pursuit of that goal. Advisers can help

devise a sensible and enjoyable course of study that meets degree requirements and provides the student with opportunities to experience advanced courses, seminars, and research projects. To maximize such opportunities, students are encouraged to complete basic science and mathematics courses in high school or during their freshman year.

## Coterminal Master's Degrees in the School of Earth, Energy and Environmental Sciences

The Stanford coterminal degree program enables an undergraduate to embark on an integrated program of study leading to the master's degree before requirements for the bachelor's degree have been completed. This may result in more expeditious progress towards the advanced degree than would otherwise be possible, making the program especially important to Earth scientists because the master's degree provides an excellent basis for entry into the profession. The coterminal plan permits students to apply for admission to a master's program after earning 120 units, completion of six non-summer quarters, and declaration of an undergraduate major, but no later than the quarter prior to the expected completion of the undergraduate degree.

The student may meet the degree requirements in the more advantageous of the following two ways: by first completing the 180 units required for the B.S. degree and then completing the three quarters required for the M.S. or the M.A. degree; or by completing a total of 15 quarters during which the requirements for the two degrees are completed concurrently. In either case, the student has the option of receiving the B.S. degree upon meeting all the B.S. requirements or of receiving both degrees at the end of the coterminal program.

Students earn degrees in the same department or program, in two different departments, or even in different schools; for example, a B.S. in Physics and an M.S. in Geological Sciences. Students are encouraged to discuss the coterminal program with their advisers during their junior year. Additional information is available in the individual department offices.

University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

## Graduate Programs in the School of Earth, Energy and Environmental Sciences

### Admission to the Graduate Program

A student who wishes to enroll for graduate work in the school must be qualified for graduate standing in the University and also must be accepted by one of the school's four departments or the Emmett Interdisciplinary Ph.D. program. One requirement for admission is submission of scores on the verbal and quantitative sections of the Graduate Record Exam. Admission to one department of the school does not guarantee admission to other departments.

### Faculty Adviser

Upon entering a graduate program, the student should report to the head of the department or program who arranges with a member of the faculty to act as the student's adviser. Alternatively, in several of the departments, advisers are established through student-faculty discussions prior to admission. The student, in consultation with the adviser(s), then arranges a course of study for the first quarter and ultimately develops a complete plan of study for the degree sought.

## Financial Aid

Detailed information on scholarships, fellowships, and research grants is available from the school's individual departments and programs.

*Dean:* Pamela A. Matson (through December 31, 2017), Stephan A. Graham (effective November 2, 2017)

*Associate Dean, Academic Affairs:* Scott Fendorf

*Senior Associate Dean, Educational Initiatives:* Margot Gerritsen

*Associate Dean, Educational Initiatives:* Robyn Dunbar

*Assistant Dean, Multicultural Affairs:* Tenea M. Nelson

*Lecturer:* Jennifer Saltzman

# EARTH SYSTEM SCIENCE

Courses offered by the Department of Earth System Science are listed under the subject code ESS on the Stanford Bulletin's ExploreCourses web site.

On April 16, 2015, the Senate of the Academic Council approved the change of name for the department to become the Department of Earth System Science. Prior to April 16, the department was named the Department of Environmental Earth System Science.

Earth System Science studies the planet's oceans, lands, and atmosphere as an integrated system, with an emphasis on changes occurring during the current period of overwhelming human influence, the Anthropocene. Faculty and students within the department use the principles of biology, chemistry, and physics to study problems involving processes occurring at the Earth's surface, such as climate change and global nutrient cycles, providing a foundation for problem solving related to environmental sustainability and global environmental change.

## Graduate Programs in Earth System Science

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin. The Department of Earth System Science does not offer coterminal admission to the master's in Earth System Science.

### Learning Objectives (Graduate)

The objectives of the doctoral program in Earth System Science are to enable students to develop the skills needed to conduct original investigations in environmental and earth system sciences, to interpret the results, and to present the data and conclusions in a publishable manner. Graduates should develop strong communication skills with the ability to teach and communicate effectively with the public.

The objectives of the master's program in Earth System Science is to continue a student's training in one of the earth science disciplines and to prepare students for a professional career or doctoral studies.

On April 16, 2015, the Senate of the Academic Council approved the Master of Science in Earth System Science. Students who matriculated into the Master of Science in Environmental Earth System Science have the option of changing the name of their degree to Earth System Science. Degree requirements remain the same.

## Master of Science in Earth System Science

The University's requirements for M.S. degrees are outlined in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

### Admission

For admission to graduate work in the department, the applicant must have taken the Aptitude Test (verbal, quantitative, and analytical writing assessment) of the Graduate Record Examination. In keeping with University policy, applicants whose first language is not English must submit TOEFL (Test of English as a Foreign Language) scores from a test taken within the last 18 months. Individuals who have completed a B.S. or two-year M.S. program in the U.S. or other English-speaking country are not required to submit TOEFL scores.

### Unit Requirements

1. A minimum of 45 units of course work at the 100 level or above.
2. Half of the courses used to satisfy the 45-unit requirement must be intended primarily for graduate students, usually at the 200 level or above.
3. No more than 15 units of thesis research may be used to satisfy the 45-unit requirement.
4. Some students may be required to make up background deficiencies in addition to these basic requirements.
5. By the end of Winter Quarter of the first year in residence, a student must complete at least three courses taught by a minimum of two different department faculty members.

### Course Work

		Units
<b>Required Core Courses</b>		
ESS 305	Climate Change: An Earth Systems Perspective	2
ESS 306	From Freshwater to Oceans to Land Systems: An Earth System Perspective to Global Challenges	2
ESS 307	Research Proposal Development and Delivery	2
<b>Distribution Requirements</b>		
Area A: Analysis of the Earth System (Select one course)		
ESS 211	Fundamentals of Modeling	3-5
GS 241	Data Science for Geoscience	3
STATS 160	Introduction to Statistical Methods: Precalculus	5
CME 106	Introduction to Probability and Statistics for Engineers	4
ESS 143	Molecular Geomicrobiology Laboratory	4
STATS 207	Introduction to Time Series Analysis	3
Area B: Measurement of the Earth System (Select one course)		
ESS 210	Techniques in Environmental Microbiology	3
ESS 212	Measurements in Earth Systems	3-4
ESS 241	Remote Sensing of the Oceans	3-4
ESS 262	Remote Sensing of Land	4
Area C: Earth System Processes, Models, and Human-Environmental Interactions (Select one course)		
ESS 220	Physical Hydrogeology	4
ESS 221	Contaminant Hydrogeology and Reactive Transport	4
ESS 232	Evolution of Earth Systems	4
ESS 244	Marine Ecosystem Modeling	3
ESS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3
ESS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
ESS 258	Geomicrobiology	3
<b>Seminar Requirements</b>		
Each quarter during the first academic year:		
Autumn Quarter of first academic year:		
ESS 301	Topics in Earth System Science	1

### Teaching Assistantship

As a program requirement, advanced degree candidates in ESS complete TA-appointed (25%) quarters at a minimum of: 2 for Ph.D. students and 1 for master's students, to be completed over the course of study. In addition, additional TA quarters may be considered and/or required in consultation with the research adviser, depending on academic goals, funding availability, or the requirements of individual doctoral programs.

## Advising

The department's graduate coordinator, in coordination with the departmental faculty, appoints an academic adviser prior to registration with appropriate consideration of the student's background, interests, and professional goals. In consultation with the adviser, the student plans a program of course work for the first year. The faculty adviser is charged with designing the curriculum in consultation with the student specific to the research topic.

## Thesis

Each student must complete a thesis describing his or her research. Thesis research should begin during the first year of study at Stanford and should be completed before the end of the second year of residence. Early during the thesis research period, and after consultation with the student, the thesis adviser appoints a second reader for the thesis who must be approved by the graduate coordinator; the thesis adviser is the first reader. The two readers jointly determine whether the thesis is acceptable for the M.S. degree in the department.

## Master of Science, Course Work Only Option for ESS Ph.D. Students

The course-work-only M.S. for ESS Ph.D. students requires 45 unduplicated units of which all 45 must be course work (non-research, non-independent study, non-thesis units). All required units must be in courses at the 100-level or above, 50 percent of those units must be in graduate-level courses (generally, at the 200-level or above). No units are awarded for course work completed elsewhere (i.e., not eligible to transfer-in units). All 45 units can be applied to the 135 unit requirement for the Ph.D. The remaining 90 units can consist of all research units

On April 16, 2015, the Senate of the Academic Council approved the Doctor of Philosophy in Earth System Science. Students who matriculated into the Doctor of Philosophy in Environmental Earth System Science have the option of changing the name of their degree to Earth System Science. Degree requirements remain the same.

## Doctor of Philosophy in Earth System Science

The University's requirements for the Ph.D. degree are outlined in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

## Admission

For admission to graduate work in the department, the applicant must have taken the Aptitude Test (verbal, quantitative, and analytical writing assessment) of the Graduate Record Examination. In keeping with University policy, applicants whose first language is not English must submit TOEFL (Test of English as a Foreign Language) scores from a test taken within the last 18 months. Individuals who have completed a B.S. or two-year M.S. program in the U.S. or other English-speaking country are not required to submit TOEFL scores.

## Unit Requirements

1. A minimum of 135 units of graduate study at Stanford must be satisfactorily completed.
2. Required courses must be taken for a letter grade, if offered.
3. Ph.D. students registered for 10 units must pass at least 6 units per quarter. Students must maintain at least a 3.0 grade point average.
4. Ph.D. students must complete a minimum of four graduate level, letter-grade courses of at least 3 units each from four different faculty members on the Academic Council in the University.

5. By the end of Spring Quarter of their first year in residence, students must complete at least three graduate level courses taught by a minimum of two different ESS faculty members.

## Course Work

		Units
<b>Required Core Courses</b>		
ESS 305	Climate Change: An Earth Systems Perspective	2
ESS 306	From Freshwater to Oceans to Land Systems: An Earth System Perspective to Global Challenges	2
ESS 307	Research Proposal Development and Delivery	2
<b>Distribution Requirements</b>		
Area A: Analysis of the Earth System (Select one course)		
ESS 211	Fundamentals of Modeling	3-5
GS 241	Data Science for Geoscience	3
STATS 160	Introduction to Statistical Methods: Precalculus	5
CME 106	Introduction to Probability and Statistics for Engineers	4
STATS 207	Introduction to Time Series Analysis	3
Area B: Measurement of the Earth System (Select one course)		
ESS 210	Techniques in Environmental Microbiology	3
ESS 212	Measurements in Earth Systems	3-4
ESS 241	Remote Sensing of the Oceans	3-4
ESS 262	Remote Sensing of Land	4
Area C: Earth System Processes, Models, and Human-Environmental Interactions (Select one course)		
ESS 220	Physical Hydrogeology	4
ESS 221	Contaminant Hydrogeology and Reactive Transport	4
ESS 232	Evolution of Earth Systems	4
ESS 244	Marine Ecosystem Modeling	3
ESS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3
ESS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
ESS 258	Geomicrobiology	3
<b>Seminar Requirements</b>		
Each quarter during the first academic year:		
EARTH 300		1
Autumn Quarter of first academic year:		
ESS 301	Topics in Earth System Science	1

## Teaching Assistantship

As a program requirement, advanced degree candidates in ESS complete TA-appointed (25%) quarters at a minimum of: 2 for Ph.D. students and 1 for master's students, to be completed over the course of study. In addition, additional TA quarters may be considered and/or required in consultation with the research advisor, depending on academic goals, funding availability, or the requirements of individual doctoral programs.

## Annual Review

Each year, the department evaluates students to assess progress to degree, identify areas of strength, provide helpful resources, and note potential issues or areas of concern. This annual review includes a record of accomplishments presented by the student, written evaluations by the faculty adviser of the student's progress, and committee feedback on the academic and research progress of the student. The student should have no 'I' grades in core courses, must maintain at least a 3.0 grade-point average, and show evidence of productive and sustained research progress, with no conflict of interest or conflict of commitment.

Possible outcomes of the annual review include: (1) continuation of the student in good standing, and (2) placing the student on probation, with specific written guidelines of the period of probation and the necessary steps for reinstatement to good standing.

Annual reviews are required for all Ph.D. students, including first-year Ph.D. students. In the first year, the annual review is conducted between the student and the Ph.D. adviser(s) (prior to forming a doctoral committee). After the first year, the annual review must be conducted between the student and the student's doctoral committee. In all years, the written annual review form must be completed and signed by both the student and the adviser.

In the year in which students are undertaking their candidacy exam (research qualifying exam), that exam serves as the annual review. In addition, any student who has scheduled the dissertation defense and petitioned to graduate in Aress may elect not to hold an additional annual review meeting. Annual reviews that are not the qualifying exam or dissertation defense should take place in the Autumn or Winter Quarter (with the exception of first-year students, who may hold their annual review meeting with their adviser(s) in Spring Quarter).

## Candidacy and Qualification Exam

Admission to a doctoral degree program is preliminary to, and distinct from, admission to candidacy. Admission to candidacy for the doctoral degree is a judgment by the faculty in the department or school of the student's potential to successfully complete the requirements of the degree program. Candidacy is valid for five calendar years (through the end of the quarter in which candidacy expires), unless terminated by the department (for example, for unsatisfactory progress). University policy requires completion of the department qualifying procedures and application for candidacy by the end of the second year in the Ph.D. program. Therefore, it is strongly advised that the qualifying exam be taken during the fifth (non-Summer) quarter so that the student may retake the exam in the case of inadequate performance and still advance to candidacy by the end of the sixth (non-Summer) quarter.

Students must present a draft proposal to their adviser in a timely fashion, and take account of the adviser's comments and require revisions before preparing a final draft. The student submits a copy of the final draft of the research proposal to each member of the examining committee at least two weeks before the scheduled date of the examination.

The qualifying exam is an oral exam based on the candidate's written research proposal. The exam is a test of the student's ability to recognize, evaluate, and plan a significant research project and his/her mastery of fields essential to the completion of research. The research proposal must provide a concise review of the background literature, and must discuss the proposed problem, its importance, and the methods to be applied to its examination. The methods should be made clear. The proposal must contain a timetable and, if appropriate, the student should discuss such matters as funding, field logistics, laboratory scheduling, and availability of equipment. The proposal must be well thought out, carefully written and edited, and finished with appropriate references and illustrations. It must not exceed 15 double-spaced pages in length, exclusive of figures and bibliography. The qualifying exam is oral and consists of three parts:

1. A presentation of the proposed research (no more than 30 minutes duration);
2. An examination of the candidate on the merits of the proposal, touching on but not limited to the aspects listed in the proposal; and
3. An examination of any subject matter judged by committee members to be relevant to the student's ability to carry out the proposed research.

It is recognized that, in practice, parts 1# 3 may not be entirely separate and distinct. The entire examination lasts no less than 2 hours and no more than 3 hours; the examination under part 3 is at least one hour. No part of examination is public.

## Doctoral Dissertation and Oral Defense

Under the supervision of the research advisory committee, the candidate must prepare a doctoral dissertation that is a contribution to knowledge and is the result of independent research; curriculum must also be developed with the supervision of the committee, which should be designed to provide a rigorous foundation for the research area. The format of the dissertation must meet University guidelines. The student is urged to prepare dissertation chapters that, in scientific content and format, are readily publishable.

The doctoral dissertation is defended in the University oral examination. The department appoints the research adviser and two other members of the research committee to be readers of the draft dissertation. The readers are charged to read the draft and to certify in writing to the department that it is adequate to serve as a basis for the University oral examination. Upon obtaining this written certification, the student is permitted to schedule the University oral examination.

*Chair:* Robert Jackson

*Professors:* Kevin Arrigo, C. Page Chamberlain, Noah Diffenbaugh<sup>3</sup>, Robert Dunbar, Scott Fendorf, Christopher Field<sup>1,3</sup>, Steven Gorelick, Robert Jackson<sup>2,3</sup>, Eric Lambin<sup>3</sup>, Pamela Matson (Dean through December 31, 2017), Rosamond Naylor<sup>3,4</sup>

*Associate Professors:* Karen Casciotti, Christopher Francis, James Holland Jones, David Lobell<sup>3,4</sup>, Leif Thomas

*Assistant Professors:* Marshall Burke<sup>4</sup>, Ann Dekas, Alexandra Konings, Balakanapathy Rajaratnam<sup>5</sup>, Paula Welander

*Courtesy Professors:* Gregory Asner, Ken Caldeira, Anna Michalak, Peter Vitousek

*Visiting Professors:* Lisa Ainsworth, Jennifer Harden, Kathleen Lohse

<sup>1</sup> Joint appointment with Biology

<sup>2</sup> Joint appointment with the Precourt Institute for Energy

<sup>3</sup> Joint appointment with the Woods Institute for the Environment

<sup>4</sup> Joint appointment with the Freeman Spogli Institute for International Studies

<sup>5</sup> Joint appointment with Statistics

# EARTH SYSTEMS

Courses offered by the Earth Systems Program are listed under the subject code EARTHSYS (<https://explorecourses.stanford.edu/search?q=EARTHSYS&view=catalog&page=0&academicYear=&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&collapse=&filter-departmentcode=EARTHSYS=on&filter-coursestatus-Active=on&filter-catalognumber-EARTHSYS=on&filter-catalognumber-EARTHSYS=on>) on the Stanford Bulletin's ExploreCourses web site.

## Mission of the Undergraduate Program in Earth Systems

The Earth Systems Program is an interdisciplinary environmental science major. Students learn about and independently investigate complex environmental problems caused by human activities in conjunction with natural changes in the Earth system. Earth Systems majors become skilled in those areas of science, economics, and policy needed to tackle the world's most pressing social-environmental problems, becoming part of a generation of scientists, professionals, and citizens who approach and solve problems in a systematic, interdisciplinary way.

For students to be effective contributors to solutions for such problems, their training and understanding must be both broad and deep. To this end, Earth Systems students take fundamental courses in ecology, calculus, chemistry, geology, and physics, as well as economics, policy, and statistics. After completing breadth training, they concentrate on advanced work in one of six focus areas: biology, energy, environmental economics and policy, land systems, sustainable food and agriculture, or oceanography and climate. Tracks are designed to support focus and rigor but include flexibility for specialization. Examples of specialized foci have included but are not limited to environment and human health, sustainable agriculture, energy economics, sustainable development, business and the environment, and marine policy. Along with formal course requirements, Earth Systems students complete a 1-unit (270-hour) internship. The internship provides a hands-on academic experience working on a supervised field, laboratory, government, or private sector project.

The Earth Systems Program provides an advising network that includes faculty, staff, and student peer advisers.

The following is an outline of the sequential topics covered and skills developed in this major.

- Fundamentals:** The Earth Systems Program includes courses that describe the natural functioning of the physical and biological components of the Earth and human activities that interact with these components. Training in fundamentals includes introductory course work in geology, biology, chemistry, physics, and economics. Additional training in course work in single and multivariable calculus, linear algebra, and statistics provides students with skills needed for quantifying environmental problems. Training in statistics is specific to the area of focus: geostatistics, biostatistics, econometrics.
- System Interactions:** Focus in these courses is on the fundamental interactions among the physical, biological, and human components of the Earth system. Understanding the dynamics between natural variation in and human-imposed influences on the Earth system informs the development of effective solutions to social-environmental challenges.
  - Earth Systems courses that introduce students to the dynamic and multiple interactions that characterize social-environmental challenges include:

EARTHSYS 10 Introduction to Earth Systems 4

EARTHSYS 111 Biology and Global Change 4  
EARTHSYS 112 Human Society and Environmental Change 4

- Competence in understanding system-level interactions is critical to development as an Earth Systems thinker, so additional classes that meet this objective are excellent choices as electives.
- Track-Specific Requirements:** After completing a core designed to introduce students to different functional components of the Earth system, undergraduate students focus their studies through one of six tracks: Human Environmental Systems (formerly Anthroposphere); Biosphere; Energy, Science and Technology; Oceans and Climate (formerly Oceans); Land Systems; or Sustainable Food and Agriculture.
  - Skills Development:** Students take skills courses that help them to recognize, quantify, describe, communicate, and help solve complex problems that face society. For example, field and laboratory methods can help students to recognize the scope and nature of environmental change. Training in satellite remote sensing and geographic information systems allows students to monitor and analyze large-scale spatial patterns of change. This training is either required or recommended for all tracks.
  - Communication:** Success in building workable solutions to environmental problems is linked to the ability to effectively communicate ideas, data, and results. Writing intensive courses (WIM) help students to communicate complex concepts to expert and non-expert audiences. Other Earth Systems courses also focus on effective written and oral communication and are recommended. All Stanford students must complete one WIM course in their major. Earth Systems students can fulfill the WIM requirement by successfully completing one of the following courses:

		Units
EARTHSYS 200	Environmental Communication in Action: The SAGE Project	3
EARTHSYS 191	Concepts in Environmental Communication	3
EARTHSYS 177C	Specialized Writing and Reporting: Environmental and Food System Journalism	4-5
EARTHSYS 149	Wild Writing	3
EARTHSYS 135		3

- Finding solutions:** Effective solutions to environmental problems take into consideration natural processes as well as human needs. Earth Systems emphasizes the importance of interdisciplinary analysis and implementation of workable solutions through:

		Units
EARTHSYS 210A	Senior Capstone and Reflection	3
or EARTHSYS 210B	Senior Capstone and Reflection	
EARTHSYS 210P	Earth Systems Capstone Project	2
EARTHSYS 260	Internship	1

A comprehensive list of environmental courses (p. 151) is available on the "Related Courses" tab. This list as well as advice on courses that focus on problem solving are available in the program office.

## Learning Outcomes (Undergraduate)

The program expects majors to be able to demonstrate the following learning outcomes. These learning outcomes serve as benchmarks for evaluating students and the program's undergraduate degree. Students are expected to:

- demonstrate knowledge of foundational skills and concepts in order to advance the interdisciplinary study of the environment.
- demonstrate the ability to analyze, integrate and apply relevant science and policy perspectives to social-environmental problems.



- demonstrate the ability to communicate complex concepts and data relevant to social-environmental problems and questions to expert and non-expert audiences.

## Learning Outcomes (Graduate)

The coterminal master's degree in Earth Systems provides the student with enhanced analytical tools to evaluate the disciplines most closely associated with the student's focus area. Specialization is gained through course work and independent research work supervised by the master's faculty adviser.

## Bachelor of Science in Earth Systems

The B.S. in Earth Systems (EARTHSYS) requires the completion of courses divided into three categories:

- core
- foundation and breadth
- track-specific requirements.

The student must fulfill the internship requirement, participate in the Senior Capstone and Reflection course (EARTHSYS 210A or EARTHSYS 210B), complete the Earth Systems Capstone Project (EARTHSYS 210P), and complete the Writing in the Major (WIM) requirement.

Core courses, track courses, and electives must be taken for a letter grade. The WIM course may not also count towards the track or electives, if counted as a WIM.

### Required Core

EARTHSYS 10	Introduction to Earth Systems	4
EARTHSYS 111	Biology and Global Change	4
EARTHSYS 112	Human Society and Environmental Change	4
Select one of the following:		3
EARTHSYS 210A	Senior Capstone and Reflection	
EARTHSYS 210B	Senior Capstone and Reflection	
EARTHSYS 210P	Earth Systems Capstone Project	2
EARTHSYS 260	Internship	1
Select one of the following (WIM):		
EARTHSYS 200	Environmental Communication in Action: The SAGE Project	
EARTHSYS 191	Concepts in Environmental Communication	
EARTHSYS 177	Specialized Writing and Reporting: Environmental and Food System Journalism	
EARTHSYS 149	Wild Writing	
EARTHSYS 135		

### Required Foundation and Breadth Courses

<b>Biology</b>		4-10
Select one of the following (see specific tracks; in some cases, other Bio courses are required):		
BIO 81	Introduction to Ecology	
BIOHOPK 43	Plant Biology, Evolution, and Ecology	
HUMBIO 2A & HUMBIO 2B	Genetics, Evolution, and Ecology and Culture, Evolution, and Society	
EARTHSYS 116	Ecology of the Hawaiian Islands	
<b>Chemistry</b>		5-10
Select one of the following:		
CHEM 31X	Chemical Principles Accelerated	

CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	
<b>Economics</b>		5
ECON 1	Principles of Economics	
<b>Geological Sciences</b> <sup>1</sup>		4-5
Select one of the following:		
GS 1	Introduction to Geology	
GS 4	Coevolution of Earth and Life	
EARTHSYS 117	Earth Sciences of the Hawaiian Islands	
EARTHSYS 128	Evolution of Terrestrial Ecosystems	
<b>Mathematics</b>		5-15
MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus	
MATH 51	Linear Algebra and Differential Calculus of Several Variables	
or CME 100	Vector Calculus for Engineers	
<b>Probability and Statistics</b>		3-5
Select one of the following:		
BIOHOPK 174H	Experimental Design and Probability	
BIO 141	Biostatistics	
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	
STATS 110	Statistical Methods in Engineering and the Physical Sciences	
STATS 116	Theory of Probability	

More extensive work in mathematics and physics may be valuable for those planning graduate study. Graduate study in ecology and evolutionary biology and in economics requires familiarity with differential equations, linear algebra, and stochastic processes. Graduate study in geology, oceanography, and geophysics may require more physics and chemistry. Students should consult their adviser for recommendations beyond the requirements specified above.

<sup>1</sup> The Geological Sciences requirement can be fulfilled by completing GS 1, GS 4, or EARTHSYS 117. GS 1A, 1B, and 1C are no longer offered. If taken in previous years, these will still fulfill the Earth Systems' Geological Sciences requirement.

### Tracks

#### Human Environmental Systems (formerly Anthrosphere)

<b>Additional foundation and breadth courses</b>		Units
ECON 50	Economic Analysis I	10
ECON 155	Environmental Economics and Policy	
Physics (select one of the following):		3-4
One physics class from the PHYSICS 20 or 40 series or GEOPHYS 110		
Choose one course in each of the three following sub-categories, with a total of six required. At least one of the six must be a skills/methods course marked with an asterisk (*):		
<b>Economics and Environmental Policy</b>		3-5
ANTHRO 164	Natural Resource Extraction: Use and Development: Assessing Policies, Practices and Outcomes	
EARTHSYS 136	The Ethics of Stewardship	
EARTHSYS 175		
EARTHSYS 243	Environmental Advocacy and Policy Communication	
ECON 51	Economic Analysis II	

ECON 102B	Applied Econometrics *	
ECON 121	Social Science Field Research Methods and Applications (ECON 121 can count towards this track requirement. Not offered 17.18.)	
ECON 150	Economic Policy Analysis	
ECON 154	Law and Economics	
ECON 159	Economic, Legal, and Political Analysis of Climate-Change Policy	
GSBGEN 336	Energy Markets and Policy	
INTNLREL 135A	International Environmental Law and Policy	
IPS 270	The Geopolitics of Energy	
LAW 2504	Environmental Law and Policy	
MS&E 243	Energy and Environmental Policy Analysis	
MS&E 294	Systems Modeling for Climate Policy Analysis	
MS&E 295	Energy Policy Analysis	
<b>Social Entrepreneurship and the Environment</b>		2-5
CEE 151	Negotiation	
EARTHSYS 187FEED	the Change: Redesigning Food Systems	
ENGR 231	Transformative Design	
ETHICSOC 234FE	Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals	
ME 206A	Design for Extreme Affordability	
ME 377	Design Thinking Studio	
MS&E 177	Creativity Rules	
MS&E 180	Organizations: Theory and Management	
URBANST 132	Concepts and Analytic Skills for the Social Sector *	
URBANST 133	Social Entrepreneurship Collaboratory	
<b>Sustainable Development</b>		3-5
ANTHRO 162	Indigenous Peoples and Environmental Problems	
ANTHRO 343	Culture as Commodity	
ANTHRO 349	Anthropology of Capitalism	
CEE 124	Sustainable Development Studio (must be taken for at least 3 units)	
CEE 126A	(CEE 126A can count towards this track requirement. Not offered 17.18.)	
CEE 126B		
EARTHSYS 106	World Food Economy *	
EARTHSYS 138	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	
EARTHSYS 185	Feeding Nine Billion	
ECON 52	Economic Analysis III *	
ECON 118	Development Economics	
HUMBIO 118	Theory of Ecological and Environmental Anthropology	
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	
POLISCI 124A	The American West	
URBANST 107	Introduction to Urban and Regional Planning	
URBANST 163	Land Use Control	
URBANST 164	Sustainable Cities	

**Elective Requirement** 6-10  
Two additional courses at the 100-level or above are required. Each must be a minimum of 3 units.

**Biosphere**

**Additional foundation and breadth courses**

Instead of Biology Foundation requirement listed in Required Foundation/Breadth section above, two of the following Bio courses are required:		5
BIO 81	Introduction to Ecology	
BIO 82	Genetics	
Or either BIO 81 or BIO 82 AND:		5
BIOHOPK 43	Plant Biology, Evolution, and Ecology	
Additional Chemistry requirement (in addition to 31A/B or X):		5
CHEM 33	Structure and Reactivity of Organic Molecules	
Physics (select one of the following):		4
PHYSICS 41	Mechanics	
or PHYSICS 45 Light and Heat		
or GEOPHYS 11 Introduction to the foundations of contemporary geophysics		
Choose two courses from Ecology and Conservation Biology, and one course from each of the remaining sub-categories below, total six required:		
<b>Biogeochemistry</b>		3-4
CEE 177	Aquatic Chemistry and Biology	
CEE 274A	Environmental Microbiology I	
EARTHSYS 132	Evolution of Earth Systems	
EARTHSYS 143	Molecular Geomicrobiology Laboratory	
EARTHSYS 151	Biological Oceanography	
EARTHSYS 152	Marine Chemistry	
EARTHSYS 155	Science of Soils	
EARTHSYS 158	Geomicrobiology	
GS 130	Soil Physics and Hydrology (Not offered in 2017-18.)	
<b>Ecology and Conservation Biology</b>		3-12
BIO 115	The Hidden Kingdom - Evolution, Ecology and Diversity of Fungi	
BIO 144	Conservation Biology: A Latin American Perspective	
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems	
BIOHOPK 173H	Marine Conservation Biology	
BIOHOPK 177H	Dynamics and Management of Marine Populations	
BIOHOPK 185H	Ecology and Conservation of Kelp Forest Communities	
EARTHSYS 116	Ecology of the Hawaiian Islands	
EARTHSYS 128	Evolution of Terrestrial Ecosystems	
GS 123	Evolution of Marine Ecosystems	
OSPAUSTL 10	Coral Reef Ecosystems	
OSPAUSTL 25	Freshwater Systems	
OSPAUSTL 30	Coastal Forest Ecosystems	
OSPSANTG 58	Living Chile: A Land of Extremes	
OSPSANTG 85	(OSPSANTG 85 can count towards this track requirement. Not offered 17.18.)	
<b>Ecosystems and Society</b> <sup>2</sup>		3-5
ANTHRO 118	Heritage, Environment, and Sovereignty in Hawaii	
ANTHRO 147	Nature, Culture, Heritage	
ANTHRO 162	Indigenous Peoples and Environmental Problems	
ANTHRO 166	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness	
ANTHRO 177	Environmental Change and Emerging Infectious Diseases	
ANTHRO 178	Evolution and Conservation in Galapagos	
BIOHOPK 168H	Disease Ecology: from parasites evolution to the socio-economic impacts of pathogens on nations	

Units

EARTHSYS 107	Control of Nature
EARTHSYS 129	Geographic Impacts of Global Change: Mapping the Stories
EARTHSYS 185	Feeding Nine Billion
HUMBIO 118	Theory of Ecological and Environmental Anthropology
SIW 144	Energy, Environment, Climate and Conservation Policy: A Washington, D.C. Perspective

**Elective Requirement** 6-10  
Two additional courses at the 100-level or above are required. Each must be a minimum of 3 units.

<sup>1</sup> Must take GS 1, GS 4, or EARTHSYS 117 to fulfill this requirement. GS 1C is no longer offered but if taken in previous years fulfills this requirement.

<sup>2</sup> May also use ANTHRO 183 to fulfill this requirement. This course is not offered this year.

### Energy, Science and Technology

**Instead of Biology Foundation requirement listed in Required Foundation/Breadth section above, select one of the following Bio courses:**

BIO 81	Introduction to Ecology
BIO 83	Biochemistry & Molecular Biology
BIOHOPK 43	Plant Biology, Evolution, and Ecology
HUMBIO 2A & HUMBIO 2B	Genetics, Evolution, and Ecology and Culture, Evolution, and Society
EARTHSYS 116	Ecology of the Hawaiian Islands

#### Additional Foundation and Breadth Courses

PHYSICS 43	Electricity and Magnetism
PHYSICS 45	Light and Heat
CME 100	Vector Calculus for Engineers (preferred over MATH 51 for this track)

Computer science requirement: One-unit of Computer Science is required (unless CME 100 was completed); see Earth Systems staff for approved CS courses. 0-1

#### Energy Fundamentals

ENGR 30	(ENGR 30 can count towards this track requirement.)	3
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Select one of the following: 3-4

CEE 272R	Modern Power Systems Engineering
ENERGY 120	Fundamentals of Petroleum Engineering
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution

Select one of the following: 3-5

EARTHSYS 101	Energy and the Environment
EARTHSYS 102	Fundamentals of Renewable Power
EARTHSYS 103	Understanding Energy

Choose at least one course in each of the three sub-categories, total five required. Note that many of these have prerequisite work:

#### Energy Resources & Technology

CEE 156	Building Systems	3-5
CEE 176A	Energy Efficient Buildings	
EARTHSYS 101	Energy and the Environment	
EARTHSYS 103	Understanding Energy	
ENERGY 120	Fundamentals of Petroleum Engineering	
ENERGY 269	Geothermal Reservoir Engineering	
ENERGY 293B	Fundamentals of Energy Processes	
ENERGY 293C	Energy from Wind and Water Currents	

MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
ME 250	Internal Combustion Engines
ME 260	Fuel Cell Science and Technology

#### Sustainable Energy & Development

cee 126A	(CEE 126A is an option for this track requirement. Enroll in 3 units. Not offered 2017-18.)	3-4
CEE 176B	Electric Power: Renewables and Efficiency	
CEE 221A	Planning Tools and Methods in the Power Sector	
CEE 226	Life Cycle Assessment for Complex Systems	
CEE 272S	(Not offered in 2017-18.)	
EARTHSYS 102	Fundamentals of Renewable Power	
EARTHSYS 146	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	
ENERGY 153	Carbon Capture and Sequestration	
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	
URBANST 165	Sustainable Urban and Regional Transportation Planning	

#### Energy Policy, Economics & Entrepreneurship

ENERGY 104	Sustainable Energy for 9 Billion	2-4
ENERGY 110	Engineering Economics	
ENERGY 171	Energy Infrastructure, Technology and Economics	
ENERGY 191	Optimization of Energy Systems	
GSBGEN 336	Energy Markets and Policy	
MS&E 243	Energy and Environmental Policy Analysis	
LAW 2503	Energy Law	
MS&E 294	Systems Modeling for Climate Policy Analysis	
MS&E 295	Energy Policy Analysis	

#### Elective Requirement

One additional course at the 100-level or above is required. This course must be a minimum of 3 units. 3 units of approved energy seminars may count as one elective. See Earth Systems staff for the approved seminar list. 3-5

### Land Systems

#### Additional foundation and breadth courses

PHYSICS 41	Mechanics	4
or PHYSICS 45	Light and Heat	
or GEOPHYS 11	Introduction to the foundations of contemporary geophysics	

Choose at least one course in each of the four sub-categories below, total seven required:

#### Land Ecosystems

BIO 144	Conservation Biology: A Latin American Perspective	3-4
EARTHSYS 128	Evolution of Terrestrial Ecosystems	
EARTHSYS 155	Science of Soils	
EARTHSYS 180	Principles and Practices of Sustainable Agriculture	
ESS 256	Soil and Water Chemistry	
OSPSANTG 58	Living Chile: A Land of Extremes	

#### Water

CEE 101B	Mechanics of Fluids	3-4
CEE 166A	Watersheds and Wetlands	
CEE 166B	Floods and Droughts, Dams and Aqueducts	
CEE 177	Aquatic Chemistry and Biology	
EARTHSYS 104	The Water Course	
GEOPHYS 190	Near-Surface Geophysics	

GS 130	Soil Physics and Hydrology (Not offered 2017-18.)	
<b>Land Use</b>		3-5
ANTHRO 166	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness	
CEE 124	Sustainable Development Studio	
CEE 176A	Energy Efficient Buildings	
EARTHSYS 106	World Food Economy	
EARTHSYS 181	Urban Agriculture in the Developing World (Not offered 2017-18.)	
EARTHSYS 185	Feeding Nine Billion	
ESS 270	Analyzing land use in a globalized world	
URBANST 110	Introduction to Urban Studies	
URBANST 113	Introduction to Urban Design: Contemporary Urban Design in Theory and Practice	
URBANST 163	Land Use Control	
URBANST 171	Urban Design Studio	
<b>Methods</b>		3-5
EARTHSYS 142	Remote Sensing of Land	
EARTHSYS 144	Fundamentals of Geographic Information Science (GIS)	
EARTHSYS 211	Fundamentals of Modeling (Not offered in 2017-18.)	
HISTORY 401A	(HISTORY 401A can count towards this track requirement. Not offered 17.18.)	

**Elective Requirement** 6-10  
Two additional courses at the 100-level or above are required. Each must be a minimum of 3 units.

**Sustainable Food and Agriculture**

**Instead of Biology Foundation requirement listed in Required Foundation/Breadth section above, the following Bio courses are required:**

BIO 81 & BIO 82 or BIO 83	Introduction to Ecology and Genetics Biochemistry & Molecular Biology	4
OR HUMBIO 2A & HUMBIO 2B		
OR EARTHSYS 116		
OR BIOHOPK 43		

**Additional foundation and breadth courses**  
PHYSICS 41 Mechanics  
or PHYSICS 45 Light and Heat  
or GEOPHYS 110 Introduction to the foundations of contemporary geophysics

A total of seven courses are required from the Food and Agriculture focus areas:

**Fundamentals of Agriculture Production and Economics** 9-10  
Both required:  
EARTHSYS 106 World Food Economy  
EARTHSYS 185 Feeding Nine Billion

**Biogeophysical Dimensions** 9-12  
Required:  
EARTHSYS 155 Science of Soils

And select two of the following:  
BIO 137 Plant Genetics  
GS 130 Soil Physics and Hydrology (Not offered 2017-18.)  
HUMBIO 113 The Human-Plant Connection  
HUMBIO 130 Human Nutrition

<b>Social Dimensions</b>		3-5
Select one of the following:		
BIO 144	Conservation Biology: A Latin American Perspective	
EARTHSYS 105	Food and Community: Food Security, Resilience and Equity	
EARTHSYS 181	Urban Agriculture in the Developing World (Not offered in 2017-18.)	
EARTHSYS 187	FEED the Change: Redesigning Food Systems	
ECON 118	Development Economics	
HISTORY 203G	(HISTORY 203G can count towards this track requirement. Not offered 17.18.)	
HUMBIO 113S	Healthy/Sustainable Food Systems: Maximum Sustainability across Health, Economics, and Environment	
HUMBIO 166	Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context	

**Applied Study in the Field** 3-4  
Required:  
EARTHSYS 180 Principles and Practices of Sustainable Agriculture

**Elective Requirement** 6-10  
Two additional courses at the 100-level or above are required. Each must be a minimum of 3 units.

**Oceans and Climate (formerly Oceans)**

<b>Additional Foundation and Breadth Courses</b>		0-5
MATH 51 & MATH 52 or CME 100	Linear Algebra and Differential Calculus of Several Variables and Integral Calculus of Several Variables (CME 100 preferred over MATH 51 and MATH 52) Vector Calculus for Engineers	
Physics (select one of the following):		3-4
PHYSICS 41	Mechanics	
PHYSICS 45	Light and Heat	
or GEOPHYS 110	Introduction to the foundations of contemporary geophysics	

**Physics of the Atmosphere and Climate** 3  
Select one of the following:  
CEE 63 Weather and Storms (Students are discouraged from taking CEE 63 in 2017.18. EARTHSYS 164 is not offered in 2017.18, so EARTHSYS 146A and EARTHSYS 146B should be taken to fulfill these track requirements instead.)  
EARTHSYS 146 Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation (preferred)

**Physics of the Ocean** 3-4  
Select one of the following:  
EARTHSYS 164 Introduction to Physical Oceanography (Not given in 2017.18. Students must take EARTHSYS 146A and EARTHSYS 146B instead.)  
EARTHSYS 146 Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation

**Spatial Analysis** 3-4  
EARTHSYS 141 Remote Sensing of the Oceans

**Biological Oceanography** 3-4  
Select one of the following:  
EARTHSYS 151 Biological Oceanography (preferred; take at the same time as EARTHSYS 152)  
BIOHOPK 163H Oceanic Biology

**Marine Chemistry** 3-4

EARTHSYS 152 Marine Chemistry

**Human Dimensions** 1-5

Select one of the following:

BIOHOPK 173H Marine Conservation Biology

BIOHOPK 280 Short Course on Ocean Policy

EARTHSYS 175

EARTHSYS 243 Environmental Advocacy and Policy Communication

LAW 2506 Natural Resources Law and Policy (Seniors only.)

**Field Experience**<sup>1</sup> 12-20

Select at least one of the following:

One quarter abroad at the Stanford in Australia Program

One quarter at Stanford @ SEA

One quarter (or more) at the Hopkins Marine Station

**Elective Requirement** 6-10

Two additional courses at the 100-level or above are required. Each must be a minimum of 3 units. See Earth Systems staff for a list of possible electives.

<sup>1</sup> Courses taken during Stanford@SEA and BOSP Australia cannot be substituted for track requirements but can count toward electives.**Summary of Course Requirements and Units****For all students:**

Earth Systems Introduction and Core	12
Required Foundation and Breadth Courses	31-48
Internship	1
Senior Capstone & Reflection and Capstone Project	5
Writing in the Major (WIM)	3-5

**Track-Specific:**

Human Environmental Systems (formerly Anthrosphere) Track	38-54
Biosphere Track	40-60
Energy, Science and Technology Track	34-47
Land Systems Track	31-44
Sustainable Food and Agriculture Track	34-45
Oceans and Climate Track	37-63

**Honors Program**

The Earth Systems honors program provides students with an opportunity to pursue interdisciplinary research. It consists of a year-long research project that is mentored by one or more Earth Systems-affiliated faculty members, and culminates in a written thesis.

To qualify for the honors program, students must have and maintain a minimum overall GPA of 3.4. Potential honors students should complete the EARTHSYS 111 Biology and Global Change and EARTHSYS 112 Human Society and Environmental Change sequence by the end of the junior year. Qualified students can apply in Spring Quarter of the junior year, or the fourth quarter before graduation (check with program for specific application deadlines) by submitting a detailed research proposal and a brief statement of support from a faculty research adviser. Students who elect to do an honors thesis should begin planning no later than Winter Quarter of the junior year.

A maximum of 9 units is awarded for thesis research through EARTHSYS 199 Honors Program in Earth Systems. Those 9 units may not substitute for any other required parts of the Earth Systems curriculum.

All these are evaluated for acceptance by the thesis faculty adviser, one additional faculty member (who is the second reader), and the Director of Earth Systems. Both the adviser and second reader must be members of the Academic Council. Acceptance into the Honors program is not a guarantee of graduating with the honors designation.

Honors students are required to present their research publicly, preferably through the School of Earth, Energy, and Environmental Sciences' Annual Thesis Symposium, which highlights undergraduate and graduate research in the school. Faculty advisers are encouraged to sponsor presentation of student research results at professional society meetings.

**Minor in Earth Systems, Sustainability Subplan**

The minor in Earth Systems, Sustainability subplan, provides an introduction to fundamental science, interdisciplinary systems thinking, and environmental justice considerations, as well as a foundation in practical skills and applied problem solving experience needed to understand social-environmental systems and address intergenerational sustainability challenges. Students declaring the minor in Earth Systems must also declare the Sustainability subplan.

Students pursuing the minor must take the courses listed below and approved electives for a minimum of 35 units. Courses that count towards the fulfillment of major requirements may not be counted towards the minor, and all courses must be taken for a letter grade.

**Units** Students declaring a minor in Earth Systems must do so no later than two quarters prior to their intended quarter of degree conferral; for example, a student must declare a minor before the end of Autumn Quarter to graduate the following Spring Quarter. The Sustainability subplan must also be declared in Axess when declaring the minor. In addition, students pursuing the minor must complete the Multiple Major/Minor Form ([http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin\\_MultMaj.pdf](http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf)) and have it reviewed by all applicable departments/programs. This form must be submitted to the Student Services Center (<https://studentservicescenter.stanford.edu>) by the application to graduate deadline for the term in which the student intends to graduate.

**Required Course Work Core**

		Units
EARTHSYS 10	Introduction to Earth Systems	4
EARTHSYS 111	Biology and Global Change	4
EARTHSYS 112	Human Society and Environmental Change	4
	(ECON 1 recommended as a pre- or co-requisite to EARTHSYS 112.)	
	(Prerequisites to EARTH 280 for the minor: EARTHSYS 111, EARTHSYS 112.)	
EARTHSYS 131	Pathways in Sustainability Careers	1
SUST 210	Pursuing Sustainability: Managing Complex Social Environmental Systems (SUST 210 is a required course for the minor; this will be an active course as of Autumn 17-18.)	3

**Electives**

Students must take a minimum of 19 units of electives at the 100-level or above that address dimensions of environmental systems and social-environmental systems in theory or practice, with at least one course taken in each category.

Of the electives selected from the categories above,

- at least one course must address dimensions of environmental justice in theory or practice;
- at least two courses must provide opportunities to develop skills applicable to sustainability-related questions or challenges; and
- at least one course must engage students in applied problem solving on a sustainability-related question or challenge.

A list of approved electives is available on the Earth Systems website and in the Earth Systems Program office (Y2E2 131). Students may petition to count one relevant freshman or sophomore seminar toward the minor.

## Coterminal Master's Degrees in Earth Systems

The Earth Systems Program offers current Stanford University undergraduates the opportunity to apply to a one-year coterminal master's program. Earth Systems offers a coterminal Master of Science (M.S.) degree in Earth Systems and a coterminal Master of Arts (M.A.) degree in Earth Systems, Environmental Communication. The Environmental Communication subplan prints on both the transcript and the diploma.

### Application and Admission

The Earth Systems Program has quarterly coterminal degree application deadlines: November 7, 2017; February 20, 2018; and May 15, 2018. Seniors must apply by Winter Quarter deadline. To apply, students should submit an online application. The application includes the following:

- The Stanford coterminal application (<https://www.applyweb.com/stanterm>)
  - A statement of purpose
  - A resume
  - A current Stanford unofficial transcript
  - Two letters of recommendation, one of which must be from the master's adviser (who must be an Academic Council member; each coterminal M.A. student has two advisers: Thomas Hayden and Kevin Arrigo, or another approved faculty adviser)
  - Master's Program Proposal (<https://earth.stanford.edu/esys/program-forms>): A list of courses that fulfill degree requirements signed by the master's adviser
1. Applications must be submitted no later than the quarter prior to the expected completion of the B.S. degree (and within quarterly application deadlines). An application fee is assessed by the Registrar's Office for coterminal applications, once students are matriculated into the program.
  2. Students applying to the coterminal master's program must have completed a minimum of 120 units toward graduation with a minimum overall Stanford GPA of 3.4.
  3. All applicants must devise a program of study that shows a level of specialization appropriate to the master's level, as determined in consultation with the master's adviser and the Director of Earth Systems. (See also following sections, Master of Science and Master of Arts in Earth Systems Degree Requirements).
  4. Students applying from an undergraduate major other than Earth Systems should review their undergraduate course list with Deana Fabbro-Johnston, Richard Nevle, or Thomas Hayden (M.A. only).
  5. The student has the option of receiving the B.S. degree after completing that degree's requirements or receiving the B.S. and M.A./M.S. degrees concurrently at the completion of the master's program.
  6. Students must submit a new application to change from the M.S. to the M.A. in Earth Systems, or from the M.A. to the M.S. in Earth Systems. If accepted, the student must submit a Graduate

Authorization Petition through Axess; a \$125 fee applies to a successful Graduate Authorization Petition.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Coterminal Master of Science in Earth Systems

### Degree Requirements

The master of science degree in Earth Systems allows specialization through graduate-level course work that may include up to 9 units of research with the master's adviser. This may culminate in the preparation of a M.S. thesis; however, a thesis is not required for the degree. The process of building mastery in the field is enriched through steady communication with a faculty adviser.

The following are required of all M.S. students:

- A minimum of 45 units of course work and/or research credit (upon approval).
- At least 34 units of the student's course work for the master's program must be at the 200-level or above.
- All remaining course work must be at the 100-level or above.
- All courses for the master's program must be taken for a letter grade; courses not taken for a letter grade must be approved by the master's adviser and Director of Earth Systems.
- A minimum overall GPA of 3.4 must be maintained.
- All coterminal master's students are required to take the capstone course, EARTHSYS 290 Master's Seminar.

For the Master of Science degree in Earth Systems, the following courses must be taken if not completed in the undergraduate degree program. These courses do not have to be completed before applying to the coterm program. These may not be counted as part of the 45-unit master's degree:

	Units
Core (both required):	8
EARTHSYS 111Biology and Global Change	
EARTHSYS 112Human Society and Environmental Change	

**Biology: One Biology Foundations/Core course pre-approved by Master's adviser, OR select from the following:** 4-10

BIOHOPK 43	Plant Biology, Evolution, and Ecology
HUMBIO 2A & HUMBIO 2B	Genetics, Evolution, and Ecology and Culture, Evolution, and Society
EARTHSYS 116	Ecology of the Hawaiian Islands

**Chemistry (select one of the following):** 5-10

CHEM 31X	Chemical Principles Accelerated
CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II

**Physics (select one of the following):** 3-4

	One physics class from the PHYSICS 20 or 40 series or GEOPHYS 110
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**Mathematics (select one of the following):** 5

MATH 51	Linear Algebra and Differential Calculus of Several Variables
CME 100	Vector Calculus for Engineers

**Statistics (select one of the following):** 3-5

BIOHOPK 174H	Experimental Design and Probability
BIO 141	Biostatistics
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists
STATS 110	Statistical Methods in Engineering and the Physical Sciences
STATS 116	Theory of Probability

- All courses for the master's program must be taken for a letter grade; courses not taken for a letter grade must be approved by the master's adviser and Director of Earth Systems.
- A minimum overall GPA of 3.4 must be maintained.
- All coterminal master's students are required to take the capstone course, EARTHSYS 290 Master's Seminar.

*Director:* Kevin Arrigo

*Deputy Director:* Richard Nevle

*Associate Director:* Deana Fabbro-Johnston

*Affiliated Faculty and Lecturers:* Michelle Anderson (Law), Patrick Archie (Earth Systems, Earth System Science), Nicole Ardoin (School of Education, Woods Institute for the Environment), Kevin Arrigo (Earth Systems, Earth System Science), Gregory Asner (Department of Global Ecology, Carnegie Institution), Greg Beroza (Geophysics), Barbara Block (Biology, Hopkins Marine Station, Woods Institute for the Environment), Alexandria Boehm (Civil and Environmental Engineering), Gordon Brown (Geological Sciences), Marshall Burke (Earth System Science), Ken Caldeira (Earth System Science), Liz Carlisle (Earth Systems), Karen Casciotti (Earth System Science), Page Chamberlain (Earth System Science), Larry Crowder (Biology, Woods Institute for the Environment), Danny Cullenward (Earth Systems), Lisa Curran (Anthropology, Woods Institute for the Environment), Gretchen Daily (Biology, Woods Institute for the Environment), Jenna Davis (Civil and Environmental Engineering, Woods Institute for the Environment), Anne Dekas (Earth System Science), Mark Denny (Biology, Hopkins Marine Station), Noah Diffenbaugh (Earth System Science, Woods Institute for the Environment), Rodolfo Dirzo (Biology, Woods Institute for the Environment), Robert Dunbar (Earth System Science, Woods Institute for the Environment), Debra Dunn (Earth Systems, Hasso Plattner Institute of Design), William Durham (Anthropology, Woods Institute for the Environment), Louis Durlofsky (Energy Resources Engineering), Stefano Ermon (Computer Science), Gary Ernst (Geological Sciences, emeritus), Walter Falcon (Freeman Spogli Institute for International Studies, emeritus, Woods Institute for the Environment), Scott Fendorf (Earth System Science, Woods Institute for the Environment, Precourt Institute for Energy), Christopher Field (Woods Institute for the Environment), Christopher Francis (Earth System Science, Woods Institute for the Environment), Zephyr Frank (History, Woods Institute for the Environment), David Freyberg (Civil and Environmental Engineering, Woods Institute for the Environment), Tad Fukami (Biology), Margot Gerritsen (Energy Resources Engineering), Elizabeth Hadly (Biology, Woods Institute for the Environment), Thomas Hayden (Earth Systems), George Hilley (Geological Sciences), Suki Hoagland (Earth Systems), Robert Jackson (Earth System Science, Woods Institute for the Environment), Michael Kahan (Urban Studies), David Kennedy (History, emeritus, Woods Institute for the Environment), Alexandra Konings (Earth System Science), Karl Knapp (Atmosphere and Energy Operations), Rosemary Knight (Geophysics, Woods Institute for the Environment), Jonathan Koomey (Earth Systems), Jeffrey Koseff (Civil and Environmental Engineering), Anthony Kovscek (Energy Resources Engineering), Eric Lambin (Earth System Science, Woods Institute for the Environment), Jim Leape (Center for Ocean Solutions), David Lobell (Earth System Science, Woods Institute for the Environment), Evan Lyons (Earth Systems Science), Gilbert Masters (Civil and Environmental Engineering), Pamela Matson (Dean, School of Earth, Energy & Environmental Sciences, Freeman Spogli Institute for International Studies, Woods Institute for the Environment), Anna Michalak (Earth System Science), Fiorenza Micheli (Hopkins Marine Station, Center for Ocean Solutions), Stephen Monismith (Civil and Environmental Engineering, Woods Institute for the Environment), Ian Monroe (Earth Systems), Harold Mooney (Biology, emeritus, Woods Institute for the Environment), Rosamond Naylor (Earth System Science, Freeman Spogli Institute for International Studies, Woods Institute for the Environment), Richard Nevle (Earth Systems), Julia Novy-Hildesley (Sustainability Science and Practice),

## Coterminal Master of Arts in Earth Systems, Environmental Communication Degree Requirements

The Master of Arts in Earth Systems, Environmental Communication, provides an overview of the theory, techniques, and challenges of communicating environmental concepts to non-specialist audiences and includes hands-on experience with different modalities of communication, principally writing, multimedia production, and education. The degree program is built on a three quarter progression of required core courses, including a required practicum experience, along with electives. Students complete 22 units of required core courses along with 23 units of focus courses to be chosen in close consultation with Thomas Hayden and a faculty co-adviser.

For the master of arts degree, prerequisites may vary based on the interests and academic background of each student, to be determined in consultation with primary adviser Thomas Hayden, the faculty co-adviser, and the Director of Earth Systems. At a minimum, entering students must have completed EARTHSYS 10 Introduction to Earth Systems (may be audited), EARTHSYS 111 Biology and Global Change, and EARTHSYS 112 Human Society and Environmental Change. These courses do not have to be completed before applying to the coterm program. Additional course work in the sciences, mathematics, and other fields may also be required on a case-by-case basis; such required foundational course work may not count toward the 45 units of master's-level course requirements.

The following are required of all M.A. students:

- All M.A. students must declare the Environmental Communication subplan in Axxess.
- A minimum of 45 units of course work and/or research credit (upon approval).
- At least 34 units of the student's course work for the master's program must be at the 200-level or above.
- All remaining course work must be at the 100-level or above.

Michael Osborne (Earth Systems), Stephen Palumbi (Biology, Hopkins Marine Station, Woods Institute for the Environment), Jonathan Payne (Geological Sciences), Kabir Peay (Biology), Emily Polk (Program in Writing and Rhetoric), Thomas Robinson (Medicine), Matt Rothe (Earth Systems, Hasso Plattner Institute of Design, Graduate School of Business), Jennifer Saltzman (Geological Sciences), Dustin Schroeder (Geophysics), Paul Segall (Geophysics), Deborah Sivas (Law), George Somero (Biology, Hopkins Marine Station), Jenny Suckale (Geophysics), James Sweeney (Management Science and Engineering, Woods Institute for the Environment), Leif Thomas (Earth System Science), Barton Thompson, Junior (Law, Woods Institute for the Environment), Sarah Truebe (Earth Systems), Tiziana Vanorio (Geophysics), Peter Vitousek (Biology, Emmett Interdisciplinary Program in Environment and Resources, Woods Institute for the Environment), Virginia Walbot (Biology), Paula Welander (Earth System Science), Cindy Wilber (Jasper Ridge), Michael Wilcox (Anthropology), Mikael Wolfe (History), Jane Woodward (Atmosphere and Energy Operations), Mark Zoback (Geophysics)

## Overseas Studies Courses in Earth Systems

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPAUSTL 10	Coral Reef Ecosystems	3
OSPAUSTL 25	Freshwater Systems	3
OSPAUSTL 30	Coastal Forest Ecosystems	3
OSPCPTWN 63	Socio-Ecological Systems	3
OSPKYOTO 45	Japan's Energy-Environment Conundrum	4
OSPMADRD 79	Earth and Water Resources' Sustainability in Spain	3-4
OSPSANTG 58	Living Chile: A Land of Extremes	5

## Environmental Courses List

		Units
AA 115N	The Global Positioning System: Where on Earth are We, and What Time is It?	
AA 116Q	Electric Automobiles and Aircraft	
AA 272C	Global Positioning Systems	
AFRICAAM 47	History of South Africa	
AFRICAAM 147	History of South Africa	
AFRICAST 109	Running While Others Walk: African Perspectives on Development	
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	
AFRICAST 209	Running While Others Walk: African Perspectives on Development	
AMSTUD 1B	Media, Culture, and Society	
AMSTUD 124A	The American West	
ANTHRO 18	Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years	
ANTHRO 34	Animals and Us	

ANTHRO 90C	Theory of Ecological and Environmental Anthropology
ANTHRO 106	Incas and their Ancestors: Peruvian Archaeology
ANTHRO 117	Thinking Through Animals
ANTHRO 118	Heritage, Environment, and Sovereignty in Hawaii
ANTHRO 119	Zooarchaeology: An Introduction to Faunal Remains
ANTHRO 125	Language and the Environment
ANTHRO 137	The Politics of Humanitarianism
ANTHRO 140C	Mobilizing Nature
ANTHRO 141A	Science, Technology, and Medicine in Africa
ANTHRO 147	Nature, Culture, Heritage
ANTHRO 155	Research Methods in Ecological Anthropology
ANTHRO 156B	Environment, Nature and Race
ANTHRO 160	Social and Environmental Sustainability: The Costa Rican Case
ANTHRO 162	Indigenous Peoples and Environmental Problems
ANTHRO 164	Natural Resource Extraction: Use and Development: Assessing Policies, Practices and Outcomes
ANTHRO 166	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness
ANTHRO 168	Everest: Extreme Anthropology
ANTHRO 169	The Ecology of Cuisine: Food, Nutrition, and the Evolution of the Human Diet
ANTHRO 170	Australian Ecosystems: Human Dimensions and Environmental Dynamics
ANTHRO 177	Environmental Change and Emerging Infectious Diseases
ANTHRO 178	Evolution and Conservation in Galapagos
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ANTHRO 277	Environmental Change and Emerging Infectious Diseases
ANTHRO 278	Evolution and Conservation in Galapagos
ANTHRO 302	History of Anthropological Theory, Ecology and Environment
ANTHRO 363A	Anthropology of Environmental Conservation
ANTHRO 364	EcoGroup: Current Topics in Ecological, Evolutionary, and Environmental Anthropology
ANTHRO 368	Dynamics of Coupled Human-Natural Systems
ANTHRO 372	Urban Ecologies
APPPHYS 219	Solid State Physics Problems in Energy Technology



APPPHYS 294	Cellular Biophysics	BIO 459	Frontiers in Interdisciplinary Biosciences
ARCHLGY 12	Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years	BIOC 459	Frontiers in Interdisciplinary Biosciences
ARCHLGY 102E	Incas and their Ancestors: Peruvian Archaeology	BIOE 44	Fundamentals for Engineering Biology Lab
ARCHLGY 119	Zooarchaeology: An Introduction to Faunal Remains	BIOE 80	Introduction to Bioengineering (Engineering Living Matter)
ARCHLGY 126	Archaeobotany	BIOE 191	Bioengineering Problems and Experimental Investigation
ARCHLGY 224	Archaeology of Food: production, consumption and ritual	BIOE 459	Frontiers in Interdisciplinary Biosciences
ARCHLGY 226	Archaeobotany	BIOHOPK 43	Plant Biology, Evolution, and Ecology
ARTHIST 152	The American West	BIOHOPK 150H	Ecological Mechanics
ARTSTUDI 153I	Ecology of Materials	BIOHOPK 152H	Physiology of Global Change
ARTSTUDI 157	Art, Invention, Activism in the Public Sphere	BIOHOPK 153H	Current Topics and Concepts in Quantitative Fish Dynamics and Fisheries Management
ARTSTUDI 253	ECOLOGY OF MATERIALS	BIOHOPK 155H	Developmental Biology and Evolution
BIO 2N	Ecology and Evolution of Infectious Disease in a Changing World	BIOHOPK 160H	Developmental Biology in the Ocean: Diverse Embryonic & Larval Strategies of marine invertebrates
BIO 3	Frontiers in Marine Biology	BIOHOPK 161H	Invertebrate Zoology
BIO 3N	Views of a Changing Sea: Literature & Science	BIOHOPK 162H	Comparative Animal Physiology
BIO 7N	Introduction to Conservation Photography	BIOHOPK 163H	Oceanic Biology
BIO 8N	Human Origins	BIOHOPK 166H	Molecular Ecology
BIO 10SC	Natural History, Marine Biology, and Research	BIOHOPK 167H	Nerve, Muscle, and Synapse
BIO 12N	Sensory Ecology of Marine Animals	BIOHOPK 168H	Disease Ecology: from parasites evolution to the socio-economic impacts of pathogens on nations
BIO 21	The Science of the Extreme Life of the Sea	BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems
BIO 30	Ecology for Everyone	BIOHOPK 173H	Marine Conservation Biology
BIO 33N	Conservation Science and Practice	BIOHOPK 174H	Experimental Design and Probability
BIO 34N	Hunger	BIOHOPK 177H	Dynamics and Management of Marine Populations
BIO 105A	Ecology and Natural History of Jasper Ridge Biological Preserve	BIOHOPK 179H	Physiological Ecology of Marine Megafauna
BIO 105B	Ecology and Natural History of Jasper Ridge Biological Preserve	BIOHOPK 181H	Physiology of Global Change
BIO 108	Essential Statistics for Human Biology	BIOHOPK 182H	Stanford at Sea
BIO 115	The Hidden Kingdom - Evolution, Ecology and Diversity of Fungi	BIOHOPK 185H	Ecology and Conservation of Kelp Forest Communities
BIO 116	Ecology of the Hawaiian Islands	BIOHOPK 187H	Sensory Ecology
BIO 117	Biology and Global Change	BIOHOPK 189H	Sustainability and Marine Ecosystems
BIO 137	Plant Genetics	BIOHOPK 198H	Directed Instruction or Reading
BIO 138	Ecosystem Services: Frontiers in the Science of Valuing Nature	BIOHOPK 199H	Undergraduate Research
BIO 141	Biostatistics	BIOHOPK 250H	Ecological Mechanics
BIO 144	Conservation Biology: A Latin American Perspective	BIOHOPK 252H	Physiology of Global Change
BIO 145	Ecology and Evolution of Animal Behavior	BIOHOPK 253H	Current Topics and Concepts in Quantitative Fish Dynamics and Fisheries Management
BIO 146	Population Studies	BIOHOPK 255H	Developmental Biology and Evolution
BIO 182	Modeling Cultural Evolution	BIOHOPK 260H	Developmental Biology in the Ocean: Diverse Embryonic & Larval Strategies of marine invertebrates
BIO 196A	Biology Senior Reflection	BIOHOPK 261H	Invertebrate Zoology
BIO 196B	Biology Senior Reflection	BIOHOPK 262H	Comparative Animal Physiology
BIO 196C	Biology Senior Reflection	BIOHOPK 263H	Oceanic Biology
BIO 202	Ecological Statistics	BIOHOPK 266H	Molecular Ecology
BIO 208	Spanish in Science/Science in Spanish	BIOHOPK 267H	Nerve, Muscle, and Synapse
BIO 227	Foundations of Community Ecology	BIOHOPK 268H	Disease Ecology: from parasites evolution to the socio-economic impacts of pathogens on nations
BIO 234	Conservation Biology: A Latin American Perspective	BIOHOPK 272H	Marine Ecology: From Organisms to Ecosystems
BIO 238	Ecosystem Services: Frontiers in the Science of Valuing Nature	BIOHOPK 273H	Marine Conservation Biology
BIO 245	Ecology and Evolution of Animal Behavior	BIOHOPK 274	Hopkins Microbiology Course
BIO 274S	Hopkins Microbiology Course	BIOHOPK 274H	Experimental Design and Probability
BIO 312	Ethical Issues in Ecology and Evolutionary Biology	BIOHOPK 275H	Synthesis in Ecology
BIO 375	Field Ecology & Conservation	BIOHOPK 276H	Estimates and Errors: The Theory of Scientific Measurement

BIOHOPK 277H	Dynamics and Management of Marine Populations	CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery
BIOHOPK 279H	Physiological Ecology of Marine Megafauna	CEE 175A	California Coast: Science, Policy, and Law
BIOHOPK 280	Short Course on Ocean Policy	CEE 175S	Environmental Entrepreneurship and Innovation
BIOHOPK 285H	Ecology and Conservation of Kelp Forest Communities	CEE 176A	Energy Efficient Buildings
BIOHOPK 287H	Sensory Ecology	CEE 176B	Electric Power: Renewables and Efficiency
BIOHOPK 289H	Sustainability and Marine Ecosystems	CEE 176C	Energy Storage Integration - Vehicles, Renewables, and the Grid
BIOHOPK 300H	Research	CEE 177	Aquatic Chemistry and Biology
BIOHOPK 320H	Physical Biology	CEE 177L	Smart Cities & Communities
BIOHOPK 323H	Stanford at Sea	CEE 177S	Design for a Sustainable World
BIOMEDIN 156	Economics of Health and Medical Care	CEE 177X	Current Topics in Sustainable Engineering
BIOMEDIN 256	Economics of Health and Medical Care	CEE 178	Introduction to Human Exposure Analysis
CEE 1	Introduction to Environmental Systems Engineering	CEE 179A	Water Chemistry Laboratory
CEE 29N	Managing Natural Disaster Risk	CEE 179C	Environmental Engineering Design
CEE 50N	Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay	CEE 179S	Seminar: Issues in Environmental Science, Technology and Sustainability
CEE 63	Weather and Storms	CEE 195	Fundamentals of Structural Geology
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions	CEE 196	Engineering Geology and Global Change
CEE 70	Environmental Science and Technology	CEE 201D	Computations in Civil and Environmental Engineering
CEE 70N	Water, Public Health, and Engineering	CEE 206	Decision Analysis for Civil and Environmental Engineers
CEE 73	Water: An Introduction	CEE 207A	Understanding Energy
CEE 100	Managing Sustainable Building Projects	CEE 207S	Energy Resources: Fuels and Tools
CEE 101B	Mechanics of Fluids	CEE 213	Patterns of Sustainability
CEE 101D	Computations in Civil and Environmental Engineering	CEE 223	Materials for Sustainable Built Environments
CEE 107A	Understanding Energy	CEE 224A	Sustainable Development Studio
CEE 107S	Energy Resources: Fuels and Tools	CEE 225	Defining Smart Cities: Visions of Urbanism for the 21st Century
CEE 112A	Industry Applications of Virtual Design & Construction	CEE 226	Life Cycle Assessment for Complex Systems
CEE 112B	Industry Applications of Virtual Design & Construction	CEE 226E	Advanced Topics in Integrated, Energy-Efficient Building Design
CEE 112C	Industry Applications of Virtual Design & Construction	CEE 227	Global Project Finance
CEE 113	Patterns of Sustainability	CEE 251	Negotiation
CEE 124	Sustainable Development Studio	CEE 255	Introduction to Sensing Networks for CEE
CEE 125	Defining Smart Cities: Visions of Urbanism for the 21st Century	CEE 256	Building Systems
CEE 126	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	CEE 260A	Physical Hydrogeology
CEE 131B	Financial Management of Sustainable Urban Systems	CEE 260C	Contaminant Hydrogeology and Reactive Transport
CEE 151	Negotiation	CEE 262A	Hydrodynamics
CEE 155	Introduction to Sensing Networks for CEE	CEE 262B	Transport and Mixing in Surface Water Flows
CEE 156	Building Systems	CEE 262C	Hydrodynamics and Sediment Transport Modeling
CEE 165C	Water Resources Management	CEE 262D	Introduction to Physical Oceanography
CEE 166A	Watersheds and Wetlands	CEE 262F	Ocean Waves
CEE 166B	Floods and Droughts, Dams and Aqueducts	CEE 263A	Air Pollution Modeling
CEE 166D	Water Resources and Water Hazards Field Trips	CEE 263B	Numerical Weather Prediction
CEE 169	Environmental and Water Resources Engineering Design	CEE 263C	Weather and Storms
CEE 171	Environmental Planning Methods	CEE 263D	Air Pollution and Global Warming: History, Science, and Solutions
CEE 171F	New Indicators of Well-Being and Sustainability	CEE 263S	Atmosphere/Energy Seminar
CEE 172	Air Quality Management	CEE 265A	Sustainable Water Resources Development
CEE 172A	Indoor Air Quality	CEE 265C	Water Resources Management
CEE 174A	Providing Safe Water for the Developing and Developed World	CEE 265D	Water and Sanitation in Developing Countries
		CEE 266A	Watersheds and Wetlands
		CEE 266B	Floods and Droughts, Dams and Aqueducts
		CEE 266C	Dams, Reservoirs, and their Sustainability
		CEE 266D	Water Resources and Water Hazards Field Trips

CEE 268	Groundwater Flow	CEE 370C	Environmental Research
CEE 269A	Environmental Engineering Seminar	CEE 370D	Environmental Research
CEE 269B	Environmental Engineering Seminar	CEE 374A	Introduction to Physiology of Microbes in Biofilms
CEE 269C	Environmental Engineering Seminar	CEE 374B	Introduction to Physiology of Microbes in Biofilms
CEE 270	Movement and Fate of Organic Contaminants in Waters	CEE 374C	Introduction to Physiology of Microbes in Biofilms
CEE 270B	Environmental Organic Reaction Chemistry	CEE 374D	Introduction to Physiology of Microbes in Biofilms
CEE 271A	Physical and Chemical Treatment Processes	CEE 374S	Advanced Topics in Microbial Pollution
CEE 271B	Environmental Biotechnology	CEE 374T	Advanced Topics in Coastal Pollution
CEE 271D	Introduction to Wastewater Treatment Process Modeling	CEE 374U	Advanced Topics in Submarine Groundwater Discharge
CEE 271F	New Indicators of Well-Being and Sustainability	CEE 374V	Advanced Topics in Microbial Source Tracking
CEE 272	Coastal Contaminants	CEE 374W	Advanced Topics in Water, Health and Development
CEE 272R	Modern Power Systems Engineering	CEE 377	Research Proposal Writing in Environmental Engineering and Science
CEE 272T	SmartGrids and Advanced Power Systems Seminar	CEE 385	Performance-Based Earthquake Engineering
CEE 273	Aquatic Chemistry	CHEM 10	Exploring Research and Problem Solving Across the Sciences
CEE 273A	Water Chemistry Laboratory	CHEM 25N	Science in the News
CEE 273D	Wastewater Treatment Process Simulators and Their Use for Emerging Technologies	CHEM 28N	Science Innovation and Communication
CEE 274A	Environmental Microbiology I	CHEM 459	Frontiers in Interdisciplinary Biosciences
CEE 274B	Microbial Bioenergy Systems	CHEMENG 25E	Energy: Chemical Transformations for Production, Storage, and Use
CEE 274D	Pathogens and Disinfection	CHEMENG 60Q	Environmental Regulation and Policy
CEE 274P	Environmental Health Microbiology Lab	CHEMENG 70Q	Masters of Disaster
CEE 274S	Hopkins Microbiology Course	CHEMENG 162	Polymers for Clean Energy and Water
CEE 275A	California Coast: Science, Policy, and Law	CHEMENG 174	Environmental Microbiology I
CEE 275K	The Practice of Environmental Consulting	CHEMENG 262	Polymers for Clean Energy and Water
CEE 275S	Environmental Entrepreneurship and Innovation	CHEMENG 274	Environmental Microbiology I
CEE 276	Introduction to Human Exposure Analysis	CHEMENG 432	Electrochemical Energy Conversion
CEE 276C	Energy Storage Integration - Vehicles, Renewables, and the Grid	CHEMENG 456	Microbial Bioenergy Systems
CEE 277F	Advanced Field Methods in Water, Health and Development	CHEMENG 459	Frontiers in Interdisciplinary Biosciences
CEE 277L	Smart Cities & Communities	CLASSICS 358	The Archaeology of Ancient Mediterranean Environments
CEE 277S	Design for a Sustainable World	CME 211	Software Development for Scientists and Engineers
CEE 277X	Current Topics in Sustainable Engineering	COMM 1B	Media, Culture, and Society
CEE 278A	Air Pollution Fundamentals	COMM 104W	Reporting, Writing, and Understanding the News
CEE 278C	Indoor Air Quality	COMM 108	Media Processes and Effects
CEE 279S	Seminar: Issues in Environmental Science, Technology and Sustainability	COMM 172	Media Psychology
CEE 279W	Innovation in Water Sector	COMM 177C	Specialized Writing and Reporting: Environmental and Food System Journalism
CEE 287	Earthquake Resistant Design and Construction	COMM 272	Media Psychology
CEE 288	Introduction to Performance Based Earthquake Engineering	COMM 277C	Specialized Writing and Reporting: Environmental and Food System Journalism
CEE 293	Foundations and Earth Structures	COMP MED 84Q	Globally Emerging Zoonotic Diseases
CEE 301	The Energy Seminar	CSRE 109A	Federal Indian Law
CEE 316	Sustainable Built Environment Research	CSRE 109B	Indian Country Economic Development
CEE 363F	Oceanic Fluid Dynamics	CSRE 156J	Environment, Nature and Race
CEE 363G	Field Techniques in Coastal Oceanography	CSRE 178	Ethics and Politics of Public Service
CEE 365A	Advanced Topics in Environmental Fluid Mechanics and Hydrology	CSRE 187A	The Anthropology of Race, Nature, and Animality
CEE 365B	Advanced Topics in Environmental Fluid Mechanics and Hydrology	EARTH 1A	Know Your Planet: Research Frontiers
CEE 365C	Advanced Topics in Environmental Fluid Mechanics and Hydrology	EARTH 1B	Know Your Planet: Big Earth
CEE 365D	Advanced Topics in Environmental Fluid Mechanics and Hydrology	EARTH 1C	Know Your Planet: Science Outside
CEE 370A	Environmental Research	EARTH 2	Climate and Society
CEE 370B	Environmental Research	EARTH 5	Geokids: Earth Sciences Education
		EARTH 14	Our National Parks
		EARTH 15	Living on the Edge

EARTH 42	Landscapes and Tectonics of the San Francisco Bay Area	EARTHSYS 107	Control of Nature
EARTH 100	Research Preparation for Undergraduates	EARTHSYS 110	Introduction to the foundations of contemporary geophysics
EARTH 114A	Our National Parks	EARTHSYS 111	Biology and Global Change
EARTH 117	Earth Sciences of the Hawaiian Islands	EARTHSYS 112	Human Society and Environmental Change
EARTH 126X	Hard Earth: Stanford Graduate-Student Talks Exploring Tough Environmental Dilemmas	EARTHSYS 113	Earthquakes and Volcanoes
EARTH 126Y	Hard Earth: Stanford Graduate-Student Talks Exploring Tough Environmental Dilemmas	EARTHSYS 115	Wetlands Ecology of the Pantanal Prefield Seminar
EARTH 131	Pathways in Sustainability Careers	EARTHSYS 115T	Island Biogeography of Tasmania Prefield Seminar
EARTH 191	Stanford EARTH Field Courses	EARTHSYS 116	Ecology of the Hawaiian Islands
EARTH 193	Natural Perspectives: Geology, Environment, and Art	EARTHSYS 117	Earth Sciences of the Hawaiian Islands
EARTH 202	PhD Students on the PhD	EARTHSYS 118	Heritage, Environment, and Sovereignty in Hawaii
EARTH 211	Software Development for Scientists and Engineers	EARTHSYS 119	Will Work for Food
EARTH 214	Software Design in Modern Fortran for Scientists and Engineers	EARTHSYS 121	Building a Sustainable Society: New Approaches for Integrating Human and Environmental Priorities
EARTH 218	Communicating Science	EARTHSYS 122	Evolution of Marine Ecosystems
EARTH 219	OPINION WRITING IN THE SCIENCES	EARTHSYS 125	Shades of Green: Redesigning and Rethinking the Environmental Justice Movements
EARTH 251	Negotiation	EARTHSYS 128	Evolution of Terrestrial Ecosystems
EARTH 310	Computational Geosciences Seminar	EARTHSYS 129	Geographic Impacts of Global Change: Mapping the Stories
EARTHSYS 4	Coevolution of Earth and Life	EARTHSYS 131	Pathways in Sustainability Careers
EARTHSYS 8	The Oceans: An Introduction to the Marine Environment	EARTHSYS 132	Evolution of Earth Systems
EARTHSYS 9	Public Service Internship Preparation	EARTHSYS 133	Social Entrepreneurship Collaboratory
EARTHSYS 10	Introduction to Earth Systems	EARTHSYS 136	The Ethics of Stewardship
EARTHSYS 18	Promoting Sustainability Behavior Change at Stanford	EARTHSYS 138	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development
EARTHSYS 36N	Life at the Extremes: From the Deep Sea to Deep Space	EARTHSYS 140	The Energy-Water Nexus
EARTHSYS 38N	The Worst Journey in the World: The Science, Literature, and History of Polar Exploration	EARTHSYS 141	Remote Sensing of the Oceans
EARTHSYS 41N	The Global Warming Paradox	EARTHSYS 142	Remote Sensing of Land
EARTHSYS 42	The Global Warming Paradox II	EARTHSYS 144	Fundamentals of Geographic Information Science (GIS)
EARTHSYS 44N	The Invisible Majority: The Microbial World That Sustains Our Planet	EARTHSYS 146A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation
EARTHSYS 46N	Exploring the Critical Interface between the Land and Monterey Bay: Elkhorn Slough	EARTHSYS 146B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation
EARTHSYS 46Q	Environmental Impact of Energy Systems: What are the Risks?	EARTHSYS 148	Grow it, Cook it, Eat it. An Experiential Exploration of How and Why We Eat What We Eat
EARTHSYS 49N	Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay	EARTHSYS 149	Wild Writing
EARTHSYS 56Q	Changes in the Coastal Ocean: The View From Monterey and San Francisco Bays	EARTHSYS 151	Biological Oceanography
EARTHSYS 57C	Climate Change from the Past to the Future	EARTHSYS 152	Marine Chemistry
EARTHSYS 61Q	Food and security	EARTHSYS 155	Science of Soils
EARTHSYS 100	Environmental and Geological Field Studies in the Rocky Mountains	EARTHSYS 158	Geomicrobiology
EARTHSYS 101	Energy and the Environment	EARTHSYS 160	Sustainable Cities
EARTHSYS 102	Fundamentals of Renewable Power	EARTHSYS 164	Introduction to Physical Oceanography
EARTHSYS 103	Understanding Energy	EARTHSYS 170	Environmental Geochemistry
EARTHSYS 104	The Water Course	EARTHSYS 172	Australian Ecosystems: Human Dimensions and Environmental Dynamics
EARTHSYS 105	Food and Community: Food Security, Resilience and Equity	EARTHSYS 176	Open Space Management Practicum
EARTHSYS 105	Ecology and Natural History of Jasper Ridge Biological Preserve	EARTHSYS 176A	Open Space Practicum Independent Study
EARTHSYS 105B	Ecology and Natural History of Jasper Ridge Biological Preserve	EARTHSYS 177	Specialized Writing and Reporting: Environmental and Food System Journalism
EARTHSYS 106	World Food Economy	EARTHSYS 179	Seminar: Issues in Environmental Science, Technology and Sustainability
		EARTHSYS 180	Principles and Practices of Sustainable Agriculture
		EARTHSYS 181	Urban Agriculture in the Developing World
		EARTHSYS 185	Feeding Nine Billion
		EARTHSYS 186	Farm and Garden Environmental Education Practicum

EARTHSYS 187	FEED the Change: Redesigning Food Systems	EASTASN 117	Health and Healthcare Systems in East Asia
EARTHSYS 188	Social and Environmental Tradeoffs in Climate Decision-Making	EASTASN 217	Health and Healthcare Systems in East Asia
EARTHSYS 191	Concepts in Environmental Communication	EASTASN 294	The Rise of China in World Affairs
EARTHSYS 197		ECON 17N	Energy, the Environment, and the Economy
EARTHSYS 199	Honors Program in Earth Systems	ECON 106	World Food Economy
EARTHSYS 200	Environmental Communication in Action: The SAGE Project	ECON 118	Development Economics
EARTHSYS 201	Editing for Publication	ECON 126	Economics of Health and Medical Care
EARTHSYS 206	World Food Economy	ECON 127	Economics of Health Improvement in Developing Countries
EARTHSYS 207	Spanish in Science/Science in Spanish	ECON 155	Environmental Economics and Policy
EARTHSYS 210A	Senior Capstone and Reflection	ECON 159	Economic, Legal, and Political Analysis of Climate-Change Policy
EARTHSYS 210	Senior Capstone and Reflection	ECON 206	World Food Economy
EARTHSYS 210B	Earth Systems Capstone Project	ECON 214	Development Economics I
EARTHSYS 211	Fundamentals of Modeling	ECON 216	Development Economics III
EARTHSYS 219	Will Work for Food	ECON 250	Environmental Economics
EARTHSYS 225	Shades of Green: Redesigning and Rethinking the Environmental Justice Movements	ECON 251	Natural Resource and Energy Economics
EARTHSYS 232	Evolution of Earth Systems	ECON 253	Energy Markets: Theory and Evidence from Latin America
EARTHSYS 235	Podcasting the Anthropocene	ECON 341	Public Economics and Environmental Economics Seminar
EARTHSYS 236	The Ethics of Stewardship	EDUC 100A	EAST House Seminar: Current Issues and Debates in Education
EARTHSYS 238	Land Use Law	EDUC 126A	Introduction to Public Service Leadership
EARTHSYS 241	Remote Sensing of the Oceans	EDUC 126B	Public Service Leadership Program Practicum
EARTHSYS 242	Remote Sensing of Land	EDUC 139	Educating Young STEM Thinkers
EARTHSYS 243	Environmental Advocacy and Policy Communication	EDUC 239	Educating Young STEM Thinkers
EARTHSYS 249	Wild Writing	EDUC 267A	Curriculum and Instruction in Science
EARTHSYS 250	Directed Research	EDUC 267B	Curriculum and Instruction in Science
EARTHSYS 251	Biological Oceanography	EDUC 267C	Curriculum and Instruction in Science
EARTHSYS 252	Marine Chemistry	EDUC 267E	Development of Scientific Reasoning and Knowledge
EARTHSYS 255	Microbial Physiology	EDUC 267F	Development of Scientific Reasoning and Knowledge II
EARTHSYS 256	Soil and Water Chemistry	EDUC 267G	Integrating the Garden into the Elementary Curriculum
EARTHSYS 258	Geomicrobiology	EDUC 280	Learning & Teaching of Science
EARTHSYS 260	Internship	EDUC 302	Behavior Design
EARTHSYS 263	Groundwork for COP21	EDUC 320	Sociology of Science
EARTHSYS 272	Antarctic Marine Geology	EDUC 332	Theory and Practice of Environmental Education
EARTHSYS 276	Open Space Management Practicum	EDUC 357	Science and Environmental Education in Informal Contexts
EARTHSYS 276A	Open Space Practicum Independent Study	EDUC 359C	Science Literacy
EARTHSYS 277	Specialized Writing and Reporting: Environmental and Food System Journalism	EE 60N	Man versus Nature: Coping with Disasters Using Space Technology
EARTHSYS 281	Urban Agriculture in the Developing World	EE 151	Sustainable Energy Systems
EARTHSYS 286	Farm and Garden Environmental Education Practicum	EE 155	Green Electronics
EARTHSYS 288	Social and Environmental Tradeoffs in Climate Decision-Making	EE 255	Green Electronics
EARTHSYS 289	FEED Lab: Food System Design & Innovation	EE 292H	Engineering, Entrepreneurship & Climate Change
EARTHSYS 289B	FEED Lab: Food System Design & Innovation	EE 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
EARTHSYS 290	Master's Seminar	EE 293B	Fundamentals of Energy Processes
EARTHSYS 291	Concepts in Environmental Communication	ENERGY 101	Energy and the Environment
EARTHSYS 292	Multimedia Environmental Communication	ENERGY 101A	Energizing California
EARTHSYS 293	Environmental Communication Practicum	ENERGY 102	Fundamentals of Renewable Power
EARTHSYS 294	Environmental Communication Capstone	ENERGY 104	Sustainable Energy for 9 Billion
EARTHSYS 297	Directed Individual Study in Earth Systems	ENERGY 110	Engineering Economics
EARTHSYS 298	Earth Systems Book Review	ENERGY 120	Fundamentals of Petroleum Engineering
EARTHSYS 299	M.S. Thesis		
EARTHSYS 323	Stanford at Sea		
EARTHSYS 801	TGR Project		
EASTASN 94	The Rise of China in World Affairs		

ENERGY 120A	Flow Through Porous Media Laboratory	ENERGY 359	Teaching Experience in Energy Resources Engineering
ENERGY 121	Fundamentals of Multiphase Flow	ENERGY 360	Advanced Research Work in Energy Resources Engineering
ENERGY 122	Lunch with Numerics	ENERGY 361	Master's Degree Research in Energy Resources Engineering
ENERGY 123	When Technology Meets Reality; An In-depth Look at the Deepwater Horizon Blowout and Oil Spill	ENGLISH 124	The American West
ENERGY 130	Well Log Analysis I	ENGR 25E	Energy: Chemical Transformations for Production, Storage, and Use
ENERGY 141	Seismic Reservoir Characterization	ENGR 90	Environmental Science and Technology
ENERGY 146	Reservoir Characterization and Flow Modeling with Outcrop Data	ENGR 120	Fundamentals of Petroleum Engineering
ENERGY 153	Carbon Capture and Sequestration	ENVRES 220	The Social Ocean: Ocean Conservation, Management, and Policy
ENERGY 155	Undergraduate Report on Energy Industry Training	ENVRES 221	New Frontiers and Opportunities in Sustainability
ENERGY 158	Bringing New Energy Technologies to Market: Optimizing Technology Push and Market Pull	ENVRES 225	E-IPER Current Topics Seminar
ENERGY 160	Modeling Uncertainty in the Earth Sciences	ENVRES 230	Field Survey Data Collection & Analysis
ENERGY 167	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties	ENVRES 240	Environmental Decision-Making and Risk Perception
ENERGY 171	Energy Infrastructure, Technology and Economics	ENVRES 250	Environmental Governance
ENERGY 175	Well Test Analysis	ENVRES 270	Graduate Practicum in Environment and Resources
ENERGY 191	Optimization of Energy Systems	ENVRES 276	Water Resources: Culture and Context
ENERGY 192	Undergraduate Teaching Experience	ENVRES 280	Topics in Environment and Resources
ENERGY 193	Undergraduate Research Problems	ENVRES 290	Capstone Project Seminar in Environment and Resources
ENERGY 194	Special Topics in Energy and Mineral Fluids	ENVRES 300	Introduction to Resource, Energy and Environmental Economics
ENERGY 199	Senior Project and Seminar in Energy Resources	ENVRES 315	Environmental Research Design Seminar
ENERGY 201	Laboratory Measurement of Reservoir Rock Properties	ENVRES 320	Designing Environmental Research
ENERGY 203	The Energy Transformation Collaborative	ENVRES 330	Research Approaches for Environmental Problem Solving
ENERGY 214	The Global Price of Oil	ENVRES 380	Innovating Large Scale Sustainable Transformations
ENERGY 216	Entrepreneurship in Energy	ENVRES 398	Directed Reading in Environment and Resources
ENERGY 217	Research Seminar: Energy Development in the Emerging Economy	ENVRES 399	Directed Research in Environment and Resources
ENERGY 221	Fundamentals of Multiphase Flow	ENVRINST 198	Prehonors Seminar
ENERGY 222	Advanced Reservoir Engineering	ENVRINST 199	Interschool Honors Program in Environmental Science, Technology, and Policy
ENERGY 223	Reservoir Simulation	ESS 8	The Oceans: An Introduction to the Marine Environment
ENERGY 224	Advanced Reservoir Simulation	ESS 38N	The Worst Journey in the World: The Science, Literature, and History of Polar Exploration
ENERGY 225	Theory of Gas Injection Processes	ESS 46N	Exploring the Critical Interface between the Land and Monterey Bay: Elkhorn Slough
ENERGY 227	Enhanced Oil Recovery	ESS 61Q	Food and security
ENERGY 230	Advanced Topics in Well Logging	ESS 101	Environmental and Geological Field Studies in the Rocky Mountains
ENERGY 240	Data science for geoscience	ESS 106	World Food Economy
ENERGY 241	Seismic Reservoir Characterization	ESS 107	Control of Nature
ENERGY 246	Reservoir Characterization and Flow Modeling with Outcrop Data	ESS 111	Biology and Global Change
ENERGY 251	Thermodynamics of Equilibria	ESS 112	Human Society and Environmental Change
ENERGY 253	Carbon Capture and Sequestration	ESS 117	Earth Sciences of the Hawaiian Islands
ENERGY 267	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties	ESS 118	Disasters, Decisions, Development in Sustainable Urban Systems
ENERGY 269	Geothermal Reservoir Engineering	ESS 132	Evolution of Earth Systems
ENERGY 271	Energy Infrastructure, Technology and Economics	ESS 135	Community Leadership
ENERGY 273	Special Topics in Energy Resources Engineering	ESS 141	Remote Sensing of the Oceans
ENERGY 274	Complex Analysis for Practical Engineering	ESS 148	Introduction to Physical Oceanography
ENERGY 275	Quantitative Methods in Basin and Petroleum System Modeling	ESS 151	Biological Oceanography
ENERGY 291	Optimization of Energy Systems		
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution		
ENERGY 293B	Fundamentals of Energy Processes		
ENERGY 293C	Energy from Wind and Water Currents		
ENERGY 301	The Energy Seminar		

ESS 152	Marine Chemistry
ESS 155	Science of Soils
ESS 158	Geomicrobiology
ESS 162	Remote Sensing of Land
ESS 164	Fundamentals of Geographic Information Science (GIS)
ESS 165	Advanced Geographic Information Systems
ESS 179S	Seminar: Issues in Environmental Science, Technology and Sustainability
ESS 206	World Food Economy
ESS 208	Topics in Geobiology
ESS 210	Techniques in Environmental Microbiology
ESS 211	Fundamentals of Modeling
ESS 212	Measurements in Earth Systems
ESS 214	Introduction to geostatistics and modeling of spatial uncertainty
ESS 218	Disasters, Decisions, Development in Sustainable Urban Systems
ESS 220	Physical Hydrogeology
ESS 221	Contaminant Hydrogeology and Reactive Transport
ESS 232	Evolution of Earth Systems
ESS 240	Advanced Oceanography
ESS 241	Remote Sensing of the Oceans
ESS 244	Marine Ecosystem Modeling
ESS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation
ESS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation
ESS 249	Marine Stable Isotopes
ESS 251	Biological Oceanography
ESS 252	Marine Chemistry
ESS 253S	Hopkins Microbiology Course
ESS 255	Microbial Physiology
ESS 256	Soil and Water Chemistry
ESS 258	Geomicrobiology
ESS 259	Environmental Microbial Genomics
ESS 260	Advanced Statistical Methods for Earth System Analysis
ESS 262	Remote Sensing of Land
ESS 265	Advanced Geographic Information Systems
ESS 270	Analyzing land use in a globalized world
ESS 280	Principles and Practices of Sustainable Agriculture
ESS 282	Designing Educational Gardens
ESS 292	Directed Individual Study in Earth System Science
ESS 300	Climate studies of terrestrial environments
ESS 301	Topics in Earth System Science
ESS 305	Climate Change: An Earth Systems Perspective
ESS 306	From Freshwater to Oceans to Land Systems: An Earth System Perspective to Global Challenges
ESS 307	Research Proposal Development and Delivery
ESS 322B	Seminar in Hydrology
ESS 323	Stanford at Sea
ESS 330	Advanced Topics in Hydrogeology
ESS 360	Social Structure and Social Networks
ESS 363	Demography and Life History Theory
ESS 363F	Oceanic Fluid Dynamics
ESS 385	Practical Experience in the Geosciences
ESS 400	Graduate Research
ETHICSOC 133	Ethics and Politics of Public Service
ETHICSOC 136f	Introduction to Global Justice
ETHICSOC 178M	Introduction to Environmental Ethics
ETHICSOC 180I	The Ethics and Politics of Collective Action
ETHICSOC 185M	Contemporary Moral Problems
ETHICSOC 278I	Introduction to Environmental Ethics
FEMGEN 129	Critical Issues in International Women's Health
GEOPHYS 20N	Predicting Volcanic Eruptions
GEOPHYS 60N	Man versus Nature: Coping with Disasters Using Space Technology
GEOPHYS 70	The Water Course
GEOPHYS 90	Earthquakes and Volcanoes
GEOPHYS 110	Introduction to the foundations of contemporary geophysics
GEOPHYS 112	Exploring Geosciences with MATLAB
GEOPHYS 120	Ice, Water, Fire
GEOPHYS 130	Introductory Seismology
GEOPHYS 141	Remote Sensing of the Oceans
GEOPHYS 150	Geodynamics: Our Dynamic Earth
GEOPHYS 160	D <sup>3</sup> : Disasters, Decisions, Development
GEOPHYS 162	Laboratory Methods in Geophysics
GEOPHYS 171	Tectonics Field Trip
GEOPHYS 181	Fluids and Flow in the Earth: Computational Methods
GEOPHYS 182	Reflection Seismology
GEOPHYS 183	Reflection Seismology Interpretation
GEOPHYS 184	Journey to the Center of the Earth
GEOPHYS 185	Rock Physics for Reservoir Characterization
GEOPHYS 186	Tectonophysics
GEOPHYS 190	Near-Surface Geophysics
GEOPHYS 191	Observing Freshwater
GEOPHYS 196	Undergraduate Research in Geophysics
GEOPHYS 201	Frontiers of Geophysical Research at Stanford: Faculty Lectures
GEOPHYS 202	Reservoir Geomechanics
GEOPHYS 203	Fluids and Flow in the Earth: Computational Methods
GEOPHYS 205	Effective Scientific Presentation and Public Speaking
GEOPHYS 208	Unconventional Reservoir Geomechanics
GEOPHYS 210	Basic Earth Imaging
GEOPHYS 211	Environmental Soundings Image Estimation
GEOPHYS 212	Topics in Climate Change
GEOPHYS 217	Numerical Methods in Engineering and Applied Sciences
GEOPHYS 220	Ice, Water, Fire
GEOPHYS 222	Reflection Seismology
GEOPHYS 223	Reflection Seismology Interpretation
GEOPHYS 224	Seismic Reflection Processing
GEOPHYS 229	Earthquake Rupture Dynamics
GEOPHYS 235	Waves and Fields in Geophysics
GEOPHYS 240	Borehole Seismic Modeling and Imaging
GEOPHYS 241A	Seismic Reservoir Characterization
GEOPHYS 255	Report on Energy Industry Training
GEOPHYS 257	Introduction to Computational Earth Sciences
GEOPHYS 259	Laboratory Methods in Geophysics
GEOPHYS 260	Rock Physics for Reservoir Characterization

GEOPHYS 262	Rock Physics
GEOPHYS 265	Imaging Radar and Applications
GEOPHYS 270	Electromagnetic Properties of Geological Materials
GEOPHYS 280	3-D Seismic Imaging
GEOPHYS 281	Geophysical Inverse Problems
GEOPHYS 284	Hydrogeophysics
GEOPHYS 287	Earthquake Seismology
GEOPHYS 288A	Crustal Deformation
GEOPHYS 288B	Crustal Deformation
GEOPHYS 289	Global Positioning System in Earth Sciences
GEOPHYS 290	Tectonophysics
GEOPHYS 385A	Reflection Seismology
GEOPHYS 385B	Environmental Geophysics
GEOPHYS 385C	Theoretical Geophysics
GEOPHYS 385E	Tectonics
GEOPHYS 385F	Crustal Mechanics
GEOPHYS 385L	Earthquake Seismology, Deformation, and Stress
GEOPHYS 385M	Experimental Rock Physics
GEOPHYS 385S	Wave Physics
GEOPHYS 385V	Poroelasticity
GEOPHYS 385W	GEOPHYSICAL MULTI-PHASE FLOWS
GEOPHYS 385Z	Radio Remote Sensing
GES 260	
GES 340	
GS 1	Introduction to Geology
GS 4	Coevolution of Earth and Life
GS 5	Living on the Edge
GS 14	Our National Parks
GS 38N	The Worst Journey in the World: The Science, Literature, and History of Polar Exploration
GS 40N	Diamonds
GS 42	Landscapes and Tectonics of the San Francisco Bay Area
GS 46Q	Environmental Impact of Energy Systems: What are the Risks?
GS 55Q	The California Gold Rush: Geologic Background and Environmental Impact
GS 59N	Earthquake 9.0: The Heritage of Fukushima Daiichi 6 Years Later
GS 90	Introduction to Geochemistry
GS 102	Earth Materials: Introduction to Mineralogy
GS 103	Earth Materials: Rocks in Thin Section
GS 104	Introduction to Petrology
GS 105	Introduction to Field Methods
GS 106	Sedimentary Geology and Depositional Systems
GS 110	Rock Deformation and Tectonics
GS 111	Fundamentals of Structural Geology
GS 114A	Our National Parks
GS 118	Disasters, Decisions, Development in Sustainable Urban Systems
GS 121	What Makes a Habitable Planet?
GS 122	Planetary Systems: Dynamics and Origins
GS 123	Evolution of Marine Ecosystems
GS 128	Evolution of Terrestrial Ecosystems
GS 130	Soil Physics and Hydrology
GS 131	Hydrologically-Driven Landscape Evolution
GS 135	Sedimentary Geochemistry and Analysis
GS 150	Senior Seminar: Issues in Earth Sciences
GS 163	Introduction to Isotope Geochemistry
GS 170	Environmental Geochemistry
GS 171	Geochemical Thermodynamics
GS 180	Igneous Processes
GS 182	Field Trip to Cascade Volcanoes of California
GS 184	Field Trip to Volcanoes of the Eastern Sierran Volcanism
GS 185	Volcanology
GS 190	Research in the Field
GS 191	Stanford EARTH Field Courses
GS 192	Undergraduate Research in Geological Sciences
GS 197	Senior Thesis
GS 198	Special Problems in Geological Sciences
GS 204	Introduction to Petrology
GS 206	Topics in Organismal Paleobiology
GS 208	Topics in Geobiology
GS 209	Microstructures
GS 213	Topics in Sedimentary Geology
GS 214	Topics in Paleobiology
GS 218	Disasters, Decisions, Development in Sustainable Urban Systems
GS 221	What Makes a Habitable Planet?
GS 222	Planetary Systems: Dynamics and Origins
GS 223	Reflection Seismology Interpretation
GS 223B	Evolution of Marine Ecosystems
GS 228	Evolution of Terrestrial Ecosystems
GS 233A	Microbial Physiology
GS 235	Sedimentary Geochemistry and Analysis
GS 238	Soil Physics
GS 240	Data science for geoscience
GS 246	Reservoir Characterization and Flow Modeling with Outcrop Data
GS 248	The Petroleum System: Investigative method to explore for conventional & unconventional hydrocarbons
GS 250	Sedimentation Mechanics
GS 251	Sedimentary Basins
GS 252	Sedimentary Petrography
GS 253	Petroleum Geology and Exploration
GS 255	Basin and Petroleum System Modeling
GS 256	Quantitative Methods in Basin and Petroleum System Modeling
GS 257	Clastic Sequence Stratigraphy
GS 259	Stratigraphic Architecture
GS 262	Thermodynamics and Disorder in Minerals and Melts
GS 263	Introduction to Isotope Geochemistry
GS 266	Managing Nuclear Waste: Technical, Political and Organizational Challenges
GS 270	Environmental Geochemistry
GS 280	Igneous Processes
GS 281	Principles of <sup>40</sup> Ar/ <sup>39</sup> Ar Thermochronometry
GS 285A	Volcanology
GS 287	Fundamentals of Mass Spectrometry
GS 290	Departmental Seminar in Geological Sciences
GS 291	GS Field Trips
GS 292	Directed Reading with Geological Sciences Faculty
GS 293A	Modern Carbonates Field Trip



GS 299	Field Research	HRP 256	Economics of Health and Medical Care
GS 311	Interpretation of Tectonically Active Landscapes	HRP 259	Introduction to Probability and Statistics for Epidemiology
GS 312	Analysis of Landforms	HRP 299	Directed Reading in Health Research and Policy
GS 313	Modeling of Landforms	HUMBIO 2A	Genetics, Evolution, and Ecology
GS 315	Literature of Structural Geology	HUMBIO 2B	Culture, Evolution, and Society
GS 336	Stanford Alpine Project Seminar	HUMBIO 3B	Behavior, Health, and Development
GS 381	Igneous Petrology and Petrogenesis Seminar	HUMBIO 4B	Environmental and Health Policy Analysis
GS 385	Practical Experience in the Geosciences	HUMBIO 5E	Science Education in Human Biology
GS 399	Advanced Projects	HUMBIO 19SC	Parks and Peoples: Dilemmas of Protected Area Conservation in East Africa
GS 400	Graduate Research	HUMBIO 112	Conservation Biology: A Latin American Perspective
GSBGEN 332	Sustainable Energy: Business Opportunities and Public Policy	HUMBIO 113	The Human-Plant Connection
GSBGEN 335	Clean Energy Project Development and Finance	HUMBIO 113S	Healthy/Sustainable Food Systems: Maximum Sustainability across Health, Economics, and Environment
GSBGEN 336	Energy Markets and Policy	HUMBIO 114	Environmental Change and Emerging Infectious Diseases
GSBGEN 532	Clean Energy Opportunities	HUMBIO 118	Theory of Ecological and Environmental Anthropology
GSBGEN 533	Technology Licensing	HUMBIO 121E	Ethnicity and Medicine
HISTORY 1B	Global History: The Early Modern World, 1300 to 1800	HUMBIO 122M	Challenges of Human Migration: Health and Health Care of Migrants and Autochthonous Populations
HISTORY 40	World History of Science	HUMBIO 125	Current Topics and Controversies in Women's Health
HISTORY 40A	The Scientific Revolution	HUMBIO 126	Promoting Health Over the Life Course: Multidisciplinary Perspectives
HISTORY 42S	The Circle of Life: Visions of Nature in Modern Science, Religion, Politics and Culture	HUMBIO 129	Critical Issues in International Women's Health
HISTORY 44	Women and Gender in Science, Medicine and Engineering	HUMBIO 130	Human Nutrition
HISTORY 47	History of South Africa	HUMBIO 151R	Biology, Health and Big Data
HISTORY 102	History of the International System	HUMBIO 153	Parasites and Pestilence: Infectious Public Health Challenges
HISTORY 103D	Human Society and Environmental Change	HUMBIO 154A	Engineering Better Health Systems: modeling for public health
HISTORY 106A	Global Human Geography: Asia and Africa	HUMBIO 155H	Humans and Viruses I
HISTORY 106B	Global Human Geography: Europe and Americas	HUMBIO 159	Genes and Environment in Disease Causation: Implications for Medicine and Public Health
HISTORY 140	World History of Science	HUMBIO 166	Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context
HISTORY 147	History of South Africa	HUMBIO 173	Science, Innovation and the Law
HISTORY 151	The American West	HUMBIO 178	Ethics and Politics of Public Service
HISTORY 208A	Science and Law in History	HUMBIO 182	Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years
HISTORY 226E	Famine in the Modern World	ILAC 363	Visions of the Andes
HISTORY 254	Popular Culture and American Nature	INTNLREL 61Q	Food and security
HISTORY 278S	The Ethical Challenges of Climate Change	INTNLREL 102	History of the International System
HISTORY 283	Middle East Oil and Global Economy	INTNLREL 135A	International Environmental Law and Policy
HISTORY 308A	Science and Law in History	INTNLREL 136F	Introduction to Global Justice
HISTORY 326E	Famine in the Modern World	IPS 201	Managing Global Complexity
HISTORY 383	Middle East Oil and Global Economy	IPS 203	Issues in International Economics
HISTORY 471A	Environmental History of Latin America	IPS 270	The Geopolitics of Energy
HISTORY 471B	Environmental History of Latin America	LAW 2518	U.S. Environmental Law in Transition
HISTORY 478	The Ethical Challenges of Climate Change	MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
HRP 206	Meta-research: Appraising Research Findings, Bias, and Meta-analysis	MATSCI 302	Solar Cells
HRP 214	Scientific Writing	MATSCI 303	Principles, Materials and Devices of Batteries
HRP 216	Analytical and Practical Issues in the Conduct of Clinical and Epidemiologic Research	ME 16N	Energy & The Industrial Revolution - Past, Present & Future
HRP 223	Introduction to Data Management and Analysis in SAS		
HRP 225	Design and Conduct of Clinical and Epidemiologic Studies		
HRP 226	Intermediate Epidemiologic and Clinical Research Methods		
HRP 231	Epidemiology of Infectious Diseases		
HRP 236	Epidemiology Research Seminar		
HRP 238	Genes and Environment in Disease Causation: Implications for Medicine and Public Health		

ME 23Q	The Worldly Engineer	OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment
ME 70	Introductory Fluids Engineering	OUTDOOR 101	Introduction to Outdoor Education
ME 206A	Design for Extreme Affordability	OUTDOOR 105	Outdoor Living Skills
ME 206B	Design for Extreme Affordability	OUTDOOR 106	Outdoor Leadership Practicum
ME 250	Internal Combustion Engines	PEDS 150	Social and Environmental Determinants of Health
ME 257	Gas-Turbine Design Analysis	PEDS 250	Social and Environmental Determinants of Health
ME 260	Fuel Cell Science and Technology	PHIL 23M	Justice and Climate Change
ME 262	Physics of Wind Energy	PHIL 25SI	The Animal-Human Relationship: Interdisciplinary Perspectives
ME 357	Gas-Turbine Design Analysis	PHIL 72	Contemporary Moral Problems
ME 370A	Energy Systems I: Thermodynamics	PHIL 73	The Ethics and Politics of Collective Action
ME 370B	Energy Systems II: Modeling and Advanced Concepts	PHIL 76	Introduction to Global Justice
ME 370C	Energy Systems III: Projects	PHIL 164	Central Topics in the Philosophy of Science: Theory and Evidence
ME 371	Combustion Fundamentals	PHIL 167B	Philosophy, Biology, and Behavior
MED 108Q	Human Rights and Health	PHIL 175A	Ethics and Politics of Public Service
MI 70Q	Photographing Nature	PHIL 177C	Ethics of Climate Change
MS&E 52	Introduction to Decision Making	PHIL 178M	Introduction to Environmental Ethics
MS&E 92Q	International Environmental Policy	PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence
MS&E 93Q	Nuclear Weapons, Energy, Proliferation, and Terrorism	PHIL 267B	Philosophy, Biology, and Behavior
MS&E 152	Introduction to Decision Analysis	PHIL 275A	Ethics and Politics of Public Service
MS&E 181	Issues in Technology and Work	PHIL 277C	Ethics of Climate Change
MS&E 185	Global Work	PHIL 278M	Introduction to Environmental Ethics
MS&E 190	Methods and Models for Policy and Strategy Analysis	PHYSICS 240	Introduction to the Physics of Energy
MS&E 243	Energy and Environmental Policy Analysis	PHYSICS 241	Introduction to Nuclear Energy
MS&E 250A	Engineering Risk Analysis	POLECON 230	Strategy Beyond Markets
MS&E 250B	Project Course in Engineering Risk Analysis	POLECON 231	Strategy Beyond Markets: Challenges and Opportunities in Developing Economies
MS&E 252	Decision Analysis I: Foundations of Decision Analysis	POLISCI 73	Energy Policy in California and the West
MS&E 292	Health Policy Modeling	POLISCI 124A	The American West
MS&E 294	Systems Modeling for Climate Policy Analysis	POLISCI 131A	The Ethics and Politics of Collective Action
MS&E 295	Energy Policy Analysis	POLISCI 133	Ethics and Politics of Public Service
MS&E 299	Voluntary Social Systems	POLISCI 134L	Introduction to Environmental Ethics
MS&E 352	Decision Analysis II: Professional Decision Analysis	POLISCI 136R	Introduction to Global Justice
MS&E 494	The Energy Seminar	POLISCI 241S	Spatial Approaches to Social Science
NATIVEAM 109A	Federal Indian Law	PSYCH 459	Frontiers in Interdisciplinary Biosciences
NATIVEAM 109B	Indian Country Economic Development	PUBLPOL 101	Politics and Public Policy
OBYGN 256	Current Topics and Controversies in Women's Health	PUBLPOL 103D	Ethics and Politics of Public Service
OIT 333	Design for Extreme Affordability	PUBLPOL 104	Economic Policy Analysis
OIT 334	Design for Extreme Affordability	PWR 1MS	Writing & Rhetoric 1: Seeing Nature: The Power of Environmental Visual Rhetoric
OSPAUSTL 10	Coral Reef Ecosystems	PWR 1SI	Writing & Rhetoric 1: Super-Storms, Polar Bears, and Droughts: The Rhetoric of Climate Change
OSPAUSTL 25	Freshwater Systems	PWR 2CR	Writing & Rhetoric 2: Communicating Science to the Public
OSPAUSTL 30	Coastal Forest Ecosystems	PWR 2JS	Writing & Rhetoric 2: In Science We Trust
OSPAUSTL 40	Australian Studies	PWR 2KM	Writing & Rhetoric 2: A Planet on the Edge: The Rhetoric of Sustainable Energy
OSPCPTWN 50	[Independent Study] Conservation & Resources in Sub-Saharan Africa	PWR 2RL	Writing & Rhetoric 2: The Rhetoric of the Natural and Beyond
OSPCPTWN 63	Socio-Ecological Systems	PWR 2SB	Writing & Rhetoric 2: Writing 'Science': Fact, Fiction, and Everything Between
OSPKYOTO 45	Japan's Energy-Environment Conundrum	PWR 91CL	Intermediate Writing: Self & Science
OSPMADR 8A	Cities and Creativity: Cultural and Architectural Interpretations of Madrid	PWR 91EP	Intermediate Writing: Communicating Climate Change: Navigating the Stories from the Frontlines
OSPPARIS 86	Measuring Well-Being and Sustainability in Today's World	PWR 91JS	Intermediate Writing: Stanford Science Podcast
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America		
OSPSANTG 58	Living Chile: A Land of Extremes		

PWR 91KS	Intermediate Writing: Design Thinking and Science Communication
PWR 91NSC	Intermediate Writing: Introduction to Science Communication
PWR 91RS	Intermediate Writing: Communicating Bioinformation
PWR 91S	Intermediate Writing: Communicating Science
SIW 144	Energy, Environment, Climate and Conservation Policy: A Washington, D.C. Perspective
SOC 118	Social Movements and Collective Action
SOC 159	Social and Cultural Dimensions of GlobalIndigeneity
SOC 160	Formal Organizations
SOC 218	Social Movements and Collective Action
SOC 260	Formal Organizations
STATS 60	Introduction to Statistical Methods: Precalculus
STATS 110	Statistical Methods in Engineering and the Physical Sciences
STATS 141	Biostatistics
STATS 160	Introduction to Statistical Methods: Precalculus
STS 131	Science, Technology, and Environmental Justice
STS 140	Science, Technology and Politics
STS 190	Issues in Technology and the Environment
STS 200A	Food and Society: Politics, Culture and Technology
STS 200E	Technology, Nature, and Environmentalism
SURG 231	Healthcare in Haiti and other Resource Poor Countries
THINK 8	Sustainability and Collapse
THINK 29	Networks: Ecological, Revolutionary, Digital
THINK 39	Energy? Understanding the Challenge, Developing Solutions
THINK 40	Sustainability Challenges and Transitions
URBANST 110	Introduction to Urban Studies
URBANST 113	Introduction to Urban Design: Contemporary Urban Design in Theory and Practice
URBANST 114	Urban Culture in Global Perspective
URBANST 122	Ethics and Politics of Public Service
URBANST 124	Spatial Approaches to Social Science
URBANST 163	Land Use Control
URBANST 164	Sustainable Cities
URBANST 165	Sustainable Urban and Regional Transportation Planning
URBANST 167	Green Mobilities for the Suburbs of the Future
URBANST 174	Defining Smart Cities: Visions of Urbanism for the 21st Century

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Total Units 0

# EMMETT INTERDISCIPLINARY PROGRAM IN ENVIRONMENT AND RESOURCES (E-IPER)

Courses offered by the Emmett Interdisciplinary Program in Environment and Resources are listed under the subject code ENVRES on the Stanford Bulletin's ExploreCourses web site (<http://explorecourses.stanford.edu/search;jsessionid=75B13D9BD401BF4435773811DC678716?view=catalog&catalog=&page=0&q=ENVRES&filter-catalognumber-ENVRES=on&filter-coursestatus-Active=on>).

## Mission of the Program

The Emmett Interdisciplinary Program in Environment and Resources develops the knowledge, skills, perspectives, and ways of thinking needed to understand and help solve the world's most significant environmental and resources sustainability challenges. E-IPER strives to be a model for interdisciplinary graduate education. E-IPER offers a Ph.D. in Environment and Resources, a Joint M.S. exclusively for students in Stanford's Graduate School of Business or Stanford Law School, and a Dual M.S. for students in the School of Medicine or a Ph.D. program in another department. E-IPER's home is the School of Earth, Energy & Environmental Sciences; affiliated faculty come from all seven Stanford schools.

## Graduate Programs in Environment and Resources

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees (p. 50)" section of this bulletin. The E-IPER Ph.D. and M.S. degrees are guided by comprehensive requirements created with faculty and student input and approved by E-IPER's Executive Committee. To access the current Ph.D. and M.S. degree requirement documents, see the E-IPER web site (<https://earth.stanford.edu/eiper>).

## Learning Outcomes (Graduate)

Completion of the Ph.D. and M.S. degrees in Environment and Resources provides students with the knowledge, skills, perspectives, and ways of thinking needed to understand and help solve the world's most significant environmental and resources sustainability challenges.

## Master of Science in Environment and Resources

For information on the University's basic requirements for the master's degree, see the "Graduate Degrees (p. 50)" section of this bulletin.

The Master of Science degree, offered as a joint master's degree or a dual master's degree, is an option only for: M.B.A. students in the Graduate School of Business; J.D. students in the Stanford Law School; M.D. students in the School of Medicine; students pursuing a Ph.D. in another Stanford department; and for E-IPER Ph.D. students who do not continue in the Ph.D. degree program.

## Joint Master's Degree

Students enrolled in a professional degree program in Stanford's Graduate School of Business or the Stanford Law School are eligible to apply for admission to the Joint M.S. in Environment and Resources Degree program. Enrollment in the joint M.S. program allows students to pursue an M.S. degree concurrently with their professional degree and to count a defined number of units toward both degrees, resulting in the

award of Joint M.B.A. and M.S. in Environment and Resources degree or a Joint J.D. and M.S. in Environment and Resources degree.

The joint M.S.-M.B.A degree program requires a total of 129 units: 84 units for the M.B.A. and 45 units for the M.S. (compared to 100 units for the M.B.A. plus 45 units for the M.S. as separate degrees) to be completed over approximately eight academic quarters.

The joint M.S.-J.D. degree program requires a minimum of 113 units; additional units may be necessary to satisfy all requirements. The J.D. degree requires 111 units (minimum of 80 Law units and 31 non-Law units) and the M.S. degree requires 45 units. The joint degree allows up to 43 overlapping units: 31 non-Law units allowed within the J.D. degree plus 12 professional school units allowed within the M.S. degree. The joint M.S.-J.D. may be completed in three years.

Each student's program of study focuses on a specific track (see "Joint M.S. and Dual M.S. Course Tracks" below), and is subject to the approval of the student's faculty adviser and E-IPER staff. The joint degree is conferred when the requirements for both the E-IPER M.S. and the professional degree program have been met.

In addition to requirements for the professional degree, all joint M.S. students are required to complete 45 units within the parameters outlined below and must achieve a 'B' (3.0) grade point average in all letter-graded courses taken toward the M.S. degree. Professional school letter-graded courses are not included in the E-IPER GPA calculation. The student must complete at least 23 units at the 200-level or above. Courses numbered 1 to 99 are not allowable. For application information, see the Admissions page on the E-IPER website.

1. *Required Courses:* An introductory core course and a capstone project seminar:

		Units
ENVRES 280	Topics in Environment and Resources	2
ENVRES 290	Capstone Project Seminar in Environment and Resources *	1-3

\* The capstone project integrates the student's professional and M.S. degrees and must be taken for a minimum of 3 units, or a maximum of 4 units, over one or two quarters.

2. *Track Courses:* A minimum of four letter-graded courses from one M.S. course track. Track courses must be taken for a minimum of 3 units. Specific track courses are listed below in the "Joint M.S. and Dual M.S. Course Tracks" section.
  - a. Cleantech
  - b. Climate and Atmosphere
  - c. Energy
  - d. Freshwater
  - e. Global, Community, and Environmental Health
  - f. Land Use and Agriculture
  - g. Oceans and Estuaries
  - h. Sustainable Built Environment
  - i. Sustainable Design
3. *Elective Courses:* At least four 3-5 unit letter-graded elective courses at the 100-level or higher. Elective courses may be taken from the student's selected course track, another course track, or elsewhere in the University, provided that they are relevant to the student's environment and resources course of study.

There are additional restrictions on course work used to fulfill the joint M.S. degree requirements:

- A maximum of 5 units from courses that are identified as primarily consisting of guest lectures, such as the Energy Seminar, may be counted toward the Joint M.S. degree.
- A maximum of 5 units of individual study courses, directed reading and/or independent research units (such as ENVRES 398 Directed Reading in Environment and Resources or ENVRES 399 Directed Research in Environment and Resources) may be counted toward the joint M.S. degree. One individual study course, if taken for 3-5 letter-graded units, may be counted as one of the four elective courses.
- A maximum of 12 units from approved courses related to environmental and resource fields, from any professional school, may be counted toward the joint M.S. degree. One approved professional school course may be counted as one of the four electives.

## Dual Master's Degree

Students in the School of Medicine or students pursuing a Ph.D. in another Stanford department may apply to pursue the M.S. in Environment and Resources dual degree. For the dual degree, students must meet the University's minimum requirements for their M.D. or Ph.D. degree and also complete an additional 45 units for the M.S. in Environment and Resources. Completion of the M.S. typically requires at least three quarters of study in addition to the time required for the student's other degree. For additional information, see the E-IPER web site.

Each student's program of study focuses on a specific track (see "Joint M.S. and Dual M.S. Course Tracks" below), and is subject to the approval of the student's faculty adviser and E-IPER staff. The two degrees are conferred when the requirements for both the E-IPER M.S. and the other degree program have been met. For application information, see the Admissions (<https://earth.stanford.edu/eiper/joint-ms-admissions>) page on the E-IPER website (<https://earth.stanford.edu/eiper>).

In addition to requirements for the M.D. or Ph.D. degree, students are required to complete 45 units within the parameters outlined below and must achieve a 'B' (3.0) grade point average in all letter-graded courses taken toward the M.S. degree. The student must complete at least 23 units at the 200-level or above. Courses numbered 1 to 99 are not allowable.

1. **Required Courses:** completion of a required introductory core course and a capstone project seminar:

ENVRES 280	Topics in Environment and Resources	2
ENVRES 290	Capstone Project Seminar in Environment and Resources (see '2' below)	1-3

2. The Capstone Project integrates the student's professional/Ph.D. and M.S. degrees and must be taken for a minimum of 3 units in one quarter, or a maximum of 4 units, over one or two quarters.
3. **Track Courses:** completion of a minimum of four letter-graded courses from one M.S. Course Track. Track courses must be taken for a minimum of 3 units. Specific track courses are listed below under Joint M.S. and Dual M.S. Course Tracks.
  - Cleantech
  - Climate and Atmosphere
  - Energy
  - Freshwater
  - Global, Community, and Environmental Health
  - Land Use and Agriculture
  - Oceans and Estuaries
  - Sustainable Built Environment
  - Sustainable Design

4. **Elective Courses:** completion of at least four additional 3-5 unit letter-graded elective courses at the 100-level or higher. Elective courses may be taken from the student's selected course track, another course track, or elsewhere in the University, provided that they are relevant to the student's environment and resources course of study.

There are additional restrictions on course work used to fulfill the dual M.S. degree requirements:

- A maximum of 5 units from courses that are identified as primarily consisting of guest lectures, such as the Energy Seminar may be counted toward the dual M.S. degree.
- A maximum of 5 units of individual study courses, directed reading, and independent research (such as ENVRES 398 Directed Reading in Environment and Resources or ENVRES 399 Directed Research in Environment and Resources) may be counted toward the Dual M.S. degree. One individual study course, if taken for 3-5 letter-graded units, may be counted as one of the four elective courses.
- A maximum of 12 units from approved courses related to the environmental and resource fields, from any professional school, may be counted toward the dual M.S. degree. One approved professional school course may be counted as one of the four electives.

## Joint M.S. and Dual M.S. Course Tracks

Students should consult the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site to view the course description, class schedule, location, eligibility, and prerequisites for all courses. Course track information and other recommended courses are also available on the E-IPER web site.

### Cleantech

		Units
APPPHYS 219	Solid State Physics Problems in Energy Technology	3
BIOE 355	Advanced Biochemical Engineering	3
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 207A	Understanding Energy	3-5
CEE 226	Life Cycle Assessment for Complex Systems	3-4
CEE 272R	Modern Power Systems Engineering	3
UrCEE 274A	Environmental Microbiology I	3
CEE 274B	Microbial Bioenergy Systems	3
CHEMENG 274	Environmental Microbiology I	3
CHEMENG 355	Advanced Biochemical Engineering	3
CHEMENG 456	Microbial Bioenergy Systems	3
ECON 155	Environmental Economics and Policy	5
EE 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ENERGY 253	Carbon Capture and Sequestration	3-4
ENERGY 267	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties	3
ENERGY 269	Geothermal Reservoir Engineering	3
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ENERGY 293C	Energy from Wind and Water Currents	3
MATSCI 302	Solar Cells	3
MATSCI 303	Principles, Materials and Devices of Batteries	3
MATSCI 316	Nanoscale Science, Engineering, and Technology	3
ME 260	Fuel Cell Science and Technology	3

## Climate and Atmosphere

		Units
BIO 117	Biology and Global Change	4
BIO 238	Ecosystem Services: Frontiers in the Science of Valuing Nature	3
CEE 172	Air Quality Management	3
CEE 226	Life Cycle Assessment for Complex Systems	3-4
CEE 263A	Air Pollution Modeling	3-4
CEE 263B	Numerical Weather Prediction	3-4
CEE 263C	Weather and Storms	3
CEE 263D	Air Pollution and Global Warming: History, Science, and Solutions	3
CEE 278A	Air Pollution Fundamentals	3
CEE 278C	Indoor Air Quality	2-3
EARTHSYS 111	Biology and Global Change	4
ECON 155	Environmental Economics and Policy	5
ENERGY 253	Carbon Capture and Sequestration	3-4
ESS 111	Biology and Global Change	4
ESS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3
ESS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
MS&E 294	Systems Modeling for Climate Policy Analysis	3

## Energy

		Units
APPPHYS 219	Solid State Physics Problems in Energy Technology	3
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 207A	Understanding Energy	3-5
CEE 226	Life Cycle Assessment for Complex Systems	3-4
CEE 226E	Advanced Topics in Integrated, Energy-Efficient Building Design	2-3
CEE 255	Introduction to Sensing Networks for CEE	3-4
CEE 256	Building Systems	4
CEE 272R	Modern Power Systems Engineering	3
EARTHSYS 101	Energy and the Environment	3
EARTHSYS 102	Fundamentals of Renewable Power	3
ECON 155	Environmental Economics and Policy	5
EE 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
EE 293B	Fundamentals of Energy Processes	3
ENERGY 101	Energy and the Environment	3
ENERGY 104	Sustainable Energy for 9 Billion	3
ENERGY 120	Fundamentals of Petroleum Engineering	3
ENERGY 226	Thermal Recovery Methods	3
ENERGY 227	Enhanced Oil Recovery	3
ENERGY 253	Carbon Capture and Sequestration	3-4
ENERGY 267	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties	3
ENERGY 269	Geothermal Reservoir Engineering	3
ENERGY 271	Energy Infrastructure, Technology and Economics	3
ENERGY 291	Optimization of Energy Systems	3-4
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ENERGY 293B	Fundamentals of Energy Processes	3
ENERGY 293C	Energy from Wind and Water Currents	3

ENGR 120	Fundamentals of Petroleum Engineering	3
GEOPHYS 208	Unconventional Reservoir Geomechanics	3
GS 253	Petroleum Geology and Exploration	3
MATSCI 302	Solar Cells	3
MATSCI 303	Principles, Materials and Devices of Batteries	3
MATSCI 316	Nanoscale Science, Engineering, and Technology	3
ME 260	Fuel Cell Science and Technology	3
ME 370A	Energy Systems I: Thermodynamics	3
ME 370B	Energy Systems II: Modeling and Advanced Concepts	4
ME 370C	Energy Systems III: Projects	3-5
MS&E 243	Energy and Environmental Policy Analysis	3
MS&E 295	Energy Policy Analysis	3

## Freshwater

		Units
BIO 238	Ecosystem Services: Frontiers in the Science of Valuing Nature	3
CEE 101B	Mechanics of Fluids	4
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 177	Aquatic Chemistry and Biology	4
CEE 226	Life Cycle Assessment for Complex Systems	3-4
CEE 260A	Physical Hydrogeology	4
CEE 260C	Contaminant Hydrogeology and Reactive Transport	3
CEE 262A	Hydrodynamics	3-4
CEE 262B	Transport and Mixing in Surface Water Flows	3-4
CEE 265A	Sustainable Water Resources Development	3
CEE 265C	Water Resources Management	3
CEE 265D	Water and Sanitation in Developing Countries	1-3
CEE 266A	Watersheds and Wetlands	4
CEE 266B	Floods and Droughts, Dams and Aqueducts	4
CEE 266D	Water Resources and Water Hazards Field Trips	2
CEE 268	Groundwater Flow	3-4
CEE 270	Movement and Fate of Organic Contaminants in Waters	3
CEE 271A	Physical and Chemical Treatment Processes	3
CEE 271B	Environmental Biotechnology	4
CEE 273	Aquatic Chemistry	3
CEE 273A	Water Chemistry Laboratory	3
ECON 155	Environmental Economics and Policy	5
ESS 220	Physical Hydrogeology	4
ESS 221	Contaminant Hydrogeology and Reactive Transport	3

## Global, Community, and Environmental Health

		Units
ANTHRO 262	Indigenous Peoples and Environmental Problems	3-5
ANTHRO 266	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness	3-5
ANTHRO 277	Environmental Change and Emerging Infectious Diseases	4-5
ANTHRO 282	Medical Anthropology	4
BIO 117	Biology and Global Change	4

BIO 238	Ecosystem Services: Frontiers in the Science of Valuing Nature	3
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 226	Life Cycle Assessment for Complex Systems	3-4
CEE 260C	Contaminant Hydrogeology and Reactive Transport	3
CEE 263A	Air Pollution Modeling	3-4
CEE 263D	Air Pollution and Global Warming: History, Science, and Solutions	3
CEE 265A	Sustainable Water Resources Development	3
CEE 265C	Water Resources Management	3
CEE 265D	Water and Sanitation in Developing Countries	1-3
CEE 270	Movement and Fate of Organic Contaminants in Waters	3
CEE 272	Coastal Contaminants	3-4
CEE 274D	Pathogens and Disinfection	3
CEE 276	Introduction to Human Exposure Analysis	3
CEE 277S	Design for a Sustainable World	1-5
CEE 278A	Air Pollution Fundamentals	3
CEE 278C	Indoor Air Quality	2-3
EARTHSYS 111	Biology and Global Change	4
ECON 155	Environmental Economics and Policy	5
ESS 111	Biology and Global Change	4
ESS 221	Contaminant Hydrogeology and Reactive Transport	3
HUMBIO 153	Parasites and Pestilence: Infectious Public Health Challenges	4
HUMBIO 166	Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context	4

## Land Use and Agriculture

		Units
ANTHRO 266	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness	3-5
BIO 117	Biology and Global Change	4
BIO 234	Conservation Biology: A Latin American Perspective	3
BIO 238	Ecosystem Services: Frontiers in the Science of Valuing Nature	3
BIO 375	Field Ecology & Conservation	4
CEE 226	Life Cycle Assessment for Complex Systems	3-4
CEE 275A	California Coast: Science, Policy, and Law	3-4
EARTHSYS 111	Biology and Global Change	4
EARTHSYS 155	Science of Soils	3-4
EARTHSYS 185	Feeding Nine Billion	4-5
EARTHSYS 187	FEED the Change: Redesigning Food Systems	2-3
EARTHSYS 242	Remote Sensing of Land	4
EARTHSYS 256	Soil and Water Chemistry	3
EARTHSYS 276	Open Space Management Practicum	4-5
EARTHSYS 281	Urban Agriculture in the Developing World	3-4
EARTHSYS 289A	FEED Lab: Food System Design & Innovation	3-4
ECON 155	Environmental Economics and Policy	5
ESS 111	Biology and Global Change	4
ESS 164	Fundamentals of Geographic Information Science (GIS)	3-4

ESS 206	World Food Economy	5
ESS 256	Soil and Water Chemistry	3
ESS 262	Remote Sensing of Land	4
ESS 270	Analyzing land use in a globalized world	3
HUMBIO 112	Conservation Biology: A Latin American Perspective	3
HUMBIO 166	Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context	4
IPS 274	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
URBANST 163	Land Use Control	4
URBANST 165	Sustainable Urban and Regional Transportation Planning	4-5

## Oceans and Estuaries

		Units
BIO 238	Ecosystem Services: Frontiers in the Science of Valuing Nature	3
BIO 274S	Hopkins Microbiology Course	3-12
BIOHOPK 263H	Oceanic Biology	4
BIOHOPK 272H	Marine Ecology: From Organisms to Ecosystems	5
BIOHOPK 273H	Marine Conservation Biology	4
BIOHOPK 274	Hopkins Microbiology Course	3-12
BIOHOPK 285H	Ecology and Conservation of Kelp Forest Communities	5
CEE 226	Life Cycle Assessment for Complex Systems	3-4
CEE 262D	Introduction to Physical Oceanography	4
CEE 272	Coastal Contaminants	3-4
CEE 274S	Hopkins Microbiology Course	3-12
CEE 275A	California Coast: Science, Policy, and Law	3-4
EARTHSYS 241	Remote Sensing of the Oceans	3-4
EARTHSYS 252	Marine Chemistry	3-4
EARTHSYS 258	Geomicrobiology	3
ECON 155	Environmental Economics and Policy	5
ESS 244	Marine Ecosystem Modeling	3
ESS 246A	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3
ESS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
ESS 251	Biological Oceanography	3-4
ESS 252	Marine Chemistry	3-4
ESS 253S	Hopkins Microbiology Course	3-12
ESS 258	Geomicrobiology	3

## Sustainable Built Environment

		Units
CEE 100	Managing Sustainable Building Projects	4
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 224A	Sustainable Development Studio	1-5
CEE 226	Life Cycle Assessment for Complex Systems	3-4
CEE 226E	Advanced Topics in Integrated, Energy-Efficient Building Design	2-3
CEE 241A	Infrastructure Project Development	3
CEE 255	Introduction to Sensing Networks for CEE	3-4

CEE 256	Building Systems	4
CEE 265A	Sustainable Water Resources Development	3
CEE 277L	Smart Cities & Communities	3
ECON 155	Environmental Economics and Policy	5
IPS 274	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
URBANST 163	Land Use Control	4
URBANST 165	Sustainable Urban and Regional Transportation Planning	4-5

## Sustainable Design

		Units
BIOE 281	Biomechanics of Movement	3
CEE 226	Life Cycle Assessment for Complex Systems	3-4
CEE 277S	Design for a Sustainable World	1-5
EARTHSYS 187	FEED the Change: Redesigning Food Systems	2-3
EARTHSYS 289A	FEED Lab: Food System Design & Innovation	3-4
ECON 155	Environmental Economics and Policy	5
ENGR 210	Perspectives in Assistive Technology (ENGR 110)	1-3
ENVRES 240	Environmental Decision-Making and Risk Perception	1-3
ENVRES 380	Innovating Large Scale Sustainable Transformations	4
ME 206A	Design for Extreme Affordability	4
ME 206B	Design for Extreme Affordability	4
ME 216A	Advanced Product Design: Needfinding	3-4
ME 281	Biomechanics of Movement	3
ME 283	Introduction to Biomechanics and Mechanobiology	3
ME 315	The Designer in Society	3
ME 316B	Product Design Master's Project	2-6

## Master of Science

In exceptional circumstances, students in E-IPER's Ph.D. program may opt to complete their training with a Master of Science degree. There is no direct admission to the M.S. degree program. Requirements for the M.S. include:

1. Completion of a minimum of 45 units at or above the 100-level, of which 23 units must be at or above the 200-level. Courses numbered 1 to 99 are not allowable.
2. Completion of the E-IPER Ph.D. core curriculum, with a letter grade of 'B' or higher in each course:

		Units
ENVRES 300	Introduction to Resource, Energy and Environmental Economics	3
ENVRES 315	Environmental Research Design Seminar	1
ENVRES 320	Designing Environmental Research	3-4
ENVRES 330 & ENVRES 398	Research Approaches for Environmental Problem Solving and Directed Reading in Environment and Resources	4-13

Additional courses may be chosen in consultation with the student's lead advisers. Students must maintain at least a 'B' (3.0) grade point average in all courses taken for the M.S. degree. The M.S. degree does not have an M.S. with thesis option. Students may write a M.S. thesis, but it is not formally recognized by the University.

## Doctor of Philosophy in Environment and Resources

For information on the University's basic requirements for the Ph.D. degree, see the "Graduate Degrees (p. 50)" section of this bulletin.

E-IPER updates the Ph.D. requirements annually, laying out the structure of advising meetings, core courses, program activities, and milestones that guide students' progress. Each student works with a faculty advising team from different research areas to design a course of study that allows the student to develop and exhibit:

1. understanding of analytical tools and research approaches for interdisciplinary problem solving, and a mastery of those tools and approaches central to the student's thesis work
2. depth of knowledge in at least two distinct fields of inquiry; and
3. interdisciplinary breadth as determined by faculty advisers and student.

Program-specific Ph.D. requirements, including a timeline to achieve milestones, are outlined in detail in the current year requirements and are summarized below:

1. In the first year, completion of the Ph.D. core course sequence:<sup>1</sup>

		Units
ENVRES 300	Introduction to Resource, Energy and Environmental Economics	3
ENVRES 315	Environmental Research Design Seminar	1
ENVRES 320	Designing Environmental Research	3-4
ENVRES 330 & ENVRES 398	Research Approaches for Environmental Problem Solving and Directed Reading in Environment and Resources	4-13

<sup>1</sup> Students who took EARTH 300 in previous years may also count this toward the requirement.

2. *Fields of Inquiry*: Fulfillment of depth in the student's two chosen fields of inquiry through courses, research, and/or independent studies as determined by the student and his/her faculty advisers and committee members. Fields of inquiry are the central focus of a student's dissertation research. Students have the freedom to define and choose the fields of inquiry in which they develop depth of understanding through the course of their Ph.D. program and which are distinct enough to ensure that the student's research is interdisciplinary. Each field of inquiry must correspond to a specific faculty adviser. As part of the qualifying exam, each student is required to submit a detailed essay describing:
  - the two fields of inquiry, explaining the development of these fields, and their relationship to the larger disciplines from which they are drawn;
  - how rigor is understood and achieved in these fields;
  - the importance and applicability of these fields to the student's research questions; and
  - how the student's work will combine these two fields of inquiry to produce an interdisciplinary research project that demonstrates scholarly rigor.
3. Demonstration of interdisciplinary breadth of knowledge that is more broadly related to environment and resources in the form of courses, independent study, and/or evidence of proficiency through prior course work or experience. Fulfillment of the interdisciplinary breadth



requirement must be certified by the student's lead faculty advisers and committee members.

4. Completion of quarterly meetings with advisers during the first year, and at minimum, annual meetings thereafter.
5. Submission of a candidacy plan for review at the second-year committee meeting of the minds and subject to the approval of the student's committee and E-IPER's faculty director. The candidacy plan should document how the student has fulfilled the program requirements to date and include a summary of research ideas and a list of faculty who might serve as qualifying exam committee members.
6. Completion of the oral qualifying exam and completion of the requirements for candidacy, including at least 25 letter-graded graduate course units (200 level and above) with at least a 'B' (3.0) average. The qualifying exam committee must include the student's two lead advisers and two to three other faculty members with expertise in the student's research area. The majority of the qualifying exam committee should be members of the Academic Council; the chair of the committee must be an Academic Council member and may not be one of the student's two lead advisers. In exceptional cases, the committee may include a member-at-large who is not a Stanford faculty member as a fourth or fifth member.
7. Completion of a written dissertation, approved by the student's dissertation reading committee consisting of the student's lead advisers and at least one other member, and passage of the University oral examination in defense of the dissertation following the guidelines outlined in the "Graduate Degrees (p. 50)" section of this bulletin. The University oral examination committee comprises the student's two lead advisers, at least two additional members, and a chair whose academic appointment is in a department outside that of the lead advisers. Normally, all committee members are Academic Council members; appointment of a non-Academic Council member must be petitioned and approved by the faculty director.

In addition to the requirements listed above, all Ph.D. students must:

1. Serve as a teaching assistant (TA) for at least one quarter in a course with a discussion section or with an opportunity to lecture in at least two class sessions, in any department or program, including but not limited to ENVRES 320 Designing Environmental Research or ENVRES 330 Research Approaches for Environmental Problem Solving. Seminars, including Introductory Seminars, may not be used to fulfill this requirement. Students should fulfill the teaching requirement by the end of the third year unless they obtain a firm commitment from a faculty member to TA a future course.
2. On an ongoing basis, submit grant proposals for external funding, defined as fellowship and/or research funds provided by a government agency, a private foundation, or a University entity other than E-IPER or the School of Earth, Energy and Environmental Sciences.
3. Participate each year in a Spring Quarter Annual Review in which the student and lead advisers submit progress reports for review by the E-IPER Academic Guidance Committee.

*Faculty Director:* Peter Vitousek (Biology)

*Associate Director:* Susannah Barsom

*Faculty:* Mark Algee-Hewitt (English), Nicole Ardoin (Education, Woods Institute for the Environment), Patrick Archie (Stanford Educational Farm), Kevin Arrigo (Earth System Science, Woods Institute for the Environment), Kenneth J. Arrow (Economics, emeritus), Gregory Asner (Global Ecology, Carnegie Institution), Shilajeet Banerjee (School of Earth, Energy & Environmental Sciences, Woods Institute for the Environment), William Barnett (Business), Michele Barry (Medicine, Woods Institute for the Environment), Eran Bendavid (Medicine, Woods Institute for the Environment), Sally M. Benson (Energy Resources Engineering, Global Climate and Energy Program, Woods Institute for the Environment),

Sarah L. Billington (Civil and Environmental Engineering), Barbara Block (Biology, Woods Institute for the Environment), Alexandria Boehm (Civil and Environmental Engineering, Woods Institute for the Environment), Adam Brandt (Energy Resources Engineering, Woods Institute for the Environment), Marshall Burke (Earth System Science, Woods Institute for the Environment), Jef Caers (Energy Resources Engineering), Ken Caldeira (Global Ecology, Carnegie Institution), Margaret Caldwell (Packard Foundation), Karen Casciotti (Earth System Science), Page Chamberlain (Earth System Science), Craig S. Criddle (Civil and Environmental Engineering, Woods Institute for the Environment), Larry B. Crowder (Biology, Woods Institute for the Environment), Mark Cullen (Medicine, Woods Institute for the Environment), Lisa Curran (Anthropology, Woods Institute for the Environment), Gretchen C. Daily (Biology, Woods Institute for the Environment), Jennifer Davis (Civil and Environmental Engineering, Woods Institute for the Environment), Giulio De Leo (Biology), Noah Diffenbaugh (Earth System Science, Woods Institute for the Environment), Rodolfo Dirzo (Biology, Woods Institute for the Environment), Robert B. Dunbar (Earth System Science, Woods Institute for the Environment), William H. Durham (Anthropology, Woods Institute for the Environment), Anne Ehrlich (Biology), Paul Ehrlich (Biology, Woods Institute for the Environment), Gary Ernst (Geological Sciences, emeritus), Walter Falcon (Woods Institute for the Environment, Freeman Spogli Institute for International Studies, emeritus), Scott Fendorf (Earth System Science, Woods Institute for the Environment), James Ferguson (Anthropology), Christopher B. Field (School of Earth, Energy and Environmental Sciences, Woods Institute for the Environment), Martin Fischer (Civil and Environmental Engineering), Zephyr Frank (History), David Freyberg (Civil and Environmental Engineering, Woods Institute for the Environment), Oliver Fringer (Civil and Environmental Engineering, Woods Institute for the Environment), Tadashi Fukami (Biology), Margot Gerritsen (Energy Resources Engineering), Steven Gorelick (Earth System Science, Woods Institute for the Environment), Mark Granovetter (Sociology, Woods Institute for the Environment), Elizabeth Hadly (Biology, Woods Institute for the Environment), Dan Iancu (Business), Mark Jacobson (Civil and Environmental Engineering, Woods Institute for the Environment), James Holland Jones (Earth System Science, Woods Institute for the Environment), Terry Karl (Political Science), David Kennedy (History, Woods Institute for the Environment), Donald Kennedy (Biology, Woods Institute for the Environment, emeritus), Julie Kennedy (Earth System Science, Woods Institute for the Environment), Brian Knutson (Psychology, Woods Institute for the Environment), Charles D. Kolstad (Stanford Institute for Economic Policy Research, Precourt Institute for Energy, Woods Institute for the Environment), Jeffrey Koseff (Civil and Environmental Engineering, Woods Institute for the Environment), Anthony Kovscek (Energy Resources Engineering), Desiree LaBeaud (Medicine), Eric Lambin (Earth System Science, Woods Institute for the Environment), Michael Lepech (Civil and Environmental Engineering, Woods Institute for the Environment), Hau Lee (Business, Woods Institute for the Environment), Raymond Levitt (Civil and Environmental Engineering, Woods Institute for the Environment), David Lobell (Earth System Science, Woods Institute for the Environment), Stephen P. Luby (Medicine, Woods Institute for the Environment, Woods Institute for the Environment), Richard Luthy (Civil and Environmental Engineering, Woods Institute for the Environment), Janet Martinez (Law), Gilbert M. Masters (Civil and Environmental Engineering, emeritus, Woods Institute for the Environment), Pamela Matson (Dean, School of Earth, Energy & Environmental Sciences, Woods Institute for the Environment), Douglas McAdam (Sociology), Daniel McFarland (Education), Michael D. McGehee (Materials Science and Engineering, Woods Institute for the Environment), Lynn Meskell (Anthropology, Woods Institute for the Environment), Anna Michalak (Global Ecology, Carnegie Institution), Fiorenza Micheli (Biology, Woods Institute for the Environment), Dale T. Miller (Business), Grant Miller (Medicine), Stephen Monismith (Civil and Environmental Engineering, Woods Institute for the Environment), Harold Mooney (Biology, Woods Institute for the Environment, emeritus), Erin Mordecai (Biology), Clayton Nall (Political Science), Rosamond Naylor (Earth System Science, Woods Institute for the Environment),

Leonard Ortolano (Civil and Environmental Engineering, Woods Institute for the Environment), Stephen Palumbi (Biology, Woods Institute for the Environment), Kabir Peay (Biology), Erica Plambeck (Business, Woods Institute for the Environment), Walter W. Powell (Education), Dariush Rafinejad (Management Science and Engineering), Ram Rajagopal (Civil and Environmental Engineering), Hayagreeva Rao (Business), Stefan J. Reichelstein (Business, Woods Institute for the Environment), Dan Reicher (Business), Thomas N. Robinson (Medicine, Woods Institute for the Environment), Robert Sapolsky (Biology), Debra Satz (Philosophy), Gary Schoolnik (Medicine, Woods Institute for the Environment), Kenneth Schultz (Political Science), Richard Scott (Sociology), Krish Seetah (Anthropology), Baba Shiv (Business), Deborah Sivas (Law, Woods Institute for the Environment), Sarah A. Soule (Business), Stephen Stedman (Freeman Spogli Institute for International Studies, Woods Institute for the Environment), Jenny Suckale (Geophysics, Woods Institute for the Environment), James Sweeney (Management Science and Engineering, Precourt Energy Efficiency Center, Woods Institute for the Environment), Leif Thomas (Earth System Science), Barton Thompson (Law, Woods Institute for the Environment), Shripad Tuljapurkar (Biology), Peter Vitousek (Biology, Woods Institute for the Environment), Michael Wara (Law, Woods Institute for the Environment), Jeremy Weinstein (Political Science), John Weyant (Management Science and Engineering, Precourt Energy Efficiency Center, Woods Institute for the Environment), Richard White (History, Woods Institute for the Environment), Michael Wilcox (Anthropology), Mikael Wolfe (History), Mark Zoback (Geophysics)

# ENERGY RESOURCES ENGINEERING

Courses offered by the Department of Energy Resources Engineering are listed under the subject code ENERGY on the Stanford Bulletin's ExploreCourses web site.

The Department of Energy Resources Engineering (ERE) awards the following degrees: the Bachelor of Science, Master of Science, Engineer, and Doctor of Philosophy in Energy Resources Engineering. The department also awards the Master of Science, Engineer, and Doctor of Philosophy in Petroleum Engineering. Consult the ERE student services office to determine the relevant program.

Energy Resources Engineering contributes to the engineering science needed to maintain and diversify energy supply while finding the least impactful and most rapid pathways toward greater energy sustainability. Energy Resources Engineering is concerned with the production, transformation, and impacts of energy resources including renewables and fossil fuels. Crude oil and natural gas are especially important components of the current energy system due to their widespread use, economic importance, and contributions to climate change. As such, the flow of water, oil, and gas in the subsurface are important to quantify accurately for energy recovery, energy storage, and environmental assessment.

The program also has a strong interest in related energy topics such as renewable energy, global climate change, carbon capture and sequestration, and energy systems. The Energy Resources Engineering curriculum provides a sound background in basic sciences and their application to practical problems to address the complex and changing nature of the field. Course work includes the fundamentals of chemistry, computer science, engineering, geology, geophysics, mathematics, and physics. Applied courses cover most aspects of energy resources engineering and some related fields such as geostatistics. The curriculum emphasizes the fundamental aspects of fluid flow in the subsurface. These principles apply to optimizing energy recovery from petroleum reservoirs, geothermal energy systems, energy storage, and remediating contaminated groundwater systems.

Faculty and graduate students conduct research in areas including: enhanced oil recovery; geostatistical reservoir characterization and mathematical modeling; geothermal engineering; natural gas engineering; production optimization; data assimilation and uncertainty quantification; properties of petroleum fluids; power production from wind and wave energy; well test analysis; carbon sequestration; multi-scale physics; and energy system modeling and optimization. Undergraduates are encouraged to participate in research projects.

The department is housed in the Green Earth Sciences Building. It operates laboratories for research in enhanced oil recovery processes, geological carbon storage operations, and geothermal engineering. Students have access to a variety of computers, computing platforms and software for research and course work.

## Mission of the Undergraduate Program in Energy Resources Engineering

The mission of the Energy Resources Engineering major is to provide students with the engineering skills and foundational knowledge needed to flourish as technical leaders within the energy industry. Such skills and knowledge include resource assessment, choices among energy alternatives, and carbon management, as well as the basic scientific background and technical skills common to engineers. The curriculum

is designed to prepare students for immediate participation in many aspects of the energy industry and graduate school.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. apply skills developed in fundamental courses to engineering problems.
2. research, analyze, and synthesize solutions to an original and contemporary energy problem.
3. work independently and as part of a team to develop and improve engineering solutions.
4. apply written, visual, and oral presentation skills to communicate scientific knowledge.

## Graduate Programs in Energy Resources Engineering

The Energy Resources Engineering department offers two distinct degree programs at both the M.S and Ph.D. levels. One program leads to the degrees of M.S. or Ph.D. in Petroleum Engineering, and the other leads to the degrees of M.S. or Ph.D. in Energy Resources Engineering. The Engineer degree, that is offered in either Petroleum Engineering or Energy Resources Engineering, is an extended form of the M.S. degree with additional course work and research.

## Learning Outcomes (Graduate)

The objective is to prepare students to be technical leaders in the energy industry, academia and research organizations through completion of independent research as well as fundamental courses in the major field and in related sciences. Students are expected to:

1. apply skills developed in fundamental courses to engineering problems.
2. research, analyze, and synthesize solutions to an original and contemporary energy problem.
3. work independently and as part of a team to develop and improve engineering solutions.
4. apply written, visual, and oral presentation skills to communicate scientific knowledge.
5. MS students are expected to develop in-depth technical understanding of energy problems at an advanced level.
6. Ph.D. students are expected to complete a scientific investigation that is significant, challenging and original.

## Bachelor of Science in Energy Resources Engineering

The four-year program leading to the B.S. degree provides a foundation for careers in many facets of the energy industry. The curriculum includes basic science and engineering courses that provide sufficient depth for a wide spectrum of careers in the energy, engineering, and environmental fields.

One of the goals of the program is to provide experience integrating the skills developed in individual courses to address a significant design problem. In ENERGY 199 Senior Project and Seminar in Energy Resources, taken in the senior year, student teams identify and propose technical solutions for an energy-resource related problem of current interest.

## Program

The requirements for the B.S. degree in Energy Resources Engineering are similar, but not identical, to those described in the "School of Engineering" section of this bulletin. Students must satisfy the University general education, writing, and language requirements. The normal Energy Resources Engineering undergraduate program automatically satisfies the University General Education Requirements (GERs) in the Disciplinary Breadth areas of Natural Sciences, Engineering and Applied Sciences, and Mathematics.

Courses taken to fulfill the requirements for the major (energy resources core and depth; mathematics; engineering fundamentals; science; and technology in society) must be taken for a letter grade if the option is offered.

The Energy Resources Engineering undergraduate curriculum is designed to prepare students for participation in the energy industry or for graduate studies, while providing requisite skills to evolve as the energy landscape shifts over the next half century. The program provides a background in mathematics, basic sciences, and engineering fundamentals such as multiphase fluid flow in the subsurface. In addition, the curriculum is structured with flexibility that allows students to explore energy topics of particular individual interest and to study abroad.

In brief, the unit and subject requirements are:

Energy Resources Core	15-16
Energy Resources Depth	18
Mathematics	25
Engineering Fundamentals and Depth	20-24
Science	29-32
Technology in Society	3-5
University Requirements: Ways, Writing, Language	60-70
<b>Total Units</b>	<b>170-195</b>

The following courses constitute the normal program leading to a B.S. in Energy Resources Engineering. The program may be modified to meet a particular student's needs and interests with the adviser's prior approval.

### Required Core in Energy Resources Engineering

The following courses constitute the core program in Energy Resources Engineering

ENERGY 101	Energy and the Environment	3
ENERGY 104	Sustainable Energy for 9 Billion	3
ENERGY 120	Fundamentals of Petroleum Engineering	3
ENERGY 160	Modeling Uncertainty in the Earth Sciences	3
ENERGY 199	Senior Project and Seminar in Energy Resources (WIM)	3-4

<b>Mathematics</b>		<b>10</b>
MATH 19	Calculus	
MATH 20	Calculus	
MATH 21	Calculus	

And the following (CME series recommended):

CME 100 or MATH 51	Vector Calculus for Engineers Linear Algebra and Differential Calculus of Several Variables	5
CME 102 or MATH 53	Ordinary Differential Equations for Engineers Ordinary Differential Equations with Linear Algebra	5
CME 104	Linear Algebra and Partial Differential Equations for Engineers	5

or MATH 52	Integral Calculus of Several Variables	
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<b>Science</b>		
CHEM 31A or CHEM 31X	Chemical Principles I Chemical Principles Accelerated	5
CHEM 31B or CHEM 31X	Chemical Principles II Chemical Principles Accelerated	5
CHEM 33	Structure and Reactivity of Organic Molecules	5
PHYSICS 41	Mechanics	4
PHYSICS 43	Electricity and Magnetism	4
PHYSICS 45	Light and Heat	4
PHYSICS 46	Light and Heat Laboratory	1
GS 1	Introduction to Geology	5

<b>Engineering Fundamentals</b>		
CS 106A or CS 106X	Programming Methodology Programming Abstractions (Accelerated)	3-5
CS 106B or CS 106X	Programming Abstractions Programming Abstractions (Accelerated)	3-5
ENGR 14	Intro to Solid Mechanics	3
ENGR 30	(Engineering Thermodynamics, no longer offered)	3
ME 30	Engineering Thermodynamics (Previously ENGR 30)	3
ENERGY 110	Engineering Economics	3
ME 70	Introductory Fluids Engineering	4
	Technology in Society, 1 course	

### Earth and Energy Depth

Complete at least 5 courses from either the Renewable and Clean Energy or Petroleum Engineering emphasis lists below. Complete at least one course from the other emphasis. Units must total to at least 18 units.

		<b>Units</b>
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#### Renewable and Clean Energy

ENERGY 102	Fundamentals of Renewable Power	3
ENERGY 153	Carbon Capture and Sequestration	3-4
ENERGY 191	Optimization of Energy Systems	3-4
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ENERGY 293B	Fundamentals of Energy Processes	3
ENERGY 293C	Energy from Wind and Water Currents	3
CEE 70	Environmental Science and Technology	3
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4

#### Petroleum Engineering

ENERGY 121	Fundamentals of Multiphase Flow	3
ENERGY 130	Well Log Analysis I	3
ENERGY 141	Seismic Reservoir Characterization	3-4
ENERGY 146	Reservoir Characterization and Flow Modeling with Outcrop Data	3
ENERGY 153	Carbon Capture and Sequestration	3-4
ENERGY 175	Well Test Analysis	3
ENERGY 180	Oil and Gas Production Engineering	3
ENERGY 191	Optimization of Energy Systems	3-4
GEOPHYS 112	Exploring Geosciences with MATLAB	1-3
GEOPHYS 182	Reflection Seismology	3
GS 106	Sedimentary Geology and Depositional Systems	4

### Honors Program

The program in Energy Resources Engineering leading to the Bachelor of Science with Honors provides an opportunity for independent study and

research on a topic of special interest and culminates in a written report and oral presentation.

The honors program is open to students with a grade point average (GPA) of at least 3.5 in all courses required for the ERE major and minimum of 3.0 in all University course work. Qualified students intending to pursue honors must submit an Honors Program Application to the undergraduate program director no later than the eighth week of their ninth quarter, but students are encouraged to apply to the program during Winter Quarter of their junior year. The application includes a short form, an unofficial transcript, and a 2-3 page research proposal prepared by the student and endorsed by a faculty member who serves as the research adviser.

Upon approval, students enroll in the honors program via Axxess. Students must enroll in a total of 9 units of ENERGY 193 Undergraduate Research Problems; these units may be spread out over the course of the senior year, and may include previous enrollment units for the same research project. Research undertaken for the honors program cannot be used as a substitute for regularly required courses. A formal written report must be submitted to the student's research adviser no later than the fourth week of the student's final quarter, and the report must be read, approved, and signed by the student's faculty adviser and a second member of the faculty. Each honors candidate must make an oral presentation of his or her research results.

## Minor in Energy Resources Engineering

The minor in Energy Resources Engineering requires the following three courses plus three additional electives. Courses must be planned in consultation with an ERE advisor. Appropriate substitutions are allowed with the consent of the advisor.

### Required courses

ENERGY 101	Energy and the Environment	Units	3
ENERGY 120	Fundamentals of Petroleum Engineering		3
ENERGY 160	Modeling Uncertainty in the Earth Sciences		3

### Elective courses

Select at least three of the following:

ENERGY 102	Fundamentals of Renewable Power	Units	
ENERGY 104	Sustainable Energy for 9 Billion		
ENERGY 121	Fundamentals of Multiphase Flow		
ENERGY 130	Well Log Analysis I		
ENERGY 141	Seismic Reservoir Characterization		
ENERGY 146	Reservoir Characterization and Flow Modeling with Outcrop Data		
ENERGY 153	Carbon Capture and Sequestration		
ENERGY 269	Geothermal Reservoir Engineering		
ENERGY 175	Well Test Analysis		
ENERGY 180	Oil and Gas Production Engineering		
GEOPHYS 182	Reflection Seismology		
GS 106	Sedimentary Geology and Depositional Systems		
GEOPHYS 112	Exploring Geosciences with MATLAB		

## Master of Science in Petroleum Engineering

The objective is to prepare the student for professional work in the energy industry, or for doctoral studies, through completion of fundamental

courses in the major field and in related sciences as well as independent research.

Students entering the graduate program are expected to have an undergraduate-level engineering or physical science background. Competence in computer programming in a high-level language (CS 106X Programming Abstractions (Accelerated) or the equivalent) and knowledge of engineering and geological fundamentals (ENERGY 120 Fundamentals of Petroleum Engineering, ENERGY 130 Well Log Analysis I, and GS 106 Sedimentary Geology and Depositional Systems) are prerequisites for taking most graduate courses.

The following are minimum requirements for a student in the Department of Energy Resources Engineering to remain in good academic standing regarding course work:

1. no more than one incomplete grade at any time
2. a cumulative grade point average (GPA) of 3.0
3. a grade point average (GPA) of 2.7 each quarter
4. a minimum of 15 units completed within each two quarter period (excluding Summer Quarter).

Unless otherwise stated by the instructor, incomplete grades in courses within the department are changed to 'NP' (not passed) at the end of the quarter after the one in which the course was given. This one quarter limit is a different constraint from the maximum one-year limit allowed by the University.

Academic performance is reviewed each quarter by a faculty committee. At the beginning of the next quarter, any student not in good academic standing receives a letter from the committee or department chair stating criteria that must be met for the student to return to good academic standing. If the situation is not corrected by the end of the quarter, possible consequences include termination of financial support, termination of departmental privileges, and termination from the University.

Students funded by research grants or fellowships from the department are expected to spend at least half of their time (a minimum of 20 hours per week) on research. Continued funding is contingent upon satisfactory research effort and progress as determined by the student's adviser. After Autumn Quarter of the first year, students receive a letter from the department chair concerning their research performance. If problems are identified and they persist through the second quarter, a warning letter is sent. Problems persisting into a third quarter may lead to loss of departmental support including tuition and stipend. Similar procedures are applied in subsequent years.

A balanced master's degree program including engineering course work and research requires a minimum of one maximum-tuition academic year beyond the baccalaureate to meet the University residence requirements. Most full-time students spend at least one additional summer to complete the research requirement. An alternative master's degree program based only on course work is available, also requiring at least one full tuition academic year to meet University residence requirements.

M.S. students who anticipate continuing in the Ph.D. program should follow the research option. M.S. students receiving financial aid normally require two academic years to complete the degree. Such students must take the research option.

The candidate must fulfill the following requirements:

1. Register as a graduate student for at least 45 units.
2. Submit a program proposal for the Master's degree approved by the adviser during the first quarter of enrollment.
3. Complete 45 units with a grade point average (GPA) of at least 3.0. This requirement is satisfied by taking the core sequence, selecting one of the seven elective sequences, an appropriate number of

additional courses from the list of technical electives, and completing 6 units of master's level research. Students electing the course work only M.S. degree are strongly encouraged to select an additional elective sequence in place of the research requirement. Students interested in continuing for a Ph.D. are expected to choose the research option and enroll in 6 units of ENERGY 361 Master's Degree Research in Energy Resources Engineering. All courses must be taken for a letter grade.

- Students entering without an undergraduate degree in Petroleum Engineering must make up deficiencies in previous training. Not more than 10 units of such work may be counted as part of the minimum total of 45 units toward the M.S. degree.

Research subjects include certain groundwater hydrology and environmental problems, energy industry management, flow of non-Newtonian fluids, geothermal energy, natural gas engineering, oil and gas recovery, pipeline transportation, production optimization, reservoir characterization and modeling, carbon sequestration, reservoir engineering, reservoir simulation, and transient well test analysis.

### Recommended Courses and Sequences

The following list is recommended for most students. With the prior special consent of the student's adviser, courses listed under technical electives may be substituted based on interest or background.

#### Core Sequence

		Units
ENERGY 175	Well Test Analysis	3
or ENERGY 130	Well Log Analysis I	
ENERGY 221	Fundamentals of Multiphase Flow	3
ENERGY 222	Advanced Reservoir Engineering	3
ENERGY 246	Reservoir Characterization and Flow Modeling with Outcrop Data	3
ENERGY 251	Thermodynamics of Equilibria	3
CME 200	Linear Algebra with Application to Engineering Computations	3
CME 204	Partial Differential Equations in Engineering	3
Total Units		21

#### Elective Sequence

Select one of the following Series:

Crustal Fluids:		
ESS 220	Physical Hydrogeology	
ESS 221	Contaminant Hydrogeology and Reactive Transport	
Environmental:		
ENERGY 227	Enhanced Oil Recovery	
ESS 221	Contaminant Hydrogeology and Reactive Transport	
And two of the following:		
ENERGY 240	Data science for geoscience	
CEE 270	Movement and Fate of Organic Contaminants in Waters	
CEE 273	Aquatic Chemistry	
CEE 274A	Environmental Microbiology I	
Enhanced Recovery:		
ESS 220	Physical Hydrogeology	
ENERGY 225	Theory of Gas Injection Processes	
ENERGY 226	Thermal Recovery Methods	
ENERGY 227	Enhanced Oil Recovery	
Geostatistics and Reservoir Modeling:		

ENERGY 240	Data science for geoscience	
ENERGY 241	Seismic Reservoir Characterization	
GEOPHYS 182	Reflection Seismology	
or GEOPHYS 262	Rock Physics	
Geothermal:		
ENERGY 269	Geothermal Reservoir Engineering	
or ENERGY 293B	Fundamentals of Energy Processes	
CHEMENG 120I	Energy and Mass Transport	
ME 131A	Heat Transfer	
Reservoir Performance:		
ENERGY 223	Reservoir Simulation	
ENERGY 280	Oil and Gas Production Engineering	
GEOPHYS 202	Reservoir Geomechanics	
Simulation and Optimization:		
ENERGY 223	Reservoir Simulation	
ENERGY 224	Advanced Reservoir Simulation	
ENERGY 284	Optimization and Inverse Modeling	
Renewable Energy:		
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	
ENERGY 293B	Fundamentals of Energy Processes	
ENERGY 293C	Energy from Wind and Water Currents	
ESS 221	Contaminant Hydrogeology and Reactive Transport	4
Total Units		13-18

#### Research Sequence

		Units
ENERGY 361	Master's Degree Research in Energy Resources Engineering	1-6
Total Units		1-6

<sup>1</sup> Students choosing the company sponsored course-work-only for the M.S. degree may substitute an additional elective sequence in place of the research.

#### Technical Electives

Technical electives from the following list of advanced-level courses usually complete the M.S. program. In unique cases, when justified and approved by the adviser prior to taking the course, courses listed here may be substituted for courses listed above in the elective sequences.

		Units
ENERGY 130	Well Log Analysis I	3
ENERGY 224	Advanced Reservoir Simulation	3
ENERGY 230	Advanced Topics in Well Logging	3
ENERGY 267	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties	3
ENERGY 269	Geothermal Reservoir Engineering	3
ENERGY 273	Special Topics in Energy Resources Engineering	1-3
ENERGY 280	Oil and Gas Production Engineering	3
ENERGY 281	Applied Mathematics in Reservoir Engineering	3
ENERGY 284	Optimization and Inverse Modeling	3
ENERGY 301	The Energy Seminar	1
CME 204	Partial Differential Equations in Engineering	3
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ENERGY 293B	Fundamentals of Energy Processes	3
ENERGY 293C	Energy from Wind and Water Currents	3
GEOPHYS 182	Reflection Seismology	3

GEOPHYS 190	Near-Surface Geophysics	3
GEOPHYS 202	Reservoir Geomechanics	3
CME 206	Introduction to Numerical Methods for Engineering	3
CME 211	Software Development for Scientists and Engineers	3

## Master of Science in Energy Resources Engineering

The objective of the M.S. degree in Energy Resources Engineering is to prepare the student either for a professional career or for doctoral studies. Students in the M.S. degree program must fulfill the following:

- Complete a 45-unit program of study. The degree has two options:
  - a course work degree, requiring 45 units of course work
  - a research degree, with a minimum of 39 units of course work, and the remainder consisting of no more than 6 research units.
- Course work units must be divided among two or more scientific and/or engineering disciplines and can include the core courses required for the Ph.D. degree.
- All courses must be taken for a letter grade.
- The program of study must be approved by the academic adviser and the department graduate program committee.
- Students taking the research-option degree are required to complete an M.S. thesis, approved by the student's thesis committee.

### Recommended Courses and Sequences

The following list is recommended for most students. With the prior consent of the student's adviser, courses listed under technical electives may be substituted based on interest or background.

#### Core Sequence

	Units
ENERGY 221 Fundamentals of Multiphase Flow	3
ENERGY 246 Reservoir Characterization and Flow Modeling with Outcrop Data	3
CME 200 Linear Algebra with Application to Engineering Computations	3
CME 204 Partial Differential Equations in Engineering	3
ENERGY 293A Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ENERGY 293B Fundamentals of Energy Processes	3
ENERGY 293C Energy from Wind and Water Currents	3
or ENERGY 262 Physics of Wind Energy	
<b>Total Units</b>	<b>21-22</b>

#### Subject Sequence Alternatives

Select one of the following Series: 15

##### Geothermal:

ENERGY 223	Reservoir Simulation
ENERGY 269	Geothermal Reservoir Engineering
CHEMENG 120	Energy and Mass Transport
ME 131A	Heat Transfer
ME 370A	Energy Systems I: Thermodynamics

##### Low Carbon Energy:

Select three of the following:

ENERGY 104	Sustainable Energy for 9 Billion
ENERGY 223	Reservoir Simulation
ENERGY 251	Thermodynamics of Equilibria
ENERGY 269	Geothermal Reservoir Engineering

ENERGY 291	Optimization of Energy Systems
CHEMENG 130	Separation Processes
GS 170	Environmental Geochemistry
GS 171	Geochemical Thermodynamics
ME 370A	Energy Systems I: Thermodynamics
ME 370B	Energy Systems II: Modeling and Advanced Concepts
MATSCI 156/ ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution

#### Modeling Natural Resources:

Select three of the following:

ENERGY 240	Data science for geoscience
ENERGY 241	Seismic Reservoir Characterization
ENERGY 284	Optimization and Inverse Modeling
GEOPHYS 262	Rock Physics

#### Oil and Gas:

ENERGY 104	Sustainable Energy for 9 Billion
ENERGY 222	Advanced Reservoir Engineering
ENERGY 223	Reservoir Simulation
ENERGY 240	Data science for geoscience
ENERGY 251	Thermodynamics of Equilibria

**Total Units** 15

#### Technical Electives

	Units
ENERGY 104 Sustainable Energy for 9 Billion	3
ENERGY 120 Fundamentals of Petroleum Engineering	3
ENERGY 130 Well Log Analysis I	3
Any 200-level ENERGY course	
ENERGY 301 The Energy Seminar	1
CEE 176A Energy Efficient Buildings	3-4
CEE 176B Electric Power: Renewables and Efficiency	3-4
CME 206 Introduction to Numerical Methods for Engineering	3
CME 212 Advanced Software Development for Scientists and Engineers	3
ECON 250 Environmental Economics	2-5
ECON 251 Natural Resource and Energy Economics	2-5
MATSCI 316 Nanoscale Science, Engineering, and Technology	3
ME 131A Heat Transfer	3-5
ME 260 Fuel Cell Science and Technology	3
ME 370A Energy Systems I: Thermodynamics	3
ME 370B Energy Systems II: Modeling and Advanced Concepts	4

## Coterminal B.S. and M.S. Program in Energy Resources Engineering

The coterminal B.S./M.S. program offers an opportunity for Stanford University students to pursue a graduate experience while completing the B.S. degree in any relevant major. Energy Resources Engineering graduate students generally come from backgrounds such as chemical, civil, or mechanical engineering; geology or other earth sciences; or physics or chemistry.

The two types of M.S. degrees, the course work only degree and the research degree, as well as the courses required to meet degree requirements, are described above in the M.S. section. Both degrees require 45 units and may take from one to two years to complete depending on circumstances unique to each student.

Requirements to enter the program are: three letters of recommendation from faculty members or job supervisors, a statement of purpose, scores from the GRE general test, and a copy of Stanford University transcripts. While the department does not require any specific GPA or GRE score, potential applicants are expected to compete favorably with graduate student applicants.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

A Petroleum Engineering or Energy Resources Engineering master's degree can be used as a terminal degree for obtaining a professional job in the engineering or energy industries, or in any related industry where application of physical principles or computer simulation skills are required. It can also be a stepping stone to a Ph.D. degree, that usually leads to a professional research job or an academic position.

Students should apply to the program any time after they have completed 120 undergraduate units, and in time to take ENERGY 120 Fundamentals of Petroleum Engineering, the basic introductory course in Autumn Quarter of the year they wish to begin the program. Contact the Department of Energy Resources Engineering to obtain additional information. Students should have a background at least through MATH 53 ([http://exploreddegrees.stanford.edu/schoolofearthsciences/energyresourcesengineering/js/fckeditor/editor/fckeditor.html?InstanceName=attr\\_text&Toolbar=PageWizard](http://exploreddegrees.stanford.edu/schoolofearthsciences/energyresourcesengineering/js/fckeditor/editor/fckeditor.html?InstanceName=attr_text&Toolbar=PageWizard)) Ordinary Differential Equations with Linear Algebra and CS 106AB ([http://exploreddegrees.stanford.edu/schoolofearthsciences/energyresourcesengineering/js/fckeditor/editor/fckeditor.html?InstanceName=attr\\_text&Toolbar=PageWizard](http://exploreddegrees.stanford.edu/schoolofearthsciences/energyresourcesengineering/js/fckeditor/editor/fckeditor.html?InstanceName=attr_text&Toolbar=PageWizard)) Programming Methodology before beginning graduate work in this program.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 46)" section of this bulletin. For University coterminal master's degree application forms, see the Registrar's Publications page (<https://registrar.stanford.edu/resources-and-help/forms/publications-and-online-guides/#Coterm>).

## Doctor of Philosophy in Petroleum Engineering or Energy Resources Engineering

The Ph.D. degree is conferred upon demonstration of high achievement in independent research and by presentation of the research results in a written dissertation and oral defense.

The following are minimum requirements for a student in the Department of Energy Resources Engineering to remain in good academic standing regarding course work:

1. no more than one incomplete grade at any time
2. a cumulative grade point average (GPA) of 3.25
3. a grade point average (GPA) of 2.7 each quarter
4. a minimum of 15 units completed within each two quarter period (excluding Summer Quarter).

Unless otherwise stated by the instructor, incomplete grades in courses within the department are changed to 'NP' (not passed) at the end of the quarter after the one in which the course was given. This one quarter limit is a different constraint from the maximum one-year limit allowed by the University.

Academic performance is reviewed each quarter by a faculty committee. At the beginning of the next quarter, any student not in good academic standing receives a letter from the committee or department chair stating criteria that must be met for the student to return to good academic standing. If the situation is not corrected by the end of the quarter, possible consequences include termination of financial support, termination of departmental privileges, and termination from the University.

Students funded by research grants or fellowships from the department are expected to spend at least half of their time (a minimum of 20 hours per week) on research. Continued funding is contingent upon satisfactory research effort and progress as determined by the student's adviser. After Autumn Quarter of the first year, students receive a letter from the department chair concerning their research performance. If problems are identified and they persist through the second quarter, a warning letter is sent. Problems persisting into a third quarter may lead to loss of departmental support including tuition and stipend. Similar procedures are applied in subsequent years.

The Ph.D. degree is awarded primarily on the basis of completion of significant, original research. Extensive course work and a minimum of 90 units of graduate work beyond the master's degree are required. Doctoral candidates planning theoretical work are encouraged to gain experimental research experience in the M.S. program. Ph.D. students receiving financial assistance are limited to 10 units per quarter and often require more than three years to complete the Ph.D. beyond the M.S. degree.

In addition to University and the Department of Energy Resources Engineering basic requirements for the doctorate, the Petroleum Engineering Ph.D. and Energy Resources Engineering Ph.D. degrees have the following requirements:

1. Complete 135 units of total graduate work (90 units beyond the master's degree). The 90 units are composed of a minimum of 36 units of research and a minimum of 36 units of course work. At least half of the classes must be at a 200 level or higher and all must be taken for a letter grade. Students with an M.S. degree or other specialized training from outside ERE are generally expected to include ENERGY 221 Fundamentals of Multiphase Flow, and ENERGY 240 Data science for geoscience, or their equivalents. The number and distribution of courses to be taken is determined with



input from the research advisers and department graduate program committee.

- To achieve candidacy (usually during or at the end of the first year of enrollment), the student must complete 24 units of letter-graded course work beyond the M.S. degree, pass a written exam, develop a written Ph.D. research proposal, and choose a dissertation committee.
- The research adviser(s) and two other faculty members comprise the dissertation reading committee. Upon completion of the dissertation, the student must pass a University oral examination in defense of the dissertation.
- Act as a teaching assistant at least once, and enroll in ENERGY 359 Teaching Experience in Energy Resources Engineering.

36 units of course work is a minimum; in some cases the research adviser may specify additional requirements to strengthen the student's expertise in particular areas. The 36 units of course work does not include required teaching experience (ENERGY 359 Teaching Experience in Energy Resources Engineering) nor required research seminars.

The dissertation must be submitted in its final form within five calendar years from the date of admission to candidacy. Candidates who fail to meet this deadline must submit an Application for Extension of Candidacy for approval by the department chair if they wish to continue in the program.

Ph.D. students entering the department are required to hold an M.S. degree in a relevant science or engineering discipline. Students wishing to follow the Ph.D. program in Petroleum Engineering must hold an M.S. degree (or equivalent) in Petroleum Engineering. Students following the Ph.D. program in Energy Resources Engineering must hold an M.S. degree (or equivalent), although it need not be in Energy Resources Engineering.

After the second quarter at Stanford, a faculty committee evaluates the student's progress. If a student is found to be deficient in course work and/or research, a written warning is issued. After the third quarter, the faculty committee decides whether or not funding should be continued for the student. Students denied funding after the third quarter are advised against proceeding with the Ph.D. proposal, though the student may choose to proceed under personal funding.

### Ph.D. Degree Qualification

The procedure for Ph.D. qualification is identical for individuals who entered the department as an M.S. or a Ph.D. student. For students completing an M.S. in the department, the student formally applies to the Ph.D. program in the second year of the M.S. degree program. The student is considered for admission to the Ph.D. program along with external applicants. The admission decision is based primarily upon research progress and course work.

There are two steps to the qualification procedure. Students first take a preliminary written exam that is offered at the beginning of Autumn Quarter. The exam focuses upon synthesis of knowledge acquired from core courses in ERE or PE. Exams are different for ERE and PE Ph.D. students, but share a goal of having students exhibit capability to solve an engineering problem. Students take the exam consistent with their Ph.D. degree objective (i.e., ERE or PE).

Students continuing within the department take the written exam at the beginning of their first quarter as Ph.D. students. Students who completed their M.S. outside of the department take the written exam at the beginning of their fourth quarter as Ph.D. students. A student who does not pass the exam may not be allowed to take the exam a second time. Any student who does not pass the written exam is considered to have failed the qualifying exam. Any student who is deemed to have not made sufficient research progress may not be allowed to take the

preliminary exam and research progress is taken into account for pass, fail, and retake decisions.

A written Ph.D. proposal and oral defense are the main components of the second step. The written proposals are reviewed by three faculty members. Students are provided a template of what constitutes an acceptable proposal. Students subsequently make an oral presentation of their proposal to three faculty members including material such as a literature review, identification of key unanswered research questions, proposed work outline, and an oral presentation. Following the presentation, the student is questioned on the research topic and general field of study. The student can pass, pass with qualifications requiring more classes or teaching assistantships, or fail. Students who completed their M.S. in the department prepare and defend their proposal in their third quarter (not counting Summer) as a Ph.D. student. Their adviser may request an additional quarter given extenuating circumstances such as a major change in research focus between M.S. and Ph.D. programs. Students who completed their M.S. outside of the department complete the proposal in their fourth quarter (not counting summer) of study.

Students who have passed the qualification procedure and later wish to change their degree objective from PE to ERE, or vice versa, may petition the graduate standing committee. A switch of degree objective is not automatically granted. Petitions are made in writing and include a brief explanation of the request for a change in degree objective and a plan to make up subject matter deficiencies. At the minimum, students who petition are expected to complete ultimately all courses listed as contributing subject matter to the written exam in the area of their degree objective with a minimum grade of 'B'. The graduate standing committee decides whether petitions have merit and if additional steps are needed to address deficiencies. Such switches in degree objective are considered provisional until all conditions have been met.

### Course Work

The 36 units of course work may include graduate courses in Energy Resources Engineering (numbered 200 and above) and courses chosen from the following list. Other courses may be substituted with prior approval of the adviser. In general, non-technical courses are not approved.

Students who enter directly into the Ph.D. program after receiving an M.S. degree from another university are expected to show expertise in the core courses required for Stanford's M.S. degree in Energy Resources Engineering, either by including those courses in their Ph.D. degree or by showing that they have taken equivalent courses during their M.S. degree.

For a Ph.D. in Energy Resources Engineering, 12 of the 36 required course units must be completed from the following list of courses. If the student has not taken ENERGY 293A Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution, ENERGY 293B Fundamentals of Energy Processes, ENERGY 293C Energy from Wind and Water Currents or their equivalent during the M.S., then these courses must be taken during the Ph.D. (they satisfy 9 of the required 12 units).

		<b>Units</b>
Required to take 12 units from the following list:		
ENERGY 104	Sustainable Energy for 9 Billion	3
ENERGY 253	Carbon Capture and Sequestration	3-4
ENERGY 269	Geothermal Reservoir Engineering	3
ENERGY 291	Optimization of Energy Systems	3-4
ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ENERGY 293B	Fundamentals of Energy Processes	3
ENERGY 293C	Energy from Wind and Water Currents	3
ENERGY 301	The Energy Seminar	1

CEE 176A	Energy Efficient Buildings	3-4	ENERGY 284	Optimization and Inverse Modeling	3
CEE 176B	Electric Power: Renewables and Efficiency	3-4	<i>Emeriti: (Professors)</i> Khalid Aziz, John W. Harbaugh, André Journal*, Franklin M. Orr, Jr.		
CEE 268	Groundwater Flow	3-4	<i>Chair:</i> Anthony R. Kovscek		
CME 206	Introduction to Numerical Methods for Engineering	3	<i>Professors:</i> Sally M. Benson, Louis J. Durlofsky, Roland N. Horne, Anthony R. Kovscek, Daniel M. Tartakovsky, Hamdi Tchelepi		
CME 302	Numerical Linear Algebra	3	<i>Associate Professors:</i> Margot Gerritsen, Tapan Mukerji		
CME 306	Numerical Solution of Partial Differential Equations	3	<i>Assistant Professors:</i> Ilenia Battiato, Adam Brandt		
ESS 221/ CEE 260C	Contaminant Hydrogeology and Reactive Transport	4	<i>Courtesy Professors:</i> Stephan A. Graham, Mark Jacobson		
CHEMENG 130	Separation Processes	3	<i>Adjunct Faculty:</i> Alan Burnham, Louis M. Castanier, Birol Dindoruk, Kurt House, Warren K. Kourt, Jonathan Lilien, Robert G. Lindblom, Anne Macfarlane, Stuart MacMillan, Mark McClure, Kiran Pande, Victor Pereyra, Richard Sears, Marco R. Thiele, Denis V. Voskov		
CHEMENG 340	Molecular Thermodynamics	3	<i>Visiting Professor:</i> Kozo Sato		
ECON 250	Environmental Economics	2-5	* Joint appointment with Geological Sciences		
ECON 251	Natural Resource and Energy Economics	2-5			
GS 170	Environmental Geochemistry	4			
GS 171	Geochemical Thermodynamics	3			
GS 253	Petroleum Geology and Exploration	3			
GEOPHYS 182	Reflection Seismology	3			
GEOPHYS 202	Reservoir Geomechanics	3			
GEOPHYS 262	Rock Physics	3			
ME 131A	Heat Transfer	3-5			
ME 250	Internal Combustion Engines	3			
ME 260	Fuel Cell Science and Technology	3			
ME 335A	Finite Element Analysis	3			
ME 335B	Finite Element Analysis	3			
ME 335C	Finite Element Analysis	3			
ME 370A	Energy Systems I: Thermodynamics	3			
ME 370B	Energy Systems II: Modeling and Advanced Concepts	4			
MATSCI 156/ ENERGY 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4			
MATSCI 316	Nanoscale Science, Engineering, and Technology	3			

## Ph.D. Minor in Petroleum Engineering or Energy Resources Engineering

To be recommended for a Ph.D. degree with Petroleum Engineering or Energy Resources Engineering as a minor subject, a student must take 20 units of graduate-level lecture courses in the department. These courses must include ENERGY 221 Fundamentals of Multiphase Flow and ENERGY 222 Advanced Reservoir Engineering for the Petroleum Engineering minor, or ENERGY 293A Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution and ENERGY 293B Fundamentals of Energy Processes and ENERGY 293C Energy from Wind and Water Currents for the Energy Resources Engineering minor. The remaining courses should be selected from:

		Units
ENERGY 175	Well Test Analysis	3
ENERGY 223	Reservoir Simulation	3-4
ENERGY 224	Advanced Reservoir Simulation	3
ENERGY 225	Theory of Gas Injection Processes	3
ENERGY 227	Enhanced Oil Recovery	3
ENERGY 240	Data science for geoscience	3
ENERGY 241	Seismic Reservoir Characterization	3-4
ENERGY 251	Thermodynamics of Equilibria	3
ENERGY 253	Carbon Capture and Sequestration	3-4
ENERGY 269	Geothermal Reservoir Engineering	3
ENERGY 280	Oil and Gas Production Engineering	3
ENERGY 281	Applied Mathematics in Reservoir Engineering	3

# GEOLOGICAL SCIENCES

Courses offered by the Department of Geological Sciences (formerly the Department of Geological and Environmental Sciences) are listed under the subject code GS on the Stanford Bulletin's ExploreCourses web site (<https://explorecourses.stanford.edu/search?q=GS&view=catalog&page=0&academicYear=&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&collapse=&filter-departmentcode-GS=on&filter-catalognumber-GS=on&filter-coursestatus-Active=on&filter-catalognumber-GS=on>).

The geological sciences are naturally interdisciplinary, and include: the study of earth materials, earth processes, and how they have changed over Earth's 4.56 billion year history. More specifically, courses and research within the department address: the chemical and physical makeup and properties of minerals, rocks, soils, sediments, and water; the formation and evolution of Earth and other planets; the processes that deform Earth's crust and shape Earth's surface; the stratigraphic, paleobiological, and geochemical records of Earth history including changes in climate, oceans, and atmosphere; present-day, historical, and long-term feedbacks between the geosphere and biosphere, and the origin and occurrence of our natural resources.

The department's research is critical to the study of natural hazards (earthquakes, volcanic eruptions, landslides, and floods), environmental and geological engineering, surface and groundwater management, the assessment, exploration, and extraction of energy, mineral and water resources, ecology and conservation biology, remediation of contaminated water and soil, geological mapping and land use planning, and human health and the environment.

A broad range of instrumentation for elemental and radiogenic/stable isotope analysis is available, including ion microprobe, electron microprobe, thermal and gas source mass spectrometry, inductively coupled plasma mass spectrometry and nuclear magnetic resonance. The Center for Materials Research and facilities at the SLAC National Accelerator Laboratory, Stanford Synchrotron Radiation Laboratory (SSRL), and the U.S. Geological Survey in nearby Menlo Park are also available for the department's research. Branner Library, devoted exclusively to the Earth Sciences, represents one of the department's most important resources. The department also maintains rock preparation (crushing, cutting, polishing), mineral separation, and microscopy facilities.

## Mission of the Undergraduate Program in Geological Sciences

The purpose of the undergraduate program in Geological Sciences is to provide students with a broad background in the fundamentals of the Earth sciences and the quantitative, analytical, and communications skills necessary to conduct research and think critically about questions involving the Earth. The major provides excellent preparation for graduate school and careers in geological and environmental consulting, land use planning, law, teaching, and other professions in which an understanding of the Earth and a background in science are important.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to develop and demonstrate:

1. an understanding of fundamental concepts in Earth science.

2. the ability to collect, analyze, and interpret geological and environmental data using a variety of techniques to test hypotheses.
3. the ability to address real geological and/or environmental problems in the field.
4. the ability to communicate scientific knowledge orally, visually, and in writing.

## Graduate Programs in Geological Sciences

Graduate Studies in the Department of Geological Sciences involve academic course work and independent research. Students are prepared for careers as professional scientists in research, education, or the application of the earth sciences to mineral, energy, and water resources. Programs lead to the M.S., Engineer, and Ph.D. degrees. Course programs in the areas of faculty interest are tailored to the student's needs and interests with the aid of his or her research adviser. Students are encouraged to include in their program courses offered in other departments in the School of Earth, Energy and Environmental Sciences as well as in other departments in the University. Diplomas designate degrees in Geological and Environmental Sciences or Geological Sciences and may also indicate the following specialized fields of study: Geostatistics and Hydrogeology.

## Learning Outcomes (Graduate)

The purpose of the master's program in Geological Sciences is to continue a student's training in one of a broad range of earth science disciplines and to prepare students for either a professional career or doctoral studies.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship, high attainment in a particular field of knowledge, and the ability to conduct independent research. To this end, the objectives of the doctoral program are to enable students to develop the skills needed to conduct original investigations in a particular discipline or set of disciplines in the earth sciences, to interpret the results, and to present the data and conclusions in a publishable manner.

On April 16, 2015, the Senate of the Academic Council approved the Bachelor of Science in Geological Sciences. Students who declared the Bachelor of Science in Geological and Environmental Sciences have the option of changing the name of their degree to Geological Sciences. Degree requirements remain the same.

## Bachelor of Science in Geological Sciences

The major consists of five interrelated components:

1. *Earth Sciences Fundamentals*—Students must complete a set of core courses that introduce the properties of Earth materials, the processes that change the Earth, and the timescales over which those processes act. These courses provide a broad foundational knowledge that can lead to specialization in many different disciplines of the geological and environmental sciences.
2. *Quantitative and Analytical Skills*—Students must complete adequate course work in mathematics, chemistry, and physics or biology. In addition, they learn analytical techniques specific to the Earth sciences through the laboratory component of courses.
3. *Advanced Course Work and Research*—Students gain breadth and depth in upper-level electives and are encouraged to apply these skills and knowledge to problems in the Earth sciences through directed research.
4. *Field Research Skills*—Most GS courses include field trips and/or field-based projects. In addition, students must complete at least six weeks of field research through departmental offerings (GS 105

Introduction to Field Methods and GS 190 Research in the Field), in which they learn and apply field techniques, field mapping, and the prepare a written report.

5. *Communication Skills*—To fulfill the Writing in the Major requirement, students take a writing-intensive senior seminar (GS 150 Senior Seminar: Issues in Earth Sciences), in which they give both oral and written presentations that address current research in the earth sciences.

The major requires at least 93 units; letter grades are required in all courses if available. Students interested in the GS major should consult with the undergraduate program coordinator for information about options within the curriculum.

### Course Sequence (103-121 units total)

#### Core Requirement

Students are required to take all of the following:

		Units
GS 1	Introduction to Geology	5
GS 4	Coevolution of Earth and Life	4
GS 90	Introduction to Geochemistry	3-4
GS 102	Earth Materials: Introduction to Mineralogy	4
GS 103	Earth Materials: Rocks in Thin Section	3
GS 104	Introduction to Petrology	4
GS 105	Introduction to Field Methods	3
GS 106	Sedimentary Geology and Depositional Systems	4
GS 110	Rock Deformation and Tectonics	5
GS 150	Senior Seminar: Issues in Earth Sciences	3
GS 190	Research in the Field	6
Total Units		44-45

#### Breadth in the Discipline Requirement

To gain understanding of the breadth of subject areas within the geological sciences, students are required to take one course from each of the following five groups (15-23 units).

##### Surface and Hydrologic Processes

		Units
GS 118	Disasters, Decisions, Development in Sustainable Urban Systems	3-5
or GS 121	What Makes a Habitable Planet?	
or ESS 117	Earth Sciences of the Hawaiian Islands	
or ESS 155	Science of Soils	
or ESS 220	Physical Hydrogeology	
or ESS 256	Soil and Water Chemistry	
or GEOPHYS 120	Ice, Water, Fire	
or GEOPHYS 190	Near-Surface Geophysics	

##### Biogeosciences

		Units
GS 123	Evolution of Marine Ecosystems	3-4
or GS 128	Evolution of Terrestrial Ecosystems	
or GS 233A	Microbial Physiology	
or ESS 158	Geomicrobiology	

##### Earth Materials and Geochemistry

		Units
GS 135	Sedimentary Geochemistry and Analysis	3-4
or GS 163	Introduction to Isotope Geochemistry	
or GS 180	Igneous Processes	
or CEE 177	Aquatic Chemistry and Biology	

or ESS 152 Marine Chemistry

##### Tectonics and Geophysics

		Units
GEOPHYS 120	Ice, Water, Fire	3-5
or GEOPHYS 110	Introduction to the foundations of contemporary geophysics	
or GEOPHYS 130	Introductory Seismology	
or GS 122	Planetary Systems: Dynamics and Origins	
or GEOPHYS 150	Geodynamics: Our Dynamic Earth	
or GEOPHYS 182	Reflection Seismology	

##### Geospatial Statistics and Computer Science

		Units
CS 106A	Programming Methodology	3-5
or EARTH 211	Software Development for Scientists and Engineers	
or ENERGY 160	Modeling Uncertainty in the Earth Sciences	
or ESS 164	Fundamentals of Geographic Information Science (GIS)	
or GEOPHYS 112	Exploring Geosciences with MATLAB	

##### Additional Field Opportunities (optional)

		Units
GS 5	Living on the Edge	1
GS 135A	Sedimentary Geochemistry Field Trip	1
OSPAUSTL 10	Coral Reef Ecosystems	3
OSPAUSTL 25	Freshwater Systems	3
OSPAUSTL 30	Coastal Forest Ecosystems	3

##### Depth in the Discipline Requirement (10 Units)

To allow students to go into greater depth in the major, students must complete at least 10 units of electives drawn primarily from the list above and other upper-level courses in GS (including graduate-level courses). Additional courses in Geophysics, ESS, and ERE may be counted towards the elective units if they allow a student to pursue a topic in depth; these options should be discussed with an adviser. A maximum of 3 elective units may be fulfilled by:

		Units
GS 192	Undergraduate Research in Geological Sciences	3-5
GS 197	Senior Thesis	
GS 198	Special Problems in Geological Sciences	
	Advanced Seminars	

Honors research (GS 199 Honors Program) may fulfill up to 4 elective units.

##### Required Supporting Mathematics (20 Units)

Choose one of the following equivalent series:

		Units
MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus	10
	or a score of 4-5 on the Calculus BC exam	
	And at least TWO of the following:	
CME 100	Vector Calculus for Engineers	5
or MATH 51	Linear Algebra and Differential Calculus of Several Variables	
CME 102	Ordinary Differential Equations for Engineers	5
or MATH 52	Integral Calculus of Several Variables	
CME 104	Linear Algebra and Partial Differential Equations for Engineers	5

or MATH 53 Ordinary Differential Equations with Linear Algebra

### Required Supporting Sciences (16-23 Units)

Advanced placement credit may be accepted for these courses as determined by the relevant departments.

#### Chemistry

CHEM 31A & CHEM 31B or CHEM 31X	Chemical Principles I and Chemical Principles II Chemical Principles Accelerated	5-10
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or a score of 4-5 on the Chemistry AP exam

And one of the following:

GS 171 or CHEM 171	Geochemical Thermodynamics Physical Chemistry I	3
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In addition to chemistry, students may choose between introductory sequences in biology and physics. This choice should be made after discussion with an adviser and based on a student's interests.

#### Biology

BIO 82 or BIO 83 or BIO 84 or BIO 86	Genetics Biochemistry & Molecular Biology Physiology Cell Biology	4
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And one of the following:

BIO 81 or BIO 85 or ESS 151 or BIO 116	Introduction to Ecology Biological Oceanography Ecology of the Hawaiian Islands	4
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Or

#### Physics

Select one of the following Series: 9-10

##### Series A

PHYSICS 21 & PHYSICS 22 & PHYSICS 23 & PHYSICS 24	Mechanics, Fluids, and Heat and Mechanics, Fluids, and Heat Laboratory and Electricity, Magnetism, and Optics and Electricity, Magnetism, and Optics Laboratory	10
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##### Series B

PHYSICS 41 & PHYSICS 43 & PHYSICS 44	Mechanics and Electricity and Magnetism and Electricity and Magnetism Lab	9
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##### Series C

PHYSICS 41 & PHYSICS 45 & PHYSICS 46	Mechanics and Light and Heat and Light and Heat Laboratory	9
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### Field Research

Field research skills are a critical component of the undergraduate curriculum in GS. The conventional and most straightforward way for undergraduates to meet the field requirement is to take the GS courses (GS 105 Introduction to Field Methods and GS 190 Research in the Field):

- GS 105 Introduction to Field Methods, is a two-week introduction to field techniques and geologic mapping that is taught every year in the White Mountains of eastern California prior to the start of Autumn Quarter in September. This course gives students the tools to undertake geologic research in the field. GS 105 Introduction to Field Methods is required of all GS majors and is the framework upon which all subsequent undergraduate field-related instruction is based.
- GS 190 Research in the Field, gives GS undergraduates additional training in field research. This course provides undergraduates with a team-based experience of collecting data to answer research

questions and is directed by faculty and graduate students. Offered in June and/or September.

By taking GS 105 Introduction to Field Methods and two iterations of GS 190 Research in the Field, GS undergraduates develop the broad experience and confidence necessary to go out and evaluate a geological or environmental geology question by collecting field-based data. The main goal is that, upon graduation, GS undergraduates will be able to plan and execute independent field research.

It is also possible to substitute non-Stanford courses to allow flexibility in fulfilling the field requirement. A modified version of an existing field-based course such as Stanford at Sea/Australia/Hawaii may fulfill one GS 190 Research in the Field requirement. To receive credit for GS 190, a proposal must be filed at the end of Winter Quarter with the field program committee which evaluates it for suitability. Students subsequently enroll in GS 190 with a specific instructor or their faculty mentor who evaluates the final report from the fieldwork.

GS 190 Research in the Field can also be satisfied by enrolling in a single four-to-six week geology field camp offered by another institution. This externally administered experience can substitute for two GS 190 courses, subject to approval by the Undergraduate Curriculum Committee.

## Engineering Geology and Hydrogeology Undergraduate Specialized Curriculum

The Engineering Geology and Hydrogeology curriculum is intended for undergraduates interested in the application of geological and engineering data and principles to the study of rock, soil, and water to recognize and interpret geological and environmental factors affecting engineering structures and groundwater resources. Students learn to characterize and assess the risks associated with natural geological hazards, such as landslides and earthquakes, and with groundwater flow and contamination. The curriculum prepares students for graduate programs and professional careers in engineering, environmental geology, geology, geotechnical engineering, and hydrogeology.

GS majors who elect the Engineering Geology and Hydrogeology curriculum are expected to complete a core course sequence and a set of courses in supporting sciences and mathematics. The core courses come from Earth Sciences and Engineering. Any substitutions for core courses must be approved by the faculty adviser and through a formal petition to the undergraduate program director. In addition, four elective courses, consistent with the core curriculum and required of all majors, are to be chosen with the advice and consent of the adviser. Typically, electives are chosen from the list below. Letter grades are required if available.

### Course Sequence (100-113 Units Total)

#### Required Geological Sciences (26-27 Units)

		Units
GS 1	Introduction to Geology	5
GS 90	Introduction to Geochemistry	3-4
GS 102	Earth Materials: Introduction to Mineralogy	4
GS 104 or ESS 155	Introduction to Petrology Science of Soils	4
GS 150	Senior Seminar: Issues in Earth Sciences	3
ENERGY 160 or STATS 110	Modeling Uncertainty in the Earth Sciences Statistical Methods in Engineering and the Physical Sciences	3
or CEE 203 or CME 106	Probabilistic Models in Civil Engineering Introduction to Probability and Statistics for Engineers	
ESS 220	Physical Hydrogeology	4

or GEOPHYS 120 Ice, Water, Fire

Total Units 26-27

or GS 128 Evolution of Terrestrial Ecosystems

or GS 233A Microbial Physiology

**Required Engineering (14-16 Units)**

CEE 101A	Mechanics of Materials	4
or CEE 177	Aquatic Chemistry and Biology	
CEE 101B	Mechanics of Fluids	4
CS 106A	Programming Methodology	3-5
ENGR 90	Environmental Science and Technology	3
Total Units		14-16

Hydrological Processes

Units

CEE 166A	Watersheds and Wetlands	3-4
or CEE 166B	Floods and Droughts, Dams and Aqueducts	
or ENERGY 121	Fundamentals of Multiphase Flow	
or ENERGY 153	Carbon Capture and Sequestration	
or GEOPHYS 181	Fluids and Flow in the Earth: Computational Methods	
or GEOPHYS 190	Near-Surface Geophysics	

**Required Supporting Sciences and Mathematics (37-42 Units)**

MATH 19	Calculus	3
MATH 20	Calculus	3
MATH 21	Calculus	4
CME 100	Vector Calculus for Engineers	5
CME 102	Ordinary Differential Equations for Engineers	5
PHYSICS 41	Mechanics	4
CHEM 31A & CHEM 31B or CHEM 31X	Chemical Principles I and Chemical Principles II Chemical Principles Accelerated	5-10
BIO 82	Genetics	4
or BIO 83	Biochemistry & Molecular Biology	
or BIO 84	Physiology	
or BIO 86	Cell Biology	
BIO 81	Introduction to Ecology	4
or BIO 85		
or ESS 151	Biological Oceanography	
or BIO 116	Ecology of the Hawaiian Islands	
Total Units		37-42

Units

Geological and Geophysical Sciences

GS 104	Introduction to Petrology	3-4
or GS 105	Introduction to Field Methods	
or GS 106	Sedimentary Geology and Depositional Systems	
or GS 110	Rock Deformation and Tectonics	
or GS 118	Disasters, Decisions, Development in Sustainable Urban Systems	
or GS 163	Introduction to Isotope Geochemistry	
or GS 180	Igneous Processes	
or GEOPHYS 110	Introduction to the foundations of contemporary geophysics	
or GEOPHYS 120	Ice, Water, Fire	
or GEOPHYS 130	Introductory Seismology	
or GEOPHYS 150	Geodynamics: Our Dynamic Earth	
or ENERGY 120	Fundamentals of Petroleum Engineering	

Surface and Environmental Processes

CEE 101C	Geotechnical Engineering	3-4
or CEE 171	Environmental Planning Methods	
or EARTHSYS 142	Remote Sensing of Land	
or ESS 117	Earth Sciences of the Hawaiian Islands	
or ESS 256	Soil and Water Chemistry	
or ESS 164	Fundamentals of Geographic Information Science (GIS)	
or GS 170	Environmental Geochemistry	
or GEOPHYS 190	Near-Surface Geophysics	

**Breadth (15-20 Units)**

Select one course from each of the five topics listed below. Courses listed as options in multiple categories (either required foundations or breadth requirements) can only be used to fulfill one requirement. Students are encouraged to work with their academic advisor to develop cross-cutting themes among their breadth requirements. Examples of cross-cutting themes could include: Earth and Energy Resources, Natural Hazards, Coastal Processes, Freshwater, etc.

**Atmosphere and Ocean Dynamics**

CEE 172	Air Quality Management
or ESS 141	Remote Sensing of the Oceans
or ESS 146A	
or ESS 146B	
or ESS 148	Introduction to Physical Oceanography
or ESS 151	Biological Oceanography
or ESS 152	Marine Chemistry

**Biogeosciences**

CEE 177	Aquatic Chemistry and Biology
or CHEMENG 174	Environmental Microbiology I
or EARTHSYS 111	Biology and Global Change
or EARTHSYS 151	Biological Oceanography
or EARTHSYS 158	Geomicrobiology
or GS 123	Evolution of Marine Ecosystems

Units

3-4

**Suggested Electives (up to 8 Units)**

Breadth electives may be relevant courses from breadth areas listed above and not used toward the breadth or core requirements, IntroSems (List 1 below), or Overseas/Off-Campus classes (List 2 below).

Units

List 1. Relevant Introductory Seminars or courses		
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions	3
or CEE 29N	Managing Natural Disaster Risk	
or EARTHSYS 41N	The Global Warming Paradox	
or EARTHSYS 44N	The Invisible Majority: The Microbial World That Sustains Our Planet	
or EARTHSYS 46N	Exploring the Critical Interface between the Land and Monterey Bay: Elkhorn Slough	
or EARTHSYS 46C	Environmental Impact of Energy Systems: What are the Risks?	

Units

3-4

or EARTHSYS 56Q	Changes in the Coastal Ocean: The View From Monterey and San Francisco Bays
or GEOPHYS 20N	Predicting Volcanic Eruptions
or ME 16N	Energy & The Industrial Revolution - Past, Present & Future
or BIO 35N	Climate change ecology: Is it too late?

## List 2. Off-campus courses

EARTHSYS 117	Earth Sciences of the Hawaiian Islands	3-5
or ESS 101	Environmental and Geological Field Studies in the Rocky Mountains	
or GS 190	Research in the Field	
or OSPMADRD 79	Earth and Water Resources' Sustainability in Spain	
or OSPAUSTL 10	Coral Reef Ecosystems	
or OSPAUSTL 25	Freshwater Systems	
or OSPAUSTL 30	Coastal Forest Ecosystems	
or BIOHOPK 163H	Oceanic Biology	
or BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems	
or BIOHOPK 182H	Stanford at Sea	
or OSPSANTG 58	Living Chile: A Land of Extremes	

## Honors Program

The honors program provides an opportunity for year-long independent study and research on a topic of special interest, culminating in a written thesis. Students select research topics in consultation with the faculty adviser of their choosing. Research undertaken for the honors program may be of a theoretical, field, or experimental nature, or a combination of these approaches. The honors program is open to students with a GPA of at least 3.5 in GS courses and 3.0 in all University course work. Modest financial support is available from several sources to help defray laboratory and field expenses incurred in conjunction with honors research. Interested students must submit an application, including a research proposal, to the department by the end of their junior year.

Upon approval of the research proposal and entrance to the program, course credit for the honors research project and thesis preparation is assigned by the student's faculty adviser within the framework of GS 199 Honors Program; the student must complete a total of 9 units over the course of the senior year. Up to 4 units of GS 199 may be counted towards the elective requirement, but cannot be used as a substitute for regularly required courses.

Both a written and oral presentation of research results are required. The thesis must be read, approved, and signed by the student's faculty adviser and a second member of the faculty. In addition, honors students must participate in the GS Honors Symposium in which they present their research to the broader community. Honors students in GS are also eligible for the Firestone medal, awarded by Undergraduate Advising and Research (<http://ual.stanford.edu>) for exceptional theses.

## Minor in Geological Sciences

The minor in GS consists of a small set of required courses plus 12 elective units. A wide variety of courses may be used to satisfy these elective requirements. All courses must be taken for a letter grade.

### Required Courses

		Units
GS 1	Introduction to Geology	5
GS 4	Coevolution of Earth and Life	4
GS 102	Earth Materials: Introduction to Mineralogy	4
GS 104	Introduction to Petrology	4
Total Units		17

## Electives (12 Units)

Students must take a minimum of 12 additional units drawn primarily from the Breadth in the Discipline list in the GS major (<http://www.stanford.edu/dept/registrar/bulletin/5038.htm>); a majority of units must be from classes within the GS department. Up to 3 units of Stanford Introductory Seminars in GS may be counted.

Students pursuing a minor in GS are encouraged to participate in the senior seminar (GS 150 Senior Seminar: Issues in Earth Sciences) and in field research (GS 105 Introduction to Field Methods)

On April 16, 2015, the Senate of the Academic Council approved the Master of Science in Geological Sciences. Students who matriculated into the Master of Science in Geological and Environmental Sciences have the option of changing the name of their degree to Geological Sciences. Degree requirements remain the same.

## Coterminal Master of Science Degree in Geological Sciences

The coterminal B.S./M.S. program offers students the opportunity to pursue graduate research and an M.S. degree concurrently with or subsequent to their B.S. studies. The M.S. degree can serve as an entrance to a professional degree in subdisciplines within the Earth sciences such as engineering geology and environmental geology, or to graduate course work and research as an intermediate step in pursuit of the Ph.D. Regardless of professional goals, coterminal B.S./M.S. students are treated as members of the graduate community and are expected to meet all of the standards set for regular M.S. students. Applicants must have earned no fewer than 120 units toward graduation, and must submit their application no later than the quarter prior to the expected completion of their undergraduate degree, normally the Winter Quarter prior to Spring Quarter graduation. The application includes a statement of purpose, a current Stanford transcript, official Graduate Record Examination (GRE) scores, letters of recommendation from two members of the Stanford faculty (at least one of whom must be in the GS department), and a list of courses in which they intend to enroll to fulfill the M.S. degree requirements. Specific research interests should be noted in the statement of purpose and discussed with a member of the GS faculty prior to submission of the application. Coterminal students must complete a thesis describing research results.

Students must meet all requirements for both the B.S. and M.S. degrees. Students may either:

1. complete 180 units required for the B.S. degree and then complete three full-time quarters (45 units at the 100-level or above) for the M.S. degree
2. or. complete a total of fifteen quarters during which the requirements of the two degrees are fulfilled concurrently.

At least half of the courses used to satisfy the 45-unit requirement must be designated as being primarily for graduate students, normally at the 200-level or above. No more than 15 units of thesis research may be used to satisfy the 45-unit requirement. Further information about this program may be obtained from the GS office.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer

of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Admission

For admission to graduate work in the department, the applicant must have taken the Aptitude Test (verbal, quantitative, and analytical writing assessment) of the Graduate Record Examination. In keeping with University policy, applicants whose first language is not English must submit TOEFL (Test of English as a Foreign Language) scores from a test taken within the last 18 months. Individuals who have completed a B.S. or two-year M.S. program in the U.S. or other English-speaking country are not required to submit TOEFL scores.

## Master of Science in Geological Sciences

### Objectives

The purpose of the master's program in Geological Sciences is to continue a student's training in one of a broad range of earth science disciplines and to prepare students for either a professional career or doctoral studies.

### Procedures

In consultation with the adviser, the student plans a program of course work for the first year. The student should select a thesis adviser within the first year of residence and submit to the thesis adviser a proposal for thesis research as soon as possible. The academic adviser supervises completion of the department requirements for the M.S. program (as outlined below) until the research proposal has been accepted; responsibility then passes to the thesis adviser. The student may change either thesis or academic advisers by mutual agreement and after approval of the Director of Graduate Studies.

### Requirements

The University's requirements for M.S. degrees are outlined in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin. Practical training (GS 385 Practical Experience in the Geosciences) may be required by some programs, with adviser approval, depending on the background of the student. Additional department requirements include the following:

1. A minimum of 45 units of course work at the 100 level or above.
  - a. Half of the courses used to satisfy the 45-unit requirement must be intended as being primarily for graduate students, usually at the 200 level or above.
  - b. No more than 15 units of thesis research may be used to satisfy the 45-unit requirement.
  - c. Some students may be required to make up background deficiencies in addition to these basic requirements.
2. By the end of Spring Quarter of their first year in residence, students must complete at least three graduate level courses taught by a minimum of two different GS faculty members.

3. Each student must have a research adviser who is a faculty member in the department and is within the student's thesis topic area or specialized area of study.
4. M.S. students must complete at least one TA appointment (25%). Additional TA quarters may be considered and/or required in consultations with the research advisor, depending on academic goals, funding availability, or the requirements of individual graduate programs.
5. Each student must complete a thesis describing his or her research. Thesis research should begin during the first year of study at Stanford and should be completed before the end of the second year of residence.
6. Early during the thesis research period, and after consultation with the student, the thesis adviser appoints a second reader for the thesis, who must be approved by the Director of Graduate Studies; the thesis adviser is the first reader. The two readers jointly determine whether the thesis is acceptable for the M.S. degree in the department.

## Engineer Degree in Geological Sciences

The Engineer degree is offered as an option for students in applied disciplines who wish to obtain a graduate education extending beyond that of an M.S., yet do not have the desire to conduct the research needed to obtain a Ph.D. A minimum of two years (six quarters) of graduate study is required. The candidate must complete 90 units of course work, no more than 10 of which may be applied to overcoming deficiencies in undergraduate training. The student must prepare a substantial thesis that meets the approval of the thesis adviser and the graduate coordinator.

On April 16, 2015, the Senate of the Academic Council approved the Doctor of Philosophy in Geological Sciences. Students who matriculated into the Doctor of Philosophy in Geological and Environmental Sciences have the option of changing the name of their degree to Geological Sciences. Degree requirements remain the same.

## Doctor of Philosophy in Geological Sciences

### Objectives

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship, high attainment in a particular field of knowledge, and the ability to conduct independent research. To this end, the objectives of the doctoral program are to enable students to develop the skills needed to conduct original investigations in a particular discipline or set of disciplines in the earth sciences, to interpret the results, and to present the data and conclusions in a publishable manner.

### Admission

For admission to graduate work in the department, the applicant must have taken the Aptitude Test (verbal, quantitative, and analytical writing assessment) of the Graduate Record Examination. In keeping with University policy, applicants whose first language is not English must submit TOEFL (Test of English as a Foreign Language) scores from a test taken within the last 18 months. Individuals who have completed a B.S. or two-year M.S. program in the U.S. or other English-speaking country are not required to submit TOEFL scores. Previously admitted students who wish to change their degree objective from M.S. to Ph.D. must petition the GS Admissions Committee.

### Requirements

The University's requirements for the Ph.D. degree are outlined in the "Graduate Degrees (p. 50)" section of this bulletin. Practical training (GS 385 Practical Experience in the Geosciences) may be required by some programs, with adviser approval, depending on the background



of the student. A summary of additional department requirements is presented below:

1. Ph.D. students must complete the required courses in their individual program or in their specialized area of study with a grade point average (GPA) of 3.0 (B) or higher, or demonstrate that they have completed the equivalents elsewhere. Ph.D. students must complete a minimum of four graduate level, letter-grade courses of at least 3 units each from four different faculty members on the Academic Council in the University. By the end of Spring Quarter of their first year in residence, students must complete at least three graduate level courses taught by a minimum of two different GS faculty members.
2. Ph.D. students must complete at least one TA appointment (25%). Additional TA quarters may be considered and/or required in consultations with the research advisor, depending on academic goals, funding availability, or the requirements of individual doctoral programs.
3. Each student must qualify for candidacy for the Ph.D. by the end of the sixth quarter in residence, excluding summers. Department procedures require selection of a faculty thesis adviser, preparation of a written research proposal, approval of this proposal by the thesis adviser, selection of a committee for the Ph.D. qualifying examination, and approval of the membership by the graduate coordinator and chair of the department. The research examination consists of three parts: oral presentation of a research proposal, examination on the research proposal, and examination on subject matter relevant to the proposed research. The exam should be scheduled prior to May 1, so that the outcome of the exam is known at the time of the annual spring evaluation of graduate students.
4. Upon qualifying for Ph.D. candidacy, the student and thesis adviser, who must be a department faculty member, choose a research committee that includes a minimum of two faculty members in the University in addition to the adviser. Annually, during the Spring Quarter, the candidate must organize a meeting of the research committee to present a brief progress report covering the past year.
5. Under the supervision of the research advisory committee, the candidate must prepare a doctoral dissertation that is a contribution to knowledge and is the result of independent research. The format of the dissertation must meet University guidelines. The student is strongly urged to prepare dissertation chapters that, in scientific content and format, are readily publishable.
6. The doctoral dissertation is defended in the University oral examination. The research adviser and two other members of the research committee are determined to be readers of the draft dissertation. The readers are charged to read the draft and to certify in writing to the department that it is adequate to serve as a basis for the University oral examination. Upon obtaining this written certification, the student is permitted to schedule the University oral examination.

## Ph.D. Minor in Geological Sciences

Candidates for the Ph.D. degree in other departments who wish to obtain a minor in Geological Sciences must complete, with a GPA of 3.0 (B) or better, 20 units in the geosciences in lecture courses intended for graduate students. The selection of courses must be approved by the student's GS adviser and the department chair.

*Emeriti: (Professors)* Atilla Aydin, Dennis K. Bird\*, W. Gary Ernst, James C. Ingle, Jr., Juhn G. Liou, Keith Loague, David D. Pollard

*Chair:* Jonathan Payne

*Associate Chair:* C. Kevin Boyce

*Professors:* Gordon E. Brown, Jr., Jef Caers, Rodney C. Ewing, Stephan A. Graham, Donald R. Lowe, Gail A. Mahood, Elizabeth L. Miller, Jonathan Payne, Jonathan F. Stebbins

*Associate Professors:* C. Kevin Boyce, George Hilley, Wendy Mao

*Assistant Professors:* Erik Sperling

*Professors (Research):* Martin J. Grove

*Courtesy Professors:* Page Chamberlain, Elizabeth Hadly, Simon L. Klemperer, Anders R. Nilsson, Alfred M. Spormann

\* Recalled to active duty

## Cognate Courses

Many courses offered within the School of Earth, Energy and Environmental Sciences, as well as courses in other schools with a significant Earth sciences component, may be used in satisfaction of optional requirements for the Geological Sciences degree. Undergraduates should discuss the options available to them with the undergraduate program coordinator; graduate students should discuss options with their advisers.

The following courses outside the School of Earth, Energy and Environmental Sciences are particularly applicable:

		Units
BIOHOPK 182H	Stanford at Sea	16
CEE 63	Weather and Storms	3
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions	3
CEE 101A	Mechanics of Materials	4
CEE 101B	Mechanics of Fluids	4
CEE 101C	Geotechnical Engineering	3-4
CEE 166A	Watersheds and Wetlands	4

## Overseas Studies Courses in Geological Sciences

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

Units

explorecourses:OSPs

# GEOPHYSICS

Courses offered by the Department of Geophysics are listed under the subject code GEOPHYS on the Stanford Bulletin's ExploreCourses web site.

Geophysics is the branch of Earth science concerned with exploring and analyzing active processes of the Earth through physical measurement. The undergraduate and graduate programs are designed to provide a background of fundamentals in science, and courses to coordinate these fundamentals with the principles of geophysics. The program leading to the Bachelor of Science (B.S.) in Geophysics permits many electives and a high degree of flexibility for each student. Graduate programs provide specialized training for professional work in resource exploration, research, and education, and lead to the degrees of Master of Science and Doctor of Philosophy.

The Department of Geophysics is housed in the Ruth Watis Mitchell Earth Sciences Building. It has numerous research facilities, among which are a state-of-the-art broadband seismic recording station, high pressure and temperature rock properties and rock deformation laboratories, various instruments for field measurements including seismic recorders, nine dual frequency GPS receivers, and field equipment for measuring in-situ stress at great depth. Current research activities include crustal deformation; earthquake seismology and earthquake mechanics; reflection, refraction, and tomographic seismology; rock mechanics, rock physics; seismic studies of the continental lithosphere; remote sensing; environmental geophysics; and synthetic aperture radar studies.

## Mission of the Undergraduate Program in Geophysics

The mission of the undergraduate program in Geophysics is to expose students to a broad spectrum of geophysics, including resource exploration, environmental geophysics, seismology, and tectonics. Students in the major obtain a solid foundation in the essentials of mathematics, physics, and geology, and build upon that foundation with advanced course work in Geophysics to develop the in-depth knowledge they need to pursue advanced graduate study and professional careers in government or the private sector.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. understand the physics and geology that form the basis for geophysical observation and measurement.
2. understand Earth structure and evolution.
3. identify the physical processes governing the behavior of common geophysical systems.
4. be able to explain the principles of applying geophysical methods to societally relevant problems, including natural hazards, resource exploration and management, and environmental issues.
5. be able to quantitatively describe the behavior of natural systems and the principles of geophysical measurement with physics-based mathematical models.
6. investigate these models by solving the governing equations with a combination of analytical and computational methods.
7. make their own observations with a variety of geophysical instruments, and reduce, model, and interpret their data and uncertainties.

8. effectively communicate their scientific knowledge through written and oral presentations.
9. be able to interpret and evaluate the published literature and oral and poster presentations at national meetings.

## Graduate Programs in Geophysics

University requirements for the M.S. and Ph.D. are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin. Lecture course units applied to graduate degree program requirements must be taken for a letter grade if the course is offered for a letter grade.

## Learning Outcomes (Graduate)

The objective of the graduate program in Geophysics is to prepare students to be leaders in the geophysics industry, academia, and research organizations through completion of fundamental courses in the major field and in related sciences, as well as through independent research. Students are expected to:

1. apply skills developed in fundamental courses to geophysical problems.
2. research, analyze, and synthesize solutions to an original and contemporary geophysics problem.
3. work independently and as part of a team to develop and improve geophysics solutions.
4. apply written, visual, and oral presentation skills to communicate scientific knowledge.
5. master's students are expected to develop in-depth technical understanding of geophysics problems at an advanced level.
6. doctoral students are expected to complete a scientific investigation that is significant, challenging and original.

## Bachelor of Science in Geophysics

The following courses are required for the B.S. degree in Geophysics. A written report on original research or an honors thesis is also required through participation in and GEOPHYS 199 Senior Seminar: Issues in Earth Sciences in Autumn Quarter of the senior year. Seniors in Geophysics who expect to do graduate work should take the Graduate Record Examination (GRE) early in their final undergraduate year.

## Optional Pre-Major Class

		Units
GEOPHYS 70	The Water Course	3
GEOPHYS 80		3
GEOPHYS 90	Earthquakes and Volcanoes	3

## Geophysics Core Courses (29-32 units)

Students must take all of the following:

		Units
GEOPHYS 110	Introduction to the foundations of contemporary geophysics	3
GEOPHYS 120	Ice, Water, Fire	3-5
GEOPHYS 130	Introductory Seismology	3
GEOPHYS 150	Geodynamics: Our Dynamic Earth	3-5
GEOPHYS 162	Laboratory Methods in Geophysics	2-3
or PHYSICS 67	Introduction to Laboratory Physics	
GEOPHYS 190	Near-Surface Geophysics	3
GEOPHYS 196	Undergraduate Research in Geophysics (or approved research internship)	5
GEOPHYS 197	Senior Thesis in Geophysics	3

or GEOPHYS 198	Honors Program	
GEOPHYS 199	Senior Seminar: Issues in Earth Sciences	3
GEOPHYS 201	Frontiers of Geophysical Research at Stanford: Faculty Lectures	1
Total Units		29-34

### Geophysics Breadth Courses (18-29 units)

Choose six upper-level courses, one from each of the following six areas (but an additional Geophysics class may substitute for either the Physics or the Geology breadth areas):

#### 1. Resources, hazards, and the environment

Select one of the following:		3
GEOPHYS 118		3-5
GEOPHYS 182	Reflection Seismology	3
GEOPHYS 183	Reflection Seismology Interpretation	1-4
GEOPHYS 185	Rock Physics for Reservoir Characterization	3
ENERGY 120	Fundamentals of Petroleum Engineering	3
Total Units		16-21

#### 2. Whole-Earth Geophysics

Select one of the following:		3
GS 122	Planetary Systems: Dynamics and Origins	3-4
GEOPHYS 141	Remote Sensing of the Oceans	3-4
GEOPHYS 184	Journey to the Center of the Earth	3
GEOPHYS 186	Tectonophysics	3
Total Units		15-17

#### 3. Numerical and computational methods

Select one of the following:		3-4
GEOPHYS 188	Basic Earth Imaging (Practical Earth Imaging)	2-3
GEOPHYS 211	Environmental Soundings Image Estimation	3
GEOPHYS 281	Geophysical Inverse Problems	3
ENERGY 160	Modeling Uncertainty in the Earth Sciences	3
EARTH 211	Software Development for Scientists and Engineers	3
ENERGY 160	Modeling Uncertainty in the Earth Sciences	3
EE 102A	Signal Processing and Linear Systems I	4
CME 108	Introduction to Scientific Computing	3
CS 106A & CS 106B	Programming Methodology and Programming Abstractions	6-10
CS 106B	Programming Abstractions	3-5
PHYSICS 113	Computational Physics	4

#### 4. Geophysical fluid dynamics

Select one of the following:		3-4
GEOPHYS 146A		3
ESS 146B		3
GEOPHYS 181	Fluids and Flow in the Earth: Computational Methods	3
ENERGY 121	Fundamentals of Multiphase Flow	3
ESS 220	Physical Hydrogeology	4
CEE 162D	Introduction to Physical Oceanography	4

#### 5. Physics

Select one of the following:		4
EE 142	Engineering Electromagnetics (formerly EE 141)	3
ME 80	Mechanics of Materials	4
PHYSICS 110	Advanced Mechanics	4
PHYSICS 120	Intermediate Electricity and Magnetism I	4

#### 6. Geology

Select one of the following:		3-5
GS 102	Earth Materials: Introduction to Mineralogy	4
GS 104	Introduction to Petrology	3-4
GS 110	Rock Deformation and Tectonics	3-5
GS 106	Sedimentary Geology and Depositional Systems	4

### Supporting Mathematics Courses

Students must take one of the following series (15 or 19 units):

CME 100	Vector Calculus for Engineers	5
CME 102	Ordinary Differential Equations for Engineers	5
CME 104	Linear Algebra and Partial Differential Equations for Engineers	5

(MATH 51 (Math 51M recommended), MATH 52, and MATH 53 plus either GEOPHYS 112 or CME 192 may substitute for CME series)

### Supporting Science Courses

Students must take all of the following (8-27 units):

Units 1	Introduction to Geology	Units 5
CHEM 31A & CHEM 31B or CHEM 31X	Chemical Principles I and Chemical Principles II or Chemical Principles Accelerated or a score of 5 on the Chemistry AP exam	5-10
PHYSICS 41 or PHYSICS 61	Mechanics or Mechanics and Special Relativity or a score of 4-5 on the Physics C Mechanics AP exam	4
PHYSICS 43 or PHYSICS 63	Electricity and Magnetism or Electricity, Magnetism, and Waves or a score of 4-5 on the Physics C E & M AP exam	4
PHYSICS 45 or PHYSICS 65	Light and Heat or Quantum and Thermal Physics	4

### Optional Field Class

GS 105	Introduction to Field Methods	3
Ur... GEOPHYS 171	Tectonics Field Trip	3

### Honors Program

The department offers a program leading to the B.S. degree in Geophysics with honors. The guidelines are:

1. Select a research project, either theoretical, field, or experimental, that has the approval of an adviser.
2. Submit a proposal to the department, which decides on its suitability as an honors project. Necessary forms are in the department office.
3. Course credit for the project is assigned by the adviser within the framework of GEOPHYS 198 Honors Program.

- The decision whether a given independent study project does or does not merit an award of honors is made jointly by the department and the student's adviser. This decision is based on the quality of both the honors work and the student's other work in Earth Sciences.
- The work done on the honors program cannot be used as a substitute for regularly required courses.

## Minor in Geophysics

The Geophysics minor provides students with a general knowledge of Geophysics in addition to a background in the related fields of physics, mathematics, and geology. The minor consists of one required class (3 units), three electives (min. 9 units), and supporting classes in geology, mathematics, and physics.

### Geophysics Core Courses (12-14 units)

- Required course:

GEOPHYS 110	Introduction to the foundations of contemporary geophysics	3
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- Plus three additional approved electives, typically chosen from:

Select three of the following:		
GEOPHYS 118		3-5
GEOPHYS 120	Ice, Water, Fire	3-5
GEOPHYS 130	Introductory Seismology	3
GEOPHYS 150	Geodynamics: Our Dynamic Earth	3
GEOPHYS 162	Laboratory Methods in Geophysics	3-4
GEOPHYS 184	Journey to the Center of the Earth	3
GEOPHYS 186	Tectonophysics	3
GEOPHYS 190	Near-Surface Geophysics	3

- Supporting Math & Science:

GS 1	Introduction to Geology	5
CME 100 or MATH 51	Vector Calculus for Engineers Linear Algebra and Differential Calculus of Several Variables	5
PHYSICS 21 or PHYSICS 22 or PHYSICS 23 or PHYSICS 24 or PHYSICS 41 & PHYSICS 43 or PHYSICS 41 & PHYSICS 45	Mechanics, Fluids, and Heat Mechanics, Fluids, and Heat Laboratory Electricity, Magnetism, and Optics Electricity, Magnetism, and Optics Laboratory Mechanics and Electricity and Magnetism Mechanics and Light and Heat	3
or equivalent AP scores		

## Coterminal Master of Science Program in Geophysics

The department offers a coterminal M.S. degree for students wishing to obtain more specialized training in Geophysics than is normally possible during study for the B.S. degree alone. An M.S. degree should be considered as the professional degree in Geophysics, and is aimed at students wishing to work in a related industry, or students desiring more focused academic study in the field than the B.S. program allows.

The coterminal M.S. degree in Geophysics is offered in conjunction with any relevant undergraduate program at Stanford. Geophysics students often enter the department with degrees in Earth Sciences, Mathematics, Physics, Chemistry, or other natural science or engineering fields. Any of these are suitable for the coterminal Geophysics program,

and interested students are encouraged to discuss their own background with a Geophysics faculty member.

### Admission

To apply for admission to the Geophysics coterminal M.S. program, students must submit the Coterminal Online Application (<https://applyweb.com/stanterm>), including submission of a transcript, a statement of purpose, and at least two letters of recommendation. Applications with a letter of recommendation from a Geophysics faculty are generally considered the strongest. Additional letters from other academic or work-related persons also strengthen the application. There are no specific GPA requirements for entry, but the department looks for proven performance in a rigorous undergraduate curriculum as a prerequisite for admission.

Undergraduates with at least junior-level standing may apply, and applications should be submitted by the Autumn Quarter of the senior

year.

The graduation requirements to obtain the degree are identical to those for the regular Geophysics master's degree.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

Units

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Science in Geophysics Objectives

To enhance the student's training for professional work in geophysics through the completion of fundamental courses, both in the major fields and in related sciences, and to begin independent work and specialization.

### Degree Requirements

The candidate must complete 45 units from the following groups of courses:

- Complete 15 units of Geophysics lecture courses with at least 9 units numbered 200 or higher.
- Complete 9 units of non-Geophysics lecture courses in the School of Earth, Energy, and Environmental Sciences, with at least 3 units numbered 200 level or higher.

- Complete 1-4 electives selected from courses numbered 100 or higher from mathematics, chemistry, engineering, physics, relevant biology, computer science, ecology, hydrology, or within the School of Earth, Energy, and Environmental Sciences. At least one course must be numbered 200 or higher. (GEOPHYS 201 and EARTH 300 are excluded.)
- Enroll for at least three quarters of research seminar (GEOPHYS 385 series).
- At least 6, but not more than 15, of the 45 units must be earned by enrollment in GEOPHYS 400 Research in Geophysics for independent work on a research problem resulting in a written report accepted and archived by the candidate's faculty. A summer internship is encouraged as venue for research, but no academic credit is given.
- Submit a program proposal for approval by a faculty adviser in the first quarter of enrollment.
- Each candidate must present and defend the results of his or her research at a public oral presentation attended by at least two faculty members; and turn in a thesis/report to adviser.
- Students are required to attend department seminars.

## Doctor of Philosophy in Geophysics

### Objectives

The Ph.D. degree is conferred upon evidence of high attainment in Geophysics and ability to conduct an independent investigation and present the results of such research.

### Transfer Credit

An incoming student with a relevant master of science degree may apply for a departmental waiver of up to 12 units of the 30 lecture units required for the Ph.D. degree, for certain courses as approved by the departmental graduate faculty adviser. Credit for courses generally requires that students identify an equivalent Stanford course and obtain the signature of the Stanford faculty responsible for that course, stating its equivalence.

### Requirements for the Degree

A minimum of 135 units of graduate study at Stanford must be satisfactorily completed. Required courses used to fulfill requirements for the Ph.D. in Geophysics must be lecture courses (component LEC) taken for a letter grade (unless S/NC is the only option offered). Geophysics courses used to fulfill requirements for the Ph.D. must be taught by Geophysics faculty (or senior academic staff if supervised by a faculty member). Lecture courses on geophysical topics taught by visiting faculty can only be counted as fulfilling a Geophysics requirement if approved in advance by the department Chair and the Director of Graduate Studies. Students are required to attend the department seminars and to complete sufficient units of independent work on a research problem to meet the 135-unit University requirement. 12 units must be met by participation in the GEOPHYS 385 series, or equivalent series in other departments with approval of the adviser and graduate coordinator. Students are encouraged to participate in the GEOPHYS 385 series from more than one faculty member or group and relevant equivalent series in other departments. Students with a master's degree may waive up to 12 units for approved courses.

ENGR 202W Technical Writing, is recommended but not required.

The student's record must indicate outstanding scholarship, and deficiencies in previous training must be removed. Experience as a teaching assistant (quarter-time for at least two academic quarters) is required for the Ph.D. degree. For more information, see the Geophysics Administrative Guide, section 1.4.1.

The student must pass the departmental oral examination by the end of the sixth academic quarter (third academic quarter for students with an M.S. degree); prepare under faculty supervision a dissertation that is a

contribution to knowledge and the result of independent work expressed in satisfactory form; and pass the University oral examination.

The Ph.D. dissertation must be submitted in its final form within five calendar years from the date of admission to candidacy. Upon formal acceptance into a research group, the student and faculty adviser form a supervising committee consisting of at least three members who are responsible for overseeing satisfactory progress toward the Ph.D. degree. At least two committee members must be Geophysics faculty members. The committee conducts the department oral examination, and meets thereafter annually with the student to review degree progress. The Geophysics faculty monitors progress of all students who have not yet passed their department oral examination by carrying out an annual performance appraisal at a closed faculty meeting.

### Course requirements

- Geophysics*: 12 units, lecture courses numbered 200 and above, from 4 different Geophysics faculty with different research specializations. These units cannot be waived.
- Additional Geophysics*: 3 units, lecture courses numbered 150 and above
- School of Earth Sciences (non-Geophysics)*: 3 units, lecture courses numbered 100 or above
- Mathematics (numbered 100 or above), Science, and Engineering (non-School of Earth Sciences)*: 6 units, lecture courses numbered 200 or above
- Any of the above categories*: 6 units, lecture courses numbered 200 or above
- Total required units*: 30 units.

### Ph.D. Department Examination Requirement

- One research proposal (10-20 pages) with a completed component that outlines a plan of research for 2-3 years
- Second scientific proposal or paper (4-10 pages) with a professor in another area
- An oral presentation with the student's advising committee on both the research proposal (~30-40 min) and the second proposal/paper (~10 min), with questions by the committee constituting the qualifying exam.

### Second Project

The purpose of the second research project is to add breadth to Ph.D. study and give the student the opportunity, ability and confidence to carry out research in multiple areas.

#### Description/Scope:

The second project should stand alone as a separate piece of work from the primary research project.

- The second project must be in Geophysics or a closely related discipline
- The topic must be substantially different from the topic of the Ph.D. thesis; i.e., it should not be the same method applied to a different problem, or a different method applied to the same problem.
- The second project should be supervised by a Stanford Geophysics faculty member (Academic Council or research faculty) who does not serve as the primary research adviser, and who must be in a separate research group. Exceptions allowing for second project advisers who are not Stanford Geophysics faculty must be approved by both the research adviser and the Director of Graduate Studies.
- Completion of the second project ideally results in a publication in the refereed literature, or a presentation at a scientific conference.
- Most students are expected to complete the second research project as part of their Ph.D. studies. However, the department allows an option of meeting academic breadth requirements through

additional focused course work; see the Geophysics (<https://pangea.stanford.edu/departments/geophysics/academics/graduate-program/graduation-requirements>) web site for further information on program requirements and the coursework breadth option.

*Chair:* Howard Zebker

*Associate Chair:* Biondo Biondi

*Professors:* Greg Beroza, Biondo Biondi, Jerry M. Harris, Simon Klemperer, Rosemary J. Knight, Paul Segall, Norman H. Sleep, Howard Zebker,\* Mark D. Zoback

*Associate Professor:* Eric Dunham

*Assistant Professors:* Tiziana Vanorio, Jenny Suckale, Dustin Schroeder

*Professor (Research):* Gerald M. Mavko, William Ellsworth

*Associate Professor (Research):* Tapan Mukerji\*\*

*Emeriti:* Jon Claerbout, Robert Kovach, Amos Nur,

*Courtesy Professors:* Stephan A. Graham, Wendy Mao, David D. Pollard

\* Joint appointment with Electrical Engineering

\*\* Joint appointment with Energy Resources Engineering

# SUSTAINABILITY SCIENCE AND PRACTICE

Courses offered by the Sustainability Science and Practice program are listed under the subject code SUST on the Stanford Bulletin's ExploreCourses (<https://explorecourses.stanford.edu>) website.

## Mission of the Coterminal Program in Sustainability Science and Practice.

The Sustainability Science and Practice program is an interdisciplinary program hosted by the School of Earth, Energy and Environmental Sciences (p. 138). As the global human population climbs toward 11 billion this century and consumption demands increase, we must find ways to meet the needs of people in ways that do not forgo possibilities for future generations. These sustainability challenges are marked by extreme complexity, urgency, conflicting demands, and often a paucity of resources or political will to address them.

The program integrates theoretical and conceptual knowledge with practical skills and tools to prepare students to both envision a prosperous future for all, and know how to design the practices and cultivate partnerships essential to building that future.

The curriculum covers three main elements:

### Understanding complex social-environmental systems

Students explore tools to measure, map, and model five capital assets – social, natural, human, manufactured, and knowledge capital – and their complex interactions in order to recognize potential feedbacks, thresholds, and unintended interactions and outcomes, as well as to identify leverage points and opportunities for interventions that can have transformative impact.

### Understanding decision making and developing strategies for change

Students examine the roles of diverse actors who influence change in social-environmental systems and explore strategies to align decision making and behavior with sustainability goals. They explore mindsets and attributes of transformative leaders and their organizations while building a range of skills, including decision making, the use of inclusive metrics and evaluation approaches, and communication approaches.

### Designing innovations with impact at scale

Students learn a framework and methods of practice for innovation in the context of complex and systemic challenges, including systems thinking, social cognitive theory, behavioral economics, technology strategy, business model innovation, and system based theories of change, in order to generate creative interventions to bring about change.

In addition, students complete a 4 unit (120 hour) practicum placement which provides a hands-on experience working with a partner organization on a real-life challenge.

## Learning Outcomes

The Sustainability Science and Practice program integrates theoretical and conceptual knowledge, mindsets and practical skills and tools to enable students to understand and manage complex systems, understand decision making and develop strategies for change, and develop partnerships and design innovations with potential for large scale impact.

The program prepares students to become effective participants and agents of change as individuals and within organizations across all

sectors of society, contributing to the advancement of the goal of sustainability, i.e., the well-being of people around the world and across generations. Using a conceptual framework that connects human well-being with key underlying assets, students learn how social-environmental systems work, how decisions are and can be made to influence system dynamics in a way that supports sustainability goals, and how to engage with others to design new ways of managing these systems.

## Coterminal Master's Degrees in Sustainability Science and Practice

The Sustainability Science and Practice program offers current Stanford University undergraduates the opportunity to apply to a one-year coterminal master's program. Sustainability Science and Practice offers both a coterminal Master of Arts (M.A.) and a coterminal Master of Science (M.S.) degree.

### Application and Admission

Sustainability Science and Practice accepts applications in the Autumn, Winter, and Spring quarters. Application deadline is 11.59pm on the seventh Monday of the quarter. If the seventh Monday is an official University holiday, applications are due by 11.59pm on the seventh Tuesday of the quarter. Seniors intending to confer their degrees at the end of the Spring Quarter must apply by Winter Quarter deadline.

To apply, students should submit an online application. The application includes the following:

- The online Stanford coterminal application (<https://www.applyweb.com/stanterm>)
- A statement of purpose
- A resume
- A current Stanford unofficial transcript
- Two letters of recommendation, one of which must be from the master's advisor (who must be an Academic Council member)
- Master's program proposal (link): a list of proposed courses that fulfill degree requirements, signed by the master's adviser.

Applications must be submitted no later than the quarter prior to the expected completion of the bachelor's degree (and within quarterly application deadlines). An application fee is assessed by the Registrar's Office for coterminal applications once students are matriculated into the program.

Students applying to the coterminal master's program must have completed a minimum of 120 units towards graduation with a minimum overall Stanford GPA of 3.4.

All applicants must devise a program of study that shows a level of courses appropriate to the master's level, as determined in consultation with the masters advisor and the Director of Sustainability Science and Practice.

The student has the option of receiving the bachelor's degree after completing the degree's requirements, or receiving the bachelors and masters degrees concurrently at the completion of the master's program.

Students must submit a new application to change from the M.S to the M.A. in Sustainability Science and Practice, or from the M.A. to the M.S. in Sustainability Science and Practice. If accepted, the student must submit a Graduate Authorization Petition through Axxess; a \$125 fee applies to a successful Graduate Authorization Petition.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the

"Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Arts in Sustainability Science and Practice

### Degree Requirements

The following are required of all M.A. students:

- A minimum of 45 units of course work.
- At least 34 units of the student's course work for the master's program must be at the 200 level or above.
- All remaining course work must be at the 100 level or above.
- All courses for the master's program must be taken for a letter grade; courses not taken for a letter grade must be approved by the master's adviser and the Director of Sustainability Science and Practice.
- A minimum overall GPA of 3.4 must be maintained.
- 25 or more of the 45 units must be designated as arts units. Course coding can be seen in the master list of courses, available here.

For the Master of Arts in Sustainability Science and Practice, an ethics course must be taken if not completed in the undergraduate degree program. This course does not have to be completed before applying to the coterm program. It can be taken as an elective.

### Required Courses

#### Ethics

Select one of the following:

	Units
ETHICSOC 234R Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals	3
PHIL 277C Ethics of Climate Change	4

or approved alternative

The following courses are required for the Master of Arts in Sustainability Science and Practice. If required courses have been taken in the undergraduate career, students pursue additional electives.

	Units	Ethics
SUST 210 Pursuing Sustainability: Managing Complex Social Environmental Systems	3	Select one of the following:
SUST 220 Case Studies in Leading Change for Sustainability	3	

SUST 230	Innovating Large Scale Sustainable Transformations	4
SUST 240	Sustainability Science and Practice Practicum	1-4
EARTHSYS 111/211	Biology and Global Change <sup>1</sup>	4
EARTHSYS 112/212	Human Society and Environmental Change <sup>1</sup>	4
<b>Minimum 1, Maximum 2 of the following</b>		3-8
SUST 231	Design Thinking for Sustainable Impact	
EARTHSYS 289	FEED Lab: Food System Design & Innovation	
ME 206A & ME 206B	Design for Extreme Affordability and Design for Extreme Affordability <sup>2</sup>	
ME 313	Human Values and Innovation in Design	
ME 377	Design Thinking Studio	
<b>Minimum 1, Maximum 2 of the following</b>		3-6
PSYCH 215	Mind, Culture, and Society	
PSYCH 216	Public Policy and Social Psychology: Implications and Applications	
PSYCH 265	Social Psychology and Social Change	
<b>One of the following</b>		3-4
LAW 7508	Problem Solving and Decision Making for Public Policy and Social Change	
GSBGEN 367	Problem Solving for Social Change	

<sup>1</sup> Students who took the undergraduate offering of this course may count it towards the degree. Students who did not take the undergraduate offering must enroll in the graduate (200-level) offering.

<sup>2</sup> These courses count as two courses towards this requirement.

A current list of electives can be found on the program's spreadsheet (<https://stanford.box.com/v/sust-courses>).

## Master of Science in Sustainability Science and Practice

### Degree requirements

The following are required of all M.A. students:

- A minimum of 45 units of course work.
- At least 34 units of the student's course work for the masters program must be at the 200 level or above.
- All remaining coursework must be at the 100 level or above.
- All courses for the master's program must be taken for a letter grade; courses not taken for a letter grade must be approved by the master's adviser and Director of Sustainability Science and Practice.
- A minimum overall GPA of 3.4 must be maintained.
- Twenty five or more of the 45 units must be designated as 'science' units. Course coding can be seen in the master list of courses, available here.
- For the Master of Arts in Sustainability Science and Practice, the following courses must be taken if not completed in the undergraduate degree program. These courses do not have to be completed before applying to the coterm program. The ethics course can be taken as an elective. The Math and Stats courses may not be counted as part of the 45-unit masters degree.



ETHICSOC 234R	Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals	3
PHIL 277C	Ethics of Climate Change	4

or approved alternative

**Mathematics**

Select one of the following:

MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
CME 100	Vector Calculus for Engineers	5

**Statistics**

Select one of the following:

ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5
STATS 116	Theory of Probability	3-5

**Required Courses**

The following courses are required for the Master of Arts in Sustainability Science and Practice. If required courses have been taken in the undergraduate career, students pursue additional electives.

SUST 210	Pursuing Sustainability: Managing Complex Social Environmental Systems	3
SUST 220	Case Studies in Leading Change for Sustainability	3
SUST 230	Innovating Large Scale Sustainable Transformations	4
SUST 240	Sustainability Science and Practice Practicum	1-4
EARTHSYS 111/211	Biology and Global Change <sup>1</sup>	4
EARTHSYS 112/212	Human Society and Environmental Change <sup>1</sup>	4
<b>Minimum 1, Maximum 2 of the following</b>		3-8
SUST 231	Design Thinking for Sustainable Impact	
EARTHSYS 289	AEED Lab: Food System Design & Innovation	
ME 206A & ME 206B	Design for Extreme Affordability and Design for Extreme Affordability <sup>2</sup>	
ME 313	Human Values and Innovation in Design	
ME 377	Design Thinking Studio	
<b>Mimum 1, Maximum 2 of the following</b>		3-6
PSYCH 215	Mind, Culture, and Society	
PSYCH 216	Public Policy and Social Psychology: Implications and Applications	
PSYCH 265	Social Psychology and Social Change	
<b>One of the following</b>		3-4
LAW 7508	Problem Solving and Decision Making for Public Policy and Social Change	
GSBGEN 367	Problem Solving for Social Change	

A current list of electives can be found on the program's spreadsheet (<https://stanford.box.com/v/sust-courses>).

Director: Pamela Matson

**Units** Associate Director: Julia Novy-Hildesley

Affiliated Faculty and Lecturers:

- Kevin Arrigo (Donald & Donald M. Steel Professor in Earth Sciences; Victoria and Roger Sant Director, Earth Systems Program)
- Nicole M. Ardoin (Associate Professor of Education and Senior Fellow at the Woods Institute for the Environment)
- Shilajeet Banerjee (Professor of Practice, Emmett Interdisciplinary Program in Environment and Resources)
- William Barnett (Thomas M. Siebel Professor In Business Leadership, Strategy, & Organizations)
- Sally Benson (Director, Precourt Institute for Energy and Professor of Energy Resources Engineering and Senior Fellow at The Precourt Institute For Energy)
- Paul Brest (University Faculty Law Teaching Professor Emeritus)
- Marshall Burke (Assistant Professor of Earth System Science and Center Fellow at the Freeman Spogli Institute for International Studies and, by courtesy, at the Woods Institute for the Environment)
- Gretchen C. Daily (Bing Professor in Environmental Science and Senior Fellow the Woods Institute for the Environment)
- Jenna Davis (Associate Professor of Civil and Environmental Engineering and Senior Fellow the Woods Institute for the Environment)
- Rob Dunbar (W.M. Keck Professor in the School of Earth, Energy & Environmental Sciences and Senior Fellow, by courtesy, at the Woods Institute for the Environment)
- Zephyr Frank (Professor of History and, by courtesy, Iberian and Latin American Cultures)
- Pamela Hinds (Professor of Management Science and Engineering)
- Rob Jackson (Michelle and Kevin Douglas Provostial Professor and Senior Fellow at the Woods Institute for the Environment and at The Precourt Institute for Energy)
- James Holland Jones (Associate Professor of Earth System Science and Senior Fellow at the Woods Institute for the Environment)
- Jeffrey R. Koseff (William Alden Campbell and Martha Campbell Professor in the School of Engineering and Senior Fellow at the Woods Institute for the Environment)
- Eric Lambin( George and Setsuko Ishiyama Provostial Professor and Senior Fellow at the Woods Institute for the Environment)
- Hazel Markus (Davis-Brack Professor in the Behavioral Sciences)
- Pamela Matson (Chester Naramore Dean of the School of Earth, Energy & Environmental Sciences, Richard and Rhoda Goldman Professor in Environmental Studies and Senior Fellow at the Woods Institute)
- Rosamond Naylor (William Wrigley Professor, Senior Fellow at the Woods Institute for the Environment and at the Freeman Spogli Institute for International Studies and Professor, by courtesy, of Economics)
- Julia Novy-Hildesley (Professor of the Practice, Emmett Interdisciplinary Program in Environment and Resources)
- Burke Robinson (Lecturer, Management Science and Engineering)
- Jenny Suckale (Assistant Professor of Geophysics and, by courtesy, of Civil and Environmental Engineering)
- Barton Thompson (Robert E. Paradise Professor in Natural Resources Law and Senior Fellow at the Woods Institute for the Environment)
- Peter Vitousek (Clifford G. Morrison Professor in Population and Resource Studies, Senior Fellow at the Woods Institute for the Environment and Professor, by courtesy, of Earth System Science)
- Jeremy Weinstein (Professor of Political Science and Senior Fellow at The Freeman Spogli Institute for International Studies)
- Mikael Wolfe (Assistant Professor of History)

# GRADUATE SCHOOL OF EDUCATION

Courses offered by the Graduate School of Education are listed under the subject code EDUC on the Stanford Bulletin's ExploreCourses web site.

The Stanford Graduate School of Education is a leader in pioneering new and better ways to achieve high-quality education for all. Faculty and students engage in groundbreaking and creative interdisciplinary scholarship that informs how people learn and shapes the practice and understanding of education. Through state-of-the-art research and innovative partnerships with educators worldwide, the school develops knowledge, wisdom, and imagination in its diverse and talented students so they can lead efforts to improve education around the globe.

Two graduate degrees with specialization in education are granted by the University: Master of Arts and Doctor of Philosophy.

While no undergraduate majors are offered, the school offers courses for undergraduates, an undergraduate minor and an undergraduate honors program.

The Graduate School of Education is organized into three area committees: Curriculum Studies and Teacher Education (CTE); Developmental and Psychological Sciences (DAPS); and Social Sciences, Humanities, and Interdisciplinary Policy Studies in Education (SHIPS).

In addition, several cross-area programs are sponsored by faculty from more than one area. These programs include the doctoral program in Learning Sciences and Technology Design (LSTD); the doctoral program in Race, Inequality, and Language in Education (RILE); two master's level programs, the Stanford Teacher Education Program (STEP) and the Learning, Design, and Technology Program (LDT); and the undergraduate honors and minor programs.

These area committees function as administrative units that act on admissions, plan course offerings, assign advisers, monitor student academic progress, and determine program requirements. Various concentrations exist within most of these areas. Faculty members are affiliated primarily with one area but may participate in several programs. While there is a great deal of overlap and interdisciplinary emphasis across areas and programs, students are affiliated with one area committee or program and must meet its degree requirements.

Detailed information about admission and degree requirements, faculty members, and specializations related to these area committees and programs can be found in the Academics section of the School's web site (<https://ed.stanford.edu/academics>).

The Graduate School of Education offers no correspondence or extension courses, and in accordance with University policy, no part-time enrollment is allowed. Work in an approved internship or as a research assistant is accommodated within the full-time program of study.

## Undergraduate Programs in Education

The Graduate School of Education offers a minor and an honors program at the undergraduate level. Further information about these programs can be found at the Graduate School of Education (<https://ed.stanford.edu/academics/undergraduate>) web site.

Regardless of whether they are enrolled in one of these undergraduate programs, undergraduates are also welcome in many graduate-level courses at the GSE.

## Graduate Programs in Education

The Graduate School of Education offers Master of Arts and Doctor of Philosophy degrees in several programs (see "Master's" and "Doctoral" tabs on this page). University and Graduate School of Education requirements must be met for each degree. The University requirements are detailed in the "Graduate Degrees (p. 50)" section of this bulletin. Students are urged to read this section carefully, noting residency, tuition, and registration requirements. A student who wishes to enroll for graduate work in the Graduate School of Education must be admitted to graduate standing by one of the school's area committees and with the approval of the Associate Dean of Student Affairs. All Graduate School of Education courses are intended for matriculated students in degree programs only.

Complete information about admissions procedures and requirements is available from Graduate Admissions (<http://studentaffairs.stanford.edu/gradadmissions>), or at the Graduate School of Education (<https://ed.stanford.edu/admissions>) web site. All applicants, except coterminal applicants, must submit scores from the Graduate Record Examination General Test (verbal, quantitative, and analytical or analytical writing areas); TOEFL scores are also required from those whose first language is not English. Applicants to the Stanford Teacher Education Program (STEP) are also required to submit specific test scores or acceptable equivalents as required by the California Commission on Teacher Credentialing; see the section on STEP. Test information is available at the Graduate School of Education (<https://ed.stanford.edu/admissions>) web site.

## Honors Program in Education

The Honors Program in Education is available to undergraduates to supplement their declared majors by applying their studies to a research project inspired by their interests in education. This program enables qualified undergraduates at Stanford to extend the training in their major field of study by pursuing education courses and undertaking a supervised research thesis involving the study of education. Students typically apply for entry during either the Autumn or Winter Quarter of their junior year. Application information can be found at the Graduate School of Education (<https://ed.stanford.edu/academics/undergraduate/honors>) web site. The current director of the honors program is John Willinsky, Khosla Family Professor of Education.

In addition to completing an honors thesis over the course of their senior year, successful candidates for honors present brief reports on their research at a mini-conference held in the Spring Quarter that all the honors students in Education, as well as other members of the academic community, are invited to attend.

Required Coursework:

1. Students are required to enroll in the Undergraduate Honors Seminar during their senior year: EDUC 199A (Autumn, 3 units), EDUC 199B (Winter, 1 unit), and EDUC 199C (Spring, 1 unit)
2. Students are required to enroll in Honors Research (EDUC 140) with their adviser during Winter and Spring quarters of their senior year. The number of units is to be determined in consultation with the faculty adviser.
3. Students must also complete a minimum of 3 courses taken for a minimum of 3 units each in Education (EDUC units) before the end of their senior year. All courses must be taken for a letter grade and must be approved by the honors director.

## Minor in Education (Undergraduate)

The Graduate School of Education awards an undergraduate minor in the field of Education. The minor is structured to provide a substantial introduction to Education through a broad-based and focused study of research, theory and practice. The goals of the minor are to allow

undergraduates to develop an understanding of the core issues facing educators and policymakers, to make connections to their major programs of study, and to provide rigorous preparation for graduate studies in Education.

Students interested in pursuing an undergraduate minor in Education begin by contacting the minor director (Jennifer Lynn Wolf, [jlwolf@stanford.edu](mailto:jlwolf@stanford.edu) ([jlwolf@stanford.edu](mailto:jlwolf@stanford.edu))), who is responsible for advising all candidates and approving each student's minor plan of study. Applications for the minor are due no later than the second quarter of the junior year.

The Education minor requires three core courses to ensure coverage of the field disciplines, while offering flexibility for students pursuing specific interests. In order to graduate with a minor in Education, undergraduates must complete the minor program of study as described here, for a total of not less than 20 units and not more than 30 units, with a minimum of six courses.

### Course Requirements and Distribution

- All minor students are required to take the minor core course:

EDUC 101	Introduction to Teaching and Learning	4
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- All students are also required to take two of the following foundational courses:

EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
EDUC 110	Sociology of Education: The Social Organization of Schools	4
EDUC 120C	Education and Society	4-5
EDUC 201	History of Education in the United States	3-5
EDUC 204	Introduction to Philosophy of Education	3

- Each student identifies a subfield of study in which to take at least three elective courses. Established subfields of study within the Graduate School of Education include: Teaching and Learning; Education Research and Policy; and Educational Technology. A comprehensive list of suitable elective courses is provided below.

#### 1. Subfield 1: Teaching and Learning—

EDUC 111	The Young Adult Novel: A Literature For and About Adolescents	4
EDUC 112	Urban Education	3-5
EDUC 130	Introduction to Counseling	3
EDUC 148	Critical Perspectives on Teaching and Tutoring English Language Learners	3
EDUC 149	Theory and Issues in the Study of Bilingualism	3-5
EDUC 165	History of Higher Education in the U.S.	3-5
EDUC 171	Preschool Counts: Engaging Young Children in Math	3
EDUC 213	Introduction to Teaching	3-4
EDUC 217	Free Speech, Academic Freedom, and Democracy	3
EDUC 218	Topics in Cognition and Learning: Technology and Multitasking	3
EDUC 241	Race, Justice, and Integration	3
EDUC 245	Understanding Racial and Ethnic Identity Development	3-5
EDUC 256	Psychological and Educational Resilience Among Children and Youth	4
EDUC 266	Educational Neuroscience	3

Units

Units

Units

EDUC 277	Education of Immigrant Students: Psychological Perspectives	4
EDUC 280	Learning & Teaching of Science	3
EDUC 332	Theory and Practice of Environmental Education	3
EDUC 357	Science and Environmental Education in Informal Contexts	3-4

#### 2. Subfield 2: Education Research and Policy—

EDUC 111	The Young Adult Novel: A Literature For and About Adolescents	4
EDUC 114N	Growing Up Bilingual	3
EDUC 116N	Howard Zinn and the Quest for Historical Truth	3
EDUC 117	Research and Policy on Postsecondary Access	3
EDUC 122Q	Democracy in Crisis: Learning from the Past	3
EDUC 123	Community-based Research As Tool for Social Change: Discourses of Equity in Communities & Classrooms	3-5
EDUC 145	Writing Across Languages and Cultures: Research in Writing and Writing Instruction	3-5
EDUC 149	Theory and Issues in the Study of Bilingualism	3-5
EDUC 151	The Future of Information	4
EDUC 165	History of Higher Education in the U.S.	3-5
EDUC 177A	Well-Being in Immigrant Children & Youth: A Service Learning Course	4

EDUC 197	Gender and Education in Global and Comparative Perspectives	4
EDUC 203	Using International Test Results in Educational Research	4
EDUC 217	Free Speech, Academic Freedom, and Democracy	3
EDUC 220D	History of School Reform: Origins, Policies, Outcomes, and Explanations	3-5
EDUC 222	Resource Allocation in Education	4-5
EDUC 241	Race, Justice, and Integration	3
EDUC 245	Understanding Racial and Ethnic Identity Development	3-5
EDUC 256	Psychological and Educational Resilience Among Children and Youth	4
EDUC 266	Educational Neuroscience	3
EDUC 277	Education of Immigrant Students: Psychological Perspectives	4

#### 3. Subfield 3: Learning Design and Technology—

EDUC 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
EDUC 139	Educating Young STEM Thinkers	3-5
EDUC 151	The Future of Information	4
EDUC 211	Beyond Bits and Atoms - Lab	3
EDUC 218	Topics in Cognition and Learning: Technology and Multitasking	3
EDUC 236	Beyond Bits and Atoms: Designing Technological Tools	3-4
EDUC 280	Learning & Teaching of Science	3
EDUC 303	Designing Learning Spaces	3-4
EDUC 328	Topics in Learning and Technology: Core Mechanics for Learning	3
EDUC 333A	Understanding Learning Environments	3
EDUC 342	Child Development and New Technologies	3

- Course work completed for the Education Minor must meet the following criteria:

- All courses must be taken for a letter grade.

- All courses must be completed with a minimum GPA of 3.0.
- Courses used to fulfill the minor may not be used to fulfill any other department degree requirements (major or minor).
- All courses must be taken at Stanford University.

## Coterminal Master's Program in Education

The Graduate School of Education admits a limited number of students from undergraduate departments within the University into a coterminal master's program. For information about the coterminal option through the Stanford Teacher Education Program (STEP), see the details under STEP (<https://ed.stanford.edu/step>). Students in a coterminal program receive the bachelor's degree in their undergraduate major and the master's degree in Education. Approval of the student's undergraduate department and admission to the Graduate School of Education's M.A. program are required. Undergraduates may apply when they have completed at least 120 units toward graduation (UTG). The number of units required for the M.A. degree depends on the program requirements; see the Master's Handbook (<https://ed.stanford.edu/academics/masters-handbook>) for additional information.

Applicants may learn more about the GSE's coterminal application process from the Graduate School of Education's (<https://ed.stanford.edu/admissions/application-reqs>) web site. All coterm programs accept online applications. Information regarding University rules about application and eligibility for coterm admission can be found on the Registrar's web site (<https://registrar.stanford.edu/students/coterminal-degree-programs>).

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Arts in Education

The M.A. degree is conferred upon fulfillment of degree requirements and by recommendation of the faculty of the Graduate School of Education. Depending on the specialization (please see below), students must complete a minimum of 45-48 units at Stanford, and 27-36 units in the Graduate School of Education (EDUC units) to receive a master's degree in Education. All M.A. students must maintain a grade point average (GPA) of 3.0 or better in courses applicable to the degree. Master's students should obtain detailed program requirements from the Master's Handbook (<https://ed.stanford.edu/academics/masters-handbook>). Additional detailed information regarding program content and degree

requirements is available on the Graduate School of Education's (<https://ed.stanford.edu/admissions/application-reqs>) website.

The Graduate School of Education offers Master of Arts degrees in the following specializations:

- Curriculum and Teacher Education (CTE) (This is not a credentialing program; see STEP below.)
- International Comparative Education (ICE)
- International Education Policy Analysis (IEPA)
- Joint Degree with Graduate School of Business (M.A./M.B.A.)
- Joint Degree with Law School (M.A./J.D.)
- Joint Degree with Public Policy Program (M.A./M.P.P.)
- Learning, Design, and Technology (LDT)
- Policy, Organization, and Leadership Studies (POLS)

In addition, an M.A. degree with a teaching credential is offered in the Stanford Teacher Education Program.

## Stanford Teacher Education Program (STEP)

STEP is a 12-month, full-time program leading to a Master of Arts and a preliminary California teaching credential. STEP offers a Master of Arts in Education that prepares program graduates for careers as teachers in single or multiple subject classrooms. STEP Elementary prepares students to become teachers in multiple subject classrooms. STEP Secondary prepares students to become teachers of English, World Languages (French, German, Japanese, Mandarin, Spanish), Mathematics, Science (biology, chemistry, earth science, physics), and History/Social Science. STEP seeks to prepare and support teacher candidates to work with diverse learners to achieve high intellectual, academic, and social standards by creating equitable and successful schools and classrooms.

The 12-month STEP year begins in June with a summer quarter of intensive academic preparation and placement in a local summer school. During the academic year, students continue their course work and begin year-long field placements under the guidance of expert teachers in local schools. The Master of Arts and teaching credential require a minimum of 45 quarter units, taken during four quarters of continuous residency.

Stanford undergraduates who enroll in STEP through the coterminal program must complete their undergraduate coursework and have their bachelor's degree conferred prior to beginning in the STEP year. Coterminal STEP students graduate with a Master of Arts in Education and a recommendation for a preliminary California teaching credential.

Applicants to STEP Elementary are required to meet the basic skills requirement by one of the following methods: pass the California Basic Educational Skills Test (CBEST), an approved out of state basic skills exam, the CSET: Writing Skills or achieve qualifying scores on the SAT, ACT or AP examinations. Applicants must also pass the California Multiple Subject Examination for Teachers (CSET), and the Reading Instruction Competence Assessment Test (RICA).

Applicants to STEP Secondary are required to meet the basic skills requirement by one of the following methods: pass the California Basic Educational Skills Test (CBEST), an approved out of state basic skills exam, or achieve qualifying scores on the SAT, ACT or AP examinations. Additionally, applicants must demonstrate subject matter competence in one of two ways:

1. by passing the California Subject Examination for Teachers (CSET) in their content area; or
2. by completing a California state-approved subject matter preparation program.

Further information regarding admission requirements, course work, and credential requirements is available at the Stanford Teacher Education Program web site. (<https://gse-step.stanford.edu>)

## Doctoral Degrees in Education

The Graduate School of Education offers the Doctor of Philosophy (Ph.D.) degree in all program area committees. The degree is conferred by the University upon recommendation by the faculty of the Graduate School of Education and the University Committee on Graduate Studies. The Ph.D. requires a minimum of 135 units of course work and research completed at Stanford beyond the baccalaureate degree. Students may transfer up to 45 units of graduate course work. Students must consult with the doctoral programs officer if they intend to transfer prior course work. Students must maintain a grade point average (GPA) of 3.0 (B) or better in courses applicable to the degree.

Students should note that admission to the doctoral program does not constitute admission to candidacy for the degree. Students must qualify and apply for candidacy by the end of their second year of study and should obtain information about procedures and requirements during their first year from the doctoral programs officer in Cubberley 135.

The Ph.D. degree is designed for students who are preparing for research work in public school systems, branches of government, or specialized institutions; teaching roles in education in colleges or universities, and research connected with such teaching; or other careers in educational scholarship and research.

Ph.D. students must complete a minor in another discipline taught outside the school, or hold an acceptable master's degree outside the field of education, or complete an approved individually designed distributed minor that combines relevant advanced work taken in several disciplines outside the school.

Upon admission, the admitting area committee assigns an initial adviser from its faculty who works with the student to establish an appropriate and individualized course of study, a relevant minor, and project research plans. Other faculty members may also be consulted in this process. Details about administrative and academic requirements for each area committee and the Graduate School of Education, along with the expected time frame to complete program milestones, are given in the publication Graduate School of Education Doctoral Degree Handbook, available for download at <http://ed.stanford.edu/academics/doctoral-handbook>.

The following doctoral specializations, with their sponsoring area and concentration, are offered:

- Anthropology of Education (SHIPS)
- Developmental and Psychological Sciences (DAPS)
- Economics of Education (SHIPS)
- Educational Linguistics (SHIPS)
- Educational Policy (SHIPS)
- Elementary Education (CTE)
- Higher Education (SHIPS)
- History/Social Science Education (CTE)
- History of Education (SHIPS)
- International Comparative Education (SHIPS)
- Learning Sciences and Technology Design (CTE, DAPS, SHIPS)
- Literacy, Language, and English Education (CTE)
- Mathematics Education (CTE)
- Organizational Studies (SHIPS)
- Philosophy of Education (SHIPS)
- Race, Inequality, and Language in Education (CTE, DAPS, SHIPS)
- Science Education (CTE)

- Sociology of Education (SHIPS)
- Teacher Education (CTE)

## Ph.D. Minor in Education

Candidates for the Ph.D. degree in other departments or schools of the University may elect to minor in Education. Requirements include a minimum of 20 quarter units of graduate course work in Education and a field of concentration. Students choosing to minor in Education should meet with the Associate Dean for Student Affairs to determine a suitable course of study early in their program.

*Emeriti: (Professors)* J. Myron Atkin, John Baugh, Edwin M. Bridges, Larry Cuban, James Greeno, Pam Grossman, Edward Haertel, Kenji Hakuta, Linda Darling-Hammond, Connie Juel, Michael Kamil, Michael W. Kirst, Henry M. Levin, Rachel Lotan, James G. March, William F. Massy, Milbrey McLaughlin, Nel Noddings, Denis C. Phillips, Thomas Rohlen, Richard J. Shavelson, Lee S. Shulman, Claude Steele, Myra H. Strober, Carl E. Thoresen, David B. Tyack, Decker F. Walker, Hans Weiler

*Dean:* Dan Schwartz

*Associate Dean for Faculty Affairs:* Tom Dee

*Associate Dean for Student Affairs:* Bryan Brown

*Senior Associate Dean for Administration:* Geoff Cox

*Associate Dean for External Relations:* Heather Trippel

*Assistant Dean for Academic Services:* Shu-Ling Chen

*Associate Dean for Administration:* Priscilla Fiden

*Assistant Dean for Information Technology and CTO:* Paul Kim

*Professors:* Arnetha Ball, Adam J. Banks, Brigid J. Barron, Jo Boaler, Hilda Borko, Eamonn Callan, Martin Carnoy, Geoffrey Cohen, William Damon, Tom Dee, Claude Goldenberg, Patricia J. Gumpert, David F. Labaree, Teresa D. LaFromboise, Susanna Loeb, Bruce D. McCandliss, Raymond P. McDermott, Daniel A. McFarland, Jonathan Osborne, Amado M. Padilla, Roy Pea, Walter Powell, Francisco O. Ramirez, Sean Reardon, Daniel Schwartz, Guillermo Solano-Flores, Deborah J. Stipek, Guadalupe Valdés, Carl Wieman, John Willinsky, Sam Wineburg

*Associate Professors:* Anthony L. Antonio, Nicole M. Ardoin, Eric Bettinger, Bryan Brown, Ari Y. Kelman, Jelena Obradović, David Rogosa, Maria Araceli Ruiz-Primo, Mitchell Stevens

*Assistant Professors:* Maren Songmy Aukerman, Paulo Blikstein, Patricia Bromley, Benjamin Domingue, Antero Garcia, Leah Gordon, Jennifer Langer-Osuna, Sarah R. Levine, Ramón Antonio Martínez, Jonathan Rosa, Candace Thille

*Professors (Teaching):* Shelley Goldman

*Associate Professors (Teaching):* David Brazer, Ira Lit, Peter Williamson, Christine Min Wotipka

*Professor (Research):* David Plank

*Associate Professor (Research):* Janet Carlson

*Assistant Professor (Research):* Michelle Reininger, Prashant Loyalka

*Courtesy Professors:* Jeremy Bailenson, Richard Banks, Stephen Barley, Albert Camarillo, Carol Dweck, Eric Hanushek, John C. Mitchell, Terry Moe, Brad Osgood, Byron Reeves, Robert Reich, John Rickford, Cecilia Ridgeway, Caroline Winterer

*Courtesy Associate Professors (Teaching):* Shashank Joshi

*Courtesy Professor (Teaching):* Don Barr, William Koski

*Senior Lecturers:* Gay Hoagland, Denise Pope, Ann Porteus, Jennifer Wolf

# SCHOOL OF ENGINEERING

Courses offered by the School of Engineering are listed under the subject code ENGR on the Stanford Bulletin's ExploreCourses web site.

The School of Engineering offers undergraduate programs leading to the degree of Bachelor of Science (B.S.), programs leading to both B.S. and Master of Science (M.S.) degrees, other programs leading to a B.S. with a Bachelor of Arts (B.A.) in a field of the humanities or social sciences, dual-degree programs with certain other colleges, and graduate curricula leading to the degrees of M.S., Engineer, and Ph.D.

The school has nine academic departments: Aeronautics and Astronautics, Bioengineering, Chemical Engineering, Civil and Environmental Engineering, Computer Science, Electrical Engineering, Management Science and Engineering, Materials Science and Engineering, and Mechanical Engineering. These departments and one interdisciplinary program, the Institute for Computational and Mathematical Engineering, are responsible for graduate curricula, research activities, and the departmental components of the undergraduate curricula.

In research where faculty interest and competence embrace both engineering and the supporting sciences, there are numerous interdisciplinary research centers and programs within the school as well as several interschool activities, including the Army High Performance Computing Research Center, Biomedical Informatics Training Program, Center for Integrated Systems, Center for Work, Technology, and Organization, Collaboratory for Research on Global Projects, National Center for Physics-Based Simulation in Biology, Center for Position, Navigation, and Time, the Energy Modeling Forum, the NIH Biotechnology Graduate Training Grant in Chemical Engineering, and the Stanford Technology Ventures Program. Energy Resources Engineering (formerly Petroleum Engineering) is offered through the School of Earth, Energy, and Environmental Sciences.

The School of Engineering's Hasso Plattner Institute of Design (also known as "the d.school," <http://dschool.stanford.edu>) brings together students and faculty in engineering, business, education, medicine, and the humanities to learn design thinking and work together to solve big problems in a human-centered way.

The Woods Institute for the Environment (<http://environment.stanford.edu>) brings together faculty, staff, and students from the schools, institutes and centers at Stanford to conduct interdisciplinary research, education, and outreach to promote an environmentally sound and sustainable world.

The Global Engineering Program (<https://engineering.stanford.edu/students/global-engineering-programs>) offers a portfolio of international opportunities for Stanford undergraduate and graduate students majoring within the School of Engineering. Opportunities range from service learning programs to internships to study tours. These opportunities enhance engineering education by providing students with an opportunity to learn about technology and engineering globally, to build professional networks, and to gain real world experience in a culturally diverse and international environment. For more information and application deadlines, please see [gcp.stanford.edu](http://gcp.stanford.edu)

Instruction in Engineering is offered primarily during Autumn, Winter, and Spring quarters of the regular academic year. During the Summer Quarter, a small number of undergraduate and graduate courses are offered.

## Undergraduate Programs in the School of Engineering

The principal goals of the undergraduate engineering curriculum are to provide opportunities for intellectual growth in the context of an

engineering discipline, for the attainment of professional competence, and for the development of a sense of the social context of technology. The curriculum is flexible, with many decisions on individual courses left to the student and the adviser. For a student with well-defined educational goals, there is often a great deal of latitude.

In addition to the special requirements for engineering majors described below, all undergraduate engineering students are subject to the University general education, writing, and foreign language requirements outlined in the first pages of this bulletin. Depending on the program chosen, students have the equivalent of from one to three quarters of free electives to bring the total number of units to 180.

The School of Engineering's *Handbook for Undergraduate Engineering Programs* is the definitive reference for all undergraduate engineering programs. It is available online at <http://ughb.stanford.edu> and provides detailed descriptions of all undergraduate programs in the school, as well as additional information about extracurricular programs and services. Because it is revised in the summer, and updates are made to the web site on a continuing basis, the handbook reflects the most up-to-date information on School of Engineering programs for the academic year.

## Accreditation

The Accreditation Board for Engineering and Technology (ABET) accredits college engineering programs nationwide using criteria and standards developed and accepted by U.S. engineering communities. At Stanford, the following undergraduate programs are accredited:

- Chemical Engineering
- Civil Engineering
- Mechanical Engineering

In ABET-accredited programs, students must meet specific requirements for engineering science, engineering design, mathematics, and science course work. Students are urged to consult the School of Engineering Handbook for Undergraduate Engineering Programs and their adviser.

Accreditation is important in certain areas of the engineering profession; students wishing more information about accreditation should consult their department office or the office of the Senior Associate Dean for Student Affairs in 135 Huang Engineering Center.

## Policy on Satisfactory/No Credit Grading and Minimum Grade Point Average

All courses taken to satisfy major requirements (including the requirements for mathematics, science, engineering fundamentals, Technology in Society, and engineering depth) for all engineering students (including both department and School of Engineering majors) must be taken for a letter grade if the instructor offers that option.

For departmental majors, the minimum combined GPA (grade point average) for all courses taken in fulfillment of the Engineering Fundamentals requirement and the Engineering Depth requirement is 2.0. For School of Engineering majors, the minimum GPA on all engineering courses taken in fulfillment of the major requirements is 2.0.

## Admission

Any students admitted to the University may declare an engineering major if they elect to do so; no additional courses or examinations are required for admission to the School of Engineering.

## Recommended Preparation

### Freshman

Students who plan to enter Stanford as freshmen and intend to major in engineering should take the highest level of mathematics offered in high school. (See the "AP Credit (p. 36)" section of this bulletin for information on advanced placement in mathematics.) High school courses in physics

and chemistry are strongly recommended, but not required. Additional elective course work in the humanities and social sciences is also recommended.

### Transfer Students

Students who do the early part of their college work elsewhere and then transfer to Stanford to complete their engineering programs should follow an engineering or pre-engineering program at the first school, selecting insofar as possible courses applicable to the requirements of the School of Engineering, that is, courses comparable to those mentioned under the Majors tab. In addition, students should work toward completing the equivalent of Stanford's foreign language requirement and as many of the University's General Education Requirements (GERs) as possible before transferring. Some transfer students may require more than four years (in total) to obtain the B.S. degree. However, Stanford affords great flexibility in planning and scheduling individual programs, which makes it possible for transfer students, who have wide variations in preparation, to plan full programs for each quarter and to progress toward graduation without undue delay.

Transfer credit is given for courses taken elsewhere whenever the courses are equivalent or substantially similar to Stanford courses in scope and rigor. The policy of the School of Engineering is to study each transfer student's preparation and make a reasonable evaluation of the courses taken prior to transfer by means of a petition process. Inquiries may be addressed to the Office of Student Affairs in 135 Huang Engineering Center. For more information, see the transfer credit section of the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>.

### Degree Program Options

In addition to the B.S. degrees offered by departments, the School of Engineering offers two other types of B.S. degrees:

- Bachelor of Science in Engineering (see subplan majors listed below)
- Bachelor of Science for Individually Designed Majors in Engineering (IDMEN)

There are six Engineering B.S. subplans that have been proposed by cognizant faculty groups and approved by the Undergraduate Council:

- Architectural Design
- Atmosphere/Energy
- Biomechanical Engineering
- Biomedical Computation
- Engineering Physics
- Product Design

The B.S. for an Individually Designed Major in Engineering has also been approved by the council.

Curricula for majors are offered by the departments of:

- Aeronautics and Astronautics
- Bioengineering
- Chemical Engineering
- Civil and Environmental Engineering
- Computer Science
- Electrical Engineering
- Management Science and Engineering
- Materials Science and Engineering
- Mechanical Engineering

Curricula for majors in these departments have the following components:

- 36-45 units of mathematics and science (see Basic Requirements 1 and 2 at the end of this section)
- Engineering fundamentals (two-three courses minimum, depending up individual program requirements; see Basic Requirement 3)
- Technology in Society (TIS) (one course minimum, see Basic Requirement 4)
- Engineering depth (courses such that the total number of units for Engineering Fundamentals and Engineering Depth is between 60 and 72)
- ABET accredited majors must meet a minimum number of Engineering Science and Engineering Design units; (see Basic Requirement 5)

Consult the 2017-18 Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>) for additional information.

### Dual and Coterminal Programs

A Stanford undergraduate may work simultaneously toward two bachelor's degrees or toward a bachelor's and a master's degree, that is, B.A. and M.S., B.A. and M.A., B.S. and M.S., or B.S. and M.A. The degrees may be granted simultaneously or at the conclusion of different quarters. Five years are usually required for a dual or coterminal program or for a combination of these two multiple degree programs. For further information, inquire with the School of Engineering's student affairs office, 135 Huang Engineering Center, or with department contacts listed in the Handbook for Undergraduate Engineering Programs, available at <http://ughb.stanford.edu>.

Dual B.A. and B.S. Degree Program—To qualify for both degrees, a student must:

1. complete the stated University and department requirements for each degree
2. complete 15 full-time quarters (3 full-time quarters after completing 180 units)
3. complete a total of 225 units (180 units for the first bachelor's degree plus 45 units for the second bachelor's degree)

Coterminal Bachelor's and Master's Degree Program—A Stanford undergraduate may be admitted to graduate study for the purpose of working simultaneously toward a bachelor's degree and a master's degree, in the same or different disciplines. To qualify for both degrees, a student must:

1. complete, in addition to the units required for the bachelor's degree, the number of units required by the graduate department for the master's degree which in no event is fewer than the University minimum of 45 units
2. complete the requirements for the bachelor's degree (department, school, and University) and apply for conferral of the degree at the appropriate time
3. complete the department and University requirements for the master's degree and apply for conferral of the degree at the appropriate time

A student may complete the bachelor's degree before completing the master's degree, or both degrees may be completed in the same quarter.

### Procedure for Applying for Admission to Coterminal Degree Programs

Stanford undergraduates apply to the pertinent graduate department using the University coterminal application. Application deadlines and admissions criteria vary by department, but in all cases the student must apply early enough to allow a departmental decision at least one quarter in advance of the anticipated date of conferral of the bachelor's degree.

Students interested in coterminal degree programs in Engineering should refer to our departments' sections of this bulletin for more detailed



information. The University requirements for the coterminal master's degree are described in the "Coterminal Master's Degrees (<http://exploreddegrees.stanford.edu/cotermdegrees/#text>)" section of this bulletin.

## Graduate Programs in the School of Engineering

### Admission

Application for admission with graduate standing in the school should be made to the graduate admissions committee in the appropriate department or program. While most graduate students have undergraduate preparation in an engineering curriculum, it is feasible to enter from other programs, including chemistry, geology, mathematics, or physics.

For further information and application instructions, see the department sections in this bulletin or <http://gradadmissions.stanford.edu>. Stanford undergraduates may also apply as coterminal students; details can be found under "Degree Program Options" in the "Undergraduate Programs in the School of Engineering (<http://www.stanford.edu/dept/registrar/bulletin/5144.htm>)" section of this bulletin.

### Fellowships and Assistantships

Departments and divisions of the School of Engineering award graduate fellowships, research assistantships, and teaching assistantships each year.

### Curricula in the School of Engineering

For further details about the following programs, see the department sections in this bulletin.

Related aspects of particular areas of graduate study are commonly covered in the offerings of several departments and divisions. Graduate students are encouraged, with the approval of their department advisers, to choose courses in departments other than their own to achieve a broader appreciation of their field of study. For example, most departments in the school offer courses concerned with nanoscience, and a student interested in an aspect of nanotechnology can often gain appreciable benefit from the related courses given by departments other than her or his own.

Departments and programs of the school offer graduate curricula as follows:

#### Aeronautics and Astronautics

- Aeroelasticity and Flow Simulation
- Aircraft Design, Performance, and Control
- Applied Aerodynamics
- Autonomy
- Computational Aero-Acoustics
- Computational Fluid Dynamics
- Computational Mechanics and Dynamical Systems
- Control of Robots, including Space and Deep-Underwater Robots
- Conventional and Composite Materials and Structures
- Decision Making under Uncertainty
- Direct and Large-Eddy Simulation of Turbulence
- High-Lift Aerodynamics
- Hybrid Propulsion
- Hypersonic and Supersonic Flow
- Micro and Nano Systems and Materials
- Multidisciplinary Design Optimization
- Navigation Systems (especially GPS)

- Optimal Control, Estimation, System Identification
- Sensors for Harsh Environments
- Space Debris Characterization
- Space Environment Effects on Spacecraft
- Space Plasmas
- Spacecraft Design and Satellite Engineering
- Turbulent Flow and Combustion

#### Bioengineering

- Biomedical Computation
- Biomedical Devices
- Biomedical Imaging
- Cell and Molecular Engineering
- Regenerative Medicine

#### Chemical Engineering

- Applied Statistical Mechanics
- Biocatalysis
- Biochemical Engineering
- Bioengineering
- Biophysics
- Computational Materials Science
- Colloid Science
- Dynamics of Complex Fluids
- Energy Conversion
- Functional Genomics
- Hydrodynamic Stability
- Kinetics and Catalysis
- Microrheology
- Molecular Assemblies
- Nanoscience and Technology
- Newtonian and Non-Newtonian Fluid Mechanics
- Polymer Physics
- Protein Biotechnology
- Renewable Fuels
- Semiconductor Processing
- Soft Materials Science
- Solar Utilization
- Surface and Interface Science
- Transport Mechanics

#### Civil and Environmental Engineering

- Atmosphere/Energy
- Environmental Engineering
- Environmental and Water Studies
- Geomechanics
- Structural Engineering
- Sustainable Design and Construction

#### Computational and Mathematical Engineering

- Applied and Computational Mathematics
- Computational Biology
- Computational Fluid Dynamics
- Computational Geometry and Topology
- Computational Geosciences
- Computational Medicine
- Data Science
- Discrete Mathematics and Algorithms
- Numerical Analysis

- Optimization
- Partial Differential Equations
- Stochastic Processes
- Uncertainty Quantification
- Financial Mathematics

### Computer Science

See <http://forum.stanford.edu/research/areas.php> for a comprehensive list.

- Algorithmic Game Theory
- Algorithms
- Artificial Intelligence
- Autonomous Agents
- Biomedical Computation
- Compilers
- Complexity Theory
- Computational and Cognitive Neuroscience
- Computational Biology
- Computational Geometry and Topology
- Computational Logic
- Computational Photography
- Computational Physics
- Computational Social Science
- Computer Architecture
- Computer Graphics
- Computer Security
- Computer Science Education
- Computer Sound
- Computer Vision
- Crowdsourcing
- Cryptography
- Database Systems
- Data Center Computing
- Data Mining
- Design and Analysis of Algorithms
- Distributed and Parallel Computation
- Distributed Systems
- Electronic Commerce
- Formal Verification
- General Game Playing
- Haptic Display of Virtual Environments
- Human-Computer Interaction
- Image Processing
- Information and Communication Technologies for Development
- Information Management
- Learning Theory
- Machine Learning
- Mathematical Theory of Computation
- Mobile Computing
- Multi-Agent Systems
- Nanotechnology-enabled Systems
- Natural Language and Speech Processing
- Networking and Internet Architecture
- Operating Systems
- Parallel Computing
- Probabilistic Models and Methods
- Programming Systems/Languages

- Robotics
- Robust System Design
- Scientific Computing and Numerical Analysis
- Sensor Networks
- Social and Information Networks
- Social Computing
- Ubiquitous and Pervasive Computing
- Visualization
- Web Application Infrastructure

### Electrical Engineering

- Biomedical Devices and Bioimaging
- Communication Systems: Wireless, Optical, Wireline
- Control, Learning, and Optimization
- Electronic and Magnetic Devices
- Energy: Solar Cells, Smart Grid, Load Control
- Environmental and Remote Sensing: Sensor Nets, Radar Systems, Space
- Fields and Waves
- Graphics, HCI, Computer Vision, Photography
- Information Theory and Coding: Image and Data Compression, Denoising
- Integrated Circuit Design: MEMS, Sensors, Analog, RF
- Network Systems and Science: Next Gen Internet, Wireless Networks
- Nano and Quantum Science
- Photonic Devices
- Systems Software: OS, Compilers, Languages
- Systems Hardware: Architecture, VLSI, Embedded Systems
- VLSI Design

### Management Science and Engineering

- Decision and Risk Analysis
- Dynamic Systems
- Economics
- Entrepreneurship
- Finance
- Information
- Marketing
- Optimization
- Organization Behavior
- Organizational Science
- Policy
- Production
- Stochastic Systems
- Strategy

### Materials Science and Engineering

- Biomaterials
- Ceramics and Composites
- Computational Materials Science
- Electrical and Optical Behavior of Solids
- Electron Microscopy
- Fracture and Fatigue
- Imperfections in Crystals
- Kinetics
- Magnetic Behavior of Solids
- Magnetic Storage Materials
- Nanomaterials
- Photovoltaics

- Organic Materials
- Phase Transformations
- Physical Metallurgy
- Solid State Chemistry
- Structural Analysis
- Thermodynamics
- Thin Films
- X-Ray Diffraction

### Mechanical Engineering

- Biomechanics
- Combustion Science
- Computational Mechanics
- Controls
- Design of Mechanical Systems
- Dynamics
- Environmental Science
- Experimental Stress and Analysis
- Fatigue and Fracture Mechanics
- Finite Element Analysis
- Fluid Mechanics
- Heat Transfer
- High Temperature Gas Dynamics
- Kinematics
- Manufacturing
- Mechatronics
- Product Design
- Robotics
- Sensors
- Solids
- Thermodynamics
- Turbulence

## Bachelor of Science in the School of Engineering

Departments within the School of Engineering offer programs leading to the Bachelor of Science degree in the following fields:

- Aeronautics and Astronautics
- Bioengineering
- Chemical Engineering
- Civil Engineering
- Computer Science
- Electrical Engineering
- Environmental Systems Engineering
- Management Science and Engineering
- Materials Science and Engineering
- Mechanical Engineering

The School of Engineering itself offers interdisciplinary programs leading to the Bachelor of Science degree in Engineering with specializations in:

- Architectural Design
- Atmosphere/Energy
- Biomechanical Engineering
- Biomedical Computation
- Engineering Physics
- Product Design

In addition, students may elect a Bachelor of Science in an Individually Designed Major in Engineering.

## Bachelor of Arts and Science (B.A.S.) in the School of Engineering

This degree is available to students who complete both the requirements for a B.S. degree in engineering and the requirements for a major or program ordinarily leading to the B.A. degree. For more information, see the "Undergraduate Degrees (p. 29)" section of this bulletin.

## Independent Study, Research, and Honors

The departments of Aeronautics and Astronautics, Bioengineering, Chemical Engineering, Civil and Environmental Engineering, Computer Science, Electrical Engineering, Materials Science and Engineering, and Mechanical Engineering, as well as the faculty overseeing the Architectural Design, Atmosphere/Energy, Biomechanical Engineering, Biomedical Computation, and Engineering Physics majors, offer qualified students opportunities to do independent study and research at an advanced level with a faculty mentor in order to receive a Bachelor of Science with honors. An honors option is also available to students pursuing an independently designed major, with the guidance and approval of their adviser.

## Petroleum Engineering

Petroleum Engineering is offered by the Department of Energy Resource Engineering in the School of Earth, Energy, and Environmental Sciences. Consult the "Energy Resources Engineering (p. 170)" section of this bulletin for requirements. School of Engineering majors who anticipate summer jobs or career positions associated with the oil industry should consider enrolling in ENGR 120.

## Programs in Manufacturing

Programs in manufacturing are available at the undergraduate, master's, and doctorate levels. The undergraduate programs of the departments of Civil and Environmental Engineering, Management Science and Engineering, and Mechanical Engineering provide general preparation for any student interested in manufacturing. More specific interests can be accommodated through Individually Designed Majors in Engineering (IDMENS).

## Basic Requirements

### Basic Requirement 1 (Mathematics)

Engineering students need a solid foundation in the calculus of continuous functions, linear algebra, an introduction to discrete mathematics, and an understanding of statistics and probability theory. Students are encouraged to select courses on these topics. To meet ABET accreditation criteria, a student's program must include the study of differential equations. Courses that satisfy the math requirement are listed at <http://ughb.stanford.edu> in the Handbook for Undergraduate Engineering Programs.

### Basic Requirement 2 (Science)

A strong background in the basic concepts and principles of natural science in such fields as physics, chemistry, geology, and biology is essential for engineering. Most students include the study of physics and chemistry in their programs. Courses that satisfy the science requirement are listed at <http://ughb.stanford.edu> in the Handbook for Undergraduate Engineering Programs.

### Basic Requirement 3 (Engineering Fundamentals)

The Engineering Fundamentals requirement is satisfied by a nucleus of technically rigorous introductory courses chosen from the various engineering disciplines. It is intended to serve several purposes. First,

it provides students with a breadth of knowledge concerning the major fields of endeavor within engineering. Second, it allows the incoming engineering student an opportunity to explore a number of courses before embarking on a specific academic major. Third, the individual classes each offer a reasonably deep insight into a contemporary technological subject for the interested non-engineer.

The requirement is met by taking two to three courses from the following list (the number depends upon the individual requirements of each major program):

		Units
ENGR 10	Introduction to Engineering Analysis	4
ENGR 14	Intro to Solid Mechanics	3
ENGR 15	Dynamics	3
ENGR 20	Introduction to Chemical Engineering	4
ENGR 21	Engineering of Systems	3
ENGR 25B	Biotechnology <sup>1</sup>	3
ENGR 25E	Energy: Chemical Transformations for Production, Storage, and Use (same as CHEMENG 25E) <sup>1</sup>	3
ENGR 40	Introductory Electronics <sup>1,2</sup>	5
ENGR 40A	Introductory Electronics	3
ENGR 40M	An Intro to Making: What is EE	3-5
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis <sup>1,2</sup>	4
ENGR 50E	Introduction to Materials Science, Energy Emphasis <sup>1</sup>	4
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis <sup>1</sup>	4
ENGR 60	Engineering Economics and Sustainability	3
ENGR 62	Introduction to Optimization (same as MS&E 111)	4
ENGR 70A/ CS 106A	Programming Methodology <sup>1</sup>	5
ENGR 70B/ CS 106B	Programming Abstractions <sup>1</sup>	5
ENGR 70X/ CS 106X	Programming Abstractions (Accelerated) <sup>1</sup>	5
ENGR 80	Introduction to Bioengineering (Engineering Living Matter) (same as BIOE 80)	4
ENGR 90	Environmental Science and Technology (same as CEE 70)	3

<sup>1</sup> Only one course from each numbered series can be used in the Engineering Fundamentals category within a major program.

<sup>2</sup> ENGR 40M Making Stuff: What is EE and ENGR 50 Introduction to Materials Science, Nanotechnology Emphasis may be taken on video at some of Stanford's Overseas Centers.

### Basic Requirement 4 (Technology in Society)

It is important for the student to obtain a broad understanding of engineering as a social activity. To foster this aspect of intellectual and professional development, all engineering majors must take one course devoted to exploring issues arising from the interplay of engineering, technology, and society. Courses that fulfill this requirement are listed online at <http://ughb.stanford.edu> in the Handbook for Undergraduate Engineering Programs.

### Basic Requirement 5 (Engineering Topics)

In order to satisfy ABET (Accreditation Board for Engineering and Technology) requirements, a student majoring in Chemical, Civil, or Mechanical Engineering must complete one and a half years of engineering topics, consisting of a minimum of 68 units of Engineering Fundamentals and Engineering Depth appropriate to the student's field

of study. In most cases, students meet this requirement by completing the major program core and elective requirements. A student may need to take additional courses in Depth in order to fulfill the minimum requirement. Appropriate courses assigned to fulfill each major's program are listed online at <http://ughb.stanford.edu> in the Handbook for Undergraduate Engineering Programs.

### Experimentation

Chemical Engineering, Civil Engineering, and Mechanical Engineering must include experimental experience appropriate to the discipline. Lab courses taken in the sciences, as well as experimental work taken in courses within the School of Engineering, will fulfill this requirement.

### Overseas Studies Courses in Engineering

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### Aeronautics and Astronautics (AA)

#### Mission of the Undergraduate Program in Aeronautics and Astronautics

The mission of the undergraduate program in Aeronautics and Astronautics Engineering is to provide students with the fundamental principles and techniques necessary for success and leadership in the conception, design, implementation, and operation of aerospace and related engineering systems. Courses in the major introduce students to engineering principles. Students learn to apply this fundamental knowledge to conduct laboratory experiments, and aerospace system design problems. Courses in the major include engineering fundamentals, mathematics, and the sciences, as well as in-depth courses in aeronautics and astronautics, dynamics, mechanics of materials, autonomous systems, computational engineering, embedded programming, fluids engineering, and heat transfer. The major prepares students for careers in aircraft and spacecraft engineering, autonomy, robotics, unmanned aerial vehicles, drones, space exploration, air and space-based telecommunication industries, computational engineering, teaching, research, military service, and other related technology-intensive fields.

Completion of the undergraduate program in Aeronautics and Astronautics leads to the conferral of the Bachelor of Science in Aeronautics and Astronautics.

### Requirements

		Units
<b>Mathematics</b>		
24 units minimum		
MATH 19	Calculus (required) <sup>2</sup>	3
MATH 20	Calculus (required) <sup>2</sup>	3
MATH 21	Calculus (required) <sup>2</sup>	4
CME 100/ ENGR 154 or MATH 51	Vector Calculus for Engineers (required) <sup>3</sup> Linear Algebra and Differential Calculus of Several Variables	5
CME 102/ ENGR 155A or MATH 53	Ordinary Differential Equations for Engineers (required) <sup>3</sup> Ordinary Differential Equations with Linear Algebra	5
CME 106/ ENGR 155C	Introduction to Probability and Statistics for Engineers (required)	4-5

or STATS 110	Statistical Methods in Engineering and the Physical Sciences	
or STATS 116	Theory of Probability	
or CS 109	Introduction to Probability for Computer Scientists	
CME 104	Linear Algebra and Partial Differential Equations for Engineers (recommended) <sup>3</sup>	5
or MATH 52	Integral Calculus of Several Variables	
CME 108	Introduction to Scientific Computing (recommended)	3
<b>Science</b>		
20 units minimum		
PHYSICS 41	Mechanics (required) <sup>4</sup>	4
PHYSICS 43	Electricity and Magnetism (required) <sup>4</sup>	4
PHYSICS 45	Light and Heat (required)	4
CHEM 31X	Chemical Principles Accelerated (or CHEM 31A and CHEM 31B, or AP Chemistry) (required)	5
ENGR 80	Introduction to Bioengineering (Engineering Living Matter) (recommended)	4
School of Engineering approved Science Electives: See Undergraduate Handbook, Figure 4-2		3-5
<b>Technology in Society (one course required)</b>		
School of Engineering approved Technology in Society courses: See Undergraduate Handbook, Figure 4-3. The course must be on the School of Engineering approved list the year you take it.		3-5
ENGR 131	Ethical Issues in Engineering (recommended)	4
<b>Engineering Fundamentals (three courses required)</b>		
11 units minimum		
ENGR 21	Engineering of Systems (required)	3
ENGR 70A/ CS 106A	Programming Methodology (required)	5
ENGR 10	Introduction to Engineering Analysis (recommended)	4
ENGR 40M	An Intro to Making: What is EE (recommended)	3-5
Fundamentals Elective; see list of Approved Courses in Undergraduate Engineering Handbook website at <a href="http://ughb.stanford.edu">ughb.stanford.edu</a> , Figure 4-4		3-5
<b>Aero/Astro Depth Requirements</b>		
27 units minimum		
ENGR 14	Intro to Solid Mechanics (required)	3
ENGR 15	Dynamics (required)	3
ENGR 105	Feedback Control Design (required)	3
ME 30	Engineering Thermodynamics (required)	3
AA 100	Introduction to Aeronautics and Astronautics (required)	3
AA 101 Introduction to Aero Fluid Mechanics, required <sup>1</sup>		
AA 131 Space Flight, required <sup>1</sup>		
AA 141	(required)	3
AA 171 Autonomous Systems, required <sup>1</sup>		
AA 190	Directed Research and Writing in Aero/Astro	3-5
<b>Aero/Astro Focus Electives</b>		
15 units minimum		
AA 102 Introduction to Applied Aerodynamics <sup>1</sup>		
AA 103 Air and Space Propulsion <sup>1</sup>		
AA 111 Introduction to Aerospace Computational Engineering <sup>1</sup>		
AA 135 Introduction to Space Policy <sup>1</sup>		
AA 151 Lightweight Structures <sup>1</sup>		
AA 156 Mechanics and Composites <sup>1</sup>		
AA 173 Flight Mechanics and Controls <sup>1</sup>		
AA 175 Embedded Programming <sup>1</sup>		

AA 272C	Global Positioning Systems	3
AA 279A	Space Mechanics	3
AA 199	Independent Study in Aero/Astro	1-5
MS&E 178	The Spirit of Entrepreneurship	2

**Aero/Astro Suggested Courses (not required)**AA 149 Operation of Aerospace Systems<sup>1</sup>**Aero/Astro Capstone Requirement**

7 units minimum

AA 123A Air Capstone I, satisfies the Writing in the Major requirement, (WIM)<sup>1</sup>AA 123B Air Capstone II<sup>1</sup>AA 124A Space Capstone I, satisfies the Writing in Major requirement, (WIM)<sup>1</sup>AA 124B Space Capstone II<sup>1</sup>

For additional information and sample programs see the Handbook for Undergraduate Engineering (<http://ughb.stanford.edu>) and the Aeronautics and Astronautics Undergraduate Program Sheet (<https://stanford.box.com/s/e61zom3k9zbihtbqhlqsqyr82skeon0nm>).

All courses taken for the major must be taken for a letter grade if that option is offered by the instructor.

Minimum Combined GPA for all courses in Engineering Topics (Engineering Fundamentals and Depth courses) is 2.0.

Transfer and AP credits in Math, Science, Fundamentals, and the Technology in Society course must be approved by the School of Engineering Dean's office.

- <sup>1</sup> This course will be offered in the near future. See the department's web site for more information about our future course offerings (<https://aa.stanford.edu/academics/undergraduate-program>).
- <sup>2</sup> A score of 4 on the Calculus BC test or 5 on the AB test only gives students 8 units, not 10 units, so is equal to MATH 19 + MATH 20, but not MATH 21. The Math Placement Exam determines what math course the student starts with.
- <sup>3</sup> It is recommended that the CME series (100, 102, 104) be taken rather than the MATH series (51, 52, 53). It is recommended that students taking the MATH series also take CME 192 Introduction to MATLAB.
- <sup>4</sup> A score of 4 or 5 on the AP Physics C Mechanics test places the student out of PHYSICS 41. Similarly, a 4 or 5 on the AP Physics Electricity and Magnetism test places the student out of PHYSICS 43.

## Architectural Design (AD)

Completion of the undergraduate program in Architectural Design leads to the conferral of the Bachelor of Science in Engineering. The subplan "Architectural Design" appears on the transcript and on the diploma.

### Mission of the Undergraduate Program in Architectural Design

The mission of the undergraduate program in Architectural Design is to develop students' ability to integrate engineering and architecture in ways that blend innovative architectural design with cutting-edge engineering technologies. Courses in the program combine hands-on architectural design studios with a wide variety of other courses. Students can choose from a broad mix of elective courses concerning energy conservation, sustainability, building systems, and structures, as well as design foundation and fine arts courses. In addition to preparing students for advanced studies in architecture and construction management, the program's math and science requirements prepare students well for

graduate work in other fields such as civil and environmental engineering, law, and business.

## Requirements

### Mathematics and Science (36 units minimum)<sup>1</sup>

Mathematics		
MATH 19	Calculus	3
MATH 20	Calculus	3
MATH 21	Calculus	4
Or 10 units AP Calculus or MATH 41 & MATH 42		
CME 100	Vector Calculus for Engineers (Recommended)	5
One course in Statistics (required)		3-5

### Science

PHYSICS 41	Mechanics	4
Recommended:		
EARTHSYS 101 Energy and the Environment		
EARTHSYS 102 Fundamentals of Renewable Power		
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions	
CEE 70	Environmental Science and Technology	
PHYSICS 23	Electricity, Magnetism, and Optics	
or PHYSICS 43 Electricity and Magnetism		

Or from School of Engineering approved list

### Technology in Society

One course required; course chosen must be on the SoE Approved Courses list at <ughb.stanford.edu> the year taken. 3-5

### Engineering Fundamentals

Two courses minimum, see Basic Requirement 3 6-8

ENGR 14	Intro to Solid Mechanics	3
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### AD Depth Core<sup>2</sup>

CEE 31	Accessing Architecture Through Drawing	5
or CEE 31Q	Accessing Architecture Through Drawing	
CEE 100	Managing Sustainable Building Projects (or CEE 32B or CEE 32D)	4
CEE 120A	Building Information Modeling Workshop	2-4
CEE 130	Architectural Design: 3-D Modeling, Methodology, and Process	5
CEE 137B	Advanced Architecture Studio	6
ARTHIST 3	Introduction to World Architecture	5

### Depth Options

See Note 2 for course options 12

### Depth Electives

Elective units must be such that courses in ENGR Fundamentals, Core, Depth Options, and Depth Electives total at least 63 units. One of the following must be taken:

CEE 131C	How Buildings are Made – Materiality and Construction Methods	4
CEE 131D	Urban Design Studio	5
CEE 32D	Construction: The Writing of Architecture	
CEE 32G	Architecture Since 1900	
CEE 32H	Responsive Structures	
CEE 32V	Architectural Design Lecture Series Course	
CEE 32T	Making and Remaking the Architect: Edward Durrell Stone and Stanford	
CEE 32U	California Modernism: The Web of Apprenticeship	
CEE 32W	Making Meaning: A Purposeful Life in Design	
CEE 133F	Principles of Freehand Drawing	

CEE 139	Design Portfolio Methods	Total Units	82-90
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Units For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

- <sup>1</sup> School of Engineering approved list of math and science courses available in the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>.
- <sup>2</sup> Engineering depth options: Choose at least 12 units from the following courses: CEE 101A, CEE 101B, CEE 101C, CEE 156, CEE 172, CEE 172A, CEE 176A, CEE 180, CEE 181, CEE 182, CEE 183, CEE 226, CEE 241, OR CEE 242. Students should investigate any prerequisites for the listed courses and carefully plan course sequences with the AD director.  
Electives:
  - CEE 32A, CEE 32B, CEE 32D, CEE 32F, CEE 32G, CEE 32H, CEE 32Q, CEE 32R, CEE 32S, CEE 32T, CEE 32U, CEE 32V, CEE 101B, CEE 101C, CEE 120A, CEE 120B, CEE 120C, CEE 122A, CEE 122B, CEE 124, CEE 131A, CEE 131B, CEE 131C, CEE 131F, CEE 134B, CEE 139, CEE 172A, CEE 176A, CEE 180, CEE 181, CEE 182, CEE 183
  - ENGR 50, ENGR 103, ENGR 131
  - ME 101, ME 110, ME 115A/B/C, ME 120, ME 203
  - ARTSTUDI 13BX, ARTSTUDI 140, ARTSTUDI 145, ARTSTUDI 151, ARTSTUDI 153, ARTSTUDI 160, ARTSTUDI 162, ARTSTUDI 163, ARTSTUDI 164, ARTSTUDI 168, ARTSTUDI 170, ARTSTUDI 171, ARTSTUDI 181
  - ARTHIST 107A, ARTHIST 142, ARTHIST 143A, ARTHIST 188A
  - FILMPROD 114
  - TAPS 137
  - SINY 122; URBANST 110, URBANST 113, URBANST 163, URBANST 171

## Architectural Design Honors Program

The AD honors program offers eligible students the opportunity to engage in guided original research, or project design, over the course of an academic year. For interested students the following outlines the process:

1. The student must submit a letter applying for the honors option endorsed by the student's primary adviser and honors adviser and submitted to the student services office in CEE. Applications must be received in the fourth quarter prior to graduation. It is strongly suggested that students meet with the Architectural Design Program Director well in advance of submitting an application.
2. The student must maintain a GPA of at least 3.5.
3. The student must complete an honors thesis or project. The timing and deadlines are to be decided by the program or honors adviser. At least one member of the evaluation committee must be a member of the Academic Council in the School of Engineering.
4. The student must present the work in an appropriate forum, e.g., in the same session as honors theses are presented in the department of the advisor. All honors programs require some public presentation of the thesis or project.

## Atmosphere/Energy (A/E)

Completion of the undergraduate program in Atmosphere/Energy leads to the conferral of the Bachelor of Science in Engineering. The subplan "Atmosphere/Energy" appears on the transcript and on the diploma.

### Mission of the Undergraduate Program in Atmosphere/Energy

Atmosphere and energy are strongly linked: fossil-fuel energy use contributes to air pollution, global warming, and weather modification; and changes in the atmosphere feed back to renewable energy resources, including wind, solar, hydroelectric, and wave resources. The mission of the undergraduate program in Atmosphere/Energy (A/E) is to provide students with the fundamental background necessary to understand large- and local-scale climate, air pollution, and energy problems and solve them through clean, renewable, and efficient energy systems.

To accomplish this goal, students learn in detail the causes and proposed solutions to the problems, and learn to evaluate whether the proposed solutions are truly beneficial. A/E students take courses in renewable energy resources, indoor and outdoor air pollution, energy efficient buildings, climate change, renewable energy and clean-vehicle technologies, weather and storm systems, energy technologies in developing countries, electric grids, and air quality management. The curriculum is flexible. Depending upon their area of interest, students may take in-depth courses in energy or atmosphere and focus either on science, technology, or policy. The major is designed to provide students with excellent preparation for careers in industry, government, and research; and for study in graduate school.

## Requirements

### Mathematics and Science (45 units minimum):

#### Mathematics 23

23 units minimum, including at least one course from each group:

##### Group A

MATH 53 Ordinary Differential Equations with Linear Algebra

CME 102 Ordinary Differential Equations for Engineers

##### Group B

CME 106 Introduction to Probability and Statistics for Engineers

STATS 60 Introduction to Statistical Methods: Precalculus

STATS 101 Data Science 101

STATS 110 Statistical Methods in Engineering and the Physical Sciences

#### Science 20

20 units minimum, including all of the following:

PHYSICS 41 Mechanics

PHYSICS 43 Electricity and Magnetism

or PHYSICS 45 Light and Heat

CHEM 31B Chemical Principles II

or CHEM 31X Chemical Principles Accelerated

CEE 70 Environmental Science and Technology <sup>1</sup>

#### Technology in Society (1 course) 3-5

One 3-5 unit course required; must be on School of Engineering Approved List the year taken.

#### Writing in the Major (WIM)

One 3-5 unit course required. Choose a TiS course that fulfills a WIM:

BIOE 131 Ethics in Bioengineering

COMM 120W Digital Media in Society

OR one of these WIM courses:

CEE 100 Managing Sustainable Building Projects

EARTHSYS 200 Environmental Communication in Action: The SAGE Project

#### Engineering Fundamentals

Two courses minimum (recommend 3), including at least one of the following: 7-9

ENGR 25E Energy: Chemical Transformations for Production, Storage, and Use

ENGR 50E Introduction to Materials Science, Energy Emphasis

Plus at least one of the following:

ENGR 10 Introduction to Engineering Analysis

ENGR 70A Programming Methodology

A third Fundamental is optional but recommended (3-4 units)

#### Engineering Depth

Required: 6-8 units <sup>2</sup>

CEE 64	Air Pollution and Global Warming: History, Science, and Solutions (cannot also fulfill science requirement)	3
CEE 107A or CEE 107S	Understanding Energy Energy Resources: Fuels and Tools	3-5
34- 36 units from the following with at least four courses from each group:		36
Group A: Atmosphere		
AA 100	Introduction to Aeronautics and Astronautics	
CEE 63	Weather and Storms	
CEE 101B or ME 70	Mechanics of Fluids Introductory Fluids Engineering	
CEE 161C	Natural Ventilation of Buildings	
CEE 1611	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	
CEE 162I	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	
CEE 172	Air Quality Management	
CEE 178	Introduction to Human Exposure Analysis	
EARTHSYS 41N	The Global Warming Paradox	
EARTHSYS 111	Biology and Global Change	
EARTHSYS 142	Remote Sensing of Land	
or EARTHSYS 144	Fundamentals of Geographic Information Science (GIS)	
EARTHSYS 188	Social and Environmental Tradeoffs in Climate Decision-Making	
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	
MS&E 92Q	International Environmental Policy	
PHYSICS 199	The Physics of Energy and Climate Change	
EARTH 2	Climate and Society	
EARTHSYS 196	Implementing Climate Solutions at Scale	
Group B: Energy		
APPPHYS 79Q	Energy Options for the 21st Century	
AA 116Q or EE 155	Electric Automobiles and Aircraft Green Electronics	
CEE 156	Building Systems	
CEE 176A	Energy Efficient Buildings	
CEE 176B	Electric Power: Renewables and Efficiency	
CEE 176C	Energy Storage Integration - Vehicles, Renewables, and the Grid	
CEE 177S	Design for a Sustainable World	
EARTHSYS 46C	Environmental Impact of Energy Systems: What are the Risks?	
EARTHSYS 101	Energy and the Environment	
EARTHSYS 102	Fundamentals of Renewable Power	
ECON 17N	Energy, the Environment, and the Economy (OR OSPKYOTO 45 OR SIW 144)	
EE 151	Sustainable Energy Systems	
ENERGY 104	Sustainable Energy for 9 Billion	
ENGR 50E	Introduction to Materials Science, Energy Emphasis <sup>3</sup>	
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	
ME 182	Electric Transportation	
POLISCI 73	Energy Policy in California and the West	
OSPANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	

## OSPSANTG 52 Energy and Climate Cooperation in the Americas: The Role of Chile

Total Units

95-101

- <sup>1</sup> Can count as a science requirement or Engineering Fundamental, but not both.
- <sup>2</sup> CEE 64 can count as a science requirement or as Engineering Depth, but not both.
- <sup>3</sup> ENGR 50E can count as Engineering Fundamental or Engineering Depth, but not both.

### Honors Program

The A/E honors program offers eligible students the opportunity to engage in guided original research, or project design, over the course of an academic year. Interested student must adhere to the following requirements:

1. Prospective honors students write up and submit a 1-2 page letter applying to the honors program in A/E describing the problem to be investigated. The letter must be signed by the student, the current primary adviser, and the proposed honors adviser, if different, and submitted to the student services office in the Department of Civil and Environmental Engineering (CEE). The application must include an unofficial Stanford transcript. Applications must be received in the fourth quarter prior to graduation. It is strongly suggested that prospective honors students meet with the proposed honors adviser well in advance of submitting an application.
2. Students must maintain a GPA of at least 3.5.
3. Students must complete an honors thesis or project over a period of three quarters. The typical length of the written report is 15-20 pages. The deadline for submission of the report is to be decided by the honors adviser, but should be no later than the end of the third week in May.
4. The report must be read and evaluated by the student's honors adviser and one other reader. It is the student's responsibility to find and obtain both the adviser and the reader. At least one of the two must be a member of the Academic Council in the School of Engineering.
5. Students must present the completed work in an appropriate forum, e.g. in the same session as honors theses are presented in the department of the adviser. All honors programs require some public presentation of the thesis or project.
6. Students may take up to 10 units of CEE 199H Undergraduate Honors Thesis (optional). However, students must take ENGR 202S Directed Writing Project or its equivalent sometime (required). Units for the writing class are beyond those required for the A/E major.
7. Two copies of the signed thesis must be provided to the CEE student services office no later than two weeks before the end of the student's graduation quarter.

For additional information and sample programs, see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

## Bioengineering (BIOE)

Completion of the undergraduate program in Bioengineering leads to the conferral of the Bachelor of Science in Bioengineering.

### Mission of the Undergraduate Program in Bioengineering

The Stanford Bioengineering major enables students to combine engineering and the life sciences in ways that advance scientific discovery, healthcare and medicine, manufacturing, environmental quality, culture, education, and policy. Students who major in BioE earn a fundamental engineering degree for which the raw materials, underlying

basic sciences, fundamental toolkit, and future frontiers are all defined by the unique properties of living systems.

Students will complete engineering fundamentals courses, including an introduction to bioengineering and computer programming. A series of core BIOE classes beginning in the second year leads to a student-selected depth area and a senior capstone design project. The department also organizes a summer Research Experience for Undergraduates (REU) (<http://bioengineering.stanford.edu/student-resources/reu>) program. BIOE graduates are well prepared to pursue careers and lead projects in research, medicine, business, law, and policy.

### Requirements

#### Mathematics

14 units minimum <sup>1</sup>

May also be satisfied with AP Calculus.

MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus	10
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Select one of the following sequences:

CME 100 & CME 102	Vector Calculus for Engineers and Ordinary Differential Equations for Engineers (Recommended)	10
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MATH 51 & MATH 53	Linear Algebra and Differential Calculus of Several Variables and Ordinary Differential Equations with Linear Algebra	10
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Select one of the following:

CME 106	Introduction to Probability and Statistics for Engineers (Recommended)	4-5
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or STATS 110 Statistical Methods in Engineering and the Physical Sciences

or STATS 141 Biostatistics

#### Science

26 units minimum <sup>2</sup>

CHEM 31X or CHEM 31A & CHEM 31B	Chemical Principles Accelerated Chemical Principles I and Chemical Principles II	5-10
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CHEM 33	Structure and Reactivity of Organic Molecules	5
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BIO 82	Genetics	4
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BIO 84	Physiology	4
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PHYSICS 41	Mechanics	4
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PHYSICS 43	Electricity and Magnetism	4
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<b>Technology in Society</b>		
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BIOE 131	Ethics in Bioengineering (WIM)	3
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#### Engineering Fundamentals

ENGR 70A	Programming Methodology (same as CS 106A)	5
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ENGR 80	Introduction to Bioengineering (Engineering Living Matter)	4
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Fundamentals Elective; see UGHB Fig. 3-4 for approved course list; may not use ENGR 70B or ENGR 70X

<b>Bioengineering Core</b>		
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BIOE 42	Physical Biology	4
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BIOE 44	Fundamentals for Engineering Biology Lab	4
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BIOE 101	Systems Biology	3
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BIOE 103	Systems Physiology and Design	4
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BIOE 123	Biomedical System Prototyping Lab	4
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BIOE 141A	Senior Capstone Design I	4
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BIOE 141B	Senior Capstone Design II	4
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#### Bioengineering Depth Electives

Four courses, minimum 12 units:

		12
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BIOE 115	Computational Modeling of Microbial Communities
BIOE 122	Biosecurity and Bioterrorism Response
BIOE 140	Physical Biology of Macromolecules
BIOE 201C	Diagnostic Devices Lab
BIOE 211	Biophysics of Multi-cellular Systems and Amorphous Computing
BIOE 212	Introduction to Biomedical Informatics Research Methodology
BIOE 214	Representations and Algorithms for Computational Molecular Biology
BIOE 217	Translational Bioinformatics
BIOE 220	Introduction to Imaging and Image-based Human Anatomy
or BIOE 51	Anatomy for Bioengineers
BIOE 221	Physics and Engineering of Radionuclide-based Medical Imaging
BIOE 222	Instrumentation and Applications for Multi-modality Molecular Imaging of Living Subjects
BIOE 223	Physics and Engineering of X-Ray Computed Tomography
BIOE 224	Probes and Applications for Multi-modality Molecular Imaging of Living Subjects
BIOE 225	Ultrasound Imaging and Therapeutic Applications
BIOE 227	Functional MRI Methods
BIOE 231	Protein Engineering
BIOE 244	Advanced Frameworks and Approaches for Engineering Integrated Genetic Systems
BIOE 253	
BIOE 260	Tissue Engineering
BIOE 279	Computational Biology: Structure and Organization of Biomolecules and Cells
BIOE 281	Biomechanics of Movement
BIOE 287	
BIOE 291	Principles and Practice of Optogenetics for Optical Control of Biological Tissues

<sup>1</sup> It is strongly recommended that CME 100 Vector Calculus for Engineers and CME 102 Ordinary Differential Equations for Engineers be taken rather than MATH 51 Linear Algebra and Differential Calculus of Several Variables and MATH 53 Ordinary Differential Equations with Linear Algebra. If you are taking the MATH 50 series, it is strongly recommended to take CME 192 Introduction to MATLAB. CME 106 Introduction to Probability and Statistics for Engineers utilizes MATLAB, a powerful technical computing program, and should be taken rather than STATS 110 Statistical Methods in Engineering and the Physical Sciences or STATS 141 Biostatistics. Although not required, CME 104 Linear Algebra and Partial Differential Equations for Engineers is recommended for some Bioengineering courses.

<sup>2</sup> Science must include both Chemistry (CHEM 31A Chemical Principles I and CHEM 31B Chemical Principles II; or CHEM 31X Chemical Principles Accelerated) and calculus-based Physics (PHYSICS 41 Mechanics and PHYSICS 43 Electricity and Magnetism), with two quarters of course work in each, in addition to two courses of BIO core. CHEM 31A Chemical Principles I and CHEM 31B Chemical Principles II are considered one course even though given over two quarters.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>). Students pursuing a premed program need to take additional courses; see the UGHB, BioE Premed 4-Year Plan.

## Honors Program

The School of Engineering offers a program leading to a Bachelor of Science in Bioengineering with Honors (BIOE-BSH). This program provides the opportunity for qualified BioE majors to conduct independent research at an advanced level with a faculty research adviser and documented in an honors thesis.

In order to receive departmental honors, students admitted to the program must:

1. Declare the honors program in Axxess (BIOE-BSH).
2. Maintain an overall grade point average (GPA) of at least 3.5 as calculated on the unofficial transcript.
3. Complete at least two quarters of research with a minimum of nine units of BIOE 191 Bioengineering Problems and Experimental Investigation or BIOE 191X Out-of-Department Advanced Research Laboratory in Bioengineering for a letter grade; up to three units may be used towards the bioengineering depth elective requirements.
4. Submit a completed thesis draft to the honors adviser and second reader by the third week of Spring Quarter. Further revisions and final endorsement are to be finished by the second Monday in May, when two signed bound copies plus one PC-compatible CD-ROM are to be submitted to the student services officer.
5. Attend the Bioengineering Honors Symposium at the end of Spring Quarter and give a poster or oral presentation, or present in another approved suitable forum.

For more information and application instructions, see the Bioengineering Honors Program (<http://bioengineering.stanford.edu/academics/undergraduate-programs/bioengineering-honors-program>) web site.

## Biomechanical Engineering (BME)

Completion of the undergraduate program in Biomechanical Engineering leads to the conferral of the Bachelor of Science in Engineering. The subplan "Biomechanical Engineering" appears on the transcript and on the diploma.

### Mission of the Undergraduate Program in Biomechanical Engineering

The mission of the undergraduate program in Biomechanical Engineering is to help students address health science challenges by applying engineering mechanics and design to the fields of biology and medicine. The program is interdisciplinary in nature, integrating engineering course work with biology and clinical medicine. Research and teaching in this discipline focus primarily on neuromuscular, musculoskeletal, cardiovascular, and cell and tissue biomechanics. This major prepares students for graduate studies in bioengineering, biomechanics, medicine or related areas.

### Requirements

		Units
<b>Mathematics</b>		21
21 units minimum; see Basic Requirement 1		
<b>Science (22 units Minimum)</b> <sup>1</sup>		
CHEM 31X	Chemical Principles Accelerated (or CHEM 31A+B)	5
CHEM 33	Structure and Reactivity of Organic Molecules	5
PHYSICS 41	Mechanics	4
Biology or Human Biology A/B core courses <sup>4</sup>		8-10
BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology (or BIO 44X if taken before 2016-17)	4
<b>Technology in Society</b>		
One course required; course must be on School of Engineering Approved Courses list in the UGHB the year taken		3-5

**Engineering Topics (Engineering Science and Design)**

Engineering Fundamentals (minimum three courses; see Basic Requirement 3):

ENGR 14	Intro to Solid Mechanics	3
ENGR 25B or ENGR 80	Biotechnology Introduction to Bioengineering (Engineering Living Matter)	3
Fundamentals Elective		3-5

**Engineering Depth**

ENGR 15	Dynamics	3
ME 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 80	Mechanics of Materials	4
ME 389	Biomechanical Research Symposium <sup>2</sup>	1

Options to complete the ME depth sequence (3 courses, minimum 9 units):

ENGR 105	Feedback Control Design	
ME 101	Visual Thinking	
ME 112	Mechanical Systems Design <sup>3</sup>	
ME 131A	Heat Transfer <sup>3</sup>	
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	
ME 161	Dynamic Systems, Vibrations and Control	
ME 203	Design and Manufacturing	
ME 210	Introduction to Mechatronics	
ME 220	Introduction to Sensors	

Options to complete the BME depth sequence (3 courses, minimum 9 units) and WIM: <sup>3</sup>

BIOE 260	Tissue Engineering	
BIOE/ME 285	Computational Modeling in the Cardiovascular System	
ME 234	Introduction to Neuromechanics	
ME 239	Mechanics of the Cell	
ME 281	Biomechanics of Movement	
ME 283	Introduction to Biomechanics and Mechanobiology	
ME 287	Mechanics of Biological Tissues	
ME 328	Medical Robotics (with permission of instructor)	
ME 337	Mechanics of Growth	

Total Units 92-98

<sup>1</sup> Science must include both Chemistry and Physics with one year of course work (3 courses) in at least one, two courses of HUMBIO core or BIO core, and CHEM 31A and CHEM 31B or CHEM 31X. CHEM 31A/B are considered one course even though given over two quarters.

<sup>2</sup> If ME 389 is not offered, other options include BIOE 393, ME 571, or course by petition.

<sup>3</sup> There are two options for fulfilling the WIM requirement. The first option is to complete ME 112. The second option is to perform engineering research over the summer or during the academic year and enroll in 3 units of ENGR 199W Writing of Original Research for Engineers, preferably during the time a student is performing research or the following quarter, to write a technical report on the research. This second option requires an agreement with the student's faculty research supervisor.

<sup>4</sup> Students satisfy the Bio core by taking two of the following: BIO 82 Genetics, BIO 83 Biochemistry & Molecular Biology, BIO 84 Physiology or BIO 86 Cell Biology. Details for Humbio core and total science unit requirement are not available at this time, but will be published soon.

**Honors Program**

The School of Engineering offers a program leading to a Bachelor of Science in Engineering: Biomechanical Engineering with Honors. This program provides an opportunity for qualified BME majors to conduct independent study and research related to biomechanical engineering at an advanced level with a faculty mentor.

**Honors Criteria:**

- GPA of 3.5 or higher in the major
- Arrangement with an ME faculty member (or a faculty member from another department who is approved by the BME Undergraduate Program Director) who agrees to serve as the honors adviser, plus a second faculty member who reads and approves the thesis. The honors adviser must be a member of the Academic Council in the School of Engineering.
- Applications are subject to the review and final approval by the BME Undergraduate Program Director. Applicants and thesis advisers receive written notification when a decision has been made. Submit application documents to the student services office, Building 530, room 125.
- An application consists of
  - One page written statement describing the research topic
  - Unofficial Stanford transcript
  - Signature of thesis adviser and thesis reader agreeing to serve on the committee
  - Deadline: No later than the second week of the Autumn Quarter of the senior year
- In order to graduate with honors:
  - Declare ENGR-BSH (honors) program in Axess
  - Maintain 3.5 GPA
  - Submit a completed thesis draft to the adviser and reader by April 1
  - Present the thesis synopsis at the Mechanical Engineering Poster Session held in April
- Further revisions and a final endorsement by the adviser and reader are to be completed by May 15 when two bound copies are to be submitted to the Mechanical Engineering student services office.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

**Biomedical Computation (BMC)**

Completion of the undergraduate program in Biomedical Computation leads to the conferral of the Bachelor of Science in Engineering. The subplan "Biomedical Computation" appears on the transcript and on the diploma.

**Mission of the Undergraduate Program in Biomedical Computation**

Quantitative and computational methods are central to the advancement of biology and medicine in the 21<sup>st</sup> century. These methods span the analysis of biomedical data, the construction of computational models for biological systems, and the design of computer systems that help biologists and physicians create and administer treatments to patients. The Biomedical Computation major prepares students to work at the cutting edge of this interface between computer science, biology, and medicine. Students begin their journey by acquiring foundational knowledge in the underlying biological and computational disciplines. They learn techniques in informatics and simulation and their numerous applications in understanding and analyzing biology at all levels, from individual molecules in cells to entire organs, organisms, and populations. Students then focus their efforts in a depth area of their choosing, and participate in a substantial research project with a

Stanford faculty member. Upon graduation, students are prepared to enter a range of disciplines in either academia or industry.

## Requirements

### Mathematics

21 unit minimum, see Basic Requirement 1

MATH 19	Calculus (or AP Calculus)	3
MATH 20	Calculus (or AP Calculus)	3
MATH 21	Calculus (or AP Calculus)	4
CS 103	Mathematical Foundations of Computing	3-5
CS 109	Introduction to Probability for Computer Scientists	3-5

### Science

17 units minimum, see Basic Requirement 2

PHYSICS 41	Mechanics	4
CHEM 31X	Chemical Principles Accelerated	5
CHEM 33	Structure and Reactivity of Organic Molecules	5
BIO 82	Genetics (or HUMBIO 2A)	4
BIO 83	Biochemistry & Molecular Biology (or BIO 84 or HUMBIO 3A)	4
BIO 86	Cell Biology (or HUMBIO 4A) <sup>4</sup>	4

### Engineering Fundamentals

CS 106B	Programming Abstractions	3-5
or CS 106X	Programming Abstractions (Accelerated)	

For the second required course, see concentrations

### Technology in Society

One course required, see Basic Requirement 4; course used must be on the School of Engineering Approved Courses list in the UGHB the year taken.

### Engineering

CS 107	Computer Organization and Systems	3-5
CS 161	Design and Analysis of Algorithms	3-5

Select one of the following: 3

CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
CS 273A	The Human Genome Source Code	
CS 274	Representations and Algorithms for Computational Molecular Biology	
CS 275	Translational Bioinformatics	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	

Research: 6 units of biomedical computation research in any department<sup>2,3</sup> 6

Engineering Depth Concentration (select one of the following concentrations):<sup>7</sup>

#### Cellular/Molecular Concentration

Mathematics: Select one of the following:

CME 100	Vector Calculus for Engineers	
STATS 141	Biostatistics	
MATH 51	Linear Algebra and Differential Calculus of Several Variables	

One additional Engineering Fundamental<sup>4</sup>

BIO 104	Advanced Molecular Biology	
CHEM 141	The Chemical Principles of Life I (or CHEM 171) <sup>4</sup>	
Cell/Mol Electives (two courses) <sup>5,6</sup>		
Informatics Electives (two courses) <sup>5,6</sup>		
Simulation Electives (two courses) <sup>5,6</sup>		
Simulation, Informatics, or Cell/Mol Elective (one course) <sup>5,6</sup>		

#### Informatics Concentration

Mathematics: Select one of the following:

STATS 141	Biostatistics	
STATS 203	Introduction to Regression Models and Analysis of Variance	
STATS 205	Introduction to Nonparametric Statistics	
STATS 215	Statistical Models in Biology	
One additional Engineering Fundamental <sup>4</sup>		
Informatics Core (three courses):		
CS 145	Introduction to Databases	
or CS 147	Introduction to Human-Computer Interaction Design	
CS 221	Artificial Intelligence: Principles and Techniques	
or CS 228	Probabilistic Graphical Models: Principles and Techniques	
or CS 229	Machine Learning	
One additional course from the previous two lines		
Informatics Electives (three courses) <sup>5,6</sup>		
Cellular Electives (two courses) <sup>5,6</sup>		
Organs Electives (two courses) <sup>5,6</sup>		6-10

#### Organs/Organisms Concentration

Mathematics (select one of the following):

CME 100	Vector Calculus for Engineers	
STATS 141	Biostatistics	
MATH 51	Linear Algebra and Differential Calculus of Several Variables	

One additional Engineering Fundamental<sup>4</sup>

Biology (two courses):

BIO 112	Human Physiology	
CHEM 141	The Chemical Principles of Life I (or BIOE 220)	
Two additional Organs Electives <sup>5,6</sup>		
Simulation Electives (two courses) <sup>5,6</sup>		
Informatics Electives (two courses) <sup>5,6</sup>		
Simulation, Informatics, or Organs Elective (one course) <sup>5,6</sup>		

#### Simulation Concentration

Mathematics:

CME 100	Vector Calculus for Engineers	
or MATH 51	Linear Algebra and Differential Calculus of Several Variables	
ME 30	Engineering Thermodynamics (Fulfills 2nd Engineering Fundamental)	3

Simulation Core:

CME 102	Ordinary Differential Equations for Engineers	5
or MATH 53	Ordinary Differential Equations with Linear Algebra	
ENGR 80	Introduction to Bioengineering (Engineering Living Matter)	4
BIOE 101	Systems Biology	3
BIOE 103	Systems Physiology and Design	4
Simulation Electives (two courses) <sup>5,6</sup>		
Cellular Elective (one course) <sup>5,6</sup>		
Organs Elective (one course) <sup>5,6</sup>		
Simulation, Cellular, or Organs Elective (two courses) <sup>5,6</sup>		

Total Units 88-104

<sup>1</sup> Acceptable substitutes for CS 109 are STATS 116 Theory of Probability, MS&E 120 Probabilistic Analysis, MS&E 220 Probabilistic Analysis, EE 178 Probabilistic Systems Analysis, and CME 106 Introduction to Probability and Statistics for Engineers are acceptable substitutes for STATS 116 Theory of Probability.

<sup>2</sup> Research projects require pre-approval of BMC Coordinators

<sup>3</sup> Research units taken as CS 191W Writing Intensive Senior Project or in conjunction with ENGR 199W Writing of Original Research for Engineers fulfill the Writing in the Major (WIM) requirement. CS 272 Introduction to Biomedical Informatics Research Methodology, which does not have to be taken in conjunction with research, also fulfills the WIM requirement.

<sup>4</sup> One 3-5 unit course required; CS 106A Programming Methodology may not be used. See Engineering Fundamentals list in Handbook for Undergraduate Engineering Programs or on Approved Courses page at [ughb.stanford.edu](http://ughb.stanford.edu).

<sup>5</sup> The list of electives is continually updated to include all applicable courses. For the current list of electives, see <http://bmc.stanford.edu>.

<sup>6</sup> A course may only be counted towards one elective or core requirement; it may not be double-counted.

<sup>7</sup> A total of 40 Engineering Fundamentals and Core/Depth units must be taken. The core classes only provide 27 Engineering units, so the remaining units must be taken from within the electives.

## Honors Program

The Biomedical Computation program offers an honors option for qualified students, resulting in a B.S. with Honors degree in Engineering (ENGR-BSH, Biomedical Computation). An honors project is meant to be a substantial research project during the later part of a student's undergraduate career, culminating in a final written and oral presentation describing the student's project and its significance. There is no limit to the number of majors who can graduate with honors; any BMC major who is interested and meets the qualifications is considered.

- Students apply by submitting a 1-2 page proposal describing the problem the student has chosen to investigate, its significance, and the student's research plan. This plan must be endorsed by the student's research and academic advisers, one of whom must be a member of the Academic Council. In making its decision, the department evaluates the overall scope and significance of the student's proposed work.
- Students must maintain a 3.5 GPA.
- Students must complete three quarters of research. All three quarters must be on the same project with the same adviser. A Summer Quarter counts as one quarter of research.
  - Ideally, funding should not be obtained through summer research college sources, but rather through the UAR's Student Grants Program (<http://exploreddegrees.stanford.edu/schoolofengineering/%20http://studentgrants.stanford.edu>). In no case can the same work be double-paid by two sources.
- Students must complete a substantial write-up of the research in the format of a publishable research paper. This research paper is expected to be approximately 15-20 pages and must be approved by the student's research adviser and by a second reader.
- As the culmination of the honors project, each student presents the results in a public forum. This can either be in the honors presentation venue of the home department of the student's adviser, or in a suitable alternate venue.

For additional information and sample programs, see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

## Chemical Engineering

Completion of the undergraduate program in Chemical Engineering leads to the conferral of the Bachelor of Science in Chemical Engineering.

### Mission of the Undergraduate Program in Chemical Engineering

Chemical engineers are responsible for the conception and design of processes for the purpose of production, transformation, and transportation of materials. This activity begins with experimentation in

the laboratory and is followed by implementation of the technology in full-scale production. The mission of the undergraduate program in Chemical Engineering is to develop students' understanding of the core scientific, mathematical, and engineering principles that serve as the foundation underlying these technological processes. The program's core mission is reflected in its curriculum which is built on a foundation in the sciences of chemistry, physics, and biology. Course work includes the study of applied mathematics, material and energy balances, thermodynamics, fluid mechanics, energy and mass transfer, separations technologies, chemical reaction kinetics and reactor design, and process design. The program provides students with excellent preparation for careers in the corporate sector and government, or for graduate study.

### Requirements\*

	Units
<b>Mathematics</b> <sup>1</sup>	10
The following sequence or approved AP credit	
MATH 19 Calculus	
MATH 20 Calculus	
MATH 21 Calculus	
Select one of the following:	5-10
CME 100 Vector Calculus for Engineers	
MATH 51 Linear Algebra and Differential Calculus of Several Variables and Integral Calculus of Several Variables	
Select one of the following:	5
CME 102 Ordinary Differential Equations for Engineers or MATH 53 Ordinary Differential Equations with Linear Algebra	
Select one of the following:	4-5
CME 104 Linear Algebra and Partial Differential Equations for Engineers or CME 106 Introduction to Probability and Statistics for Engineers	
<b>Science</b> <sup>1</sup>	
CHEM 31X Chemical Principles Accelerated	5
CHEM 33 Structure and Reactivity of Organic Molecules	5
CHEM 35 Organic Chemistry of Bioactive Molecules	5
PHYSICS 41 Mechanics	4
PHYSICS 43 Electricity and Magnetism	4
CHEM 131 Organic Polyfunctional Compounds	3
<b>Technology in Society</b>	
One course required, see Basic Requirement 4; course chosen must be on the SoE-Approved Courses list at <a href="http://ughb.stanford.edu">ughb.stanford.edu</a> the year taken.	3-5
<b>Engineering Fundamentals</b>	
Three courses minimum; see Basic Requirement 3	
CHEMENG/ENGR Introduction to Chemical Engineering	4
20	
Fundamentals Elective from another School of Engineering department	3-5
See the UGHB for a list of courses.	
Select one of the following:	3
ENGR 25B Biotechnology (same as CHEMENG 25B)	
ENGR 25E Energy: Chemical Transformations for Production, Storage, and Use (same as CHEMENG 25E)	
<b>Chemical Engineering Depth</b>	
Minimum 68 Engineering Science and Design units; see Basic Requirement 5	
CHEMENG 10 The Chemical Engineering Profession	1
CHEMENG 100 Chemical Process Modeling, Dynamics, and Control	3
CHEMENG 110 Equilibrium Thermodynamics	3

CHEMENG 120A	Fluid Mechanics	4	45 units minimum; see Basic Requirements 1 and 2 <sup>1</sup>
CHEMENG 120B	Energy and Mass Transport	4	<b>Technology in Society</b>
CHEMENG 130	Separation Processes	3	One course; course chosen must be on the SoE Approved Courses list at <ughb.stanford.edu> the year taken; see Basic Requirement 4 <sup>2</sup>
CHEMENG 150	Biochemical Engineering	3	<b>Engineering Fundamentals</b>
CHEMENG 170	Kinetics and Reactor Design	3	Two courses required
CHEMENG 180	Chemical Engineering Plant Design	4	ENGR 14 Intro to Solid Mechanics 3
CHEMENG 181	Biochemistry I	4	ENGR 90/CEE 70 Environmental Science and Technology 3
CHEMENG 185A	Chemical Engineering Laboratory A (WIM)	4	<b>Engineering Depth</b>
CHEMENG 185B	Chemical Engineering Laboratory B	4	Minimum of 68 Engineering Fundamentals plus Engineering Depth; see Basic Requirement 5
CHEM 171	Physical Chemistry I	4	CEE 100 Managing Sustainable Building Projects <sup>3</sup> 4
CHEM 173	Physical Chemistry II	3	CEE 101A Mechanics of Materials 4
CHEM 175	Physical Chemistry III	3	CEE 101B Mechanics of Fluids (or CEE 101N) 4
Select four of the following: <sup>2,3</sup>		12	CEE 101C Geotechnical Engineering 4
CHEMENG 140	Micro and Nanoscale Fabrication Engineering		Specialty courses in either: 36-39
CHEMENG 142	Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations		Environmental and Water Studies (see below)
CHEMENG 160	Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life		Structures and Construction (see below)
CHEMENG 162	Polymers for Clean Energy and Water		Other School of Engineering Electives 3-0
CHEMENG 174	Environmental Microbiology I		Total Units 109-111
CHEMENG 183	Biochemistry II		
CHEMENG 196	Creating New Ventures in Engineering and Science-based Industries		
Total Units		125-135	

<sup>1</sup> Unit count is higher if program includes one or more of the following: MATH 51 and MATH 52 in lieu of CME 100; or CHEM 31A and CHEM 31B in lieu of CHEM 31X.

<sup>2</sup> Any two acceptable except combining 160 and 162.

<sup>3</sup> Students may substitute two of the depth electives with two other science and engineering 3-unit lecture courses. See Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>) for additional details.

\* For additional information and sample programs, see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>)

## Civil Engineering (CE)

Completion of the undergraduate program in Civil Engineering leads to the conferral of the Bachelor of Science in Civil Engineering.

## Mission of the Undergraduate Program in Civil Engineering

The mission of the undergraduate program in Civil Engineering is to provide students with the principles of engineering and the methodologies necessary for civil engineering practice. This pre-professional program balances the fundamentals common to many specialties in civil engineering and allows for concentration in structures and construction or environmental and water studies. Students in the major learn to apply knowledge of mathematics, science, and civil engineering to conduct experiments, design structures and systems to creatively solve engineering problems, and communicate their ideas effectively. The curriculum includes course work in structural, construction, and environmental engineering. The major prepares students for careers in consulting, industry and government, as well as for graduate studies in engineering.

## Requirements

Mathematics and Science	Units	45
ME 30	Engineering Thermodynamics	3
CEE 101D	Computations in Civil and Environmental Engineering (or CEE 101S) <sup>2</sup>	3
CEE 162E	Rivers, Streams, and Canals	3
CEE 166A	Watersheds and Wetlands	4
CEE 166B	Floods and Droughts, Dams and Aqueducts	4
CEE 171	Environmental Planning Methods	3
CEE 172	Air Quality Management	3
CEE 177	Aquatic Chemistry and Biology	4
CEE 179A	Water Chemistry Laboratory	3
CEE 179C	Environmental Engineering Design	5
(or CEE 169) Capstone design experience course		
Remaining specialty units from:		
CEE 63	Weather and Storms <sup>2</sup>	3
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions <sup>2</sup>	3
CEE 107A	Understanding Energy	3-5

<sup>1</sup> Mathematics must include CME 100 Vector Calculus for Engineers and CME 102 Ordinary Differential Equations for Engineers (or Math 51 Linear Algebra and Differential Calculus of Several Variables and MATH 53 Ordinary Differential Equations with Linear Algebra) and a Statistics course. Science must include Physics 41 Mechanics; either ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology, CHEM31A Chemical Principles I or CHEM 31X Chemical Principles; two additional quarters in either chemistry or physics, and GS 1A Introduction to Geology: The Physical Science of the Earth (or GS 1B or 1C); for students in the Environmental and Water Studies track, the additional chemistry or physics must include CHEM 33; for students in the Structures and Construction track, it must include PHYSICS 43 or 45. Please note that the only quarter GS 1A is offered for AY 2015-16 is Spring Quarter.

<sup>2</sup> Chosen TiS class must specifically include an ethics component, as indicated in Figure 3-3 in the Engineering Undergraduate Handbook (<http://web.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Handbooks>)

<sup>3</sup> CEE 100 meets the Writing in the Major (WIM) requirement

## Environmental and Water Studies Focus

		Units
ME 30	Engineering Thermodynamics	3
CEE 101D	Computations in Civil and Environmental Engineering (or CEE 101S) <sup>2</sup>	3
CEE 162E	Rivers, Streams, and Canals	3
CEE 166A	Watersheds and Wetlands	4
CEE 166B	Floods and Droughts, Dams and Aqueducts	4
CEE 171	Environmental Planning Methods	3
CEE 172	Air Quality Management	3
CEE 177	Aquatic Chemistry and Biology	4
CEE 179A	Water Chemistry Laboratory	3
CEE 179C	Environmental Engineering Design	5
(or CEE 169) Capstone design experience course		
Remaining specialty units from:		
CEE 63	Weather and Storms <sup>2</sup>	3
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions <sup>2</sup>	3
CEE 107A	Understanding Energy	3-5

CEE 155	Introduction to Sensing Networks for CEE	4	
CEE 161C	Natural Ventilation of Buildings	3	
CEE 161I	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3	
CEE 162D	Introduction to Physical Oceanography	4	
CEE 162F	Coastal Engineering	3	
CEE 162I	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3	
CEE 165C	Water Resources Management	3	
CEE 166D	Water Resources and Water Hazards Field Trips	2	
CEE 174A	Providing Safe Water for the Developing and Developed World	3	
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3	
CEE 176A	Energy Efficient Buildings	3-4	
CEE 176B	Electric Power: Renewables and Efficiency	3-4	
CEE 178	Introduction to Human Exposure Analysis	3	
CEE 199	Undergraduate Research in Civil and Environmental Engineering	1-4	
CEE 161C	Natural Ventilation of Buildings	3	
CEE 162E	Rivers, Streams, and Canals	3-4	
CEE 171	Environmental Planning Methods	3	
CEE 176A	Energy Efficient Buildings	3-4	
CEE 176B	Electric Power: Renewables and Efficiency	3-4	
CEE 195	Fundamentals of Structural Geology	3	
CEE 196	Engineering Geology and Global Change	3	
CEE 199	Undergraduate Research in Civil and Environmental Engineering	1-4	
CEE 203	Probabilistic Models in Civil Engineering	3-4	
One of the following can also count as remaining specialty units.			3-4
CEE 120B	Building Information Modeling Workshop	2-4	
CEE 130	Architectural Design: 3-D Modeling, Methodology, and Process		
CEE 131A	Professional Practice: Mixed-Use Design in an Urban Setting		
CEE 134B	Intermediate Arch Studio		

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

## Structures and Construction Focus

CEE 102	Legal Principles in Design, Construction, and Project Delivery	3
CEE 120A	Building Information Modeling Workshop (or CEE 120S)	3-4
CEE 156	Building Systems	4
CEE 180	Structural Analysis	4
CEE 181	Design of Steel Structures	4
CEE 182	Design of Reinforced Concrete Structures	4
CEE 183	Integrated Civil Engineering Design Project	4
Select one of the following (beyond the 2 required Engineering Fundamentals):		
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	
ENGR 50E	Introduction to Materials Science, Energy Emphasis	
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis	
Remaining specialty units from:		
ENGR 15	Dynamics	3
CME 104	Linear Algebra and Partial Differential Equations for Engineers	5
CEE 101D	Computations in Civil and Environmental Engineering (or CEE 101S)	3
CEE 112A	Industry Applications of Virtual Design & Construction	2-4
CEE 112B	Industry Applications of Virtual Design & Construction	2-4
CEE 122A	Computer Integrated Architecture/Engineering/Construction	2
CEE 122B	Computer Integrated A/E/C	2
CEE 131A	Professional Practice: Mixed Use Design in an Urban Setting (not given AY 2015-16)	
CEE 131B	Financial Management of Sustainable Urban Systems	3
CEE 141A	Infrastructure Project Development	3
CEE 141B	Infrastructure Project Delivery	3
CEE 151	Negotiation	3
CEE 155	Introduction to Sensing Networks for CEE	4

## Units

## Computer Science (CS)

Completion of the undergraduate program in Computer Science leads to the conferral of the Bachelor of Science in Computer Science.

## Mission of the Undergraduate Program in Computer Science

The mission of the undergraduate program in Computer Science is to develop students' breadth of knowledge across the subject areas of computer science, including their ability to apply the defining processes of computer science theory, abstraction, design, and implementation to solve problems in the discipline. Students take a set of core courses. After learning the essential programming techniques and the mathematical foundations of computer science, students take courses in areas such as programming techniques, automata and complexity theory, systems programming, computer architecture, analysis of algorithms, artificial intelligence, and applications. The program prepares students for careers in government, law, the corporate sector, and for graduate study.

## Requirements

### Mathematics (26 units minimum)–

CS 103	Mathematical Foundations of Computing	5
CS 109	Introduction to Probability for Computer Scientists	5
MATH 19	Calculus <sup>1</sup>	3
MATH 20	Calculus <sup>1</sup>	3
MATH 21	Calculus <sup>1</sup>	4
Plus two electives <sup>2</sup>		

### Science (11 units minimum)–

PHYSICS 41	Mechanics	4
PHYSICS 43	Electricity and Magnetism	4
Science elective <sup>3</sup>		3

### Technology in Society (3-5 units)–

One course; course chosen must be on the SoE Approved Courses list at [ughb.stanford.edu](http://ughb.stanford.edu) the year taken; see Basic Requirements 4 in the School of Engineering section

**Engineering Fundamentals (13 units minimum; see Basic Requirement 3 in the School of Engineering section)–**

CS 106B	Programming Abstractions	5
or CS 106X	Programming Abstractions (Accelerated)	
ENGR 40M	An Intro to Making: What is EE (or ENGR 40A and ENGR 40B)	3-5
Fundamentals Elective (May be an ENGR fundamentals or an additional CS Depth course. See Fig. 3-4 in the UGHB for approved ENGR fundamentals list. May not be any CS 106)		3-5
*Students who take ENGR 40A or 40M for fewer than 5 units are required to take 1-2 additional units of ENGR Fundamentals (13 units minimum), or 1-2 additional units of Depth (27 units minimum for track and elective courses).		

**Writing in the Major–**

Select one of the following:

CS 181W	Computers, Ethics, and Public Policy
CS 191W	Writing Intensive Senior Project
CS 194W	Software Project
CS 210B	Software Project Experience with Corporate Partners
CS 294W	Writing Intensive Research Project in Computer Science

**Computer Science Core (15 units)–**

CS 107	Computer Organization and Systems	5
or CS 107E	Computer Systems from the Ground Up	
CS 110	Principles of Computer Systems	5
CS 161	Design and Analysis of Algorithms	5

**Senior Project (3 units)–**

CS 191	Senior Project
CS 191W	Writing Intensive Senior Project
CS 194	Software Project
CS 194H	User Interface Design Project
CS 194W	Software Project
CS 210B	Software Project Experience with Corporate Partners
CS 294	6
or CS 294W	Writing Intensive Research Project in Computer Science

**Computer Science Depth B.S.**

Choose one of the following ten CS degree tracks (a track must consist of at least 25 units and 7 classes):

**Artificial Intelligence Track–**

CS 221	Artificial Intelligence: Principles and Techniques	Units 4
Select two courses, each from a different area:		
Area I, AI Methods:		
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229	Machine Learning	
CS 234	Reinforcement Learning	
CS 238	Decision Making under Uncertainty	
Area II, Natural Language Processing:		
CS 124	From Languages to Information	
CS 224N	Natural Language Processing with Deep Learning	
CS 224S	Spoken Language Processing	

CS 224U	Natural Language Understanding
Area III, Vision:	
CS 131	Computer Vision: Foundations and Applications
CS 231A	Computer Vision: From 3D Reconstruction to Recognition
CS 231N	Convolutional Neural Networks for Visual Recognition
Area IV, Robotics:	
CS 223A	Introduction to Robotics
Select one additional course from the Areas above or from the following:	
AI Methods:	
CS 157	Logic and Automated Reasoning
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics
STATS 315A	Modern Applied Statistics: Learning
STATS 315B	Modern Applied Statistics: Data Mining
Vision:	
CS 231B	
CS 231M	
CS 331A	
Comp Bio:	
CS 262	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells
CS 371	Computational Biology in Four Dimensions
CS 374	
Information and the Web:	
CS 276	Information Retrieval and Web Search
CS 224W	Analysis of Networks
Other:	
CS 227B	General Game Playing
CS 277	
CS 379	Interdisciplinary Topics
Robotics and Control:	
CS 327A	Advanced Robotic Manipulation
CS 329	Topics in Artificial Intelligence (with advisor approval)
ENGR 205	Introduction to Control Design Techniques
EE 209	
MS&E 251	Introduction to Stochastic Control with Applications
MS&E 351	Dynamic Programming and Stochastic Control
Track Electives: at least three additional courses selected from the Areas and lists above, general CS electives, or the following: <sup>4</sup>	
CS 238	Decision Making under Uncertainty
CS 275	Translational Bioinformatics
CS 326	Topics in Advanced Robotic Manipulation
CS 334A	Convex Optimization I
or EE 364A	Convex Optimization I
CS 428	Computation and cognition: the probabilistic approach
EE 278	Introduction to Statistical Signal Processing
EE 364B	Convex Optimization II
ECON 286	Game Theory and Economic Applications
MS&E 252	Decision Analysis I: Foundations of Decision Analysis

MS&E 352	Decision Analysis II: Professional Decision Analysis
MS&E 355	Influence Diagrams and Probabilistic Networks
PHIL 152	Computability and Logic
PSYCH 202	Cognitive Neuroscience
PSYCH 204A	Human Neuroimaging Methods
PSYCH 204B	Computational Neuroimaging: Methods & Analyses
PSYCH 209	Neural Network Models of Cognition: Principles and Applications
STATS 200	Introduction to Statistical Inference
STATS 202	Data Mining and Analysis
STATS 205	Introduction to Nonparametric Statistics

CS 157 or PHIL 151	Logic and Automated Reasoning Metalogic	3
CS 164		
CS 166	Data Structures	3-4
CS 167		
CS 168	The Modern Algorithmic Toolbox	3-4
CS 190	Software Design Studio	3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 205B	Mathematical Methods for Fluids, Solids, and Interfaces	3
CS 210A	Software Project Experience with Corporate Partners	3-4
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Analysis of Networks	3-4
CS 225A	Experimental Robotics	3
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 229T	Statistical Learning Theory	3
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3-4
CS 231B		
CS 231M		
CS 231N	Convolutional Neural Networks for Visual Recognition	3-4
CS 232	Digital Image Processing	3
CS 233	Geometric and Topological Data Analysis	3
CS 234	Reinforcement Learning	3
CS 238	Decision Making under Uncertainty	3-4
CS 240	Advanced Topics in Operating Systems	3
CS 240H		
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 244	Advanced Topics in Networking	3-4
CS 244B	Distributed Systems	3
CS 245	Database Systems Principles	3
CS 246	Mining Massive Data Sets	3-4
CS 247	Human-Computer Interaction Design Studio	3-4
CS 248	Interactive Computer Graphics	3-4
CS 249A		
CS 251	Bitcoin and Crypto Currencies	3
CS 254	Computational Complexity	3
CS 255	Introduction to Cryptography	3
CS 261	Optimization and Algorithmic Paradigms	3
CS 262		
CS 263	Algorithms for Modern Data Models	3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266		
CS 267	Graph Algorithms	3
CS 269I	Incentives in Computer Science	3

### Biocomputation Track—

The Mathematics, Science, and Engineering Fundamentals requirements are non-standard for this track. See Handbook for Undergraduate Engineering Programs for details.

Select one of the following: 3-4

CS 221	Artificial Intelligence: Principles and Techniques
CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 229	Machine Learning
CS 231A	Computer Vision: From 3D Reconstruction to Recognition

Select one of the following:

CS 262	
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving
CS 273A	The Human Genome Source Code
CS 274	Representations and Algorithms for Computational Molecular Biology
CS 275	Translational Bioinformatics
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells

One additional course from the lists above or the following: 3-4

CS 124	From Languages to Information
CS 145	Introduction to Databases
CS 147	Introduction to Human-Computer Interaction Design
CS 148	Introduction to Computer Graphics and Imaging
CS 248	Interactive Computer Graphics

One course selected from the following: 3-4

CS 108	Object-Oriented Systems Design	3-4
CS 124	From Languages to Information	3-4
CS 131	Computer Vision: Foundations and Applications	3-4
CS 140	Operating Systems and Systems Programming	3-4
or CS 140E	Operating systems design and implementation	
CS 142	Web Applications	3
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3

Units



CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3	STATS 315A	Modern Applied Statistics: Learning	2-3
CS 272	Introduction to Biomedical Informatics Research Methodology	3-5	STATS 315B	Modern Applied Statistics: Data Mining	2-3
CS 273A	The Human Genome Source Code	3	BMI 231		
CS 273B	Deep Learning in Genomics and Biomedicine	3	BMI 260		
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4	GENE 211	Genomics	3
CS 275	Translational Bioinformatics	4	One course selected from the list above or the following:		
CS 276	Information Retrieval and Web Search	3	BIOE 222A		
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3	BIOE 222B		
CS 348B	Computer Graphics: Image Synthesis Techniques	3-4	CHEMENG 150	Biochemical Engineering	3
CS 348C	Computer Graphics: Animation and Simulation	3	CHEMENG 174	Environmental Microbiology I	3
CS 371	Computational Biology in Four Dimensions	3	APPPHYS 294	Cellular Biophysics	3
CS 374			BIO 104	Advanced Molecular Biology	5
CME 108	Introduction to Scientific Computing	3	BIO 118	Genetic Analysis of Biological Processes	4
EE 180	Digital Systems Architecture	4	BIO 129A		
EE 263	Introduction to Linear Dynamical Systems	3	BIO 129B		
EE 282	Computer Systems Architecture	3	BIO 188		
EE 364A	Convex Optimization I	3	BIO 189		
BIOE 101	Systems Biology	3	BIO 214	Advanced Cell Biology	4
MS&E 152	Introduction to Decision Analysis	3-4	BIO 217		
MS&E 252	Decision Analysis I: Foundations of Decision Analysis	3-4	BIO 230	Molecular and Cellular Immunology	4
STATS 206	Applied Multivariate Analysis	3	CHEM 135		
STATS 315A	Modern Applied Statistics: Learning	2-3	CHEM 171	Physical Chemistry I	4
STATS 315B	Modern Applied Statistics: Data Mining	2-3	BIOC 218		
BMI 231			BIOC 241	Biological Macromolecules	3-5
BMI 260			SBIO 228		
GENE 211	Genomics	3	One course from the following:		
One course from the following:			BIOE 220	Introduction to Imaging and Image-based Human Anatomy	3
CS 145	Introduction to Databases	3-4	BIOE 222A		
CS 147	Introduction to Human-Computer Interaction Design	3-5	BIOE 222B		
CS 221	Artificial Intelligence: Principles and Techniques	3-4	CHEMENG 150	Biochemical Engineering	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4	CHEMENG 174	Environmental Microbiology I	3
CS 229	Machine Learning	3-4	CS 262		
CS 262			CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3	CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CS 273A	The Human Genome Source Code	3	CS 371	Computational Biology in Four Dimensions	3
CS 273B	Deep Learning in Genomics and Biomedicine	3	CS 374		
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4	ME 281	Biomechanics of Movement	3
CS 275	Translational Bioinformatics	4	APPHYS 294		
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3	BIO 104	Advanced Molecular Biology	5
CS 371	Computational Biology in Four Dimensions	3	BIO 112	Human Physiology	4
CS 373	Statistical and Machine Learning Methods for Genomics	3	BIO 118	Genetic Analysis of Biological Processes	4
CS 374			BIO 129A		
EE 263	Introduction to Linear Dynamical Systems	3	BIO 129B		
EE 364A	Convex Optimization I	3	BIO 158	Developmental Neurobiology	4
MS&E 152	Introduction to Decision Analysis	3-4	BIO 183	Theoretical Population Genetics	3
MS&E 252	Decision Analysis I: Foundations of Decision Analysis	3-4	BIO 188		
STATS 206	Applied Multivariate Analysis	3	BIO 189		
			BIO 214	Advanced Cell Biology	4
			BIO 217		
			BIO 230	Molecular and Cellular Immunology	4
			CHEM 135		
			CHEM 171	Physical Chemistry I	4
			BIOC 218		
			BIOC 241	Biological Macromolecules	3-5

DBIO 210	Developmental Biology	4
GENE 211	Genomics	3
SBIO 228		
SURG 101	Regional Study of Human Structure	5

### Computer Engineering Track—

For this track there is a 10 unit minimum for ENGR Fundamentals and a 31 unit minimum for Depth (for track and elective courses)

EE 108 & EE 180	Digital System Design and Digital Systems Architecture	6-8
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Select two of the following: 8

EE 101A	Circuits I	
EE 101B	Circuits II	
EE 102A	Signal Processing and Linear Systems I	
EE 102B	Signal Processing and Linear Systems II	

Satisfy the requirements of one of the following concentrations:

1) Digital Systems Concentration

CS 140	Operating Systems and Systems Programming or CS 140E or C	
EE 109	Digital Systems Design Lab	
EE 271	Introduction to VLSI Systems	

Plus two of the following (6-8 units):

CS 140	Operating Systems and Systems Programming (if not counted above) or CS 140E or C	
CS 144	Introduction to Computer Networking	
CS 149	Parallel Computing	
CS 190	Software Design Studio	
CS 240E		
CS 244	Advanced Topics in Networking	
EE 273	Digital Systems Engineering	
EE 282	Computer Systems Architecture	

2) Robotics and Mechatronics Concentration

CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	
CS 223A	Introduction to Robotics	
ME 210	Introduction to Mechatronics	
ENGR 105	Feedback Control Design	

Plus one of the following (3-4 units):

CS 225A	Experimental Robotics	
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
ENGR 205	Introduction to Control Design Techniques	
ENGR 207B	Linear Control Systems II	

3) Networking Concentration

CS 140 & CS 144	Operating Systems and Systems Programming and Introduction to Computer Networking (CS 140E can substitute for CS 140)	
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Plus three of the following (9-11 units):

CS 240	Advanced Topics in Operating Systems	
CS 240E		
CS 241	Embedded Systems Workshop	
CS 244	Advanced Topics in Networking	
CS 244B	Distributed Systems	
CS 244E		
EE 179	Analog and Digital Communication Systems	

### Graphics Track—

CS 148 & CS 248	Introduction to Computer Graphics and Imaging and Interactive Computer Graphics	8
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Select one of the following: <sup>5</sup> 3-5

CS 205A	Mathematical Methods for Robotics, Vision, and Graphics (strongly recommended as a preferred choice)	
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CME 104	Linear Algebra and Partial Differential Equations for Engineers (Note: students taking CME 104 are also required to take its prerequisite course, CME 102)	
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CME 108	Introduction to Scientific Computing	
MATH 52	Integral Calculus of Several Variables	
MATH 113	Linear Algebra and Matrix Theory	

Select two of the following: 6-8

CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
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or CS 131 Computer Vision: Foundations and Applications

CS 233	Geometric and Topological Data Analysis	
CS 268	Geometric Algorithms	
CS 348A	Computer Graphics: Geometric Modeling & Processing	

CS 348B Computer Graphics: Image Synthesis Techniques

CS 348C Computer Graphics: Animation and Simulation

CS 448 Topics in Computer Graphics

Track Electives: at least two additional courses from the lists above, 6-8 the general CS electives list, or the following: <sup>4</sup>

ARTSTUDI 160 Intro to Digital / Physical Design

ARTSTUDI 170 PHOTOGRAPHY I: BLACK AND WHITE

ARTSTUDI 179 Digital Art I

CME 302 Numerical Linear Algebra

CME 306 Numerical Solution of Partial Differential Equations

EE 168 Introduction to Digital Image Processing

EE 262 Two-Dimensional Imaging

EE 264 Digital Signal Processing

EE 278 Introduction to Statistical Signal Processing

EE 368 Digital Image Processing

ME 101 Visual Thinking

PSYCH 30 Introduction to Perception

PSYCH 221 Image Systems Engineering

### Human-Computer Interaction Track—

CS 147	Introduction to Human-Computer Interaction Design	4
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CS 247	Human-Computer Interaction Design Studio	4
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Any three of the following:

CS 142 Web Applications

CS 148 Introduction to Computer Graphics and Imaging

CS 194H User Interface Design Project

CS 210A Software Project Experience with Corporate Partners

CS 376 Human-Computer Interaction Research

Any CS 377 'Topics in HCI' of three or more units

CS 448B Data Visualization

ME 216M Introduction to the Design of Smart Products

At least two additional courses from above list, the general CS electives list, or the following:<sup>4</sup>

Any d.school class of 3 or more units		3-6	
Any class of 3 or more units at hci.stanford.edu under the 'courses' link			
Communication-			
COMM 121	Behavior and Social Media		
COMM 124	Lies, Trust, and Tech		
or COMM 224	Lies, Trust, and Tech		
COMM 140			
or COMM 240			
COMM 166	Virtual People		
COMM 169			
or COMM 269			
COMM 172	Media Psychology		
or COMM 272	Media Psychology		
COMM 182			
COMM 324	Language and Technology		
Art Studio-			
ARTSTUDI 160	Intro to Digital / Physical Design		
ARTSTUDI 162	Embodied Interfaces		
ARTSTUDI 163	Drawing with Code		
ARTSTUDI 164	DESIGN IN PUBLIC SPACES		
ARTSTUDI 165	Social Media and Performative Practices		
ARTSTUDI 168	Data as Material		
ARTSTUDI 264	Advanced Interaction Design		
ARTSTUDI 266	Sculptural Screens / Malleable Media		
ARTSTUDI 267	Emerging Technology Studio		
Sym Sys-			
SYMSYS 245	Cognition in Interaction Design		
Psychology-			
PSYCH 30	Introduction to Perception		
PSYCH 45	Introduction to Learning and Memory		
PSYCH 70	Self and Society: Introduction to Social Psychology		
PSYCH 75	Introduction to Cultural Psychology		
PSYCH 110			
PSYCH 131			
PSYCH 154	Judgment and Decision-Making		
Empirical Methods-			
MS&E 125	Introduction to Applied Statistics		
PSYCH 252	Statistical Methods for Behavioral and Social Sciences		
PSYCH 254	Affective Neuroscience		
PSYCH 110			
STATS 203	Introduction to Regression Models and Analysis of Variance		
EDUC 191			
HUMBIO 82A	Qualitative Research Methodology		
ME Design-			
ME 101	Visual Thinking		
ME 115A	Introduction to Human Values in Design		
ME 203	Design and Manufacturing		
ME 210	Introduction to Mechatronics		
ME 216A	Advanced Product Design: Needfinding		
Learning Design + Tech-			
EDUC 236	Beyond Bits and Atoms: Designing Technological Tools		

EDUC 281	Technology for Learners
EDUC 239	Educating Young STEM Thinkers
EDUC 338	Innovations in Education
EDUC 342	Child Development and New Technologies
MS&E-	
MS&E 185	Global Work
MS&E 331	
Computer Music-	
MUSIC 220A	Fundamentals of Computer-Generated Sound
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music
MUSIC 220C	Research Seminar in Computer-Generated Music
MUSIC 250A	Physical Interaction Design for Music
MUSIC 256A	Music, Computing, Design I: Art of Design for Computer Music

Optional Elective<sup>4</sup>

### Information Track—

	Units	
CS 124	From Languages to Information	4
CS 145	Introduction to Databases	4
Two courses, from different areas:		6-9
1) Information-based AI applications		
CS 224N	Natural Language Processing with Deep Learning	
CS 224S	Spoken Language Processing	
CS 229	Machine Learning	
CS 233	Geometric and Topological Data Analysis	
CS 234	Reinforcement Learning	
2) Database and Information Systems		
CS 140	Operating Systems and Systems Programming	
or CS 140E	Operating systems design and implementation	
CS 142	Web Applications	
CS 245	Database Systems Principles	
CS 246	Mining Massive Data Sets	
CS 341	Project in Mining Massive Data Sets	
CS 345	(Offered occasionally)	
CS 346		
CS 347		
3) Information Systems in Biology		
CS 262		
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
CS 274	Representations and Algorithms for Computational Molecular Biology	
4) Information Systems on the Web		
CS 224W	Analysis of Networks	
CS 276	Information Retrieval and Web Search	
At least three additional courses from the above areas or the general CS electives list. <sup>4</sup>		

### Systems Track—

	Units	
CS 140	Operating Systems and Systems Programming	4
or CS 140E	Operating systems design and implementation	
Select one of the following:		3-4
CS 143	Compilers	
EE 180	Digital Systems Architecture	
Two additional courses from the list above or the following:		6-8

CS 144	Introduction to Computer Networking	
CS 145	Introduction to Databases	
CS 149	Parallel Computing	
CS 155	Computer and Network Security	
CS 190	Software Design Studio	
CS 240	Advanced Topics in Operating Systems	
CS 242	Programming Languages	
CS 243	Program Analysis and Optimizations	
CS 244	Advanced Topics in Networking	
CS 245	Database Systems Principles	
EE 271	Introduction to VLSI Systems	
EE 282	Computer Systems Architecture	
Track Electives: at least three additional courses selected from the list above, the general CS electives list, or the following: <sup>4</sup>		9-12
CS 240E		
CS 241	Embedded Systems Workshop	
CS 244E		
CS 316	Advanced Multi-Core Systems	
CS 341	Project in Mining Massive Data Sets	
CS 343	(Not given this year)	
CS 344	Topics in Computer Networks (3 or more units, any suffix)	
CS 345	(Advanced Topics in Database Systems - 3 or more units, any suffix)	
CS 346		
CS 347		
CS 349	Topics in Programming Systems (with permission of undergraduate advisor)	
CS 448	Topics in Computer Graphics	
EE 108	Digital System Design	
EE 382C	Interconnection Networks	
EE 384A	Internet Routing Protocols and Standards	
EE 384B	Multimedia Communication over the Internet	
EE 384C	Wireless Local and Wide Area Networks	
EE 384S	Performance Engineering of Computer Systems & Networks	
EE 384X		

**Theory Track—**

CS 154	Introduction to Automata and Complexity Theory	4
Select one of the following:		3
CS 167		
CS 168	The Modern Algorithmic Toolbox	
CS 255	Introduction to Cryptography	
CS 261	Optimization and Algorithmic Paradigms	
CS 264	Beyond Worst-Case Analysis	
CS 265	Randomized Algorithms and Probabilistic Analysis	
CS 268	Geometric Algorithms	
Two additional courses from the list above or the following:		6-8
CS 143	Compilers	
CS 155	Computer and Network Security	
CS 157	Logic and Automated Reasoning	
or PHIL 151	Metalogic	
CS 166	Data Structures	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	

CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 233	Geometric and Topological Data Analysis	
CS 242	Programming Languages	
CS 250	Algebraic Error Correcting Codes	
CS 251	Bitcoin and Crypto Currencies	
CS 254	Computational Complexity	
CS 259	(with permission of undergraduate advisor)	
CS 262		
CS 263	Algorithms for Modern Data Models	
CS 266		
CS 267	Graph Algorithms	
CS 269I	Incentives in Computer Science	
CS 352	Pseudo-Randomness	
CS 354	(Not given this year)	
CS 355	Advanced Topics in Cryptography (Not given this year)	
CS 357	(Not given this year)	
CS 358		
CS 359	Topics in the Theory of Computation (with permission of undergraduate advisor)	
CS 364A		
CS 367	(Not given this year)	
CS 369	Topics in Analysis of Algorithms (with permission of undergraduate advisor)	
CS 374		
MS&E 310	Linear Programming	

Track Electives: at least three additional courses from the lists above, 9-12 the general CS electives list, or the following:<sup>4</sup>

CS 269G	Almost Linear Time Graph Algorithms	
CME 302	Numerical Linear Algebra	
CME 305	Discrete Mathematics and Algorithms	
PHIL 152	Computability and Logic	

**Unspecialized Track—**

CS 154	Introduction to Automata and Complexity Theory	4
Select one of the following:		4
CS 140	Operating Systems and Systems Programming	
or CS 140E	Operating systems design and implementation	
CS 143	Compilers	
One additional course from the list above or the following:		3-4
CS 144	Introduction to Computer Networking	
CS 155	Computer and Network Security	
CS 190	Software Design Studio	
CS 242	Programming Languages	
CS 244	Advanced Topics in Networking	
EE 180	Digital Systems Architecture	
Select one of the following:		3-4
CS 221	Artificial Intelligence: Principles and Techniques	
CS 223A	Introduction to Robotics	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229	Machine Learning	
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
Select one of the following:		3-4
CS 145	Introduction to Databases	

CS 147	Introduction to Human-Computer Interaction Design
CS 148	Introduction to Computer Graphics and Imaging
CS 248	Interactive Computer Graphics
CS 262	
At least two courses from the general CS electives list <sup>4</sup>	

### Individually Designed Track—

Students may propose an individually designed track. Proposals should include a minimum of 25 units and seven courses, at least four of which must be CS courses numbered 100 or above. See Handbook for Undergraduate Engineering Programs for further information.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>)

- <sup>1</sup> MATH 19, MATH 20, and MATH 21 OR MATH 41 and MATH 42 OR AP Calculus Credit may be used as long as at least 26 MATH units are taken. AP Calculus Credit must be approved by the School of Engineering.
- <sup>2</sup> The math electives list consists of: MATH 51, MATH 104, MATH 108, MATH 109, MATH 110, MATH 113; CS 157, CS 205A; PHIL 151; CME 100, CME 102, CME 103 (or EE103), CME 104. Completion of MATH 52 and MATH 53 will together count as one math elective. Restrictions: CS 157 and PHIL 151 may not be used in combination to satisfy the math electives requirement. Students who have taken both MATH 51 and MATH 52 may not count CME 100 as an elective. Courses counted as math electives cannot also count as CS electives, and vice versa.
- <sup>3</sup> The science elective may be any course of 3 or more units from the School of Engineering Science list (Fig. 4-2 in the UGHB), PSYCH 30, or AP Chemistry Credit. Either of the PHYSICS sequences 61/63 or 21/23 may be substituted for 41/43 as long as at least 11 science units are taken. AP Chemistry Credit and AP Physics Credit must be approved by the School of Engineering.
- <sup>4</sup> General CS Electives: CS 108, CS 124, CS 131, CS 140 (or CS 140E), CS 142, CS 143, CS 144, CS 145, CS 147, CS 148, CS 149, CS 154, CS 155, CS 157 (or PHIL 151), CS 164, CS 166, CS 167, CS 168, CS 190, CS 205A, CS 205B, CS 210A, CS 223A, CS 224N, CS 224S, CS 224U, CS 224W, CS 225A, CS 227B, CS 228, CS 229, CS 229T, CS 231A, CS 231B, CS 231M, CS 231N, CS 232, CS 233, CS 234, CS 238, CS 240, CS 240H, CS 242, CS 243, CS 244, CS 244B, CS 245, CS 246, CS 247, CS 248, CS 249A, CS 251, CS 254, CS 255, CS 261, CS 262, CS 263, CS 264, CS 265, CS 266, CS 267, CS 269I, CS 270, CS 272, CS 273A, CS 273B, CS 274, CS 276, CS 279, CS 348B, CS 348C, CS 352; CME 108; EE 180, EE 282, EE 364A.
- <sup>5</sup> CS 205A Mathematical Methods for Robotics, Vision, and Graphics is strongly recommended in this list for the Graphics track. Students taking CME 104 Linear Algebra and Partial Differential Equations for Engineers are also required to take its prerequisite, CME 102 Ordinary Differential Equations for Engineers.
- <sup>6</sup> Independent study projects (CS 191 Senior Project or CS 191W Writing Intensive Senior Project) require faculty sponsorship and must be approved by the adviser, faculty sponsor, and the CS senior project adviser (P. Young). A signed approval form, along with a brief description of the proposed project, should be filed the quarter before work on the project is begun. Further details can be found in the *Handbook for Undergraduate Engineering Programs*.

## Electrical Engineering (EE)

Completion of the undergraduate program in Electrical Engineering leads to the conferral of the Bachelor of Science in Electrical Engineering.

## Mission of the Undergraduate Program in Electrical Engineering

The mission of the undergraduate program of the Department of Electrical Engineering is to augment the liberal education expected of all Stanford undergraduates, to impart basic understanding of electrical engineering and to develop skills in the design and building of systems that directly impact societal needs.

The program includes a balanced foundation in the physical sciences, mathematics and computing; core courses in electronics, information systems and digital systems; and develops specific skills in the analysis and design of systems. Students in the major have broad flexibility to select from disciplinary areas beyond the core, including hardware and software, information systems and science, and physical technology and science, as well as electives in multidisciplinary areas, including bio-electronics and bio-imaging, energy and environment and music.

The program prepares students for a broad range of careers—both industrial and government—as well as for professional and academic graduate education.

## Requirements

	Units
<b>Mathematics</b> <sup>1</sup>	
Select one sequence: May also be satisfied with AP Calculus.	10
MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus
Select one 2-course sequence:	10
CME 100 & CME 102	Vector Calculus for Engineers and Ordinary Differential Equations for Engineers (Same as ENGR 154 and ENGR 155A)
MATH 51 & MATH 53	Linear Algebra and Differential Calculus of Several Variables and Ordinary Differential Equations with Linear Algebra <sup>2</sup>
EE Math. One additional 100-level course. Select one:	3
EE 103	Introduction to Matrix Methods (Preferred)
MATH 113	Linear Algebra and Matrix Theory
CS 103	Mathematical Foundations of Computing
Statistics/Probability. Select one:	3-4
EE 178	Probabilistic Systems Analysis (Preferred)
CS 109	Introduction to Probability for Computer Scientists
<b>Science</b>	
Minimum 12 units	
Select one sequence:	12
PHYSICS 41 & EE 42	Mechanics and Introduction to Electromagnetics and Its Applications <sup>3</sup>
PHYSICS 41 & PHYSICS 43	Mechanics and Electricity and Magnetism <sup>3</sup>
PHYSICS 61 & PHYSICS 63	Mechanics and Special Relativity and Electricity, Magnetism, and Waves
Science elective. One additional 4-5 unit course from approved list in Undergraduate Handbook, Figure 4-2.	4-5
<b>Technology in Society</b>	
One course, see Basic Requirement 4 in the School of Engineering section. The course taken must be on the School of Engineering Approved Courses list, Fig 4-3, the year it is taken.	3-5
<b>Engineering Topics</b>	

Minimum 60 units comprised of: Engineering Fundamentals (minimum 10 units), Core Electrical Engineering Courses (minimum 16 units) Disciplinary Area (minimum 17 units), Electives (maximum 17 units, restrictions apply).

**Engineering Fundamentals**

2 courses required; minimum 10 units

Select one:

CS 106B/ ENGR 70B	Programming Abstractions	5
or CS 106X/ ENGR 70X	Programming Abstractions (Accelerated)	

Choose one Fundamental from the Approved List; Recommended: ENGR 40A and ENGR 40B or ENGR 40M (recommended before taking EE 101A); taking CS 106A or a second ENGR 40-series course not allowed for the Fundamentals elective. Choose from table in Undergraduate Handbook, Approved List.

**Core Electrical Engineering Courses**

EE 100	The Electrical Engineering Profession <sup>4</sup>	
EE 101A	Circuits I	
EE 102A	Signal Processing and Linear Systems I	
EE 108	Digital System Design	
Physics of Electrical Engineering.		4
EE 65	Modern Physics for Engineers <sup>5</sup>	

**Disciplinary Area** 17  
Minimum 17 units, 5 courses: 1-2 Required, 1 WIM/Design and 2-3 disciplinary area electives.

**Writing in the Major (WIM)** 3-5

Select one. A single course can concurrently meet the WIM and Design Requirements.

EE 109	Digital Systems Design Lab (WIM/Design)	
EE 133	Analog Communications Design Laboratory (WIM/Design)	
EE 134	Introduction to Photonics (WIM/Design)	
EE 153	Power Electronics (WIM/Design)	
EE 155	Green Electronics (WIM/Design)	
EE 168	Introduction to Digital Image Processing (WIM/Design)	
EE 191W	Special Studies and Reports in Electrical Engineering (WIM; Department approval required) <sup>6</sup>	
EE 264W	Digital Signal Processing (WIM/Design)	
CS 194W	Software Project (WIM/Design)	

**Design Course** 3-5

Select one. Students may select their Design course from any Disciplinary Area.

EE 109	Digital Systems Design Lab (WIM/Design)	
EE 133	Analog Communications Design Laboratory (WIM/Design)	
EE 134	Introduction to Photonics (WIM/Design)	
EE 153	Power Electronics (WIM/Design)	
EE 155	Green Electronics (WIM/Design)	
EE 168	Introduction to Digital Image Processing (WIM/Design)	
EE 262	Two-Dimensional Imaging (Design)	
EE 264	Digital Signal Processing (Design) <sup>7</sup>	
EE 264W	Digital Signal Processing (WIM/Design)	
EE 267	Virtual Reality (Design) <sup>7</sup>	
CS 194	Software Project (Design)	
CS 194W	Software Project (WIM/Design)	

**Electives** 17

Minimum 17 units. Students may select electives from the disciplinary areas; from the multidisciplinary elective areas; or any combination of disciplinary and multidisciplinary areas. May include up to two additional Engineering Fundamentals, any CS 193 course and any letter graded EE courses (minus any previously noted restrictions). Freshman and Sophomore seminars, EE 191 and CS 106A do not count toward the 60 units. Students may have fewer elective units if they have more units in their disciplinary area.

- <sup>1</sup> Math 41 and Math 42 are no longer offered and have been replaced by Math 19, Math 20, and Math 21.
- <sup>2</sup> MATH 52 may be taken in place of MATH 51. CME 102 can be taken in place of MATH 53.
- <sup>3</sup> EE 42 may be used in place of PHYSICS 43 (if not used in EE electives area). The EE introductory class ENGR 40A and ENGR 40B or ENGR 40M may be taken concurrently with either EE 42 or PHYSICS 43. There are no prerequisites for ENGR 40A and ENGR 40B or ENGR 40M.
- <sup>4</sup> For upper division students, a 200-level seminar in their disciplinary area will be accepted, on petition.
- <sup>5</sup> Students may petition to have either PHYSICS 65 or the combination of PHYSICS 45 and PHYSICS 70 count as an alternative to EE 65.
- <sup>6</sup> EE 191W may satisfy WIM only if it is a follow-up to an REU, independent study project or as part of an honors thesis project where a faculty agrees to provide supervision of writing a technical paper and with suitable support from the Writing Center.
- <sup>7</sup> To satisfy Design, must take EE 264 or EE 267 for 4 units and complete the laboratory project.

**Disciplinary Areas**

		Units
<b>Hardware and Software</b>		
EE 180	Digital Systems Architecture (Required)	4
EE 107	Embedded Networked Systems	3
EE 109	Digital Systems Design Lab (WIM/Design)	4
EE 118	Introduction to Mechatronics	4
EE 155	Green Electronics (Design)	4
EE 213	Digital MOS Integrated Circuits	3
EE 264	Digital Signal Processing (Design)	3-4
EE 264W	Digital Signal Processing	5
EE 267	Virtual Reality	3-4
EE 271	Introduction to VLSI Systems	3
EE 272	Design Projects in VLSI Systems	3-4
EE 273	Digital Systems Engineering	3
EE 282	Computer Systems Architecture	3
EE 285	Embedded Systems Workshop	2
CS 107	Computer Organization and Systems (Required prerequisite for EE 180; CS 107E preferred)	3-5
or CS 107E	Computer Systems from the Ground Up	
CS 108	Object-Oriented Systems Design	3-4
CS 110	Principles of Computer Systems	3-5
CS 131	Computer Vision: Foundations and Applications	3-4
CS 140	Operating Systems and Systems Programming	3-4
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
CS 145	Introduction to Databases	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 155	Computer and Network Security	3
CS 194W	Software Project (WIM/Design)	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4

CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 225A	Experimental Robotics	3
CS 229	Machine Learning	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3-4
CS 231N	Convolutional Neural Networks for Visual Recognition	3-4
CS 241	Embedded Systems Workshop	2
CS 244	Advanced Topics in Networking	3-4

**Information Systems and Science**

EE 102B	Signal Processing and Linear Systems II (Required)	4
EE 103	Introduction to Matrix Methods	3-5
EE 104	Introduction to Machine Learning	3-5
EE 107	Embedded Networked Systems	3
EE 118	Introduction to Mechatronics	4
EE 124	Introduction to Neuroelectrical Engineering	3
EE 133	Analog Communications Design Laboratory (WIM/ Design)	3-4
EE 155	Green Electronics (WIM/Design)	4
EE 168	Introduction to Digital Image Processing (WIM/ Design)	3-4
EE 169	Introduction to Bioimaging	3
EE 179	Analog and Digital Communication Systems	3
EE 261	The Fourier Transform and Its Applications	3
EE 262	Two-Dimensional Imaging (Design)	3
EE 263	Introduction to Linear Dynamical Systems	3
EE 264	Digital Signal Processing (Design)	3-4
EE 264W	Digital Signal Processing (WIM/Design)	5
EE 267	Virtual Reality (Design)	3-4
EE 278	Introduction to Statistical Signal Processing	3
EE 279	Introduction to Digital Communication	3
CS 107	Computer Organization and Systems	3-5
CS 229	Machine Learning	3-4
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3

**Physical Technology and Science**

EE 101B	Circuits II (Required)	4
EE 107	Embedded Networked Systems	3
EE 114	Fundamentals of Analog Integrated Circuit Design	3-4
EE 116	Semiconductor Devices for Energy and Electronics	3
EE 118	Introduction to Mechatronics	4
EE 124	Introduction to Neuroelectrical Engineering	3
EE 133	Analog Communications Design Laboratory (WIM/ Design)	3-4
EE 134	Introduction to Photonics (WIM/Design)	4
EE 136		
EE 142	Engineering Electromagnetics	3
EE 153	Power Electronics (WIM/Design)	3-4
EE 155	Green Electronics (WIM/Design)	4
EE 212	Integrated Circuit Fabrication Processes	3
EE 213	Digital MOS Integrated Circuits	3
EE 214B	Advanced Analog Integrated Circuit Design	3
EE 216	Principles and Models of Semiconductor Devices	3
EE 222	Applied Quantum Mechanics I	3
EE 223	Applied Quantum Mechanics II	3
EE 228	Basic Physics for Solid State Electronics	3

EE 236A	Modern Optics	3
EE 236B	Guided Waves	3
EE 242	Electromagnetic Waves	3
EE 247	Introduction to Optical Fiber Communications	3
EE 267	Virtual Reality (Design)	3-4
EE 271	Introduction to VLSI Systems	3
EE 272	Design Projects in VLSI Systems	3-4
EE 273	Digital Systems Engineering	3
EE 282	Computer Systems Architecture	3
CS 107	Computer Organization and Systems	3-5

**Multidisciplinary Area Electives****Bio-electronics and Bio-imaging**

EE 101B	Circuits II	4
EE 102B	Signal Processing and Linear Systems II	4
EE 107	Embedded Networked Systems	3
EE 124	Introduction to Neuroelectrical Engineering	3
EE 134	Introduction to Photonics (WIM/Design)	4
EE 168	Introduction to Digital Image Processing (WIM/ Design)	4
EE 169	Introduction to Bioimaging	3
EE 225	Biochips and Medical Imaging	3
BIOE 248	Neuroengineering Laboratory	3
BIOE 131	Ethics in Bioengineering	3
MED 275B	Biodesign Fundamentals	4

**Energy and Environment**

EE 101B	Circuits II	4
EE 103	Introduction to Matrix Methods	3-5
EE 116	Semiconductor Devices for Energy and Electronics	3
EE 134	Introduction to Photonics (WIM/Design)	4
EE 151	Sustainable Energy Systems	3
EE 153	Power Electronics (WIM/Design)	3-4
EE 155	Green Electronics (WIM/Design)	4
EE 168	Introduction to Digital Image Processing (WIM/ Design)	3-4
EE 180	Digital Systems Architecture	4
EE 263	Introduction to Linear Dynamical Systems	3
EE 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
EE 293B	Fundamentals of Energy Processes	3
CEE 107A	Understanding Energy (Formerly CEE 173A)	3-5
CEE 155	Introduction to Sensing Networks for CEE	3-4
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3
MATSCI 142	Quantum Mechanics of Nanoscale Materials (Formerly MATSCI 157)	4
MATSCI 152	Electronic Materials Engineering	4
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ME 185	Electric Vehicle Design	3
ME 227	Vehicle Dynamics and Control	3
ME 271E	Aerial Robot Design	3

**Music**

EE 102B	Signal Processing and Linear Systems II	4
EE 109	Digital Systems Design Lab (WIM/Design)	4
EE 264	Digital Signal Processing (Design)	3-4

EE 264W	Digital Signal Processing (WIM/Design)	5
MUSIC 250A	Physical Interaction Design for Music	3-4
MUSIC 250B	Interactive Sound Art	1-4
MUSIC 256A	Music, Computing, Design I: Art of Design for Computer Music	3-4
MUSIC 256B	Music, Computing, Design II: Virtual and Augmented Reality for Music	3-4
MUSIC 257	Neuroplasticity and Musical Gaming	3-5
MUSIC 320A	Introduction to Audio Signal Processing Part I: Spectrum Analysis	3-4
MUSIC 320B	Introduction to Audio Signal Processing Part II: Digital Filters	3-4
MUSIC 420A	Signal Processing Models in Musical Acoustics <sup>1</sup>	3-4
MUSIC 421A	Audio Applications of the Fast Fourier Transform <sup>1</sup>	3-4
MUSIC 422	Perceptual Audio Coding <sup>1</sup>	3
MUSIC 424	Signal Processing Techniques for Digital Audio Effects <sup>1</sup>	3-4

<sup>1</sup> Best taken as a coterm student.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

## Engineering Physics (EPHYS)

Completion of the undergraduate program in Engineering Physics leads to the conferral of the Bachelor of Science in Engineering. The subplan "Engineering Physics" appears on the transcript and on the diploma.

### Mission of the Undergraduate Program in Engineering Physics

The mission of the undergraduate program in Engineering Physics is to provide students with a strong foundation in physics and mathematics, together with engineering and problem-solving skills. All majors take high-level math and physics courses as well as engineering courses. This background prepares them to tackle complex problems in multidisciplinary areas that are at the forefront of 21st-century technology such as aerospace physics, biophysics, computational science, quantum science & engineering, materials science, nanotechnology, electromechanical systems, energy systems, renewable energy, and any other engineering field that requires a solid background in physics. Because the program emphasizes science, mathematics, and engineering, students are well prepared to pursue graduate work in engineering, physics, or applied physics.

### Requirements

#### Mathematics

Select one of the following sequences: 10

MATH 51 & MATH 52	Linear Algebra and Differential Calculus of Several Variables and Integral Calculus of Several Variables	
CME 100 & CME 104	Vector Calculus for Engineers and Linear Algebra and Partial Differential Equations for Engineers	
MATH 53 or CME 102	Ordinary Differential Equations with Linear Algebra	5
MATH 131P	Ordinary Differential Equations for Engineers	
MATH 131P	Partial Differential Equations (or CME 204 or MATH 173 or MATH 220 or PHYSICS 111)	3

#### Science

PHYSICS 41	Mechanics (or PHYSICS 61)	4
PHYSICS 42	Classical Mechanics Laboratory (or PHYSICS 62)	1
PHYSICS 43	Electricity and Magnetism (or PHYSICS 63)	4
PHYSICS 67	Introduction to Laboratory Physics <sup>1</sup>	2

PHYSICS 45	Light and Heat (or PHYSICS 65)	4
PHYSICS 46	Light and Heat Laboratory (or PHYSICS 67)	1
PHYSICS 70	Foundations of Modern Physics (if taking the 40 series)	4

#### Technology in Society

One course required; course must be on the School of Engineering Approved List, Fig 4-3 in the UGHB, the year it is taken. See Basic Requirement 4.

#### Engineering Fundamentals

Two courses minimum (CS 106A or X recommended) <sup>2</sup> 6-10

#### Engineering Physics Depth (core)

Advanced Mathematics:

One advanced math elective such as 3-5

EE 261	The Fourier Transform and Its Applications	
PHYSICS 112	Mathematical Methods for Physics	
CS 109	Introduction to Probability for Computer Scientists	
CME 106	Introduction to Probability and Statistics for Engineers	

Also qualified are EE 263, any Math or Statistics course numbered 100 or above, and any CME course numbered 200 or above, except CME 206.

Advanced Mechanics: 3-4

AA 242A	Classical Dynamics (or ME 333 or PHYSICS 110)	3
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Intermediate Electricity and Magnetism 6-8

Select one of the following sequences:

PHYSICS 120	Intermediate Electricity and Magnetism I & PHYSICS 121 and Intermediate Electricity and Magnetism II	
EE 142 & EE 242	Engineering Electromagnetics and Electromagnetic Waves	

Numerical Methods

Select one of the following: 3-4

APPPHYS 215	Numerical Methods for Physicists and Engineers	
CME 108	Introduction to Scientific Computing	
CME 206/ ME 300C	Introduction to Numerical Methods for Engineering	
PHYSICS 113	Computational Physics	

#### Electronics Lab

Select one of the following: 3-5

ENGR 40A & ENGR 40B	Introductory Electronics and Introductory Electronics Part II (ENGR 40A alone is not allowed)	
EE 101B	Circuits II	
EE 122A		
PHYSICS 105	Intermediate Physics Laboratory I: Analog Electronics	
APPPHYS 207	Laboratory Electronics	

#### Writing in the Major (WIM)

Select one of the following: 4-5

AA 190	Directed Research and Writing in Aero/Astro (for Aerospace specialty only)	
ENGR 199W	Writing of Original Research for Engineers (for students pursuing an independent research project)	
BIOE 131	Ethics in Bioengineering (for Biophysics specialty only)	
CS 181W	Computers, Ethics, and Public Policy (for Computational Science specialty only)	
EE 134	Introduction to Photonics (for Photonics specialty only)	



EE 155	Green Electronics (for Renewable Energy specialty only)	
ME 112	Mechanical Systems Design (for Electromechanical System Design specialty only)	
ME 131A & ME 140	Heat Transfer and Advanced Thermal Systems (for Energy Systems specialty only)	
MATSCI 161	Energy Materials Laboratory (Okay for Materials Science and Renewable Energy specialties)	
MATSCI 164	Electronic and Photonic Materials and Devices Laboratory (Okay for Materials Science and Renewable Energy specialties)	
PHYSICS 107	Intermediate Physics Laboratory II: Experimental Techniques and Data Analysis (for Photonics or other specialty)	
<b>Quantum Mechanics</b>		
Select one of the following sequences:		6-8
EE 222 & EE 223	Applied Quantum Mechanics I and Applied Quantum Mechanics II	
PHYSICS 130 & PHYSICS 131	Quantum Mechanics I and Quantum Mechanics II	
<b>Thermodynamics and Statistical Mechanics</b>		
PHYSICS 170 & PHYSICS 171	Thermodynamics, Kinetic Theory, and Statistical Mechanics I and Thermodynamics, Kinetic Theory, and Statistical Mechanics II	3-8
or ME 346A	Introduction to Statistical Mechanics	
<b>Design Course</b>		
Select one of the following:		3-4
AA 236A	Spacecraft Design	
CS 108	Object-Oriented Systems Design	
EE 133	Analog Communications Design Laboratory	
ME 203	Design and Manufacturing	
ME 210	Introduction to Mechatronics	
PHYSICS 108	Advanced Physics Laboratory: Project	
<b>Specialty Tracks</b>		
See Undergraduate Engineering Handbook for important details. Select three courses from one specialty area:		9-12
<b>Aerospace Physics:</b>		
AA 203	Introduction to Optimal Control and Dynamic Optimization	
AA 244A	Introduction to Plasma Physics and Engineering	
AA 251	Introduction to the Space Environment	
AA 279A	Space Mechanics	
ME 161	Dynamic Systems, Vibrations and Control	
<b>Materials Science:</b>		
Any MATSCI courses numbered 151 to 199 (except 159Q) or PHYSICS 172		
<b>Electromechanical System Design:</b>		
ME 80	Mechanics of Materials	
ME 112	Mechanical Systems Design	
ME 210 or EE 118	Introduction to Mechatronics	
<b>Energy Systems:</b>		
ME 131A	Heat Transfer	
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	
ME 140	Advanced Thermal Systems	
<b>Renewable Energy:</b>		
CEE 176B	Electric Power: Renewables and Efficiency	

EE 153	Power Electronics	
EE 155	Green Electronics	
EE 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	
EE 293B	Fundamentals of Energy Processes	
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	
MATSCI 302	Solar Cells	
MATSCI 316	Nanoscale Science, Engineering, and Technology	
ME 260	Fuel Cell Science and Technology	
<b>Biophysics:</b>		
APPPHYS 205	Introduction to Biophysics	
BIO 132	Advanced Imaging Lab in Biophysics	
BIOE 41		
BIOE 42	Physical Biology	
BIOE 44	Fundamentals for Engineering Biology Lab	
BIOE 101	Systems Biology	
BIOE 103	Systems Physiology and Design	
BIOE 123	Biomedical System Prototyping Lab	
BIOE 211	Biophysics of Multi-cellular Systems and Amorphous Computing	
BIOE 214	Representations and Algorithms for Computational Molecular Biology	
EE 169 or EE 369A	Introduction to Bioimaging Medical Imaging Systems I	
<b>Computational Science:</b>		
CME 212	Advanced Software Development for Scientists and Engineers	
CME 215A	Advanced Computational Fluid Dynamics	
CME 215B	Advanced Computational Fluid Dynamics	
Any CME course with course number greater than 300 and less than 390		
CS 103	Mathematical Foundations of Computing	
CS 154	Introduction to Automata and Complexity Theory	
CS 161	Design and Analysis of Algorithms	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	
CS 205B	Mathematical Methods for Fluids, Solids, and Interfaces	
CS 221	Artificial Intelligence: Principles and Techniques	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229	Machine Learning	
STATS 202	Data Mining and Analysis	
STATS 213	Introduction to Graphical Models	
<b>Quantum Science &amp; Engineering</b>		
APPPHYS 203	Atoms, Fields and Photons	
APPPHYS 225	Probability and Quantum Mechanics	
APPPHYS 383	Introduction to Atomic Processes	
CS 254	Computational Complexity	
EE 234	Photonics Laboratory	
EE 236C	Lasers	
EE 243	Semiconductor Optoelectronic Devices	
EE 340	Optical Micro- and Nano-Cavities	
PHYSICS 134	Advanced Topics in Quantum Mechanics	
PHYSICS 230	Graduate Quantum Mechanics I	
PHYSICS 231	Graduate Quantum Mechanics II	

**PHYSICS 282 Introduction to Modern Atomic Physics and Quantum Optics**

Total Units 93-119

- <sup>1</sup> PHYSICS 67 Introduction to Laboratory Physics (2 units), recommended in place of PHYSICS 44 Electricity and Magnetism Lab
- <sup>2</sup> The Engineering Fundamental courses are to be selected from the Basic Requirements 3 list. Fundamentals courses acceptable for the core program may also be used to satisfy the fundamentals requirement as long as 45 unduplicated units of Engineering are taken.
- <sup>3</sup> Although not required, PHYSICS 59 (<https://explorecourses.stanford.edu/search?view=catalog&filter=coursestatus-Active=on&page=0&catalog=&academicYear=&q=physics59&collapse=>) Frontiers in Physics Research, 1 unit) and PHYSICS 91SI (<https://explorecourses.stanford.edu/search?view=catalog&filter=coursestatus-Active=on&page=0&catalog=&academicYear=&q=physics91si&collapse=>) Practical Computing for Scientists, 2 units) are highly recommended.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

**Honors Program**

The School of Engineering offers a program leading to a Bachelor of Science in Engineering: Engineering Physics with Honors.

**Honors Criteria**

- 1. Minimum overall GPA of 3.5.
- 2. Independent research conducted at an advanced level with a faculty research adviser and documented in an honors thesis. The honors candidate must identify a faculty member who will serve as his or her honors research adviser and a second reader who will be asked to read the thesis and give feedback before endorsing the thesis. One of the two must be a member of the Academic Council and in the School of Engineering.

*Application:* The deadline to apply is October 15 in Autumn Quarter of the senior year. The application documents should be submitted to the Student Services Officer. Applications are reviewed by a subcommittee of the faculty advisers for Engineering Physics majors. Applicants and thesis advisers receive written notification when the application is approved. An application consists of three items:

- 1. One-page description of the research topic
- 2. Application form ([http://www.stanford.edu/group/ughb/2011-12/2012-13/EPhysHonorsReq\\_App\\_2012.doc](http://www.stanford.edu/group/ughb/2011-12/2012-13/EPhysHonorsReq_App_2012.doc)) signed by the honors thesis adviser
- 3. Unofficial Stanford transcript

**Requirements and Timeline for Honors in Engineering Physics:**

- 1. Declare the honors program in Axess (ENGR-BSH, Subplan: Engineering Physics)
- 2. Obtain application form from the student services officer.
- 3. Apply to honors program by October 15 in the Autumn Quarter of the senior year.
- 4. Maintain an overall GPA of at least 3.5.
- 5. Optional: Under direction of the thesis adviser, students may enroll for research units in ENGR 199(W) or in departmental courses such as AA 190 or ME 191(H).
- 6. Submit a completed thesis draft to the research adviser and second reader by April 15.

- 7. Present the thesis work in an oral presentation or poster session in an appropriate forum (e.g., an event that showcases undergraduate research and is organized by the department of the adviser, the school of the adviser, or the University).
- 8. Incorporate feedback, which the adviser and second reader should provide by April 30, and obtain final endorsement signatures from the thesis adviser and second reader by May 15.
- 9. Submit one signed, single-sided copy to the student services officer by May 15. Students are sent email instructions on how to archive a permanent electronic copy in Terman Engineering library.

**Environmental Systems Engineering (EnvSE)**

Completion of the undergraduate program in Environmental Systems Engineering leads to the conferral of the Bachelor of Science in Environmental Systems Engineering.

**Mission of the Undergraduate Program in Environmental Systems Engineering**

The mission of the undergraduate program in Environmental Systems Engineering is to prepare students for incorporating environmentally sustainable design, strategies and practices into natural and built systems and infrastructure involving buildings, water supply, and coastal regions. Courses in the program are multidisciplinary in nature, combining math/science/engineering fundamentals, and tools and skills considered essential for an engineer, along with a choice of one of three focus areas for more in-depth study: coastal environments, freshwater environments, or urban environments. This major offers the opportunity for a more focused curriculum than the Environmental and Water Studies concentration in the Civil Engineering degree program. The program of study, which includes a capstone experience, aims to equip engineering students to take on the complex challenges of the twenty-first century involving natural and built environments, in consulting and industry as well as in graduate school.

**Requirements**

**Mathematics and Science**

See Basic Requirement 1 and 2 <sup>1</sup> 36

**Technology in Society (TiS)**

One 3-5 unit course required, course chosen must be on the SoE Approved Courses list at <[ughb.stanford.edu](http://ughb.stanford.edu)> the year taken; see Basic Requirement 4 3-5

**Engineering Fundamentals**

Two courses minimum (see Basic Requirement 3), including:  
ENGR 70A Programming Methodology 5  
(or ENGR 70X)

ENGR 14 Intro to Solid Mechanics 3

**Fundamental Tools/Skills** <sup>2</sup> 9

in visual, oral/written communication, and modeling/analysis

**Specialty Courses, in either** 37

Coastal environments (see below)

or freshwater environments (see below)

or urban environments (see below)

**Total Units** 96-100

- <sup>1</sup> Math must include CME 100 Vector Calculus for Engineers (or MATH 51 Linear Algebra and Differential Calculus of Several Variables), and either a Probability/Statistics course or CME 102 Ordinary Differential Equations for Engineers (or MATH 53 Ordinary Differential Equations with Linear Algebra). Science must include PHYSICS 41 Mechanics; and either CHEM 31B Chemical Principles II or CHEM 31X Chemical Principles Accelerated (or PHYSICS 43 Electricity and Magnetism, for Urban focus area only).
- <sup>2</sup> Fundamental tools/skills must include:
1. CEE 1 Introduction to Environmental Systems Engineering ;
  2. at least one visual communication class from CEE 31 Accessing Architecture Through Drawing / CEE 31Q Accessing Architecture Through Drawing, CEE 133F Principles of Freehand Drawing, ME 101 Visual Thinking, ME 110 Design Sketching, ARTSTUDI 160 Intro to Digital / Physical Design, or OSPPARIS 44 EAP: Analytical Drawing and Graphic Art;
  3. at least one oral/written communication class from ENGR 103 Public Speaking, ENGR 102W Writing for Engineers, ENGR 202W Technical Writing, CEE 151 Negotiation, CEE 175P Persuasive Communication for Environmental Scientists, Practitioners, and Entrepreneurs, EARTHSYS 191 Concepts in Environmental Communication or EARTHSYS 200 Environmental Communication in Action: The SAGE Project;
  4. at least one modeling/analysis class from CEE 101D Computations in Civil and Environmental Engineering (or CEE 101S) if not counted as Math, CEE 120A Building Information Modeling Workshop (or CEE 120S Building Information Modeling Special Study), CEE 155 Introduction to Sensing Networks for CEE, CEE 226 Life Cycle Assessment for Complex Systems, CME 211 Software Development for Scientists and Engineers, CS 102 Big Data: Tools and Techniques, Discoveries and Pitfalls, EARTHSYS 142 Remote Sensing of Land, EARTHSYS 144 Fundamentals of Geographic Information Science (GIS), EARTHSYS 211 Fundamentals of Modeling, or ENGR 150 Data Challenge Lab.

### Urban Environments Focus Area (37 units)

#### Required

CEE 100	Managing Sustainable Building Projects	4
CEE 101B	Mechanics of Fluids	4
CEE 146S	Engineering Economics and Sustainability	3
CEE 176A	Energy Efficient Buildings	3-4

Electives (at least two of the 4 areas below must be included)

#### Building Systems

CEE 102	Legal Principles in Design, Construction, and Project Delivery	3
CEE 130	Architectural Design: 3-D Modeling, Methodology, and Process	5
CEE 156	Building Systems	4
CEE 161C	Natural Ventilation of Buildings	3

#### Energy Systems

CEE 107A	Understanding Energy	4-5
CEE 176B	Electric Power: Renewables and Efficiency	3-4
EE 151	Sustainable Energy Systems	3
ENERGY 171	Energy Infrastructure, Technology and Economics	3

or

ENERGY 191	Optimization of Energy Systems	3-4
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#### Water Systems

CEE 165C	Water Resources Management	3
CEE 166A	Watersheds and Wetlands	4
CEE 166B	Floods and Droughts, Dams and Aqueducts	4
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3

#### Urban Planning, Design, Analysis

CEE 6	Physics of Cities	3
CEE 171	Environmental Planning Methods	3

or

CEE 265E	Adaptation to Sea Level Rise and Extreme Weather Events	3
CEE 177L	Smart Cities & Communities	3
URBANST 113	Introduction to Urban Design: Contemporary Urban Design in Theory and Practice	5
or		
URBANST 164	Sustainable Cities	4-5
or		
URBANST 165	Sustainable Urban and Regional Transportation Planning	4-5
<b>Capstone (one class required)</b>		
CEE 112A	Industry Applications of Virtual Design & Construction	3-4
CEE 122A	Computer Integrated Architecture/Engineering/Construction	2
CEE 122B	Computer Integrated A/E/C	2
CEE 126	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
CEE 131D	Urban Design Studio	5
CEE 141A	Infrastructure Project Development	3
CEE 141B	Infrastructure Project Delivery	3
CEE 224X	Disasters, Decisions, Development in Sustainable Urban Systems (CEE)	3-5
CEE 224Y	Sustainable Urban Systems Project	3-5
CEE 224Z	Sustainable Urban Systems Project	3-5
CEE 226E	Advanced Topics in Integrated, Energy-Efficient Building Design	3
CEE 243	Intro to Urban Sys Engrg	3
CEE 199	Undergraduate Research in Civil and Environmental Engineering	3-4

### Freshwater Environments Focus Area (37 units)

#### Required

CEE 70	Environmental Science and Technology	3
(if not counted as 3rd Engineering fundamental)		
CEE 101B	Mechanics of Fluids	4
CEE 177	Aquatic Chemistry and Biology	4
CEE 166A	Watersheds and Wetlands	4
or		
CEE 174A	Providing Safe Water for the Developing and Developed World	3

#### Electives

CEE 162E	Rivers, Streams, and Canals	3
CEE 165C	Water Resources Management	3
CEE 166A	Watersheds and Wetlands (if not counted as a req'd course)	4
CEE 166B	Floods and Droughts, Dams and Aqueducts	4
CEE 166D	Water Resources and Water Hazards Field Trips	2
CEE 171	Environmental Planning Methods	3
or		
CEE 265E	Adaptation to Sea Level Rise and Extreme Weather Events	3
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 179A	Water Chemistry Laboratory	3
CEE 265A	Sustainable Water Resources Development	3
CEE 265D	Water and Sanitation in Developing Countries	3

BIOHOPK 150H	Ecological Mechanics	3
GEOPHYS 191	Observing Freshwater	3
GS 130	Soil Physics and Hydrology	3
OSPAUSTL 25	Freshwater Systems	3
<b>Capstone (1 class required)</b>		
CEE 126	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
CEE 141A	Infrastructure Project Development	3
CEE 169	Environmental and Water Resources Engineering Design	5
CEE 179C	Environmental Engineering Design	5
CEE 224X	Disasters, Decisions, Development in Sustainable Urban Systems (CEE)	1-5
CEE 224Y	Sustainable Urban Systems Project	3-5
CEE 224Z	Sustainable Urban Systems Project	3-5
CEE 199	Undergraduate Research in Civil and Environmental Engineering	3-4

### Coastal Environments Focus Area (37 units) Required

CEE 70	Environmental Science and Technology (if not counted as 3rd Engineering fundamental)	3
CEE 101B	Mechanics of Fluids	4
CEE 162F	Coastal Engineering	3
CEE 175A	California Coast: Science, Policy, and Law	3-4

### Electives

CEE 162I	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
CEE 166A	Watersheds and Wetlands	4
CEE 166B	Floods and Droughts, Dams and Aqueducts	4
CEE 171	Environmental Planning Methods	3
or		
CEE 265E	Adaptation to Sea Level Rise and Extreme Weather Events	3
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 177	Aquatic Chemistry and Biology	4
CEE 272	Coastal Contaminants	3-4
BIO 30	Ecology for Everyone	4
or		
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems	5
or		
EARTHSYS 116	Ecology of the Hawaiian Islands	4
or		
OSPAUSTL 10	Coral Reef Ecosystems	3
or		
ESS 8	The Oceans: An Introduction to the Marine Environment	4
or		
BIOHOPK 182H	Stanford at Sea	16
EARTHSYS 141	Remote Sensing of the Oceans	3-4
EARTHSYS 151	Biological Oceanography	3-4
to be taken concurrently with		
EARTHSYS 152	Marine Chemistry	3-4
<b>Capstone (1 class required)</b>		
CEE 126	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5

CEE 141A	Infrastructure Project Development	3
CEE 169	Environmental and Water Resources Engineering Design	5
CEE 179C	Environmental Engineering Design	5
CEE 224X	Disasters, Decisions, Development in Sustainable Urban Systems (CEE)	3-5
CEE 224Y	Sustainable Urban Systems Project	3-5
CEE 224Z	Sustainable Urban Systems Project	3-5
BIOHOPK 168H	Disease Ecology: from parasites evolution to the socio-economic impacts of pathogens on nations	3
CEE 199	Undergraduate Research in Civil and Environmental Engineering	3-4

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

## Individually Designed Majors in Engineering (IDMENS)

Completion of the undergraduate program in Individually Designed Majors in Engineering (IDMEN) leads to the conferral of the Bachelor of Science in an Individually Designed Major: (approved title). The approved title of the IDMEN also appears on the transcript.

### Mission of the Undergraduate Program in Individually Designed Majors in Engineering

The mission of the undergraduate program in Individually Designed Majors in Engineering (IDMEN) is to provide students with an understanding of engineering principles and the analytical and problem solving, design, and communication skills necessary to be successful in the field. The B.S. for IDMENS is intended for undergraduates interested in pursuing engineering programs that, by virtue of their focus and intellectual content, cannot be accommodated by existing departmental majors or the pre-approved School of Engineering majors. Core courses in the curriculum include engineering fundamentals, mathematics, technology in society, and the sciences. Students then take additional courses pertinent to their IDMEN major. The program prepares students for careers in government and the corporate sector, and for graduate study.

### B.S. in Individually Designed Majors in Engineering

The B.S. degree for IDMENS is intended for undergraduates interested in pursuing engineering programs that, by virtue of their focus and intellectual content, cannot be accommodated by existing departmental majors or the pre-approved School of Engineering majors. IDMEN curricula are designed by students with the assistance of two faculty advisers of their choice and are submitted to the Undergraduate Council's Subcommittee on Individually Designed Majors. The degree conferred is "Bachelor of Science in Individually Designed Major in Engineering: (approved title)."

Students must submit written proposals to the IDMEN subcommittee detailing their course of study. Programs must meet the following requirements: mathematics (21 units minimum, see Basic Requirement 1 in right sidebar); science (17 units minimum, see Basic Requirement 2); a Technology in Society (one course from School of Engineering Approved Courses list; the course must be on the list the year it is taken; see Basic Requirement 4); at least two Engineering Fundamentals courses, see Basic Requirement 3 for a list of courses; a minimum of 34 units of engineering depth courses, including a capstone depth course with content relevant to proposed goals; and sufficient relevant additional course work to bring the total number of units to at least 90 and at most 107. Students may take additional courses pertinent to their IDMEN major, but the IDMEN proposal itself may not exceed 107 units. Students are responsible for completing the prerequisites for all courses included in their majors.

Each proposal should begin with a statement describing the proposed major. In the statement, the student should make clear the motivation for and goal of the major, and indicate how it relates to her or his projected career plans. The statement should specify how the courses to be taken relate to and move the student toward realizing the major's goal. A proposed title for the major should be included. The title approved by the IDMEN Subcommittee is listed on the student's official University transcript and on the diploma in this form: "Individually Designed Major in Subplan", where "Subplan" is the title approved by the IDMEN Subcommittee.

The proposal statement should be followed by a completed Program Sheet listing all the courses comprising the student's IDMEN curriculum, organized by the five categories printed on the sheet (mathematics, science, technology in society, engineering fundamentals, and engineering depth). Normally, the courses selected should comprise a well-coordinated sequence or sequences that provide mastery of important principles and techniques in a well-defined field. In some circumstances, especially if the proposal indicates that the goal of the major is to prepare the student for graduate work outside of engineering, a more general engineering program may be appropriate. A four-year study plan, showing courses to be taken each quarter, should also be included in the student's IDMEN proposal.

The proposal must be signed by two faculty members who certify that they endorse the major as described in the proposal and that they agree to serve as the student's permanent advisers. One of the faculty members, who must be a member of the School of Engineering and of the Academic Council, acts as the student's primary adviser. The proposal must be accompanied by a statement from that person giving an appraisal of the academic value and viability of the proposed major.

Students proposing IDMENs must have at least four quarters of undergraduate work remaining at Stanford after the quarter in which their proposals are first submitted. Any changes in a previously approved major must be endorsed by the advisers and re-approved by the IDMEN subcommittee. A request by a student to make changes in her or his approved curriculum must be made sufficiently far in advance so that, should the request be denied, adequate time remains to complete the original, approved curriculum. Proposals are reviewed and acted upon once a quarter. Planning forms may be obtained from the Handbook for Undergraduate Engineering Programs at <http://ughb.stanford.edu>. Completed proposals should be submitted to Darlene Lazar in the Office of Student Affairs, Huang Engineering Center, Suite 135. An IDMEN cannot be a student's secondary major.

## Management Science and Engineering (MS&E)

Completion of the undergraduate program in Management Science and Engineering leads to the conferral of the Bachelor of Science in Management Science and Engineering.

### Requirements

#### Mathematics and Science

All required; see SoE Basic Requirements 1 and 2 <sup>1</sup> 23

CME 100 Vector Calculus for Engineers  
or MATH 51 Linear Algebra and Differential Calculus of Several Variables

CME 103 Introduction to Matrix Methods

MS&E 120 Probabilistic Analysis

MS&E 121 Introduction to Stochastic Modeling

MS&E 125 Introduction to Applied Statistics

Select one of the following sequences: 8

CHEM 31B & CHEM 33	Chemical Principles II and Structure and Reactivity of Organic Molecules	
CHEM 31X & CHEM 33	Chemical Principles Accelerated and Structure and Reactivity of Organic Molecules	
PHYSICS 21 & PHYSICS 23	Mechanics, Fluids, and Heat and Electricity, Magnetism, and Optics	
PHYSICS 22	and Mechanics, Fluids, and Heat Laboratory	
PHYSICS 24	Electricity, Magnetism, and Optics Laboratory	
PHYSICS 41 & PHYSICS 43	Mechanics and Electricity and Magnetism	
Up to ten units of AP/IB Calculus, MATH 19, 20, 21, 41, or 42.		10
Math, Science, or Statistics Elective from SoE approved lists. <sup>1</sup>		3
<b>Technology in Society</b>		
Select one of the following; see SoE Basic Requirement 4		3-5
AA 252	Techniques of Failure Analysis	
COMM 120W	Digital Media in Society	
CS 181	Computers, Ethics, and Public Policy	
ENGR 131	Ethical Issues in Engineering	
ENGR 311C		
ME 267	Ethics and Equity in Transportation Systems	
MS&E 193	Technology and National Security	
STS 1	The Public Life of Science and Technology	
<b>Engineering Fundamentals</b> <sup>2</sup>		
Two courses; see SoE Basic Requirement 3		8-10
CS 106A	Programming Methodology <sup>3</sup>	
Select one of the following:		
ENGR 10	Introduction to Engineering Analysis	
ENGR 14	Intro to Solid Mechanics	
ENGR 15	Dynamics	
ENGR 20	Introduction to Chemical Engineering	
ENGR 25B	Biotechnology	
ENGR 21	Engineering of Systems	
ENGR 25E	Energy: Chemical Transformations for Production, Storage, and Use	
ENGR 40	Introductory Electronics	
ENGR 40A	Introductory Electronics	
ENGR 40M	An Intro to Making: What is EE	
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	
ENGR 50E	Introduction to Materials Science, Energy Emphasis	
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis	
ENGR 80	Introduction to Bioengineering (Engineering Living Matter)	
ENGR 90	Environmental Science and Technology	
<b>Engineering Depth</b> <sup>2</sup>		
Core Courses (all six required)		25-27
CS 106B or CS 106X	Programming Abstractions and Programming Abstractions (Accelerated)	
ECON 50	Economic Analysis I	
MS&E 108	Senior Project (WIM)	
MS&E 111 or MS&E 111X	Introduction to Optimization <sup>4</sup> and Introduction to Optimization (Accelerated)	
MS&E 140 or MS&E 140X	Accounting for Managers and Entrepreneurs and Financial Accounting Concepts and Analysis	
MS&E 180	Organizations: Theory and Management	
Area Courses (see below)		27

Choose four or five courses (minimum 15 units) from a primary area and two courses (minimum 6 units) from each of the other two areas.

## Depth Areas

### Finance and Decision Area

Students choosing F&D as their primary area must take at least two of ECON 51, MS&E 145 (or 245A), and MS&E 152 (or 252), as part of their 15 units

Introductory (no prerequisites)

MS&E 147 Finance and Society for non-MBAs

MS&E 152 Introduction to Decision Analysis

Intermediate (has prerequisites and/or appropriate for juniors and seniors)

MS&E 145 Introduction to Investment Science

MS&E 146 Corporate Financial Management

MS&E 252 Decision Analysis I: Foundations of Decision Analysis

Advanced (intended primarily for graduate students, but may be taken by advanced undergraduates)

MS&E 245A Investment Science

MS&E 245B Advanced Investment Science

MS&E 246 Financial Risk Analytics

MS&E 250A Engineering Risk Analysis

MS&E 250B Project Course in Engineering Risk Analysis

### Operations and Analytics Area

Students choosing O&A as their primary area may also include CS 161, CS 229, and STATS 202 in their selections<sup>4</sup>

Methods

MS&E 112 Mathematical Programming and Combinatorial Optimization

MS&E 135 Networks

MS&E 213 Introduction to Optimization Theory

MS&E 223 Simulation

MS&E 226 "Small" Data

MS&E 231 Introduction to Computational Social Science

MS&E 237 Networks, Markets, and Crowds

MS&E 251 Introduction to Stochastic Control with Applications

Applications

MS&E 130 Information Networks and Services

MS&E 233 Networked Markets

MS&E 234 Data Privacy and Ethics

MS&E 235 Network Analytics

MS&E 260 Introduction to Operations Management

MS&E 262 Supply Chain Management

MS&E 263 Healthcare Operations Management

MS&E 267 Service Operations and the Design of Marketplaces

MS&E 330 Law, Order & Algorithms

### Organizations, Technology, and Policy Area

Students choosing OT&P as their primary area must take at least two of ENGR 145, MS&E 175, MS&E 184, and MS&E 185 as part of their 15 units

Introductory (no prerequisites)

ENGR 131 Ethical Issues in Engineering<sup>4</sup>

MS&E 190 Methods and Models for Policy and Strategy Analysis

Units  
6-15

MS&E 193 Technology and National Security<sup>4</sup>

Advanced (has prerequisites and/or appropriate for juniors and seniors)

ENGR 145 Technology Entrepreneurship

MS&E 175 Innovation, Creativity, and Change

or MS&E 177 Creativity Rules

MS&E 183 Leadership in Action

MS&E 184 Future of Work: Issues in Organizational Learning and Design

MS&E 185 Global Work

MS&E 188 Organizing for Good

MS&E 243 Energy and Environmental Policy Analysis

MS&E 292 Health Policy Modeling

MS&E 294 Systems Modeling for Climate Policy Analysis

MS&E 295 Energy Policy Analysis

- 1 Math and Science must total a minimum of 44 units. Electives must come from the School of Engineering approved list, or, PSYCH 50 Introduction to Cognitive Neuroscience, or PSYCH 70 Self and Society: Introduction to Social Psychology, and may not repeat material from any other requirement. AP/IB credit for Chemistry and Physics may be used.
- 2 Engineering fundamentals plus engineering depth must total a minimum of 60 units. Recommended engineering fundamentals are E25B, E25E, E40A, E40M, and E80.
- 3 Students may petition to place out of CS 106A Programming Methodology.
- 4 Courses used to satisfy the Math, Science, Technology in Society, or Engineering Fundamental requirement may not also be used to satisfy an engineering depth requirement.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

## Materials Science and Engineering (MATSCI)

Completion of the undergraduate program in Materials Science and Engineering leads to the conferral of the Bachelor of Science in Materials Science and Engineering.

## Mission of the Undergraduate Program in Materials Science and Engineering

The mission of the undergraduate program in Materials Science and Engineering is to provide students with a strong foundation in materials science and engineering with emphasis on the fundamental scientific and engineering principles which underlie the knowledge and implementation of material structure, processing, properties, and performance of all classes of materials used in engineering systems. Courses in the program develop students' knowledge of modern materials science and engineering, teach them to apply this knowledge analytically to create effective and novel solutions to practical problems, and develop their communication skills and ability to work collaboratively. The program prepares students for careers in industry and for further study in graduate school.

The B.S. in Materials Science and Engineering provides training for the materials engineer and also preparatory training for graduate work in materials science. Capable undergraduates are encouraged to take at least one year of graduate study to extend their course work through the coterminal degree program which leads to an M.S. in Materials Science and Engineering. Coterminal degree programs are encouraged both for

undergraduate majors in Materials Science and Engineering and for undergraduate majors in related disciplines.

## Requirements

### Mathematics

20 units minimum; see Basic Requirement 1 <sup>1</sup>

Select one of the following:

MATH 51 Linear Algebra and Differential Calculus of Several Variables 5

CME 100/  
ENGR 154 Vector Calculus for Engineers

Select one of the following: 5

MATH 52 Integral Calculus of Several Variables

CME 104/  
ENGR 155B Linear Algebra and Partial Differential Equations for Engineers

Select one of the following: 5

MATH 53 Ordinary Differential Equations with Linear Algebra

CME 102/  
ENGR 155A Ordinary Differential Equations for Engineers

One additional course 5

### Science

20 units minimum; see Basic Requirement 2 <sup>2</sup> 20

Must include a full year of physics or chemistry, with one quarter of study in the other subject.

### Technology in Society

One course; course chosen must be on the SoE Approved Courses list at <ughb.stanford.edu> the year taken; see Basic Requirement 3 <sup>3</sup> 3-5

### Engineering Fundamentals

Two courses minimum; see Basic Requirement 4 <sup>4</sup>

Select one of the following: 4

ENGR 50 Introduction to Materials Science, Nanotechnology Emphasis <sup>4</sup>

ENGR 50E Introduction to Materials Science, Energy Emphasis <sup>4</sup>

ENGR 50M Introduction to Materials Science, Biomaterials Emphasis <sup>4</sup>

At least one additional courses 6-9

### Materials Science and Engineering Depth

Materials Science Fundamentals: All of the following

MATSCI 142 Quantum Mechanics of Nanoscale Materials 4

MATSCI 143 Materials Structure and Characterization 4

MATSCI 144 Thermodynamic Evaluation of Green Energy Technologies 4

MATSCI 145 Kinetics of Materials Synthesis 4

Two of the following courses: 8

MATSCI 151 Microstructure and Mechanical Properties

MATSCI 152 Electronic Materials Engineering

MATSCI 156 Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution

MATSCI 158 Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life

MATSCI 190 Organic and Biological Materials

MATSCI 192 Materials Chemistry

MATSCI 193 Atomic Arrangements in Solids

MATSCI 194 Thermodynamics and Phase Equilibria

MATSCI 195 Waves and Diffraction in Solids

MATSCI 196 Defects in Crystalline Solids

MATSCI 197 Rate Processes in Materials

MATSCI 198 Mechanical Properties of Materials

MATSCI 199 Electronic and Optical Properties of Solids

### Engineering Depth 16

Four laboratory courses for Sixteen units; Four units must be WIM

MATSCI 161 Energy Materials Laboratory (WIM)

MATSCI 164 Electronic and Photonic Materials and Devices Laboratory (WIM)

MATSCI 160 Nanomaterials Laboratory

MATSCI 162 X-Ray Diffraction Laboratory

MATSCI 163 Mechanical Behavior Laboratory

MATSCI 165 Nanoscale Materials Physics Computation Laboratory

### Focus Area Options <sup>6</sup> 10

<sup>1</sup> Basic Requirement 1 (20 units minimum): see a list of approved Math Courses ([http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved\\_Courses](http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses)).

<sup>2</sup> Basic Requirement 2 (20 units minimum): see a list of approved Science Courses ([http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved\\_Courses](http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses)).

<sup>3</sup> Basic Requirement 3 (one course minimum): see a list of approved Technology in Society Courses ([http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved\\_Courses](http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses)).

<sup>4</sup> Basic Requirement 4 (3 courses minimum): see a list of approved Engineering Fundamentals ([http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved\\_Courses](http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses)) Courses. If both ENGR 50 Introduction to Materials Science, Nanotechnology Emphasis, ENGR 50E Introduction to Materials Science, Energy Emphasis, and/or ENGR 50M Introduction to Materials Science, Biomaterials Emphasis are taken, one may be used for the Materials Science Fundamentals requirement.

<sup>5</sup> ENGR 30 may be substituted for MATSCI 144 Thermodynamic Evaluation of Green Energy Technologies as long as the total MATSCI program units total 50 or more.

<sup>6</sup> Focus Area Options: 10 units from one of the following Focus Area Options below.

## Focus Area Options (Four courses for a minimum of 13 units; select from one of the ten Focus Areas.)

### Bioengineering

BIOE 220 Introduction to Imaging and Image-based Human Anatomy

BIOE 281 Biomechanics of Movement

BIOE 284B Cardiovascular Bioengineering

BIOE 333 Interfacial Phenomena and Bionanotechnology

BIOE 381 Orthopaedic Bioengineering

MATSCI 158 Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life

MATSCI 190 Organic and Biological Materials

MATSCI 380 Nano-Biotechnology

MATSCI 381 Biomaterials in Regenerative Medicine

MATSCI 382 Biochips and Medical Imaging

### Chemical Engineering

CHEM 171 Physical Chemistry I

CHEMENG 130 Separation Processes

CHEMENG 140 Micro and Nanoscale Fabrication Engineering

CHEMENG 150 Biochemical Engineering

CHEMENG 160 Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life

### Chemistry

CHEM 151	Inorganic Chemistry I
CHEM 153	Inorganic Chemistry II
CHEM 171	Physical Chemistry I
CHEM 173	Physical Chemistry II
CHEM 175	Physical Chemistry III
CHEM 181	Biochemistry I
CHEM 183	Biochemistry II
CHEM 185	Biophysical Chemistry

#### Electronics & Photonics

EE 101A	Circuits I
EE 101B	Circuits II
EE 102A	Signal Processing and Linear Systems I
EE 102B	Signal Processing and Linear Systems II
EE 116	Semiconductor Devices for Energy and Electronics
EE 134	Introduction to Photonics
EE 142	Engineering Electromagnetics (Formerly EE 141)
MATSCI 343	Organic Semiconductors for Electronics and Photonics

#### Energy Technology

EE 293B	Fundamentals of Energy Processes
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
MATSCI 302	Solar Cells
MATSCI 303	Principles, Materials and Devices of Batteries
ME 260	Fuel Cell Science and Technology

#### Materials Characterization Techniques

MATSCI 320	Nanocharacterization of Materials
MATSCI 321	Transmission Electron Microscopy
MATSCI 322	Transmission Electron Microscopy Laboratory
MATSCI 323	Thin Film and Interface Microanalysis
MATSCI 326	X-Ray Science and Techniques

#### Mechanical Behavior & Design

AA 240A	Analysis of Structures
AA 240B	Analysis of Structures
AA 256	Mechanics of Composites
MATSCI 198	Mechanical Properties of Materials
MATSCI 358	Fracture and Fatigue of Materials and Thin Film Structures
ME 80	Mechanics of Materials
or CEE 101A	Mechanics of Materials
ME 203	Design and Manufacturing

#### Nanoscience

BIOE 333	Interfacial Phenomena and Bionanotechnology
ENGR 240	Introduction to Micro and Nano Electromechanical Systems
MATSCI 316	Nanoscale Science, Engineering, and Technology
MATSCI 320	Nanocharacterization of Materials
MATSCI 346	Nanophotonics
MATSCI 347	Magnetic materials in nanotechnology, sensing, and energy
MATSCI 380	Nano-Biotechnology

#### Physics

PHYSICS 70	Foundations of Modern Physics
PHYSICS 110	Advanced Mechanics
PHYSICS 120	Intermediate Electricity and Magnetism I
PHYSICS 121	Intermediate Electricity and Magnetism II
PHYSICS 130	Quantum Mechanics I

PHYSICS 131	Quantum Mechanics II
PHYSICS 134	Advanced Topics in Quantum Mechanics
PHYSICS 170	Thermodynamics, Kinetic Theory, and Statistical Mechanics I
PHYSICS 171	Thermodynamics, Kinetic Theory, and Statistical Mechanics II
PHYSICS 172	Solid State Physics
Self-Defined Option	
Petition for a self-defined cohesive program.	

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

## Mechanical Engineering (ME)

Completion of the undergraduate program in Mechanical Engineering leads to the conferral of the Bachelor of Science in Mechanical Engineering.

## Mission of the Undergraduate Program in Mechanical Engineering

The mission of the undergraduate program in Mechanical Engineering is to provide students with a balance of theoretical and practical experiences that enable them to address a variety of societal needs. The curriculum encompasses elements from a wide range of disciplines built around the themes of biomedicine, computational engineering, design, energy, and multiscale engineering. Course work may include mechatronics, computational simulation, solid and fluid dynamics, microelectromechanical systems, biomechanical engineering, energy science and technology, propulsion, sensing and control, nano- and micro- mechanics, and design. The program prepares students for entry-level work as mechanical engineers and for graduate studies in either an engineering discipline or other fields where a broad engineering background is useful.

### Requirements

#### Mathematics

24 units minimum; see Basic Requirement 1 <sup>1</sup>		
CME 102/ ENGR 155A	Ordinary Differential Equations for Engineers	5
or MATH 53	Ordinary Differential Equations with Linear Algebra	
Select one of the following:		3-5
CME 106/ ENGR 155C	Introduction to Probability and Statistics for Engineers	
STATS 110	Statistical Methods in Engineering and the Physical Sciences	
STATS 116	Theory of Probability	
Plus additional courses to total min. 24		16

#### Science

20 units minimum; see Basic Requirement 2 <sup>1</sup>		
CHEM 31X	Chemical Principles Accelerated	5
Plus additional required courses <sup>1</sup>		15

#### Technology in Society

One course required; must be on SoE Approved Courses list at < <a href="http://ughb.stanford.edu">ughb.stanford.edu</a> > the year taken.; see Basic Requirement 4		3-5
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#### Engineering Fundamentals

Two courses minimum; see Basic Requirement 3		
ENGR 40M	An Intro to Making: What is EE	5
ENGR 70A	Programming Methodology (same as CS 106A)	5

#### Engineering Depth



Minimum of 68 Engineering Science and Design ABET units; see Basic Requirement 5

ENGR 14	Intro to Solid Mechanics	3
ENGR 15	Dynamics	3
ME 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 80	Mechanics of Materials	4
ME 101	Visual Thinking	4
ME 103D	Engineering Drawing and Design <sup>2</sup>	1
ME 112	Mechanical Systems Design <sup>4</sup>	4
Take one of the following:		
ME 113	Mechanical Engineering Design	
ME 170B	Mechanical Engineering Design: Integrating Context with Engineering <sup>3</sup>	
ME 131A	Heat Transfer <sup>4</sup>	3-5
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	4
ME 140	Advanced Thermal Systems <sup>4</sup>	5
or ME 141	Alternative Energy Systems	
ME 161	Dynamic Systems, Vibrations and Control	4
ME 203	Design and Manufacturing <sup>2</sup>	4

<sup>1</sup> Math and science must total 45 units.

- Math: 24 units required and must include a course in differential equations (CME 102 Ordinary Differential Equations for Engineers or MATH 53 Ordinary Differential Equations with Linear Algebra; one of these required) and calculus-based Statistics (CME 106 Introduction to Probability and Statistics for Engineers or STATS 110 Statistical Methods in Engineering and the Physical Sciences or STATS 116 is required).
- Science: 20 units minimum and requires courses in calculus-based Physics and Chemistry, with at least a full year (3 courses) in one or the other. CHEM 31A Chemical Principles I/CHEM 31B Chemical Principles II are considered one course because they cover the same material as CHEM 31X Chemical Principles Accelerated but at a slower pace. CHEM 31X Chemical Principles Accelerated is recommended.

<sup>2</sup> Courses ME 103D and ME 203 must be taken concurrently.

<sup>3</sup> ME 170A and ME 170B are a 2-quarter Capstone Design Sequence and must be taken in consecutive quarters. Students that take the Capstone Design Sequence may use ME 170B as an alternative to ME 113. ME 170A will then be counted as an ME Elective Course.

<sup>4</sup> ME 112, ME 131A, and ME 140 or ME 141, together fulfill the WIM requirement.

Options to complete the ME depth sequence: see the list of options in the ME major section of the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

## Product Design (PD)

Completion of the undergraduate program in Product Design leads to the conferral of the Bachelor of Science in Engineering. The subplan Product Design appears on the transcript and on the diploma.

### Mission of the Undergraduate Program in Product Design

The mission of the undergraduate program in Product Design is to graduate designers who can synthesize technology, human factors, and business factors in the service of human need. The program teaches a design process that encourages creativity, craftsmanship, aesthetics, and personal expression, and emphasizes brainstorming and need finding. The course work provides students with the skills necessary to carry projects from initial concept to completion of working prototypes. Students studying product design follow the basic Mechanical Engineering curriculum and are expected to meet the

University requirements for a Bachelor of Science degree. The program prepares students for careers in industry and for graduate study.

## Requirements

	Units
<b>Mathematics and Science</b>	43 minimum
<b>Mathematics</b>	20
20 units minimum	
Recommended: one course in Statistics	
<b>Science</b>	23 units minimum
23 units minimum: 12 units Physics and 3-5 units of an additional science class from School of Engineering approved list, and 8 units minimum of behavioral sciences. <sup>1</sup>	
PHYSICS 41	Mechanics 4
PHYSICS 43	Electricity and Magnetism 4
PHYSICS 45	Light and Heat 4
PSYCH 1	Introduction to Psychology 5
PSYCH or HUMBIO elective <sup>1</sup>	3-5
<b>Technology in Society</b>	
One course required; must be on the SoE approved TIS courses list at < <a href="http://ughb.stanford.edu">ughb.stanford.edu</a> > the year it is taken..	
<b>Engineering Fundamentals</b>	8 units minimum
ENGR 70A	Programming Methodology 5
ENGR 40M	An Intro to Making: What is EE 5
or ENGR 40A	Introductory Electronics
<b>Product Design Engineering Depth</b>	53-56 units minimum
Three Art Studio or Computer Science courses, 100 series or higher	12
ENGR 14	Intro to Solid Mechanics <sup>2</sup> 3
ME 80	Mechanics of Materials 4
ME 101	Visual Thinking <sup>2</sup> 4
ME 103D	Engineering Drawing and Design <sup>3</sup> 1
ME 110	Design Sketching <sup>2</sup> 2
ME 112	Mechanical Systems Design <sup>4</sup> 4
ME 115A	Introduction to Human Values in Design 3
ME 115B	Product Design Methods 3
ME 215C	Analytical Product Design <sup>5</sup> 3
ME 203	Design and Manufacturing <sup>3</sup> 4
ME 216A	Advanced Product Design: Needfinding 4
ME 216B	Advanced Product Design: Implementation 1 <sup>6</sup> 4
ME 216C	Advanced Product Design: Implementation 2 <sup>6</sup> 4

<sup>1</sup> School of Engineering approved science list available at <http://ughb.stanford.edu>. PSYCH electives numbered 30-200 or HUMBIO 82A or HUMBIO 160 are preapproved. If the Psychology elective was taken prior to the requirement being increased to 3 units minimum in 2012-13, student may be short 1 unit in science/behavioral science; this is approved without petition.

<sup>2</sup> If ENGR 14 and/or ME 110, and/or ME 101 were taken prior to the courses being offered for 3 and 2 units, depth total may be reduced by 1-3 units with no petition required.

<sup>3</sup> ME 103D and ME 203 should be taken concurrently.

<sup>4</sup> ME 112 meets the Writing in the Major (WIM) requirement for Product Design.

<sup>5</sup> ME 215C is the only course that can be waived if a student takes a quarter overseas. Students should plan their overseas quarter to take place in sophomore year, or Spring Quarter of the junior year only. If the student elects to go overseas junior year, the total depth units are reduced by 3; this is approved without petition.

<sup>6</sup> You may substitute ME 216B and ME 216C with ME 206A and ME 206B Design for Extreme Affordability.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

## Mission

The Joint Major provides a unique opportunity to gain mastery in two disciplines: Computer Science and a selected humanities field. Unlike the double major or dual major, the Joint Major emphasizes integration of the two fields through a cohesive, transdisciplinary course of study and integrated capstone experience. The Joint Major not only blends the intellectual traditions of two Stanford departments—it does so in a way that reduces the total unit requirement for each major.

## Computer Science Major Requirements in the Joint Major Program

(See the respective humanities department Joint Major Program section of this bulletin for details on humanities major requirements.)

The CS requirements for the Joint Major follow the CS requirements for the CS-BS degree with the following exceptions:

1. Two of the depth electives are waived. The waived depth electives are listed below for each CS track.
2. The Senior Project is fulfilled with a joint capstone project. The student enrolls in CS191 or 191W (3 units) during the senior year. Depending on the X department, enrollment in an additional Humanities capstone course may also be required. But, at a minimum, 3 units of CS191 or 191W must be completed.
3. There is no double-counting of units between majors. If a course is required for both the CS and Humanities majors, the student will work with one of the departments to identify an additional course - one which will benefit the academic plan - to apply to that major's total units requirement.
4. For CS, WIM can be satisfied with CS181W or CS191W.

### Depth Electives for CS Tracks for students completing a Joint Major:

#### Artificial Intelligence Track:

One Track Elective (rather than three).

#### Biocomputation Track:

One course from Note 3 of the Department Program Sheet, plus one course from Note 4 of the Program Sheet.

### Computer Engineering Track:

- EE 108A and 108B
- One of the following: EE 101A, 101B, 102A, 102B
- Satisfy the requirements of one of the following concentrations:
  1. Digital Systems Concentration: CS 140 or 143; EE 109, 271; plus one of CS 140 or 143 (if not counted above), 144, 149, 240E, 244; EE 273, 282
  2. Robotics and Mechatronics Concentration: CS 205A, 223A; ME 210; ENGR 105
  3. Networking Concentration: CS 140, 144; plus two of the following, CS 240, 240E, 244, 244B, 244E, 249A, 249B, EE 179, EE 276

### Graphics Track:

No Track Electives required (rather than two)

### HCI Track:

No Interdisciplinary HCI Electives required

Information Track:

One Track Elective (rather than three)

### Systems Track:

One Track Elective (rather than three)

### Theory Track:

One Track Elective (rather than three)

### Unspecialized Track:

No Track Electives required (rather than two)

### Individually Designed Track:

Proposals should include a minimum of five (rather than seven) courses, at least four of which must be CS courses numbered 100 or above.

## Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

## Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) . Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

## Transcript and Diploma

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

## Minor in the School of Engineering

An undergraduate minor in some Engineering programs may be pursued by interested students; see the Handbook for Undergraduate Engineering Programs, or consult with a department's undergraduate program representative or the Office of Student Affairs, Huang Engineering Center, Suite 135.

General requirements and policies for a minor in the School of Engineering are:

1. A set of courses totaling not less than 20 and not more than 36 units, with a minimum of six courses of at least 3 units each. These courses must be taken for a letter grade except where letter grades are not offered, and a minimum GPA of 2.0 within the minor course list must be maintained (departments may require a higher GPA if they choose).
2. The set of courses should be sufficiently coherent as to present a body of knowledge within a discipline or subdiscipline.
3. Prerequisite mathematics, statistics, or science courses, such as those normally used to satisfy the school's requirements for a department major, may not be used to satisfy the requirements of the minor; conversely, engineering courses that serve as prerequisites for subsequent courses must be included in the unit total of the minor program.
4. Courses used for the major and/or minor core must not be duplicated within any other of the student's degree programs; that is, students may not overlap (double-count) courses for completing core major and minor requirements.

Departmentally based minor programs are structured at the discretion of the sponsoring department, subject only to requirements 1, 2, 3, and 4 above. Interdisciplinary minor programs may be submitted to the Undergraduate Council for approval and sponsorship. A general Engineering minor is not offered.

### Aeronautics and Astronautics (AA) Minor

The Aero/Astro minor introduces undergraduates to the key elements of modern aerospace systems. Within the minor, students may focus on aircraft, spacecraft, or disciplines relevant to both. The course requirements for the minor are described in detail below. If any core classes (aside from ENGR 21; see footnote) are part of student's major or other degree program, the AA adviser can help select substitute courses to fulfill the AA minor requirements; no double counting allowed. All courses taken for the minor must be taken for a letter grade if that option is offered by the instructor. Minimum GPA for all minor courses combined is 2.0.

The following core courses fulfill the minor requirements:

#### AA Core

12 Core Units, 24 Total Program Units		
ENGR 21	Engineering of Systems <sup>2</sup>	3
AA 100	Introduction to Aeronautics and Astronautics	3
AA 131	Space Flight <sup>1</sup>	
AA 141		3
AA Electives		
Choose 4 courses		
AA 101	Introduction to Aero Fluid Mechanics <sup>1</sup>	
AA 102	Introduction to Applied Aerodynamics <sup>1</sup>	
AA 103	Air and Space Propulsion <sup>1</sup>	
AA 111	Introduction to Aerospace Computational Engineering <sup>1</sup>	
AA 135	Introduction to Space Policy <sup>1</sup>	
AA 151	Lightweight Structures <sup>1</sup>	
AA 156	Mechanics and Composites <sup>1</sup>	
AA 171	Autonomous Systems <sup>1</sup>	
AA 173	Flight Mechanics and Controls <sup>1</sup>	
AA 175	Embedded Programming <sup>1</sup>	
AA 272C	Global Positioning Systems	3
AA 279A	Space Mechanics	3
ENGR 105	Feedback Control Design	3

<sup>1</sup> This course will be offered in the future. Please see our website for future course offerings (<https://aa.stanford.edu/academics/undergraduate-program>).

<sup>2</sup> ENGR 21 is waived as minor requirement if already taken as part of the major program.

### Chemical Engineering Minor

The following core courses fulfill the minor requirements:

		Units
ENGR 20	Introduction to Chemical Engineering	4
CHEMENG 100	Chemical Process Modeling, Dynamics, and Control	3
CHEMENG 110	Equilibrium Thermodynamics	3
CHEMENG 120A	Fluid Mechanics	4
CHEMENG 120B	Energy and Mass Transport	4
CHEMENG 170	Kinetics and Reactor Design	3
CHEMENG 185A	Chemical Engineering Laboratory A	4
CHEM 171	Physical Chemistry I	4
CHEMENG 180	Chemical Engineering Plant Design	4
Select one of the following:		3
CHEMENG 140 Micro and Nanoscale Fabrication Engineering		
CHEMENG 142 Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations		
CHEMENG 160 Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life		
CHEMENG 162 Polymers for Clean Energy and Water		
CHEMENG 174 Environmental Microbiology I		
CHEMENG 181 Biochemistry I		
Total Units		36

### Civil Engineering (CE) Minor

The civil engineering minor is intended to give students a focused introduction to one or more areas of civil engineering. Departmental expertise and undergraduate course offerings are available in the areas of Architectural Design, Construction Engineering and Management, and Structural and Geotechnical Engineering. Students interested in Environmental and Water Studies should refer to the Environmental Systems Engineering minor.

The minimum prerequisite for a civil engineering minor is MATH 19 Calculus (or MATH 20 Calculus or MATH 21 Calculus); however, many courses of interest require PHYSICS 41 Mechanics and/or MATH 51 Linear Algebra and Differential Calculus of Several Variables as prerequisites. The minimum prerequisite for a Civil Engineering minor focusing on architectural design is MATH 19 Calculus (or MATH 20 Calculus or MATH 21 Calculus) and a course in Statistics. Students should recognize that a minor in civil engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining a civil engineering minor, and the field itself is so broad, no single set of course requirements will be appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below. Additional information, including example minor programs, are provided on the CEE web site ([http://cee.stanford.edu/prospective/undergrad/minor\\_overview.html](http://cee.stanford.edu/prospective/undergrad/minor_overview.html)) and in Chapter 6 of the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

General guidelines are:

1. A civil engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes

of at least 3 units each of letter-graded work, except where letter grades are not offered.

- The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another. Example programs are given on the CEE webpage.

Professor Anne Kiremidjian (kiremidjian@stanford.edu) is the CEE undergraduate minor adviser in Structural Engineering and Construction Engineering and Management. John Barton (jhbarton@stanford.edu (<http://www.stanford.edu/dept/registrar/bulletin/jhbarton@stanford.edu>)), Program Director for Architectural Design, is the undergraduate minor adviser in Architectural Design. Students must consult the appropriate adviser when developing their minor program, and obtain approval of the finalized study list from them.

### Computer Science (CS) Minor

The following core courses fulfill the minor requirements. Prerequisites include the standard mathematics sequence through MATH 51 (or CME 100).

Introductory Programming (AP Credit may be used to fulfill this requirement):

CS 106B	Programming Abstractions	5
or CS 106X	Programming Abstractions (Accelerated)	

Core:

CS 103	Mathematical Foundations of Computing	5
CS 107	Computer Organization and Systems	5
or CS 107E	Computer Systems from the Ground Up	
CS 109	Introduction to Probability for Computer Scientists	5

Electives (choose two courses from different areas):

#### Artificial Intelligence—

CS 124	From Languages to Information	4
CS 221	Artificial Intelligence: Principles and Techniques	4
CS 229	Machine Learning	3-4

#### Human-Computer Interaction—

CS 147	Introduction to Human-Computer Interaction Design	4
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#### Software—

CS 108	Object-Oriented Systems Design	4
CS 110	Principles of Computer Systems	5

#### Systems—

CS 140	Operating Systems and Systems Programming	4
or CS 140E	Operating systems design and implementation	
CS 143	Compilers	4
CS 144	Introduction to Computer Networking	4
CS 145	Introduction to Databases	4
CS 148	Introduction to Computer Graphics and Imaging	4

#### Theory—

CS 154	Introduction to Automata and Complexity Theory	4
CS 157	Logic and Automated Reasoning	3
CS 161	Design and Analysis of Algorithms	5

Note: for students with no programming background and who begin with CS 106A, the minor consists of seven courses.

### Electrical Engineering (EE) Minor

The options for completing a minor in EE are outlined below. Students must complete a minimum of 23-25 units, as follows:

Select one:

Units  
5

EE 42	Introduction to Electromagnetics and Its Applications	
EE 65	Modern Physics for Engineers	
ENGR 40A & ENGR 40B	Introductory Electronics and Introductory Electronics Part II	
ENGR 40M	An Intro to Making: What is EE	
Select one:		8
Option I:		
EE 101A	Circuits I	
EE 101B	Circuits II	
Option II:		
EE 102A	Signal Processing and Linear Systems I	
EE 102B	Signal Processing and Linear Systems II	
Option III:		
EE 102A	Signal Processing and Linear Systems I	
EE 103	Introduction to Matrix Methods	
Option IV:		
EE 108	Digital System Design	
EE 180	Digital Systems Architecture	12

In addition, four letter-graded EE courses at the 100-level or higher must be taken (12 units minimum). CS 107 is required as a prerequisite for EE 180, but can count as one of the four classes.

### Environmental Systems Engineering (EnvSE) Minor

The Environmental Systems Engineering minor is intended to give students a focused introduction to one or more areas of Environmental Systems Engineering. Departmental expertise and undergraduate course offerings are available in the areas of environmental engineering and science, environmental fluid mechanics and hydrology, and atmosphere/energy. The minimum prerequisite for an Environmental Systems Engineering minor is MATH 19 Calculus (or MATH 20 Calculus or MATH 21 Calculus); additionally, many courses of interest require PHYSICS 41 Mechanics and/or MATH 51 Linear Algebra and Differential Calculus of Several Variables as prerequisites. Students should recognize that a minor in Environmental Systems Engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining an Environmental Systems Engineering minor, no single set of course requirements is appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below. Additional information on preparing a minor program is available in the Undergraduate Engineering Handbook (<http://web.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Handbooks>).

General guidelines are—

- An Environmental Systems Engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes of at least 3 units each of letter-graded work, except where letter grades are not offered.
- The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another. Example programs are available on the CEE web site (<https://cee.stanford.edu/academics/undergraduate-programs/minor/>).

Professor Nicholas Ouellette (nto@stanford.edu) is the CEE undergraduate minor adviser in Environmental Systems Engineering. Students must consult with Professor Ouellette (<https://>

cee.stanford.edu/people/nicholas-t-ouellette) in developing their minor program, and obtain approval of the finalized study list from him.

### Management Science and Engineering (MS&E) Minor

The following courses are required to fulfill the minor requirements:

		Units
<b>Background requirements (two courses)</b>		
CME 100	Vector Calculus for Engineers	5
or MATH 51	Linear Algebra and Differential Calculus of Several Variables	
CS 106A	Programming Methodology	5
<b>Minor requirements (seven courses, letter-graded)</b>		
MS&E 111	Introduction to Optimization	3-4
or MS&E 111X	Introduction to Optimization (Accelerated)	
MS&E 120	Probabilistic Analysis	5
MS&E 121	Introduction to Stochastic Modeling	4
MS&E 125	Introduction to Applied Statistics	4
MS&E 180	Organizations: Theory and Management	4
Electives (select any two 100- or 200-level MS&E courses)		6

#### Recommended courses

In addition to the required background and minor courses, it is recommended that students also take the following courses.

ECON 50	Economic Analysis I	5
MS&E 140	Accounting for Managers and Entrepreneurs (may be used as one of the required electives above)	2-4
or MS&E 140X	Financial Accounting Concepts and Analysis	

### Materials Science and Engineering (MATSCI) Minor

A minor in Materials Science and Engineering allows interested students to explore the role of materials in modern technology and to gain an understanding of the fundamental processes that govern materials behavior.

The following courses fulfill the minor requirements:

		Units
<b>Engineering Fundamentals</b>		
Select one of the following:		4
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	
ENGR 50E	Introduction to Materials Science, Energy Emphasis	
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis	

#### Materials Science Fundamentals and Engineering Depth

Select six of the following:		24
MATSCI 142	Quantum Mechanics of Nanoscale Materials	
MATSCI 143	Materials Structure and Characterization	
MATSCI 144	Thermodynamic Evaluation of Green Energy Technologies	
MATSCI 145	Kinetics of Materials Synthesis	
MATSCI 151	Microstructure and Mechanical Properties	
MATSCI 152	Electronic Materials Engineering	
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	
MATSCI 158	Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life	
MATSCI 160	Nanomaterials Laboratory	
MATSCI 161	Energy Materials Laboratory	
MATSCI 162	X-Ray Diffraction Laboratory	

MATSCI 163	Mechanical Behavior Laboratory	
MATSCI 164	Electronic and Photonic Materials and Devices Laboratory	
MATSCI 165	Nanoscale Materials Physics Computation Laboratory	
MATSCI 190	Organic and Biological Materials	
MATSCI 192	Materials Chemistry	
MATSCI 193	Atomic Arrangements in Solids	
MATSCI 194	Thermodynamics and Phase Equilibria	
MATSCI 195	Waves and Diffraction in Solids	
MATSCI 196	Defects in Crystalline Solids	
MATSCI 197	Rate Processes in Materials	
MATSCI 198	Mechanical Properties of Materials	
MATSCI 199	Electronic and Optical Properties of Solids	
Total Units		28

### Mechanical Engineering (ME) Minor

The following courses fulfill the minor requirements:

		Units
<b>General Minor *</b>		
ENGR 14	Intro to Solid Mechanics	3
ENGR 15	Dynamics	3
ME 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 101	Visual Thinking	4
Plus two of the following:		8-9
ME 80	Mechanics of Materials	
ME 131A	Heat Transfer	
ME 161	Dynamic Systems, Vibrations and Control	
ME 203	Design and Manufacturing	
Total Units: 26		
<b>Thermosciences Minor **</b>		
ENGR 14	Intro to Solid Mechanics	3
ME 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 131A	Heat Transfer	5
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	4
ME 140	Advanced Thermal Systems	5
Total units: 24		
<b>Mechanical Design Minor ***</b>		
ENGR 14	Intro to Solid Mechanics	3
ENGR 15	Dynamics	3
ME 80	Mechanics of Materials	4
ME 101	Visual Thinking	4
ME 112	Mechanical Systems Design	4
ME 203	Design and Manufacturing	4
Plus one of the following:		3-4
ME 113	Mechanical Engineering Design	
ME 210	Introduction to Mechatronics	
ME 220	Introduction to Sensors	
Total units: 25-26		

\* This minor aims to expose students to the breadth of ME in terms of topics and analytic and design activities. Prerequisites: MATH 19 Calculus, MATH 20 Calculus, MATH 21 Calculus, and PHYSICS 41 Mechanics.

- \*\* Prerequisites: MATH 19 Calculus, MATH 20 Calculus, MATH 21 Calculus, MATH 51 Linear Algebra and Differential Calculus of Several Variables (or CME 100 Vector Calculus for Engineers) and PHYSICS 41 Mechanics.
- \*\*\* This minor aims to expose students to design activities supported by analysis. Prerequisites: MATH 19 Calculus, MATH 20 Calculus, MATH 21 Calculus, PHYSICS 42 Classical Mechanics Laboratory, and PHYSICS 41 Mechanics.

## Master of Science in the School of Engineering

The M.S. degree is conferred on graduate students in engineering according to the University regulations stated in the "Graduate Degrees (p. 50)" section of this bulletin, and is described in the various department listings. A minimum of 45 units is usually required in M.S. programs in the School of Engineering. The presentation of a thesis is not a school requirement. Further information is found in departmental listings.

## Master of Science in Engineering

The M.S. in Engineering is available to students who wish to follow an interdisciplinary program of study that does not conform to a normal graduate program in a department.

Each student's program is administered by the particular department in which it is lodged and must meet the standard of quality of that department. Transfer into this program is possible from any graduate program by application through the appropriate department; the department then recommends approval to the Office of Student Affairs in the School of Engineering. The application should be submitted before completing 18 units of the proposed program; it should include a statement describing the objectives of the program, the coherence of the proposed course work, and why this course of study cannot conform to existing graduate programs. Normally, it would include the approval of at least one faculty member willing to serve as adviser. (A co-advising team may be appropriate for interdisciplinary programs.) Each student's program is administered by the particular department in which it is lodged and must meet the standard of quality of that department. The actual transfer is accomplished through the Graduate Authorization Petition process.

There are three school requirements for the M.S. degree in Engineering:

1. The student's program must be a coherent one with a well-defined objective and must be approved by a department within the school which has experience with graduate-level teaching and advising in the program area.
2. The student's program must include at least 21 units of courses within the School of Engineering with catalog numbers of 200 or above in which the student receives letter grades.
3. The program must include a total of at least 45 units.

Departments may have additional requirements or expectations for programs of study which they would recommend for this degree; further information may be found in departmental listings or handbooks.

The M.S. in Engineering is rarely pursued as a coterminal program, and potential cotermers are encouraged to explore the range of master's options in the departments and interdisciplinary programs. In the unusual circumstance of a coterminal application to the M.S. in Engineering, the application process should be the same as described above, using either the Graduate Authorization Petition in Axess (for coterminal students who want to transfer between MS programs) or the Application for Admission to Coterminal Masters' Program (<http://registrar.stanford.edu/pdf/CotermApplic.pdf>) (for students who have not yet been admitted to a master's program). The policy for transferring courses taken as an undergraduate prior to coterm admission to the M.S. in Engineering

corresponds to the policy of the particular department in which the student's program is lodged and administered. A clear statement of the department's coterminal policy, and how it applies to the applicant within the Master of Science in Engineering program, should be added to the application materials.

## Honors Cooperative Program

Industrial firms, government laboratories, and other organizations may participate in the Honors Cooperative Program (HCP), a program that permits qualified engineers, scientists, and technology professionals admitted to Stanford graduate degree programs to register for Stanford courses and obtain the degree on a part-time basis. In many areas of concentration, the master's degree can be obtained entirely online.

Through this program, many graduate courses offered by the School of Engineering on campus are made available through the Stanford Center for Professional Development (SCPD). SCPD delivers more than 250 courses a year online. For HCP employees who are not part of a graduate degree program at Stanford, courses and certificates are also available through a non-degree option (NDO) and a non-credit professional education program. Non-credit short courses may be customized to meet a company's needs. For a full description of educational services provided by SCPD, see <http://scpd.stanford.edu>; call (650) 204-3984; fax (650) 725-2868; or email [scpd-customerservice@stanford.edu](mailto:scpd-customerservice@stanford.edu).

## Engineer Degree in the School of Engineering

The degree of Engineer is intended for students who want additional graduate training beyond that offered in an M.S. program. The program of study must satisfy the student's department and must include at least 90 units beyond the B.S. degree. The presentation of a thesis is required. The University regulations for the Engineer degree are stated in the "Graduate Degrees (p. 50)" section of this bulletin, and further information is available in the individual departmental sections of this bulletin.

## Doctor of Philosophy in the School of Engineering

Programs leading to the Ph.D. degree are offered in each of the departments of the school. University regulations for the Ph.D. are given in the "Graduate Degrees (p. 50)" section of this bulletin. Further information is found in departmental listings.

*Dean:* Jennifer Widom

*Senior Associate Deans:* Stacey Bent (Faculty and Academic Affairs), Laura L. Breyfogle (External Relations), Scott Calvert (Administration), Thomas Kenny (Student Affairs)

*Associate Dean:* Noé P. Lozano (Diversity Programs), Kirsti Copeland (Student Affairs)

*Assistant Dean:* Sally Gressens (Graduate Student Affairs)

## Faculty Teaching General Engineering Courses

*Professors:* Juan Alonso, Mark Cappelli, Ashish Goel, Chaitan Khosla, Chris Gerdes, Mark Horowitz, Roger Howe, Ellen Kuhl, Allison Okamura, Peter Pinsky, Jim Plummer, Stephen M. Rock, Bernard Roth, Sheri Sheppard, Robert Sinclair, Simon Wong, Yinyu Ye

*Associate Professors:* Eric Darve, Chuck Eesley, Sarah Heilshorn, W. Matthias Ihme, Michael Lepech, Jan Liphardt, Nick Melosh, Amin Saberi, Thomas Jaramillo,

*Assistant Professors:* Sindy Tang

*Professors (Teaching):* Thomas H. Byers, Robert McGinn, Mehran Sahami

*Senior Lecturers:* Vadim Khayms

*Lecturers:* Jeff Epstein, Christopher Gregg, Kelly Harrison, David Jaffe, Victoria Kirst, Royal Kopperud, Hung Le, Cynthia Bailey Lee, Mary McDevitt, Chris Piech, Marty Stepp, Matt Vassar

*Professor of the Practice:* Tina Seelig

## Overseas Studies Courses in Engineering

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPBER 40M	An Intro to Making: What is EE	5
OSPBER 50M	Introductory Science of Materials	4
OSPFLOR 50M	Introductory Science of Materials	4
OSPKYOTO 40M	An Intro to Making: What is EE	5
OSPPARIS 40M	An Intro to Making: What is EE	5
OSPPARIS 50M	Introductory Science of Materials	4

# AERONAUTICS AND ASTRONAUTICS

Courses offered by the Department of Aeronautics and Astronautics are listed under the subject code AA on the (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-AA=on&filter-term-Summer=on&page=0&q=AA&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on&catalog=71>) *Stanford Bulletin's* ExploreCourses web site.

The Department of Aeronautics and Astronautics prepares students for professional positions in industry, government, and academia by offering a comprehensive program of undergraduate and graduate teaching and research. In this broad program, students have the opportunity to learn and integrate multiple engineering disciplines. The program emphasizes structural, aerodynamic, guidance and control, and propulsion problems of aircraft and spacecraft. Courses in the teaching program lead to the degrees of Bachelor of Science, Master of Science, Engineer, and Doctor of Philosophy. Undergraduates and doctoral students in other departments may also elect a minor in Aeronautics and Astronautics.

Requirements for all degrees include courses on basic topics in Aeronautics and Astronautics, as well as in mathematics, and related fields in engineering and the sciences.

The current research and teaching activities cover a number of advanced fields, with emphasis on:

- Aeroelasticity and Flow Simulation
- Aircraft Design, Performance, and Control
- Applied Aerodynamics
- Autonomy
- Computational Aero-Acoustics
- Computational Fluid Dynamics
- Computational Mechanics and Dynamical Systems
- Control of Robots, including Space and Deep-Underwater Robots
- Conventional and Composite Materials and Structures
- Decision Making under Uncertainty
- Direct and Large-Eddy Simulation of Turbulence
- High-Lift Aerodynamics
- Hybrid Propulsion
- Hypersonic and Supersonic Flow
- Micro and Nano Systems and Materials
- Multidisciplinary Design Optimization
- Navigation Systems (especially GPS)
- Optimal Control, Estimation, System Identification
- Sensors for Harsh Environments
- Space Debris Characterization
- Space Environment Effects on Spacecraft
- Space Plasmas
- Spacecraft Design and Satellite Engineering
- Turbulent Flow and Combustion

## Mission of the Undergraduate Program in Aeronautics and Astronautics

The mission of the undergraduate program in Aeronautics and Astronautics Engineering is to provide students with the fundamental principles and techniques necessary for success and leadership in the conception, design, implementation, and operation of aerospace

and related engineering systems. Courses in the major introduce students to engineering principles. Students learn to apply this fundamental knowledge to conduct laboratory experiments and aerospace system design problems. Courses in the major include engineering fundamentals, mathematics, and the sciences, as well as in-depth courses in aeronautics and astronautics, dynamics, mechanics of materials, autonomous systems, computational engineering, embedded programming, fluids engineering, and heat transfer. The major prepares students for careers in aircraft and spacecraft engineering, autonomy, robotics, unmanned aerial vehicles, drones, space exploration, air and space-based telecommunication industries, computational engineering, teaching, research, military service, and many related technology-intensive fields.

Completion of the undergraduate program in Aeronautics and Astronautics leads to the conferral of the Bachelor of Science in Aeronautics and Astronautics.

## Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course work which provides a solid grounding in the basic disciplines, including fluid mechanics, dynamics and control, propulsion, structural mechanics, and applied or computational mathematics, and course work or supervised research which provides depth and breadth in the student's area of specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Aeronautics and Astronautics and related fields.

## Graduate Programs in Aeronautics and Astronautics

### Admission

To be eligible to apply for admission to the department, a student must have a bachelor's degree in engineering, physical science, mathematics, or an acceptable equivalent. Students who have not yet received a master's degree in a closely allied discipline will be considered for admission to the master's program; eligibility for the Ph.D. program is considered after the master's year (see "Doctor of Philosophy"). Applications for admission with financial aid (fellowships or assistantships) or without financial aid must be received and completed by December 5 for the next Autumn Quarter.

Information about admission to the Honors Cooperative Program is included in the "School of Engineering (p. 237)" section of this bulletin. The department considers HCP applications for Winter or Spring quarters as well as for Autumn Quarter; prospective applicants may contact the department's student services office with questions.

Further information and application forms for all graduate degree programs may be obtained from Graduate Admissions, the Registrar's Office, <http://gradadmissions.stanford.edu>.

### Transfer Credits

The number of transfer credits allowed for each degree (Engineer and Ph.D.) is delineated in the "Graduate Degrees (p. 62)" section of this bulletin; transfer credit is not accepted for the master's degree. Transfer credit is allowed only for courses taken as a graduate student, after receiving a bachelor's degree, in which equivalence to Stanford courses is established and for which a grade of 'B' or better has been awarded. Transfer credits, if approved, reduce the total number of Stanford units required for a degree.



## Fellowships and Assistantships

Fellowships and course or research assistantships are available to qualified graduate students. Fellowships sponsored by Gift Funds, Stanford University, and Industrial Affiliates of Stanford University in Aeronautics and Astronautics provide grants to several first-year students for up to five quarters to cover tuition and living expenses. Stanford Graduate Fellowships, sponsored by the University, provide grants for up to three full years of study and research; each year, the department is invited to nominate several outstanding doctoral or predoctoral students for these prestigious awards. Students who have excelled in their master's-level course work at Stanford are eligible for course assistantships in the department; those who have demonstrated research capability are eligible for research assistantships from individual faculty members. Students may also hold assistantships in other departments if the work is related to their academic progress; the criteria for selecting course or research assistants are determined by each hiring department. A standard, 20 hours/week course or research assistantship provides a semi-monthly salary and an 8-10 unit tuition grant per quarter. Research assistants may be given the opportunity of additional summer employment. They may use their work as the basis for a dissertation or Engineer's thesis.

## Aeronautics and Astronautics Facilities

The work of the department is centered in the William F. Durand Building for Space Engineering and Science. This 120,000 square foot building houses advanced research and teaching facilities and concentrates in one complex the Department of Aeronautics and Astronautics. The Durand Building also houses faculty and staff offices and several conference rooms.

Through the department's close relations with nearby NASA-Ames Research Center, students and faculty have access to one of the best and most extensive collections of experimental aeronautical research facilities in the world, as well as the latest generation of supercomputers.

## General Information

Further information about the facilities and programs of the department is available at <http://aa.stanford.edu>, or from the department's student services office.

The department has a student branch of the American Institute of Aeronautics and Astronautics, which sponsors programs and speakers covering aerospace topics and social events. It also conducts visits to nearby research, government, and industrial facilities, and sponsors a Young Astronauts Program in the local schools.

## Aeronautics and Astronautics (AA) Mission of the Undergraduate Program in Aeronautics and Astronautics

The mission of the undergraduate program in Aeronautics and Astronautics Engineering is to provide students with the fundamental principles and techniques necessary for success and leadership in the conception, design, implementation, and operation of aerospace and related engineering systems. Courses in the major introduce students to engineering principles. Students learn to apply this fundamental knowledge to conduct laboratory experiments, and aerospace system design problems. Courses in the major include engineering fundamentals, mathematics, and the sciences, as well as in-depth courses in aeronautics and astronautics, dynamics, mechanics of materials, autonomous systems, computational engineering, embedded programming, fluids engineering, and heat transfer. The major prepares students for careers in aircraft and spacecraft engineering, autonomy, robotics, unmanned aerial vehicles, drones, space exploration, air and space-based telecommunication industries, computational engineering,

teaching, research, military service, and other related technology-intensive fields.

Completion of the undergraduate program in Aeronautics and Astronautics leads to the conferral of the Bachelor of Science in Aeronautics and Astronautics.

## Requirements

		Units
<b>Mathematics</b>		
24 units minimum		
MATH 19	Calculus (required) <sup>2</sup>	3
MATH 20	Calculus (required) <sup>2</sup>	3
MATH 21	Calculus (required) <sup>2</sup>	4
CME 100/ ENGR 154 or MATH 51	Vector Calculus for Engineers (required) <sup>3</sup> Linear Algebra and Differential Calculus of Several Variables	5
CME 102/ ENGR 155A or MATH 53	Ordinary Differential Equations for Engineers (required) <sup>3</sup> Ordinary Differential Equations with Linear Algebra	5
CME 106/ ENGR 155C or STATS 110 or STATS 116 or CS 109	Introduction to Probability and Statistics for Engineers (required) Statistical Methods in Engineering and the Physical Sciences Theory of Probability Introduction to Probability for Computer Scientists	4-5
CME 104 or MATH 52	Linear Algebra and Partial Differential Equations for Engineers (recommended) <sup>3</sup> Integral Calculus of Several Variables	5
CME 108	Introduction to Scientific Computing (recommended)	3
<b>Science</b>		
20 units minimum		
PHYSICS 41	Mechanics (required) <sup>4</sup>	4
PHYSICS 43	Electricity and Magnetism (required) <sup>4</sup>	4
PHYSICS 45	Light and Heat (required)	4
CHEM 31X	Chemical Principles Accelerated ( or CHEM 31A and CHEM 31B, or AP Chemistry) (required)	5
ENGR 80	Introduction to Bioengineering (Engineering Living Matter) (recommended)	4
School of Engineering approved Science Electives: See Undergraduate Handbook, Figure 4-2		3-5
<b>Technology in Society (one course required)</b>		
School of Engineering approved Technology in Society courses: See Undergraduate Handbook, Figure 4-3. The course must be on the School of Engineering approved list the year you take it.		3-5
ENGR 131	Ethical Issues in Engineering (recommended)	4
<b>Engineering Fundamentals (three courses required)</b>		
11 units minimum		
ENGR 21	Engineering of Systems (required)	3
ENGR 70A/ CS 106A	Programming Methodology (required)	5
ENGR 10	Introduction to Engineering Analysis (recommended)	4
ENGR 40M	An Intro to Making: What is EE (recommended)	3-5
Fundamentals Elective; see list of Approved Courses in Undergraduate Engineering Handbook website at <a href="http://ughb.stanford.edu">ughb.stanford.edu</a> , Figure 4-4		3-5
<b>Aero/Astro Depth Requirements</b>		

27 units minimum		
ENGR 14	Intro to Solid Mechanics (required)	3
ENGR 15	Dynamics (required)	3
ENGR 105	Feedback Control Design (required)	3
ME 30	Engineering Thermodynamics (required)	3
AA 100	Introduction to Aeronautics and Astronautics (required)	3

AA 101	Introduction to Aero Fluid Mechanics, required <sup>1</sup>	
AA 131	Space Flight, required <sup>1</sup>	
AA 141	(required)	3
AA 171	Autonomous Systems, required <sup>1</sup>	
AA 190	Directed Research and Writing in Aero/Astro	3-5

**Aero/Astro Focus Electives**

15 units minimum		
AA 102	Introduction to Applied Aerodynamics <sup>1</sup>	
AA 103	Air and Space Propulsion <sup>1</sup>	
AA 111	Introduction to Aerospace Computational Engineering <sup>1</sup>	
AA 135	Introduction to Space Policy <sup>1</sup>	
AA 151	Lightweight Structures <sup>1</sup>	
AA 156	Mechanics and Composites <sup>1</sup>	
AA 173	Flight Mechanics and Controls <sup>1</sup>	
AA 175	Embedded Programming <sup>1</sup>	
AA 272C	Global Positioning Systems	3
AA 279A	Space Mechanics	3
AA 199	Independent Study in Aero/Astro	1-5
MS&E 178	The Spirit of Entrepreneurship	2

**Aero/Astro Suggested Courses (not required)**

AA 149	Operation of Aerospace Systems <sup>1</sup>	
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**Aero/Astro Capstone Requirement**

7 units minimum		
AA 123A	Air Capstone I, satisfies the Writing in the Major requirement, (WIM) <sup>1</sup>	
AA 123B	Air Capstone II <sup>1</sup>	
AA 124A	Space Capstone I, satisfies the Writing in Major requirement, (WIM) <sup>1</sup>	
AA 124B	Space Capstone II <sup>1</sup>	

For additional information and sample programs see the Handbook for Undergraduate Engineering (<http://ughb.stanford.edu>) and the Aeronautics and Astronautics Undergraduate Program Sheet (<https://stanford.box.com/s/e61zom3k9zbihtbqhlslsqr82skeon0nm>).

All courses taken for the major must be taken for a letter grade if that option is offered by the instructor.

Minimum Combined GPA for all courses in Engineering Topics (Engineering Fundamentals and Depth courses) is 2.0.

Transfer and AP credits in Math, Science, Fundamentals, and the Technology in Society course must be approved by the School of Engineering Dean's office.

<sup>1</sup> This course will be offered in the near future. See the department's web site for more information about our future course offerings (<https://aa.stanford.edu/academics/undergraduate-program>).

<sup>2</sup> A score of 4 on the Calculus BC test or 5 on the AB test only gives students 8 units, not 10 units, so is equal to MATH 19 + MATH 20, but not MATH 21. The Math Placement Exam determines what math course the student starts with.

<sup>3</sup> It is recommended that the CME series (100, 102, 104) be taken rather than the MATH series (51, 52, 53). It is recommended that students taking the MATH series also take CME 192 Introduction to MATLAB.

<sup>4</sup> A score of 4 or 5 on the AP Physics C Mechanics test places the student out of PHYSICS 41. Similarly, a 4 or 5 on the AP Physics Electricity and Magnetism test places the student out of PHYSICS 43.

## Aeronautics and Astronautics (AA) Minor

The Aero/Astro minor introduces undergraduates to the key elements of modern aerospace systems. Within the minor, students may focus on aircraft, spacecraft, or disciplines relevant to both. The course requirements for the minor are described in detail below. If any core classes (aside from ENGR 21; see footnote) are part of student's major or other degree program, the AA adviser can help select substitute courses to fulfill the AA minor requirements; no double counting allowed. All courses taken for the minor must be taken for a letter grade if that option is offered by the instructor. Minimum GPA for all minor courses combined is 2.0.

The following core courses fulfill the minor requirements:

	Units	
<b>AA Core</b>		
12 Core Units, 24 Total Program Units		
ENGR 21	Engineering of Systems <sup>2</sup>	3
AA 100	Introduction to Aeronautics and Astronautics	3
AA 131	Space Flight <sup>1</sup>	
AA 141		3
<b>AA Electives</b>		
Choose 4 courses		
AA 101	Introduction to Aero Fluid Mechanics <sup>1</sup>	
AA 102	Introduction to Applied Aerodynamics <sup>1</sup>	
AA 103	Air and Space Propulsion <sup>1</sup>	
AA 111	Introduction to Aerospace Computational Engineering <sup>1</sup>	
AA 135	Introduction to Space Policy <sup>1</sup>	
AA 151	Lightweight Structures <sup>1</sup>	
AA 156	Mechanics and Composites <sup>1</sup>	
AA 171	Autonomous Systems <sup>1</sup>	
AA 173	Flight Mechanics and Controls <sup>1</sup>	
AA 175	Embedded Programming <sup>1</sup>	
AA 272C	Global Positioning Systems	3
AA 279A	Space Mechanics	3
ENGR 105	Feedback Control Design	3

<sup>1</sup> This course will be offered in the future. Please see our website for future course offerings (<https://aa.stanford.edu/academics/undergraduate-program>).

<sup>2</sup> ENGR 21 is waived as minor requirement if already taken as part of the major program.

## Master of Science in Aeronautics and Astronautics

The University's basic requirements for the master's degree are outlined in the "Graduate Degrees (p. 50)" section of this bulletin.

Students with an aeronautical engineering background should be able to complete the master's degree in five quarters; note that many courses are not taught during the summer. Students with a bachelor's degree in Physical Science, Mathematics, or other areas of Engineering may find it

necessary to take certain prerequisite courses, which may lengthen the time required to obtain the master's degree.

The Master of Science (M.S.) program is a terminal degree program. It is based on the completion of lecture courses focused on a theme within the discipline of Aeronautics and Astronautics engineering. No thesis is required. No research is required.

## Grade Point Averages

A minimum grade point average (GPA) of 2.75 is required to fulfill the department's master's degree requirements. A minimum GPA of 3.5 is required for eligibility to attempt the Ph.D. qualifying examination. Students must also meet the University's quarterly academic requirements for graduate students as described in the "Degree Progress (p. 55)" section of this bulletin and in the "Satisfactory Progress" section of the Guide to Graduate Studies in Aeronautics and Astronautics. All courses (excluding seminars) used to satisfy the requirements for basic courses, mathematics and technical electives must be taken for a letter grade. Insufficient grade points on which to base the GPA may delay expected degree conferral or result in refusal of permission to take the qualifying examinations.

## Course Requirements

The master's degree program requires 45 quarter units of course work, which must be taken at Stanford. The course work is divided into four categories:

- Basic Courses
- Mathematics Courses
- Technical Electives
- Other Electives

### Basic Courses

Master's degree candidates must select eight courses as follows:

(I) Five courses in the basic areas of Aeronautics and Astronautics (one in each area):

Fluids		
AA 200	Applied Aerodynamics	3
AA 210A	Fundamentals of Compressible Flow	3
Structures		
AA 240A	Analysis of Structures	3
Guidance and Control		
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3
Propulsion		
AA 283	Aircraft and Rocket Propulsion	3
Experimentation/Design Requirements (see courses under Related Courses tab above)		

(II) Three courses (one each from three of the four areas below)

Fluids		
AA 200	Applied Aerodynamics	3
AA 210A	Fundamentals of Compressible Flow	3
AA 244A	Introduction to Plasma Physics and Engineering	3
Structures		
AA 240B	Analysis of Structures	3
AA 242B	Mechanical Vibrations	3
AA 256	Mechanics of Composites	3
AA 280	Smart Structures	3
Guidance and Control		
AA 242A	Classical Dynamics	3

AA 242B	Mechanical Vibrations	3
AA 251	Introduction to the Space Environment	3
AA 271A	Dynamics and Control of Spacecraft and Aircraft	3
AA 272C	Global Positioning Systems	3
AA 279A	Space Mechanics	3
One course selected from AA courses numbered 200 and above, excluding seminars and independent research		

## Course Waivers

Waivers of the basic courses required for the M.S. degree in Aeronautics and Astronautics can only be granted by the instructor of that course. Students who believe that they have had a substantially equivalent course at another institution should consult with the course instructor to determine if they are eligible for a waiver, and with their adviser to judge the effect on their overall program plans. To request a waiver, students should fill out a Petition for Waiver form (reverse side of the department's program proposal) and have it approved by the instructor and their adviser. One additional technical elective must be added for each basic course that is waived.

## Mathematics Courses

M.S. candidates are expected to exhibit competence in applied mathematics. Students meet this requirement by taking two courses, for a minimum of 6 units, of either advanced mathematics offered by the Mathematics Department or technical electives that strongly emphasize applied mathematics. Common choices include:

- AA 203 Introduction to Optimal Control and Dynamic Optimization
- AA 212 Advanced Feedback Control Design
- AA 214A Numerical Methods in Engineering and Applied Sciences
- AA 214B Numerical Methods for Compressible Flows
- AA 214C Numerical Computation of Viscous Flow
- AA 215A Advanced Computational Fluid Dynamics
- AA 218 Introduction to Symmetry Analysis
- AA 222 Engineering Design Optimization
- AA 228 Decision Making under Uncertainty
- AA 229 Advanced Topics in Sequential Decision Making
- AA 242B Mechanical Vibrations

See the list of mathematics courses under Related Courses (<http://exploreddegrees.stanford.edu/aeronauticsandastronautics/#relatedcoursestext>) tab for additional suggestions, which includes all courses in the Mathematics Department numbered 200 or above.

A maximum of three independent study/research units (AA 290 or independent study in another department) may count toward your M.S. program. If you fulfill your experimentation/design requirement with a course other than AA 290 (or equivalent from another department), it is possible to count AA 290 as a technical or free elective.

## Technical Electives

Students, in consultation with their adviser, select at least four courses\* from among the graduate-level courses, totaling at least 12 units, from departments in the School of Engineering and related science departments. These courses should be taken for a letter grade; the student should not elect the credit/no-credit option for any course except free elective.

\*Up to three seminar units may count toward an M.S. program, and is counted as one technical elective. At least three additional graduate courses offered in Engineering or related math/science departments should be taken to meet the technical elective section requirement.

## Other Electives

It is recommended that all candidates enroll in a humanities or social sciences course to complete the 45-unit requirement. Practicing courses

in, for example, art, music, and physical education do not qualify in this category. Language courses may qualify.

## Coterminal Master's Program in Aeronautics and Astronautics

This program allows Stanford undergraduates an opportunity to work simultaneously toward a B.S. degree and an M.S. in Aeronautics and Astronautics. Stanford undergraduates who wish to continue their studies for the master of science degree in the coterminal program must have earned a minimum of 120 units towards graduation. This includes allowable Advanced Placement (AP) and transfer credit.

The department-specific AA coterminal program application, which includes information and deadlines, can be obtained from the AA student services office (<https://aa.stanford.edu/academics/student-services-office>). A completed application (including letters of recommendation, transcripts and GRE scores) must be received no later than the quarter prior to the expected completion of the undergraduate degree. Admission is granted or denied through the departmental faculty admissions committee. Stanford undergraduates interested in learning more about receiving an AA master's degree as a coterm student should review the information on the University Registrar's web site (<https://registrar.stanford.edu/students/coterminal-degree-programs>) and visit the AA student services office (<https://aa.stanford.edu/academics/student-services-office>).

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## The Honors Cooperative Program

The Honors Cooperative Program (HCP) makes it possible for academically qualified engineers and scientists in nearby companies to be part-time master's students in Aeronautics and Astronautics while continuing nearly full-time professional employment. Prospective HCP students follow the same admission process and must meet the same admission requirements as full-time master's students. For more information regarding the Honors Cooperative Program, see the "School of Engineering (p. 237)" section of this bulletin.

## Master of Science in Engineering (AA)

Students whose career objectives require a more interdepartmental or narrowly focused program than is possible in the M.S. program in Aeronautics and Astronautics (AA) may pursue a program for an M.S. degree in Engineering (45 units). This program is described in the "Graduate Programs in the School of Engineering (p. )" section of this bulletin.

Sponsorship by the Department of Aeronautics and Astronautics in this more general program requires that the student file a proposal before completing 18 units of the proposed graduate program. The proposal must be accompanied by a statement explaining the objectives of the program and how the program is coherent, contains depth, and fulfills a well-defined career objective. The proposed program must include at least 12 units of graduate-level work in the department and meet rigorous standards of technical breadth and depth comparable to the regular AA Master of Science program. The grade and unit requirements are the same as for the M.S. degree in Aeronautics and Astronautics.

## Engineer in Aeronautics and Astronautics

The degree of Engineer represents an additional year (or more) of study beyond the M.S. degree and includes a research thesis. The program is designed for students who wish to do professional engineering work upon graduation and who want to engage in more specialized study than is afforded by the master's degree alone. It is expected that full-time students will be able to complete the degree within two years of study after the master's degree.

The University's basic requirements for the degree of Engineer are outlined in the "Graduate Degrees (p. 50)" section of this bulletin. The following are department requirements.

The candidate's prior study program should have fulfilled the department's requirements for the master's degree or a substantial equivalent. Beyond the master's degree, a total of 45 units of work is required, including a thesis and a minimum of 21 units of courses chosen as follows:

1. 21 units of approved technical electives, of which 6 are in mathematics or applied mathematics. See the list of mathematics courses under Related Courses tab above. All courses in the Mathematics Department numbered 200 or above are included. The remaining 15 units are chosen in consultation with the adviser, and represent a coherent field of study related to the thesis topic. Suggested fields include: (a) acoustics, (b) aerospace structures, (c) aerospace systems synthesis and design, (d) analytical and experimental methods in solid and fluid mechanics, (e) computational fluid dynamics, and (f) guidance and control.
2. The remaining 24 units may be thesis, research, technical courses, or free electives.

Candidates for the degree of Engineer are expected to have a minimum grade point average (GPA) of 3.0 for work in courses beyond those required for the master's degree. All courses except seminars and directed research should be taken for a letter grade.

## Engineer's thesis

For specific information on the format and deadlines for submission of theses, please check with the Graduate Degree Progress Office. The department recommends that students follow the format defined in the handbook *Directions for Preparing Doctoral Dissertations* (<https://studentaffairs.stanford.edu/registrar/students/dissertation-thesis>), available in the Graduate Degree Progress Office. Note: the advisor must sign the thesis before the filing deadline, which is generally the last day of classes during the graduation quarter.

## Doctor of Philosophy in Aeronautics and Astronautics

The University's basic requirements for the Ph.D. degree are outlined in the "Graduate Degrees (p. 50)" section of this bulletin.

Department requirements are stated below. Applicants who have received their M.S. from other institutions may apply directly to the Ph.D. program. Students who are currently pursuing the M.S. in our department and wish to continue for the Ph.D. should submit a graduate program authorization petition form online through Axxess at the beginning of their last quarter in the master's program.

Before beginning dissertation research for the Ph.D. degree, a student must pass the departmental qualifying examination. A student must meet the following conditions by the appropriate deadline to be able to take the qualifying examination:

1. 30 units of master's course work completed in our department. A student who has completed fewer than 30 units may petition to take the qualifying examination.
2. Stanford graduate GPA of 3.5 or higher.
3. Investigation of a research problem, under the direction of a faculty member who evaluates this work as evidence of the potential for doctoral research. The minimum requirement for taking the qualifying examination is to complete 3 units of AA 290 before the qualifying examination quarter.

Additional information about the deadlines, nature, and scope of the Ph.D. qualifying examination can be obtained from the department. Recommended courses to prepare for the qualifying examination are listed on the AA web site (<http://aa.stanford.edu/academics/graduate-programs/doctoral-program>). After passing the exam, the student must submit an approved program of Ph.D. course work on an Application for Candidacy for Doctoral Degree to the department's student services office.

### Course Requirements

Each individual Ph.D. program in Aeronautics and Astronautics, designed by the student in consultation with the adviser, should represent a strong and cohesive program reflecting the student's major field of interest. A total of 90 units of credit is required beyond the M.S. Of these 90 units, a minimum of 27 must be formal course work (excluding research, directed study and seminars), consisting primarily of graduate courses in engineering and the pertinent sciences. The remainder of the 90 units may be in the form of either Ph.D. dissertation units or free electives. For students who elect a minor in another department, a maximum of 9 units from the minor program may be included in the 27 units of formal course work; the remaining minor units may be considered free electives and are included in the 90 unit total required for the AA Ph.D. degree.

Ph.D. students in Aeronautics and Astronautics must take 9 units of mathematics courses, with at least 6 of these units from courses with numbers over 200. The AA department and other engineering departments offer many courses that have sufficient mathematical content that they may be used to satisfy the mathematics requirement. See the list of mathematics courses under Related Courses (p. 245) tab for suggestions. Others may be acceptable if approved by the adviser and the AA Student Services Office. University requirements for continuous registration apply to doctoral students for the duration of the degree.

### Grade Point Average

A minimum grade point average (GPA) of 3.0 is required to fulfill the department's Ph.D. It is incumbent upon Ph.D. students to request letter grades in all courses listed on the Application for Candidacy form.

### Candidacy

Ph.D. students must complete the candidacy process and be admitted to candidacy by their second year of doctoral study. There are two requirements for admission to Ph.D. candidacy in Aeronautics and Astronautics: students must first pass the departmental qualifying exam and must then submit an application for candidacy. The candidacy form lists the courses the student will take to fulfill the requirements for the degree. The form must include the 90 non-M.S. units required for the Ph.D.; it should be signed by the adviser and submitted to the AA student services office for the candidacy chairman's signature. AA has a department-specific candidacy form, which may be obtained in the AA student services office. Candidacy is valid for five years; this term is not affected by leaves of absence.

### Dissertation Reading Committee

Each Ph.D. candidate is required to establish a reading committee for the doctoral dissertation within six months after passing the department's Ph.D. qualifying exam. Thereafter, the student should consult frequently with all members of the committee about the direction and progress of the dissertation research.

A dissertation reading committee consists of the principal dissertation adviser and at least two other readers. If the principal adviser is emeritus, there should be a non-emeritus co-adviser. It is expected that at least two members of the AA faculty be on each reading committee. If the principal research adviser is not within the AA department, then the student's AA academic adviser should be one of those members. The initial committee, and any subsequent changes, must be approved by the department Chair.

Although all readers are usually members of the Stanford Academic Council, the department Chair may approve one non-Academic Council reader if the person brings unusual and necessary expertise to the dissertation research. Generally, this non-Academic Council reader will be a fourth reader, in addition to three Academic Council members.

### University Oral Examination

The Ph.D. candidate is required to take the University oral examination after the dissertation is substantially completed (with the dissertation draft in writing), but before final approval. The examination consists of a public presentation of dissertation research, followed by substantive private questioning on the dissertation and related fields by the University oral committee (four faculty examiners, plus a chairman). The examiners usually include the three members on the student's Ph.D. reading committee. The chairman must not be in the same department as the student or the adviser. Once the oral has been passed, the student finalizes the dissertation for reading committee review and final approval. Forms for the University oral scheduling and a one-page dissertation abstract should be submitted to the AA student services office at least three weeks prior to the date of the oral for departmental review and approval. Students must be enrolled during the quarter when they take their University oral. If the oral takes place during the vacation time between quarters, the student must be enrolled in the prior quarter.

### Doctoral Dissertation

See the Directions for Preparing Doctoral Dissertation (<https://registrar.stanford.edu/students/dissertation-and-thesis-submission/preparing-dissertations-electronic-submission/format>), which outlines the University guidelines for preparing a Ph.D. dissertation.

When a student is ready for a final draft of the dissertation, the student should make an appointment to consult with the graduate degree progress officer to review the completion of the Ph.D. program and the strict formatting requirements for the dissertation. Students must submit the final version of the dissertation to the Registrar's Office no later than the posted deadline. *Note:* All members of the Reading Committee must sign the dissertation before the filing deadline.

The student's Ph.D. reading committee and University oral committee must each include at least one faculty member from Aeronautics and Astronautics.

## Ph.D. Minor in Aeronautics and Astronautics

A student who wishes to obtain a Ph.D. minor in Aeronautics and Astronautics should consult the department office for designation of a minor adviser. A minor in Aeronautics and Astronautics may be obtained by completing 20 units of graduate-level courses in the Department of Aeronautics and Astronautics, following a program and performance approved by the department's candidacy chair. The student's Ph.D. reading committee and University oral committee must each include at least one faculty member from AA.

*Emeriti: (Professors)* Arthur E. Bryson, Robert H. Cannon, Richard Christensen\*, Daniel B. DeBra, Robert W. MacCormack, Bradford W. Parkinson\*, J. David Powell, George S. Springer, Charles R. Steele, Stephen W. Tsai\*, Walter G. Vincenti

*Chair:* Charbel Farhat

*Professors:* Juan Alonso, Brian J. Cantwell, Fu-Kuo Chang, Per Enge (on leave Winter Quarter), Charbel Farhat, Ilan Kroo, Sanjay Lal, Sanjiva Lele, Stephen Rock

*Research Professors:* Antony Jameson

*Associate Professor:* Sigrid Close

*Assistant Professors:* Simone D'Amico, Mykel Kochenderfer, Marco Pavone, Mac Schwager, Debbie Senesky

*Courtesy Professors:* Lambertus Hesselink

*Adjunct Professors:* Andrew Barrows, G. Scott Hubbard, Arif Karabeyoglu, Abid Kemal, James Spilker

\* Recalled to active duty.

## Experimentation/Design Requirements Courses

The following courses satisfy the master's Experimentation/Design Requirements.

		Units
AA 236A	Spacecraft Design	3-5
AA 236B	Spacecraft Design Laboratory	3-5
AA 236C	Spacecraft Design Laboratory	3-5
AA 241X	Autonomous Aircraft: Design/Build/Fly	3
AA 284B	Propulsion System Design Laboratory	3
CS 225A	Experimental Robotics	3
CS 402L	Beyond Bits and Atoms - Lab	1-3
EE 233	Analog Communications Design Laboratory	3-4
EE 234	Photonics Laboratory	3
EE 251	High-Frequency Circuit Design Laboratory	3
EE 312	Integrated Circuit Fabrication Laboratory	3-4
ENGR 341	Micro/Nano Systems Design and Fabrication	3-5
MATSCI 160	Nanomaterials Laboratory	4
MATSCI 164	Electronic and Photonic Materials and Devices Laboratory	3-4
MATSCI 171	Energy Materials Laboratory	3-4
MATSCI 172	X-Ray Diffraction Laboratory	3-4

MATSCI 173	Mechanical Behavior Laboratory	3-4
MATSCI 322	Transmission Electron Microscopy Laboratory	3
ME 210	Introduction to Mechatronics	4
ME 218A	Smart Product Design Fundamentals	4-5
ME 218B	Smart Product Design Applications	4-5
ME 218C	Smart Product Design Practice	4-5
ME 218D	Smart Product Design: Projects	3-4
ME 220	Introduction to Sensors	3-4
ME 310A	Engineering Design Entrepreneurship and Innovation: exploring the problem space	4
ME 310B	Engineering Design Entrepreneurship and Innovation: exploring the solution space	4
ME 310C	Engineering Design Entrepreneurship and Innovation: making it REAL	4
ME 324	Precision Engineering	4
ME 348	Experimental Stress Analysis	3
ME 354	Experimental Methods in Fluid Mechanics	4-5
ME 367	Optical Diagnostics and Spectroscopy Laboratory	4

## Mathematics Courses

Each Aero/Astro degree has a mathematics requirement, for which courses on the following list are pre-approved. (Other advanced courses may also be acceptable.) Students should consult with their advisers in selecting the most appropriate classes for their field. M.S. candidates select 2 courses; they may also use the mathematics courses listed as common choices in the master's degree course requirements. Engineers select 3 courses; Ph.D. candidates select 3 courses, with at least 6 units from courses numbered above 200.

		Units
AA 212	Advanced Feedback Control Design	3
AA 214A	Numerical Methods in Engineering and Applied Sciences	3
AA 214B	Numerical Methods for Compressible Flows	3
AA 218	Introduction to Symmetry Analysis	3
AA 222	Engineering Design Optimization	3-4
AA 228	Decision Making under Uncertainty	3-4
AA 229	Advanced Topics in Sequential Decision Making	3-4
AA 242B	Mechanical Vibrations	3
AA 284C	Propulsion System Design Laboratory	3
CEE 281	Mechanics and Finite Elements	3
CME 108	Introduction to Scientific Computing	3
CME 302	Numerical Linear Algebra	3
CME 303	Partial Differential Equations of Applied Mathematics	3
CME 306	Numerical Solution of Partial Differential Equations	3
CME 307	Optimization	3
CME 308	Stochastic Methods in Engineering	3
CME 326	Numerical Methods for Initial Boundary Value Problems	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
EE 261	The Fourier Transform and Its Applications	3
EE 263	Introduction to Linear Dynamical Systems	3
EE 264	Digital Signal Processing	3-4
EE 278	Introduction to Statistical Signal Processing	3
EE 364A	Convex Optimization I	3
EE 364B	Convex Optimization II	3

ENGR 207B	Linear Control Systems II	3
ENGR 209A	Analysis and Control of Nonlinear Systems	3
MATH 113	Linear Algebra and Matrix Theory	3
MATH 115	Functions of a Real Variable	3
MATH 120	Groups and Rings	3
ME 300A	Linear Algebra with Application to Engineering Computations	3
ME 300B	Partial Differential Equations in Engineering	3
ME 300C	Introduction to Numerical Methods for Engineering	3
ME 335A	Finite Element Analysis	3
ME 335B	Finite Element Analysis	3
ME 335C	Finite Element Analysis	3
ME 408	Spectral Methods in Computational Physics	3
ME 469	Computational Methods in Fluid Mechanics	3
MS&E 201	Dynamic Systems	3-4
MS&E 221	Stochastic Modeling	3
MS&E 311	Optimization	3
MS&E 312	Advanced Methods in Numerical Optimization	3
MS&E 351	Dynamic Programming and Stochastic Control	3
PHYSICS 211	Continuum Mechanics	3
STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5
STATS 116	Theory of Probability	3-5
STATS 217	Introduction to Stochastic Processes I	2-3

# BIOENGINEERING

Courses offered by the Department of Bioengineering are listed under the subject code BIOE (<https://explorecourses.stanford.edu/search?q=BIOE&view=catalog&page=0&academicYear=&collapse=&filter-coursestatus=Active=on&filter-departmentcode=BIOE=on&filter-catalognumber=BIOE=on>) on the *Stanford Bulletin's* ExploreCourses web site.

Bioengineering is jointly supported by the School of Engineering and the School of Medicine. The facilities and personnel of the Department of Bioengineering are housed in the Shriram Center, James H. Clark Center, the William F. Durand Building for Space Engineering and Science, the William M. Keck Science Building, the Jerry Yang and Akiko Yamazaki Environment and Energy Building, and the Richard M. Lucas Center for Magnetic Resonance Spectroscopy and Imaging. The departmental headquarters is in the Shriram Center for Bioengineering and Chemical Engineering.

Courses in the teaching program lead to the degrees of Bachelor of Science in Bioengineering, Master of Science and Doctor of Philosophy. The department collaborates in research and teaching programs with faculty members in Chemical Engineering, Mechanical Engineering, Electrical Engineering, and departments in the School of Medicine. Quantitative biology is the core science base of the department. The research and educational thrusts are in biomedical computation, biomedical imaging, biomedical devices, regenerative medicine, and cell/molecular engineering. The clinical dimension of the department includes cardiovascular medicine, neuroscience, orthopedics, cancer care, neurology, and environment.

## Mission of the Undergraduate Program in Bioengineering

The Stanford Bioengineering (BIOE) major enables students to combine engineering and the life sciences in ways that advance scientific discovery, healthcare and medicine, manufacturing, environmental quality, culture, education, and policy. Students who major in bioengineering earn a fundamental engineering degree for which the raw materials, underlying basic sciences, fundamental toolkit, and future frontiers are all defined by the unique properties of living systems.

The department offers an undergraduate major in Bioengineering leading to the B.S. degree in Bioengineering.

## Learning Outcomes (Undergraduate)

The learning outcomes are used in evaluating students as well as the department's undergraduate program. The department expects undergraduate majors in the program to be able to demonstrate the ability to:

1. Apply the knowledge of mathematics, science, and engineering.
2. Design and conduct experiments, as well to analyze and interpret data.
3. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. Function on multidisciplinary teams.
5. Identify, formulate, and solve engineering problems.
6. Understand professional and ethical responsibility.
7. Communicate effectively.
8. Understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. Demonstrate a working knowledge of contemporary issues.

10. Apply the techniques, skills, and modern engineering tools necessary for engineering practice.

11. Transition from engineering concepts and theory to real engineering applications.

## Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course work with specialization in an area of the field, including biomedical computation, regenerative medicine and tissue engineering, molecular and cell bioengineering, biomedical imaging, and biomedical devices.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Bioengineering and related fields.

## Graduate Programs in Bioengineering

The University's requirements for the M.S. and Ph.D. degrees are outlined in the "Graduate Degrees (p. 50)" section of this bulletin.

### Admission

Students are expected to enter with a series of core competencies in mathematics, biology, chemistry, physics, computing, and engineering. Students entering the program are assessed by the examination of their undergraduate transcripts and research experiences. Specifically, the department requires that students have completed mathematics through multivariable calculus and differential equations, completed a series of undergraduate biology courses and completed physics, chemistry, and computer sciences courses required of all undergraduate majors in engineering.

Qualified applicants are encouraged to apply for predoctoral national competitive fellowships, especially those from the National Science Foundation. Applicants to the Ph.D. program should consult with their financial aid officers for information and applications.

The deadline for receiving applications is December 5, 2017.

Further information and application instructions for all graduate degree programs may be obtained from Graduate Admissions (<http://gradadmissions.stanford.edu>).

## Bachelor of Science in Bioengineering

The department offers an undergraduate major in Bioengineering (BIOE) leading to the B.S. degree in Engineering. For additional information, see the *Handbook for Undergraduate Engineering Programs (UGHB)* at <http://ughb.stanford.edu>.

## Bioengineering (BIOE)

Completion of the undergraduate program in Bioengineering leads to the conferral of the Bachelor of Science in Bioengineering.

### Mission of the Undergraduate Program in Bioengineering

The Stanford Bioengineering major enables students to combine engineering and the life sciences in ways that advance scientific discovery, healthcare and medicine, manufacturing, environmental quality, culture, education, and policy. Students who major in BioE earn a fundamental engineering degree for which the raw materials, underlying basic sciences, fundamental toolkit, and future frontiers are all defined by the unique properties of living systems.

Students will complete engineering fundamentals courses, including an introduction to bioengineering and computer programming. A



series of core BIOE classes beginning in the second year leads to a student-selected depth area and a senior capstone design project. The department also organizes a summer Research Experience for Undergraduates (REU) (<http://bioengineering.stanford.edu/student-resources/reu>) program. BIOE graduates are well prepared to pursue careers and lead projects in research, medicine, business, law, and policy.

## Requirements

### Mathematics

14 units minimum<sup>1</sup>

May also be satisfied with AP Calculus.

MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus	10
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Select one of the following sequences:

CME 100 & CME 102	Vector Calculus for Engineers and Ordinary Differential Equations for Engineers (Recommended)	10
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MATH 51 & MATH 53	Linear Algebra and Differential Calculus of Several Variables and Ordinary Differential Equations with Linear Algebra	10
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Select one of the following:

CME 106	Introduction to Probability and Statistics for Engineers (Recommended)	4-5
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or STATS 110	Statistical Methods in Engineering and the Physical Sciences	
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or STATS 141	Biostatistics	
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### Science

26 units minimum<sup>2</sup>

CHEM 31X or CHEM 31A & CHEM 31B	Chemical Principles Accelerated Chemical Principles I and Chemical Principles II	5-10
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CHEM 33	Structure and Reactivity of Organic Molecules	5
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BIO 82	Genetics	4
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BIO 84	Physiology	4
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PHYSICS 41	Mechanics	4
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PHYSICS 43	Electricity and Magnetism	4
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### Technology in Society

BIOE 131	Ethics in Bioengineering (WIM)	3
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### Engineering Fundamentals

ENGR 70A	Programming Methodology (same as CS 106A)	5
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ENGR 80	Introduction to Bioengineering (Engineering Living Matter)	4
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Fundamentals Elective; see UGHB Fig. 3-4 for approved course list; 3-5  
may not use ENGR 70B or ENGR 70X

### Bioengineering Core

BIOE 42	Physical Biology	4
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BIOE 44	Fundamentals for Engineering Biology Lab	4
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BIOE 101	Systems Biology	3
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BIOE 103	Systems Physiology and Design	4
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BIOE 123	Biomedical System Prototyping Lab	4
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BIOE 141A	Senior Capstone Design I	4
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BIOE 141B	Senior Capstone Design II	4
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### Bioengineering Depth Electives

Four courses, minimum 12 units: 12

BIOE 115	Computational Modeling of Microbial Communities	
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BIOE 122	Biosecurity and Bioterrorism Response	
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BIOE 140	Physical Biology of Macromolecules	
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BIOE 201C	Diagnostic Devices Lab	
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BIOE 211	Biophysics of Multi-cellular Systems and Amorphous Computing	
BIOE 212	Introduction to Biomedical Informatics Research Methodology	
BIOE 214	Representations and Algorithms for Computational Molecular Biology	
BIOE 217	Translational Bioinformatics	
BIOE 220	Introduction to Imaging and Image-based Human Anatomy	
or BIOE 51	Anatomy for Bioengineers	
BIOE 221	Physics and Engineering of Radionuclide-based Medical Imaging	
BIOE 222	Instrumentation and Applications for Multi- modality Molecular Imaging of Living Subjects	
BIOE 223	Physics and Engineering of X-Ray Computed Tomography	
BIOE 224	Probes and Applications for Multi-modality Molecular Imaging of Living Subjects	
BIOE 225	Ultrasound Imaging and Therapeutic Applications	
BIOE 227	Functional MRI Methods	
BIOE 231	Protein Engineering	
BIOE 244	Advanced Frameworks and Approaches for Engineering Integrated Genetic Systems	
BIOE 253		
BIOE 260	Tissue Engineering	
BIOE 279	Computational Biology: Structure and Organization of Biomolecules and Cells	
BIOE 281	Biomechanics of Movement	
BIOE 287		
BIOE 291	Principles and Practice of Optogenetics for Optical Control of Biological Tissues	

<sup>1</sup> It is strongly recommended that CME 100 Vector Calculus for Engineers and CME 102 Ordinary Differential Equations for Engineers be taken rather than MATH 51 Linear Algebra and Differential Calculus of Several Variables and MATH 53 Ordinary Differential Equations with Linear Algebra. If you are taking the MATH 50 series, it is strongly recommended to take CME 192 Introduction to MATLAB. CME 106 Introduction to Probability and Statistics for Engineers utilizes MATLAB, a powerful technical computing program, and should be taken rather than STATS 110 Statistical Methods in Engineering and the Physical Sciences or STATS 141 Biostatistics. Although not required, CME 104 Linear Algebra and Partial Differential Equations for Engineers is recommended for some Bioengineering courses.

<sup>2</sup> Science must include both Chemistry (CHEM 31A Chemical Principles I and CHEM 31B Chemical Principles II; or CHEM 31X Chemical Principles Accelerated) and calculus-based Physics (PHYSICS 41 Mechanics and PHYSICS 43 Electricity and Magnetism), with two quarters of course work in each, in addition to two courses of BIO core. CHEM 31A Chemical Principles I and CHEM 31B Chemical Principles II are considered one course even though given over two quarters.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>). Students pursuing a premed program need to take additional courses; see the UGHB, BioE Premed 4-Year Plan.

## Honors Program

The School of Engineering offers a program leading to a Bachelor of Science in Bioengineering with Honors (BIOE-BSH). This program provides the opportunity for qualified BioE majors to conduct

independent research at an advanced level with a faculty research adviser and documented in an honors thesis.

In order to receive departmental honors, students admitted to the program must:

1. Declare the honors program in Axess (BIOE-BSH).
2. Maintain an overall grade point average (GPA) of at least 3.5 as calculated on the unofficial transcript.
3. Complete at least two quarters of research with a minimum of nine units of BIOE 191 Bioengineering Problems and Experimental Investigation or BIOE 191X Out-of-Department Advanced Research Laboratory in Bioengineering for a letter grade; up to three units may be used towards the bioengineering depth elective requirements.
4. Submit a completed thesis draft to the honors adviser and second reader by the third week of Spring Quarter. Further revisions and final endorsement are to be finished by the second Monday in May, when two signed bound copies plus one PC-compatible CD-ROM are to be submitted to the student services officer.
5. Attend the Bioengineering Honors Symposium at the end of Spring Quarter and give a poster or oral presentation, or present in another approved suitable forum.

For more information and application instructions, see the Bioengineering Honors Program (<http://bioengineering.stanford.edu/academics/undergraduate-programs/bioengineering-honors-program>) web site.

## Coterminal Master's Program in Bioengineering

This option is available to Stanford undergraduates who wish to work simultaneously toward a B.S. in another field and an M.S. in Bioengineering. The degrees may be granted simultaneously or at the conclusion of different quarters, though the bachelor's degree cannot be awarded after the master's degree has been granted.

The University minimum requirements for the coterminal program are 180 units for the bachelor's degree plus 45 unduplicated units for the master's degree.

In order to apply for the coterminal master's program student's must have completed six, non-summer quarters at Stanford (two non-summer quarters for transfer students), have completed 120 undergraduate units, and must have declared the undergraduate major. They must be accepted into our program one quarter before receiving the B.S. degree.

Students should apply directly to the Bioengineering student service office by December 5, 2017. Students interested in the coterminal master's degree must take the Graduate Record Examination (GRE) (<http://www.gre.org>). Prospective applicants should see the department's web site for application form, instructions, and supporting documents (<http://bioengineering.stanford.edu/admissions/coterm>).

The application must provide evidence of potential for strong academic performance as a graduate student. The application is evaluated and acted upon by the graduate admissions committee of the department. Students are expected to enter with a series of core competencies in mathematics, biology, chemistry, physics, computing, and engineering. Typically, a GPA of at least 3.5 in engineering, science, and math is expected.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements

for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Science in Bioengineering

The Master of Science in Bioengineering requires 45 units of course work. The curriculum consists of core bioengineering courses, technical electives, seminars and unrestricted electives. Core courses focus on quantitative biology and biological systems analysis. Approved technical electives are chosen by the student in consultation with his/her graduate adviser, and can be selected from graduate course offerings in mathematics, statistics, engineering, physical sciences, life sciences, and medicine. Seminars highlight emerging research in bioengineering and provide training in research ethics. Unrestricted electives can be freely chosen by the student in association with his/her adviser.

### Requirements

The department's requirements for the M.S. in Bioengineering are:

#### 1. Core Bioengineering courses (10 units)

The following courses are required:

		Units
BIOE 300A	Molecular and Cellular Bioengineering	3
BIOE 300B	Engineering Concepts Applied to Physiology	3
Select two of the following:		4-5
BIOE 301A	Molecular and Cellular Engineering Lab	
BIOE 301B	Clinical Needs and Technology	
BIOE 301C	Diagnostic Devices Lab	
BIOE 301D	Microfluidic Device Laboratory	
Total Units		10-11

These courses, together with the approved technical electives, should form a cohesive course of study that provides depth and breadth.

#### 2. Approved Technical Electives (26 units)

These units must be selected from graduate courses in mathematics, statistics, engineering, physical science, life science, and medicine. They should be chosen in concert with the bioengineering courses to provide a cohesive degree program in a bioengineering focus area. Students are required to take at least one course in some area of device or instrumentation. Up to 9 units of directed study and research may be used as approved electives.

#### 3. Seminars (3 units)

The seminar units should be fulfilled through:

BIOE 393	Bioengineering Departmental Research Colloquium	2
MED 255	The Responsible Conduct of Research	1

Other relevant seminar units may also be used with the approval of the faculty adviser. One of the seminar units must be MED 255 The Responsible Conduct of Research.

#### 4. Unrestricted Electives (6 units).

Students are assigned an initial faculty adviser to assist them in designing a plan of study that creates a cohesive degree program with a concentration in a particular bioengineering focus area. These focus areas include, but are not limited to: Biomedical Computation, Regenerative Medicine/Tissue Engineering, Molecular and Cell Bioengineering, Biomedical Imaging, and Biomedical Devices.

To ensure that an appropriate program is pursued by all M.S. candidates, students who first matriculate at Stanford at the graduate level must:

1. submit an adviser-approved Program Proposal for a Master's Degree form to the student services office during the first month of the first quarter of enrollment
2. obtain approval from the M.S. adviser and the Chair of Graduate Studies for any subsequent program change or changes.

It is expected that the requirements for the M.S. in Bioengineering can be completed within approximately one year. There is no thesis requirement for the M.S.

Due to the interdisciplinary nature of Bioengineering, a number of courses are offered directly through the Bioengineering Department but many are available through other departments. See respective ExploreCourses for course descriptions.

## Doctor of Philosophy in Bioengineering

A student studying for the Ph.D. degree must complete a master's degree (45 units) comparable to that of the Stanford M.S. degree in Bioengineering. Up to 45 units of master's degree residency units may be counted towards the degree. The Ph.D. degree is awarded after the completion of a minimum of 135 units of graduate work as well as satisfactory completion of any additional University requirements. Students admitted to the Ph.D. program with an M.S. degree must complete at least 90 units of work at Stanford. The maximum number of transfer units is 45.

On the basis of the research interests expressed in their application, students are assigned an initial faculty adviser who assists them in choosing courses and identifying research opportunities. The department does not require formal lab rotations, but students are encouraged to explore research activities in two or three labs during their first academic year.

Prior to being formally admitted to candidacy for the Ph.D. degree, the student must demonstrate knowledge of bioengineering fundamentals and a potential for research by passing a qualifying oral examination before the end of the the second year.

Typically, the exam is taken shortly after the student earns a master's degree. The student must have a graduate Stanford GPA of 3.25 to be eligible for the exam. Once the student's faculty sponsor has agreed that the exam is to take place, the student must submit an application folder containing items including a curriculum vitae, research project abstract, and preliminary dissertation proposal to the student services office. Information about the exam may be obtained from the student services office.

**Units** In addition to the course requirements of the M.S. degree, doctoral candidates must complete a minimum of 15 additional units of approved formal course work (excluding research, directed study, and seminars).

## Dissertation Reading Committee

Each Ph.D. candidate is required to establish a reading committee for the doctoral dissertation within six months after passing the department's Ph.D. qualifying exams. Thereafter, the student should consult frequently with all members of the committee about the direction and progress of the dissertation research, no less than once per year.

A dissertation reading committee consists of the principal dissertation adviser and at least two other readers. Reading committees in Bioengineering may include faculty from another department. It is required that at least one member of the Bioengineering faculty be on each reading committee. The initial committee, and any subsequent changes, must be officially approved by the department Chair.

## University Oral and Dissertation

The Ph.D. candidate is required to take the University oral examination after the dissertation is substantially completed (with the dissertation draft in writing), but before final approval. The examination consists of a public presentation of dissertation research, followed by substantive private questioning on the dissertation and related fields by the University oral committee (four selected faculty members, plus a chair from another department). Once the oral has been passed, the student finalizes the dissertation for reading committee review and final approval.

## Ph.D. Minor in Bioengineering

Doctoral students pursuing a Ph.D. degree in a degree program other than Bioengineering may apply for the Ph.D. minor in Bioengineering. A minor is not a requirement for any degree, but is available when agreed upon by the student and the major and minor department.

Application forms, including the University's general requirements, can be found at <http://registrar.stanford.edu/shared/forms.htm>.

A student desiring a Ph.D. minor in Bioengineering must have a minor program advisor who is a regular Bioengineering faculty member. This advisor must be a member of the student's reading committee for the doctoral dissertation, and the entire reading committee must meet at least one year prior to the date of the student's dissertation defense.

The Ph.D. minor program must include at least 20 units of course work in Stanford Bioengineering or Bioengineering cognate courses at or above the 200 level. Of these 20 units, no more than 10 can be in cognate courses. All courses listed to fulfill the 20-unit requirement must be taken for a letter grade and the GPA must be at least 3.25. Courses used for a minor may not be used to also meet the requirements for a master's degree.

## M.D./Ph.D. Dual Degree Program

Students interested in a career oriented towards bioengineering and medicine can pursue the combined M.D./Ph.D. degree program. Stanford has two ways to do an M.D./Ph.D. U.S. citizens and permanent residents can apply to the Medical Scientist Training Program and can be accepted with funding from both M.D. and Ph.D. programs for stipend and tuition. They then apply to the bioengineering Ph.D during their first or second year of M.D. training. Students not admitted to the Medical Scientist Training Program must apply to be admitted separately to the M.D. program and the Ph.D. program of their choice.

The Ph.D. is administered by the Department of Bioengineering. To be formally admitted as a Ph.D. degree candidate in this combined degree program, the student must apply through normal departmental channels and must have earned or have plans to earn an M.S. in bioengineering or other engineering discipline at Stanford or another university. The M.S.

requires 45 units of course work which consists of core bioengineering courses, technical electives, seminars, and 6 unrestricted units. Students must also pass the Department of Bioengineering Ph.D. qualifying examination.

For students fulfilling the full M.D. requirements who earned their master's level engineering degree at Stanford, the Department of Bioengineering waives the normal departmental requirement of 15 units applied towards the Ph.D. degree beyond the master's degree level through formal course work. Consistent with the University Ph.D. requirements, the department accepts 15 units comprised of courses, research, or seminars approved by the student's academic adviser and the department chair. Students not completing their M.S. engineering degree at Stanford are required to take 15 units of formal course work in engineering-related areas as determined by their academic adviser.

## Joint Degree Programs in Bioengineering and the School of Law

The School of Law and the Department of Bioengineering offer joint programs leading to either a J.D. degree combined with an M.S. degree in Bioengineering or to a J.D. degree combined with a Ph.D. in Bioengineering.

The J.D./M.S. and J.D./Ph.D. degree programs are designed for students who wish to prepare themselves intensively for careers in areas relating to both law and bioengineering. Students interested in either joint degree program must apply and gain entrance separately to the School of Law and the Department of Bioengineering and, as an additional step, must secure permission from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or the Bioengineering Department may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or the Department of Bioengineering. Faculty advisers from each academic unit will participate in the planning and supervising of the student's joint program. Students must be enrolled full time in the Law School for the first year of law school, and, at some point during the joint program, may be required to devote one or more quarters largely or exclusively to studies in the Bioengineering program regardless of whether enrollment at that time is in the Law School or in the Department of Bioengineering. At all other times, enrollment may be in the graduate school or the Law School, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the M.S. or Ph.D. degrees as specified in the *Stanford Bulletin* or elsewhere.

The Law School shall approve courses from the Bioengineering Department that may count toward the J.D. degree, and the Bioengineering Department shall approve courses from the Law School that may count toward the M.S. or Ph.D. degree in Bioengineering. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The lists may differ depending on whether the student is pursuing an M.S. or a Ph.D. in Bioengineering.

In the case of a J.D./M.S. program, no more than 45 units of approved courses may be counted toward both degrees. In the case of a J.D./Ph.D. program, no more than 54 units of approved courses may be counted toward both degrees. In either case, no more than 36 units of courses that originate outside the Law School may count toward the law degree. To the extent that courses under this joint degree program originate outside of the Law School but count toward the law degree,

the law school credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis, but not below zero. The maximum number of law school credits that may be counted toward the M.S. or Ph.D. in Bioengineering is the greater of: (i) 15 units; or (ii) the maximum number of units from courses outside of the department that M.S. or Ph.D. candidates in Bioengineering are permitted to count toward the applicable degree under general departmental guidelines or in the case of a particular student's individual program. Tuition and financial aid arrangements will normally be through the school in which the student is then enrolled.

*Chair:* Norbert J. Pelc

*Professors:* Russ B. Altman, Kwabena Boahen, Dennis R. Carter, Karl Deisseroth, Scott L. Delp, Norbert J. Pelc, Beth Pruitt, Stephen R. Quake, Matthew Scott, Christina D. Smolke, James R. Swartz, Paul Yock

*Associate Professors:* Annelise E. Barron, Zev David Bryant, Jennifer R. Cochran, Markus Willard Covert, Andrew Endy, Daniel S. Fisher, Kerwyn C. Huang, Jin Hyung Lee, Craig Levin, Jan T. Liphardt, Alison Lesley Marsden

*Assistant Professors:* David B. Camarillo, Lacramioara Bintu, Polly M. Fordyce, Possu Huang, Jin Hyung Lee, Michael Z. Lin, Paul Nuyujukian, Manu Prakash, Stanley S. Qi, Ingmar Riedel-Kruse, Bo Wang, Fan Yang

*Courtesy Professors:* Christopher H. Contag, Bruce L. Daniel, Daniel S. Fisher, Sanjiv S. Gambhir, Garry E. Gold, Stuart B. Goodman, Geoffrey C. Gurtner, Thomas M. Krummel, Craig Levin, Michael T. Longaker, David Magnus, Lloyd B. Minor, Krishna Shenoy, Paul J. Wang, Joseph Woo

*Courtesy Associate Professors:* Jeffrey A. Feinstein, Brian Hargreaves, Kim Butts Pauly, Marc E. Levenston, Sakti Srivastava, Yunzhi Peter Yang

*Courtesy Assistant Professors:* Sarah Heilshorn, Ellen Kuhl, Mary Frances Nunez Teruel, James K. Wall

*Consulting Faculty:* Todd Brinton, Stephen Fodor, Uday Kumar, John Linehan, Marc L. Salit, Gordon Saul, Charles A. Taylor

*Lecturer:* Natalia Khuri, Joesph Mandato, Ryan K. Piece, Kara H. Rogers, Ross D. Venook

### Graduate Related Courses

		Units
BIOMEDIN 210	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
BIOMEDIN 217	Translational Bioinformatics	4
EE 369A	Medical Imaging Systems I	3
EE 369B	Medical Imaging Systems II	3
ME 287	Mechanics of Biological Tissues	4

# CHEMICAL ENGINEERING

Courses offered by the Department of Chemical Engineering are listed under the subject code CHEMENG on the (<https://explorecourses.stanford.edu/search?q=CHEMENG&view=catalog&page=0&academicYear=&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&collapse=&filter-departmentcode=CHEMENG=on&filter-catalognumber-CHEMENG=on&filter-coursestatus-Active=on&filter-catalognumber-CHEMENG=on>) *Stanford Bulletin's* ExploreCourses web site..

Research investigations are currently being carried out in the following fields: applied statistical mechanics, biocatalysis, bioengineering, biophysics, colloid science, computational materials science, electronic materials, hydrodynamic stability, kinetics and catalysis, Newtonian and non-Newtonian fluid mechanics, polymer science, renewable energy, rheo-optics of polymeric systems, and surface and interface science. Additional information may be found at <http://cheme.stanford.edu>.

The Department of Chemical Engineering offers opportunities for both undergraduates and graduate students to pursue course work and research in energy sciences and technology, which include the chemical, physical, mathematical, and engineering sciences. Courses include 25E, 35N, 140/240, 142/242, 162/262, 432, 444 with some 400 level courses being offered only in alternate years.

In addition, both undergraduates and graduate students can pursue work in interdisciplinary biosciences, which include the chemical, biological, physical, mathematical, and engineering sciences. Courses include 150, 174/274, 181/281, 183/283, 185B, 355, 420, 450, 454 with some advanced graduate courses offered only in alternate years. Students are encouraged to review course offerings in all departments of the School of Engineering and to seek academic advising with individual chemical engineering faculty. Students wishing assistance should talk with student services staff in the department.

Further information about the department also may be found at <http://cheme.stanford.edu>. Undergraduates considering majoring in Chemical Engineering are encouraged to talk with faculty and to meet with student services' staff in Shriram room 129. Students interested in pursuing advanced work in chemical engineering, including coterminal degrees, should contact the student services manager. Admission to an advanced degree program for an active Stanford graduate student is by approval of a Graduate Authorization Petition. All other interested applicants should go to <http://studentaffairs.stanford.edu/gradadmissions> for general and departmental information about the requirements and processes for applying for admission to a graduate degree program.

## Mission of the Undergraduate Program in Chemical Engineering

Chemical engineers are responsible for the conception and design of processes for the purpose of production, transformation, and transportation of materials. This activity begins with experimentation in the laboratory and is followed by implementation of the technology in full-scale production. The mission of the undergraduate program in Chemical Engineering is to develop students' understanding of the core scientific, mathematical, and engineering principles that serve as the foundation underlying these technological processes. The program's core mission is reflected in its curriculum which is built on a foundation in the sciences of chemistry, physics, and biology. Course work includes the study of applied mathematics, material and energy balances, thermodynamics, fluid mechanics, energy and mass transfer, separations technologies, chemical reaction kinetics and reactor design, and process design. The

program provides students with excellent preparation for careers in the corporate sector and government or for advanced study.

## Learning Outcomes (Undergraduate)

Learning outcomes are used in evaluating students and the undergraduate program. The department expects undergraduate majors in the program to be able to demonstrate the following:

1. an ability to apply knowledge of mathematics, science, and engineering.
2. an ability to design and conduct experiments, as well as to analyze and interpret data.
3. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. an ability to function on multidisciplinary teams.
5. an ability to identify, formulate, and solve engineering problems.
6. an understanding of professional and ethical responsibility.
7. an ability to communicate effectively.
8. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. a recognition of the need for, and an ability to engage in life-long learning.
10. a knowledge of contemporary issues.
11. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

## Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through advanced lecture course work in the fundamentals of the field, including microhydrodynamics, molecular thermodynamics, kinetics, spectroscopy, applied mathematics, and biochemical engineering, in addition to the student's area of specialization. All students must master the fundamental chemical, physical, and biological concepts that govern molecular behavior.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Chemical Engineering and related fields.

## Graduate Programs in Chemical Engineering

The University's requirements, including residency requirements, for the M.S., Engineer, and Ph.D. degrees are summarized in the "Graduate Degrees" section of this bulletin.

Current research and teaching activities cover a number of advanced topics in chemical engineering, including applied statistical mechanics, biocatalysis, biochemical engineering, bioengineering, biophysics, computational materials science, colloid science, dynamics of complex fluids, energy conversion, functional genomics, hydrodynamic stability, kinetics and catalysis, microrheology, molecular assemblies, nanoscience and technology, Newtonian and non-Newtonian fluid mechanics, polymer physics, protein biotechnology, renewable fuels, semiconductor processing, soft materials science, solar utilization, surface and interface science, and transport mechanics.

## Fellowships and Assistantships

Qualified predoctoral applicants are encouraged to apply for nationally competitive fellowships, for example, those from the National Science Foundation. Applicants to the Ph.D. program should consult with their financial aid officers for application information and advice. In the absence of other awards, incoming Ph.D. students normally are awarded departmental fellowships. Matriculated Ph.D. students are supported primarily by fellowship awards and assistantship research or teaching appointments. All students are encouraged to apply for external, competitive fellowships and may obtain information about various awarding agencies from faculty advisers and student services. Assistantships are paid positions for graduate students that, in addition to a salary, provide the benefit of a tuition allocation. Individual faculty members appoint students to research assistantships; the department chair appoints doctoral students to teaching assistantships. Contact departmental student services for additional information.

## Bachelor of Science in Chemical Engineering

The Chemical Engineering B.S. program requires basic courses in biology, chemistry, engineering, mathematics, and physics. The depth sequence of courses required for the major in chemical engineering provides training in applied chemical kinetics, biochemical engineering, electronic materials, engineering thermodynamics, plant design, polymers, process analysis and control, separation processes, and transport phenomena. Undergraduates who are considering and/or wish to major in chemical engineering should talk with departmental student services as early as during freshman orientation if feasible and consult the curriculum outlined in the "Undergraduate Program in Chemical Engineering" section of this bulletin. Courses taken to fulfill the requirements for the major (courses in mathematics; science; technology and society; engineering fundamentals; and engineering depth) must be taken for a letter grade if this option is offered.

Representative sequences of courses leading to a B.S. in Chemical Engineering, in both flow chart and 4-year, quarter-by-quarter formats, can be found in the *Handbook for Undergraduate Engineering Programs*, available at <http://ughb.stanford.edu>. These are explanatory examples, with each sequence starting at a different level and demonstrating how a student, based on his or her pre-college preparation, can complete the major in four years. These typical course schedules are available as well from departmental student services and chemical engineering faculty advisers for undergraduates. It is recommended that students discuss their prospective programs with the chemical engineering faculty advisers, particularly if they are transferring from another major such as Biology, Chemistry, Physics, or another Engineering major. With advance planning, students can usually arrange to attend one of the overseas campuses.

Students interested in a minor in Chemical Engineering should consult the requirements for a "Minor in Chemical Engineering" section of this bulletin.

## Chemical Engineering

Completion of the undergraduate program in Chemical Engineering leads to the conferral of the Bachelor of Science in Chemical Engineering.

### Mission of the Undergraduate Program in Chemical Engineering

Chemical engineers are responsible for the conception and design of processes for the purpose of production, transformation, and transportation of materials. This activity begins with experimentation in the laboratory and is followed by implementation of the technology in full-scale production. The mission of the undergraduate program in Chemical Engineering is to develop students' understanding of the core scientific, mathematical, and engineering principles that serve as the foundation underlying these technological processes. The program's core mission is

reflected in its curriculum which is built on a foundation in the sciences of chemistry, physics, and biology. Course work includes the study of applied mathematics, material and energy balances, thermodynamics, fluid mechanics, energy and mass transfer, separations technologies, chemical reaction kinetics and reactor design, and process design. The program provides students with excellent preparation for careers in the corporate sector and government, or for graduate study.

### Requirements\*

	Units
<b>Mathematics</b> <sup>1</sup>	10
The following sequence or approved AP credit	
MATH 19 Calculus	
MATH 20 Calculus	
MATH 21 Calculus	
Select one of the following:	5-10
CME 100 Vector Calculus for Engineers	
MATH 51 Linear Algebra and Differential Calculus of Several Variables and Integral Calculus of Several Variables & MATH 52	
Select one of the following:	5
CME 102 Ordinary Differential Equations for Engineers or MATH 53 Ordinary Differential Equations with Linear Algebra	
Select one of the following:	4-5
CME 104 Linear Algebra and Partial Differential Equations for Engineers or CME 106 Introduction to Probability and Statistics for Engineers	
<b>Science</b> <sup>1</sup>	
CHEM 31X Chemical Principles Accelerated	5
CHEM 33 Structure and Reactivity of Organic Molecules	5
CHEM 35 Organic Chemistry of Bioactive Molecules	5
PHYSICS 41 Mechanics	4
PHYSICS 43 Electricity and Magnetism	4
CHEM 131 Organic Polyfunctional Compounds	3
<b>Technology in Society</b>	
One course required, see Basic Requirement 4; course chosen must be on the SoE-Approved Courses list at <a href="http://ughb.stanford.edu">ughb.stanford.edu</a> the year taken.	3-5
<b>Engineering Fundamentals</b>	
Three courses minimum; see Basic Requirement 3	
CHEMENG/ENGR Introduction to Chemical Engineering 20	4
Fundamentals Elective from another School of Engineering department	3-5
See the UGHB for a list of courses.	
Select one of the following:	3
ENGR 25B Biotechnology (same as CHEMENG 25B)	
ENGR 25E Energy: Chemical Transformations for Production, Storage, and Use (same as CHEMENG 25E)	
<b>Chemical Engineering Depth</b>	
Minimum 68 Engineering Science and Design units; see Basic Requirement 5	
CHEMENG 10 The Chemical Engineering Profession	1
CHEMENG 100 Chemical Process Modeling, Dynamics, and Control	3
CHEMENG 110 Equilibrium Thermodynamics	3
CHEMENG 120A Fluid Mechanics	4
CHEMENG 120B Energy and Mass Transport	4
CHEMENG 130 Separation Processes	3
CHEMENG 150 Biochemical Engineering	3

CHEMENG 170	Kinetics and Reactor Design	3
CHEMENG 180	Chemical Engineering Plant Design	4
CHEMENG 181	Biochemistry I	4
CHEMENG 185A	Chemical Engineering Laboratory A (WIM)	4
CHEMENG 185B	Chemical Engineering Laboratory B	4
CHEM 171	Physical Chemistry I	4
CHEM 173	Physical Chemistry II	3
CHEM 175	Physical Chemistry III	3
Select four of the following: <sup>2,3</sup>		12
CHEMENG 140	Micro and Nanoscale Fabrication Engineering	
CHEMENG 142	Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations	
CHEMENG 160	Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life	
CHEMENG 162	Polymers for Clean Energy and Water	
CHEMENG 174	Environmental Microbiology I	
CHEMENG 183	Biochemistry II	
CHEMENG 196	Creating New Ventures in Engineering and Science-based Industries	
Total Units		125-135

<sup>1</sup> Unit count is higher if program includes one or more of the following: MATH 51 and MATH 52 in lieu of CME 100; or CHEM 31A and CHEM 31B in lieu of CHEM 31X.

<sup>2</sup> Any two acceptable except combining 160 and 162.

<sup>3</sup> Students may substitute two of the depth electives with two other science and engineering 3-unit lecture courses. See Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>) for additional details.

\* For additional information and sample programs, see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>)

## Honors Program in Chemical Engineering

The Department of Chemical Engineering offers a program leading to the degree of Bachelor of Science in Chemical Engineering with Honors. Qualified undergraduate majors conduct independent study and research at an advanced level with faculty mentors, graduate students, and fellow undergraduates. This three quarter sequential program requires concurrent participation each quarter in the CHEMENG 191H Undergraduate Honors Seminar; completion of a faculty-approved thesis; and participation in the Chemical Engineering Honors Poster Session held annually during the Mason Lecture Series Spring Quarter. The last requirement may be fulfilled through an alternative, public, oral presentation with the approval of the department chair. A research proposal/application must be submitted at least five quarters prior to graduation with work to begin at a minimum of four quarters prior to graduation.

Admission to the honors program is by application and submission of a research proposal and is subject to approvals by faculty advisers, sponsors, and the chair of the department. Declared Chemical Engineering majors with a cumulative grade point average (GPA) of 3.5 or higher are encouraged to apply. Students must submit their applications no later than the first week of March Winter Quarter of their junior year, assuming a June degree conferral the following year, e.g. the 2017-2018 deadline is March 2, 2018. An application includes a Stanford transcript in addition to the research proposal, approved by both the student's research thesis adviser, a faculty reader, and, if required, a chemical engineering faculty sponsor. The research adviser or the reader or, alternatively, a faculty sponsor, must be a faculty member in the Department of Chemical Engineering. Students must start their research no later than Spring Quarter their junior year and

are encouraged to consider incorporating research opportunities such as those sponsored by Undergraduate Academic Life into their honors research proposal; see [http://ual.stanford.edu/00/research\\_opps/Grants](http://ual.stanford.edu/00/research_opps/Grants) [http://ual.stanford.edu/00/research\\_opps/Grants](http://ual.stanford.edu/00/research_opps/Grants). See departmental student services staff in Shriram Center room 129, for more information about the application process, a proposal template, and other assistance.

In order to receive departmental honors, students admitted to the honors program must:

1. Maintain an overall grade point average (GPA) of at least 3.5 as calculated on the unofficial transcript.
2. Complete at least three quarters of research with an aggregate enrollment of a minimum of 9 units in CHEMENG 190H Undergraduate Honors Research in Chemical Engineering for a letter grade. All quarters must focus on the same topic. The same faculty adviser and faculty reader should be maintained throughout if feasible.
3. Enroll in CHEMENG 191H Undergraduate Honors Seminar, concurrently with each quarter of enrollment in CHEMENG 190H Undergraduate Honors Research in Chemical Engineering.
4. Participate with a poster and oral presentation of thesis work at the Chemical Engineering Honors Poster Session held during the Mason Lectures week, Spring Quarter, or, at the Undergraduate Program Committee's discretion, at a comparable public event. Submit at the same time to student services one copy of the poster in electronic format.
5. Submit final drafts of a thesis simultaneously to the adviser and the reader and, if appropriate, to the Chemical Engineering faculty sponsor, no later than April 9, 2018, or the first school day of the second week of the quarter in which the degree is to be conferred.
6. Complete all work and thesis revisions and obtain indicated faculty approvals on the Certificate of Final Reading of Thesis forms by April 30, 2018, or the end of the first month of the graduation quarter.
7. Submit to departmental student services five (5) final copies of the honors thesis, as approved by the appropriate faculty. Include in each thesis an original, completed, faculty signature sheet immediately following the title page. The 2017-2018 deadline is May 3, 2018.
8. Submit to student services a copy of the honors thesis in electronic format at the same time as the final copies of the thesis.

Upon faculty approval, departmental student services to submit one copy of each honors thesis to Student Affairs, School of Engineering.

### Chemical Engineering Minor

The following core courses fulfill the minor requirements:

		Units
ENGR 20	Introduction to Chemical Engineering	4
CHEMENG 100	Chemical Process Modeling, Dynamics, and Control	3
CHEMENG 110	Equilibrium Thermodynamics	3
CHEMENG 120A	Fluid Mechanics	4
CHEMENG 120B	Energy and Mass Transport	4
CHEMENG 170	Kinetics and Reactor Design	3
CHEMENG 185A	Chemical Engineering Laboratory A	4
CHEM 171	Physical Chemistry I	4
CHEMENG 180	Chemical Engineering Plant Design	4
Select one of the following:		3
CHEMENG 140	Micro and Nanoscale Fabrication Engineering	
CHEMENG 142	Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations	
CHEMENG 160	Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life	

CHEMENG 162 Polymers for Clean Energy and Water

CHEMENG 174 Environmental Microbiology I

CHEMENG 181 Biochemistry I

Total Units

36

## Master of Science in Chemical Engineering

A range of M.S. programs comprising appropriate course work is available to accommodate students wishing to obtain further academic preparation before pursuing a chemical engineering career or a degree program. The degree requirements are lecture course based; there are no research or thesis requirements. This is a terminal M.S. degree, i.e. this degree is not a prerequisite for nor does it lead to admission to the department's Ph.D. program.

Coterminal master's students should see the specific requirements for the coterminal degree below.

For conferral of a master's degree in Chemical Engineering, the following departmental requirements must be met.

### Unit and Course Requirements for the Master's Degree

Students terminating their graduate work with the M.S. degree in Chemical Engineering must develop a graduate-level, thematic M.S. program consisting of a minimum of 45 completed units of academic work that includes:

1. Four (4) Chemical Engineering core graduate lecture courses selected from the CHEMENG 300 series
2. Three (3) units of CHEMENG 699 Colloquium
3. An additional 30 units, selected from graduate-level science or engineering lecture courses (3 units or more) in any appropriate department. Of these 30 units, 18 must be graduate-level science and engineering lecture courses. The remaining 12 units can come from a combination of the following categories:
  - An additional 3-12 units of graduate-level science and engineering lecture courses.
  - No more than 6 units of non-science and engineering lecture courses; for example, MS&E classes and CHEMENG 296 fall into this category.
  - No more than 6 units of lab courses.
  - No more than 6 units combined of research units or seminar courses on science and engineering topics under the following conditions:
    - Up to 6 units of research
    - No more than 3 of these 6 units can be taken as seminar courses ; examples include: 1 unit seminar and 5 units research; 2 units seminar and 4 units research; 3 units seminar and 3 units research.

Credit toward the required minimum of 45 completed units for the M.S. degree is not given for Chemical Engineering special topics courses numbered in the 500 series.

To ensure that an appropriate Chemical Engineering graduate program is pursued by each M.S. candidate, students who first matriculate at Stanford at the graduate level must do the following, during the first quarter, no later than the seventh week:

1. Complete a Program Proposal for a Master's Degree form, that is approved by the M.S. adviser
2. Submit this petition form to departmental student services, for review by the graduate curriculum committee, and

3. Obtain approval for any subsequent program change or changes, using a freshly completed Program Proposal form, from the M.S. adviser and the faculty chair of the graduate curriculum committee.

All M.S. candidates must obtain approvals for the final M.S. program no later than the seventh week of the quarter preceding the quarter of degree conferral, in order to permit amendment of the final quarter's study list if the faculty deem this necessary. Students with questions should contact departmental graduate student services.

### Minimum Grade Requirement

Any course used to satisfy the 45-unit minimum for the Master of Science degree must be taken for a letter grade, if offered. An overall grade point average (GPA) of 3.0 must be maintained for these courses.

### Research Experience

Students in the M.S. program wishing to obtain research experience should talk with departmental student services and work with the M.S. faculty adviser on the choice of research adviser as early as feasible and in advance of the anticipated quarter(s) of research. Once arrangements are mutually agreed upon, including the number of units, students enroll in the appropriate section of CHEMENG 600 Graduate Research in Chemical Engineering. A written report describing the results of the research undertaken must be submitted to and approved by the research adviser. Research units may not be substituted for any of the required four 300-level core lecture courses.

## Coterminal Master's Degrees in Chemical Engineering

Stanford undergraduates with strong academic records may apply to study for a master's degree while at the same time completing their bachelor's degree(s). Interested students should discuss their educational goals with their faculty advisers and talk with departmental graduate student services about the application requirements before submitting an application in Axxess. Students, who have completed at least 120 units toward an undergraduate degree and complete their applications by the seventh week of a quarter, may be admitted to the Chemical Engineering M.S. program the following quarter.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree



Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Engineer in Chemical Engineering

The degree of Engineer is awarded after the completion of a minimum of 90 units of graduate work beyond the B.S. degree and the satisfactory completion of all University requirements plus the following departmental requirements. Application to this program is open only to active chemical engineering M.S. or Ph.D. candidates. This degree is not a prerequisite for the Ph.D. program.

### Unit and Course Requirements

A minimum of 90 completed units is required, including a component of a minimum of 45 units in science and engineering courses, consisting of 42 lecture units and 3 CHEMENG 699 Colloquium units. The required CHEMENG courses are listed below.

		Units
CHEMENG 300	Applied Mathematics in the Chemical and Biological Sciences	3
CHEMENG 310	Microhydrodynamics	3
CHEMENG 320	Chemical Kinetics and Reaction Engineering	3
CHEMENG 340	Molecular Thermodynamics	3
CHEMENG 345	Fundamentals and Applications of Spectroscopy	3
CHEMENG 355	Advanced Biochemical Engineering	3
Plus 3 units of:		
CHEMENG 699	Colloquium	1

The additional lecture courses, (24 units), may be chosen from graduate level science and engineering courses according to the guidelines given in the "Master's (p. 255)" section and with the consent of the graduate curriculum committee chair and the department chair. In fulfilling the required 45-unit requirement for lecture course units, the course work may not include chemical engineering's 500 level seminar courses or similar 1-2 unit courses in other departments. The remaining 45 units are primarily research units.

Students seeking the Engineer degree may petition to add a M.S. program and apply for the M.S. degree once the requirements for that degree have been fulfilled. See General Requirements in the "Graduate Degrees (p. 50)" section of this bulletin and Chemical Engineering's "Master's (p. 255)" section.

### Minimum Grade Requirement

Any course intended to satisfy the Engineer degree requirements must be taken for a letter grade, if offered. An overall grade point average (GPA) of 3.0 must be maintained.

### Reading Committee Requirement

All candidates are required to have an initial meeting with their reading committees by the end of their ninth quarter. The committee must have a minimum of two members, both of whom are Chemical Engineering faculty members. The reading committee meetings are intended to be discussion sessions, to help to focus and guide the thesis project; they are not examinations.

Students are responsible for reporting meeting dates to departmental student services.

### Thesis Requirement

The thesis must represent a substantial piece of research equivalent to nine months of full-time effort and must be approved by the student's reading committee.

## Qualification for the Ph.D. Program by Students Ready to Receive the Degree of Engineer

After completing the requirements for the Engineer degree, a student may petition to be examined on the research work completed for that degree, for the purpose of qualifying for admission to Ph.D. candidacy. If the petition is approved, the student's thesis must be approved by the reading committee and available in its final form for inspection by the entire faculty at least two weeks prior to the scheduled date of said examination.

## Doctor of Philosophy in Chemical Engineering

The University's general requirements for the Ph.D. are specified in the "Graduate Degrees (p. 50)" section of this bulletin.

The Ph.D. degree is awarded after the completion of a minimum of 135 units of graduate work as well as satisfactory completion of any additional University requirements and the following departmental requirements. Completion of a M.S. degree is not a prerequisite for beginning, pursuing, or completing doctoral work.

### Unit and Course Requirements

A minimum of 135 completed units is required, including a component of a minimum of 45 units in science and engineering courses, consisting of 42 lecture units and 3 units of CHEMENG 699 Colloquium.

1. CHEMENG 699 should be taken all years each quarter of the academic year; all these units count toward the required 135 units.
2. The research units for CHEMENG 399 count toward the required 135 units, but may not be counted toward the 45 unit component.
3. Students working with a research adviser should enroll each quarter in the 500 series, 600, and 699 as appropriate and as study list unit limits permit. All these seminar and research units are included within the required minimum of 135 units for degree.

Students with questions or issues should contact departmental graduate student services (<http://cheme.stanford.edu/about/contact>).

The following courses are required:

		Units
CHEMENG 300	Applied Mathematics in the Chemical and Biological Sciences	3
CHEMENG 310	Microhydrodynamics	3
CHEMENG 320	Chemical Kinetics and Reaction Engineering	3
CHEMENG 340	Molecular Thermodynamics	3
CHEMENG 345	Fundamentals and Applications of Spectroscopy	3
CHEMENG 355	Advanced Biochemical Engineering	3
CHEMENG 399	Graduate Research Rotation in Chemical Engineering	1
CHEMENG 699	Colloquium	1
Plus two courses at the 400 course level; in 2017-18 the following are available:		
CHEMENG 420	Growth and Form	3
CHEMENG 444	Electronic Structure Theory and Applications to Chemical Kinetics	3
CHEMENG 454	Synthetic Biology and Metabolic Engineering	3
CHEMENG 456	Microbial Bioenergy Systems	3
CHEMENG 466	Polymer Physics	3

These courses are to be taken at Stanford, and any petition to substitute another graduate-level course for any of these core courses must be approved by the department chair. The remaining graduate-level

science and engineering lecture courses may be chosen from any department. A student may petition the department chair for approval to include an upper-division undergraduate science or engineering lecture course. All proposals for Ph.D. required course work must be approved by the student's adviser and the department chair or the chair of the department's Graduate Curriculum Committee. Students with questions, concerns, or issues should contact student services staff in the department office in Shriram Center, room 129.

Ph.D. students may petition to add a M.S. degree program to their university record; submit in a Graduate Authorization petition in Axxess. Once the online petition is approved, the M.S. candidate must complete a Program Proposal for a Master's Degree form and submit it to departmental student services.

Ph.D. students with a M.S. program apply in Axxess for M.S. degree conferral. (See the "Master of Science in Chemical Engineering" section in this bulletin.) The M.S. degree must be awarded within the University's candidacy period for completion of a master's degree.

## Minimum Grade Requirement

Any course intended to satisfy the Ph.D. degree requirements must be taken for a letter grade, if offered. A GPA of 3.0 or above is required by the end of the first year, in order to continue in the Ph.D. program. The overall grade point average (GPA) of at least 3.0 must be maintained.

## Degree Milestones

Degree milestones indicate progress toward degree. They are listed on unofficial transcripts and document satisfactory and timely completion of various events, such as securing research advisers, candidacy examinations, submission of completed degree progress forms, dates of reading committee meetings, assisting with the teaching CHEMENG courses. Report and submit forms as appropriate to departmental student services. Students with questions or issues should talk with student services staff; students approaching a milestone should be aware of intradepartmental communications and support, and students with concerns should discuss them with student services staff.

## Candidacy

To be advanced to Ph.D. candidacy, the student must secure a research dissertation adviser (and any required co-adviser), successfully complete a Ph.D. candidacy examination, and submit a completed Application for Candidacy for Doctoral Degree form.

First, the research adviser and any required co-adviser must be established by the end of the second quarter in the Ph.D. program. Failure to do so leads to termination of a student's study toward a Ph.D. in Chemical Engineering; however, the student may continue to work toward an M.S. degree (see the "Master of Science in Chemical Engineering (p. 255)" section of this bulletin). Departmental Ph.D. financial support does not continue.

Second, the Ph.D. candidacy examination before a faculty committee is at the end of the fourth quarter. It consists of (a) a student's oral presentation of their thinking about their research proposal and current progress and (b) an examination by faculty members of the proposal specifics as well as the student's understanding of the fundamental chemical, physical, and biological concepts that govern the molecular behavior of the system being studied. Upon successful completion of this examination, candidates must submit an Application for Candidacy for Doctoral Degree form, approved by their research adviser(s), to departmental graduate student services within two months.

## Teaching Requirement

Teaching experience is considered an essential component of pre-doctoral training because it assists in the further development and refinement of candidates' skills in conveying what they know, think, and conclude, based on articulated assumptions and knowledge. All

Ph.D. candidates, regardless of the source of their financial support, are required to assist in the teaching of a minimum of two chemical engineering courses.

## Reading Committee Requirement

Reading committee meetings are intended to be discussion sessions with all members of the reading committee participating that help to focus and refine the dissertation project; they are not examinations.

By the end of the second year, all Ph.D. candidates are required to assemble reading committees and submit Doctoral Dissertation Reading Committee forms signed by research advisers to student services.

By the end of the first quarter of the third year, candidates are required to have an initial meeting with the complete reading committee. It is the candidate's responsibility to schedule committee meetings, and the faculty's to respond in a timely manner to scheduling requests. The composition of the reading committee may be amended; submit appropriate form to student services. Candidates are responsible for reporting meeting dates to departmental student services.

The faculty strongly encourage doctoral candidates to take advantage of the benefits of annual committee meetings, to enable candidates to benefit from this type of open discussion, support, and recommendations from faculty.

## Research Poster Requirement

Experience in analyzing and presenting one's research to diverse audiences also is an essential component of predoctoral training, and faculty strongly encourage candidates to do so several times each year, starting in the second year. All candidates in their third year are required to prepare and present a research poster during the annual Mason Lectures week in spring quarter.

## Dissertation and Oral Defense Requirements

A dissertation based on a successful investigation of a fundamental problem in chemical engineering is required. A student is expected to have fulfilled all the requirements for this degree, including the completion of a dissertation approved by his or her research adviser(s) and reading committee members within approximately five years after enrolling in the Ph.D. program. Upon adviser approval (s), copies of the final draft of the dissertation must be distributed to each reading committee member. No sooner than three weeks after this distribution, a student may schedule an oral examination. This examination is a dissertation defense, based on the candidate's dissertation research, and is in the form of a public seminar followed by a private examination by the faculty members on the student's oral examination committee. Satisfactory performance in the oral examination and acceptance of an approved dissertation by Graduate Degree Progress, Office of the University Registrar, leads to Ph.D. degree conferral.

## Ph.D. Minor in Chemical Engineering

The University's general requirements for the Ph.D. minor are specified in the "Graduate Degrees (p. 50)" section of this bulletin. An application for a Ph.D. minor must be approved by both the major and minor departments.

A student proposing a Ph.D. minor in Chemical Engineering must work with a minor program adviser who has a faculty appointment in Chemical Engineering. This adviser must be included as a member of the student's reading committee for the doctoral dissertation, and the entire reading committee must meet at least once with the candidate. This meeting should occur at least one year prior to the scheduling of the student's oral examination; the department strongly prefers that regular meetings of the complete reading committee start in the second year of graduate study. In addition, the Chemical Engineering faculty member who is the minor

adviser must be a member of the student's University oral examination committee.

The Ph.D. minor program must include at least 20 units of graduate-level lecture courses (numbered at the 200 level or above), but may not include any 1-2 unit lecture courses in the 20-unit minimum. The list of courses must form a coherent program and must be approved by the minor program adviser and the chair of this department. All courses for the minor must be taken for a letter grade, and a GPA of at least 3.0 must be earned for these courses.

*Emeriti: (Professors)* Andreas Acrivos, George M. Homsy, Robert J. Madix, Channing R. Robertson

*Chair:* Eric S. G. Shaqfeh

*Professors:* Zhenan Bao, Stacey F. Bent, Curtis W. Frank, Gerald G. Fuller, Chaitan Khosla, Jens K. Nørskov, Eric S. G. Shaqfeh, Alfred M. Spormann, James R. Swartz

*Associate Professors:* Alexander R. Dunn, Thomas F. Jaramillo, Andrew J. Spakowitz

*Assistant Professors:* Matteo Cargnello, Jian Qin, Elizabeth S. Sattely, Roseanna N. Zia

*Courtesy Professors:* Jennifer R. Cochran, Sarah C. Heilshorn, Daniel Herschlag, Christina D. Smolke, H. Tom Soh, Robert M. Waymouth

*Senior Lecturer:* Lisa Y. Hwang

*Lecturers:* Melis Duyar, Ricardo B. Levy, Shari B. Libicki, Sara Loesch-Frank, John E. Moalli, Howard B. Rosen

*Adjunct Professors:* Ying Chih Chang, Jae Chun Hyun, Do Y. Yoon

### Cognate Courses for Advanced Degrees in Chemical Engineering

In addition to core CHEMENG graduate courses in the 300 series and elective CHEMENG graduate courses in the 200 and 400 series, students pursuing advanced degrees in chemical engineering include elective courses offered by other departments. The following list is a partial list of the more frequently chosen courses and is subdivided into five focus areas.

#### Broadly Applicable

APPPHYS 207	Laboratory Electronics	4
CHEM 221	Advanced Organic Chemistry	3
CHEM 271	Advanced Physical Chemistry	3
CHEM 273	Advanced Physical Chemistry	3
EE 261	The Fourier Transform and Its Applications	3
STATS 200	Introduction to Statistical Inference	3

#### Biochemistry and Bioengineering focus \*

BIO 217		4
BIOE 331	Protein Engineering	3
BIOPHYS 228		
BIOPHYS/SBIO 241	Biological Macromolecules	3-5
CBIO 241		
MCP 256	How Cells Work: Energetics, Compartments, and Coupling in Cell Biology	4
SBIO 228		
SBIO 241	Biological Macromolecules	3-5

#### Fluid Mechanics, Applied Mathematics, and Numerical Analysis focus \*\*

AA 218	Introduction to Symmetry Analysis	3
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CME 200	Linear Algebra with Application to Engineering Computations	3
CME 204	Partial Differential Equations in Engineering	3
CME 206	Introduction to Numerical Methods for Engineering	3
CME 212	Advanced Software Development for Scientists and Engineers	3
ME 351A	Fluid Mechanics	3
ME 457	Fluid Flow in Microdevices	3
<b>Materials Science focus ***</b>		
MATSCI 210	Organic and Biological Materials	3
MATSCI 251	Microstructure and Mechanical Properties	3
MATSCI 316	Nanoscale Science, Engineering, and Technology	3
MATSCI 343	Organic Semiconductors for Electronics and Photonics	3
MATSCI 380	Nano-Biotechnology	3
<b>Microelectronics focus ****</b>		
AA 218	Introduction to Symmetry Analysis	3
CME 200	Linear Algebra with Application to Engineering Computations	3
CME 204	Partial Differential Equations in Engineering	3
CME 206	Introduction to Numerical Methods for Engineering	3
CME 212	Advanced Software Development for Scientists and Engineers	3
ME 457	Fluid Flow in Microdevices	3
<b>Microelectronics focus ****</b>		
AA 218	Introduction to Symmetry Analysis	3
CME 200	Linear Algebra with Application to Engineering Computations	3
CME 204	Partial Differential Equations in Engineering	3
CME 206	Introduction to Numerical Methods for Engineering	3
CME 212	Advanced Software Development for Scientists and Engineers	3
ME 457	Fluid Flow in Microdevices	3

\* e.g., with CHEMENG 281 Biochemistry I, CHEMENG 283 Biochemistry II, CHEMENG 454 Synthetic Biology and Metabolic Engineering, CHEMENG 456 Microbial Bioenergy Systems.

\*\* e.g., with CHEMENG 462 Complex Fluids and Non-Newtonian Flows.

\*\*\* e.g., with CHEMENG 442 Suspension Mechanics, CHEMENG 464 Polymer Chemistry, CHEMENG 466 Polymer Physics.

\*\*\*\* e.g., with CHEMENG 240 Micro and Nanoscale Fabrication Engineering.

#### Units

# CIVIL AND ENVIRONMENTAL ENGINEERING

Courses offered by the Department of Civil and Environmental Engineering are listed under the subject code CEE (<https://explorecourses.stanford.edu/search/?search?view=catalog&academicYear=&q=CEE&filter-departmentcode=CEE=on&filter-coursestatus-Active=on&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&page=0>) on the *Stanford Bulletin's* ExploreCourses (<https://explorecourses.stanford.edu>) web site.

The Department of Civil and Environmental Engineering (CEE) at Stanford conducts fundamental and applied research to advance the civil and environmental engineering professions, educate future academic and industry leaders, and prepare students for careers in professional practice. Civil and environmental engineers work to sustain the natural environment while creating and maintaining the built environment. Civil and environmental engineers are essential to providing the necessities of human life, including water, air, shelter, the infrastructure, and energy, in increasingly more efficient and renewable ways.

Research and teaching in the department focus on the theme of engineering for sustainability, including three core areas: built environment, environmental and water studies, and atmosphere/energy. In the area of sustainable built environments, the focus is on processes, techniques, materials, and monitoring technologies for planning, design, construction and operation of environmentally sensitive, economically efficient, performance-based buildings and infrastructure, and managing associated risks from natural and man-made hazards. In the area of environmental and water studies, the focus is on creating plans, policies, science-based assessment models and engineered systems to manage water in ways that protect human health, promote human welfare, and provide freshwater and coastal ecosystem services. In the atmosphere/energy area, research and teaching focus on fundamental energy and atmospheric engineering and science, assessment of energy-use effects on atmospheric processes and air quality, and analysis and design energy-efficient generation and use systems with minimal environmental impact.

The department oversees undergraduate programs in Civil Engineering and in Environmental Systems Engineering. The department also hosts the School of Engineering undergraduate major in Architectural Design and the undergraduate major in Atmosphere/Energy - both of which lead to a B.S. in Engineering.

## Mission of the Undergraduate Program in Civil Engineering

The mission of the undergraduate program in Civil Engineering is to equip students with the knowledge and skills needed for world-class civil engineering practice. This pre-professional program balances the fundamentals common to many specialties in civil engineering while allowing for concentration in structures and construction or in environmental and water studies. Students in the major learn to apply knowledge of mathematics, science, and civil engineering to conduct experiments, design structures and systems to creatively solve engineering problems, and communicate their ideas effectively. The curriculum includes course work in structural, construction, and environmental engineering. The major prepares students for careers in consulting, industry and government, as well as for graduate studies in science and engineering.

## Mission of the Undergraduate Program in Environmental Systems Engineering

The mission of the undergraduate program in Environmental Systems Engineering is to prepare students for incorporating environmentally sustainable design, strategies and practices into natural and built systems and infrastructure involving buildings, water supply, and coastal regions. Courses in the program are multidisciplinary in nature, combining math, science, and engineering fundamentals, and tools and skills considered essential for an engineer. Students can choose from one of three focus areas for more in-depth study: coastal environments, freshwater environments, or urban environments. The major offers the opportunity for a more focused curriculum than the Environmental and Water Studies concentration in the Civil Engineering degree program. The program of study, which includes a capstone experience, aims to equip engineering students to take on the complex challenges of the 21<sup>st</sup> century involving natural and built environments, in consulting and industry as well as in graduate school.

## Learning Outcomes (Undergraduate)

Undergraduates in the Civil Engineering and the Environmental Systems Engineering programs are expected to achieve the following learning outcomes through their major. These learning outcomes are used both in evaluating students and the department's undergraduate programs. Students are expected to demonstrate the ability to:

1. apply knowledge of mathematics, science, and engineering.
2. design and conduct experiments, as well as analyze and interpret data.
3. design a system, component, or process to meet desired needs.
4. function on multidisciplinary teams.
5. identify, formulate, and solve engineering problems.
6. understand professional and ethical responsibility.
7. communicate effectively.
8. obtain the broad education necessary to understand the impact of engineering solutions in a global and societal context.
9. recognize the need for and engage in life-long learning.
10. gain knowledge of contemporary issues.
11. apply the techniques, skills, and modern engineering tools necessary for engineering practice.
12. acquire the background for admission to engineering or other professional graduate programs.

## Learning Outcomes (Graduate)

The purpose of the master's program is to equip students with the knowledge and skills necessary for a successful professional career or for the pursuit of doctoral studies. Students are prepared through course work that is organized into three broad areas including the built environment, atmosphere and energy, and environmental engineering. Graduate students must master the analytical, quantitative, and interpretive skills necessary for successful leadership in their chosen field.

The Ph.D. is conferred upon candidates who have demonstrated substantial original scholarship and the ability to conduct independent research. The Ph.D. program prepares students to make original contributions to the theory and practice of Civil and Environmental Engineering and related fields.

## Graduate Programs in Civil and Environmental Engineering

The Department of Civil and Environmental Engineering (CEE) offers graduate degrees structured in three areas of study.

- The Atmosphere/Energy Program offers degrees with the designation of Atmosphere/Energy.
- The Sustainable Built Environment Program offers degrees with two designations:
  - Structural Engineering and Geomechanics
  - Sustainable Design and Construction
- The Environmental Engineering Program offers degrees with the designation of Environmental Engineering

For detailed information on these programs and degree designations, see the "Programs of Graduate Study in Civil and Environmental Engineering" section of this bulletin.

### Admissions and Financial Aid

Applications require online submission of the application form and statement of purpose, followed by three letters of recommendation, results of the General Section of the Graduate Record Examination, and transcripts of all courses taken at colleges and universities. See <http://gradadmissions.stanford.edu>. Policies for each of the programs in the department are available on the department website. See: <http://cee.stanford.edu>. Successful applicants are advised as to the degree and program for which they are admitted. If students wish to transfer from one CEE program to another after being accepted, an application for the intradepartmental change must be filed within the department. If, after enrollment at Stanford, students wish to continue toward a degree beyond that for which they were originally admitted, a written application must be made to the Department of Civil and Environmental Engineering.

The department maintains a continuing program of merit-based financial aid for graduate students. Merit-based financial aid consists of teaching assistantships and/or research assistantships for up to half-time work, with the assumption that students spend the rest of their time on coursework and research required for completion of the degree. Fellowship and scholarship awards or loans may supplement assistantships and other basic support. Continued support is generally provided for further study toward the Engineer or Ph.D. degree based on the student's performance, the availability of research funds, and requisite staffing of current research projects.

### Research Centers and Facilities

Research in the department related to environmental and water studies is conducted in the Bob and Norma Street Environmental Fluid Mechanics Laboratory (EFML) and the Environmental Engineering and Science Laboratory (EESL). The EESL is home to the National Science Foundation (NSF) supported Engineering Research Center for Re-inventing the Nation's Urban Water Infrastructure (ReNUWIt), a four-university consortium that seeks more sustainable solutions to urban water challenges in the arid west, and the William and Cloy Codiga Resource Recovery Center (CR2C), a new facility for pilot-scale testing of resource recovery technology. Other centers and groups in the department related to environmental engineering include the Environmental Informatics Group, the National Performance of Dams Program (NPDP), and the center for Sustainable Development and Global Competitiveness (SDGC). There is also extensive collaboration with research centers and groups throughout the university, including the Woods Institute for the Environment, the Bill Lane Center for the American West, the Carnegie Institution, the Center for Innovation in Global Health, Stanford Bio-X, the Environmental and Natural Resources Law and Policy Program, the

Freeman Spogli Institute for International Studies, and the Precourt Institute for Energy.

Several research centers in the department focus on improving the sustainability of the built environment. The John A. Blume Earthquake Engineering Center conducts research on earthquake engineering including advanced sensing and control, innovative materials, and risk hazard assessment. Research and advanced global teamwork education is conducted in the Project Based Learning (PBL) Laboratory. In collaboration with the Department of Computer Science, the Center for Integrated Facility Engineering (CIFE) employs advanced information and communication technologies and concepts to integrate the facility development process and enhance the usability, buildability, operability, and sustainability of facilities. The Global Projects Center (GPC) is a multi-discipline, multi-university research program aimed at improving the performance of global engineering and construction projects, with a special focus on financing and governance of sustainable civil and social infrastructure projects. The Stanford Sustainable Systems Lab (S3L) aims to advance the state of the art in the design, monitoring and management of built environment systems, with a special focus on smart grid, smart buildings and smart infrastructures.

## Programs of Graduate Study in Civil and Environmental Engineering

### Atmosphere/Energy Program

The Atmosphere/Energy Program in Civil and Environmental Engineering combines atmospheric science with energy science and engineering. The main goals of the program are to educate students and the public, through courses, research, and public outreach, about the causes of climate, air pollution, and weather problems and methods of addressing these problems through renewable and efficient energy systems. In addition, students learn about feedback between the atmosphere and renewable energy systems and the effects of the current energy infrastructure on the atmosphere.

Major focus areas of energy research include examining the resource availability of renewable energies, such as wind, solar, and wave, and studying optimal methods of combining renewable energies together to match energy supply with instantaneous demand. This type of work is generally done through a combination of data analysis, three-dimensional atmospheric computer modeling of wind, solar, wave, and hydroelectric power resources, and transmission load flow computer modeling. Other energy research, performed through three-dimensional computer modeling, focuses on the effects, for example, of hydrogen fuel cell vehicles on air pollution and the ozone layer and the effects of ethanol and diesel vehicles on air quality and climate. Studies also examine the feedback of wind turbines to the atmosphere and the effects of climate change on wind and solar energy resources.

Atmospheric research in the program generally involves laboratory work, field measurements, or three-dimensional computer modeling of the combined atmosphere, ocean, and land surface. An example of laboratory work includes measuring the properties of organic particulate matter that forms in the atmosphere. Examples of fieldwork include measuring exposures to secondhand smoke, allergens, and emissions from building materials.

Computer modeling is performed at a variety of spatial scales, from the globe down to the size of a building or smaller. Some examples of modeling studies include examining the effects of air pollution particles on clouds, rainfall, water supply, ultraviolet radiation, the stratospheric ozone layer, and climate, simulating the dispersion of toxic contaminants in an urban street canyon, studying the effects of aircraft exhaust and biomass burning on climate, studying the effects of carbon dioxide domes over cities on air pollution mortality, and studying the leading causes of global warming and their impacts.

Students interested in the Atmosphere and also Clean Renewable Energy systems would most likely apply to the Atmosphere/Energy Program.

Those interested in the Atmosphere and also Water systems would most likely apply to the Environmental Engineering Program. Those interested in Atmospheric topics alone (e.g. weather, climate, pollution and its impacts) could apply to either, depending on the courses of interest.

### Environmental Engineering Program

The mission of the Environmental Engineering program is to develop state-of-the-art knowledge, models, and processes which form the core of environmental engineering practice, and to train and educate current and future academic and professional environmental leaders. We do this by synthesizing physical, biological, and chemical facets of engineering and science along with elements of the social sciences into our research and teaching. Ultimately, the goal is to protect and sustain our natural resources and human health and contribute to the sustainable development of physical infrastructure, including systems for wastewater treatment, water supply, renewable energy, and resilient coastal environments.

The Environmental Engineering (EnvEng) program combines elements of two former programs in the department, namely Environmental Fluid Mechanics and Hydrology (EFMH) and Environmental Engineering and Science (EES). Research and coursework in the Environmental Engineering program are centered around the five focus areas which include

- Environmental Modeling and Simulation
- Environmental and Geophysical Fluid Mechanics
- Hydrology and Water Resources
- Aquatic Chemistry and Biology and Process Engineering
- Human Health and the Environment

Research in the program spans the physical, chemical, and biological dimensions of Environmental Engineering Research related to the physical aspects of environmental engineering is conducted in the Bob and Norma Street Environmental Fluid Mechanics Laboratory (EFML), whereas research on the chemical and biological aspects is conducted in the Environmental Engineering and Science Laboratory (EESL). The EESL is home to the National Science Foundation (NSF) supported Engineering Research Center for Re-inventing the Nation's Urban Water Infrastructure (ReNUWit), a four-university consortium that seeks more sustainable solutions to urban water challenges in the arid west, and the William and Cloy Codiga Resource Recovery Center (CR2C), a new facility for pilot-scale testing of resource recovery technology. There is extensive crossover between the EFML and the EESL, reflecting the interdisciplinary nature of environmental engineering that seeks to quantify physical, biological, and chemical processes in the environment in an integrated way. Environmental Engineering research is also conducted in numerous centers and groups in the department including the Environmental Informatics Group, the National Performance of Dams Program (NPDP), and the center for Sustainable Development and Global Competitiveness (SDGC). There is also extensive collaboration with research centers and groups throughout the university, including the Woods Institute for the Environment, the Bill Lane Center for the American West, the Carnegie Institution, the Center for Innovation in Global Health, Stanford Bio-X, the Environmental and Natural Resources Law and Policy Program, the Freeman Spogli Institute for International Studies, and the Precourt Institute for Energy.

Courses in the Environmental Modeling and Simulation, Environmental and Geophysical Fluid Mechanics, and Hydrology and Water Resources focus areas concentrate on developing an understanding of the physical processes controlling the movement of mass, energy, and momentum in aquatic environments and the atmosphere. Specific course topics include experimental methods, fluid transport and mixing processes, the fluid mechanics of stratified flows, natural flows in coastal waters, estuaries, lakes, and open channels, and turbulence and its modeling,

flow and transport in porous media, stochastic methods in both surface and subsurface hydrology, watershed hydrology and modeling, global atmospheric circulation, the atmospheric boundary layer, air pollution from global to indoor scales, and wind energy.

Courses in the Aquatic Chemistry and Biology, Process Engineering, and Human Health and the Environment focus areas emphasize the chemical, biological, and engineering aspects of air and water quality and pollution fate and transport, along with characterizing human health risks and developing testing strategies to protect public health.

Specific course topics include chemical principles and their application to the analysis and solution of problems in aqueous environments, biochemical and biophysical principles of biochemical reactions, physical and chemical unit operations for water treatment, microbial processes for the transformation of environmental contaminants, microbial metabolic pathways in microbial bioenergy systems, the movement and survival of pathogens in the environment, use of microbial bioreactors for degradation of contaminants and recovery of clean water, quantification of human exposure to toxic chemicals and pathogens in the environment, methods to enumerate and isolate organisms used to assess risk of enteric illnesses in drinking and recreational waters, and the impacts of water supply and wastewater management approaches on public health around the globe.

### Sustainable Built Environment Program

The Sustainable Built Environment program includes subprograms in Structural Engineering and Geomechanics, and Sustainable Design and Construction. These programs focus on educating practitioners and researchers to plan, design, build, and operate more sustainable buildings and infrastructure.

The Structural Engineering and Geomechanics (SEG) subprogram educates designers and researchers who want to progress beyond traditional life safety code-based design, to develop and disseminate performance-based structural and geotechnical engineering methods and tools that maximize the lifecycle economic value of facilities.

The Sustainable Design and Construction (SDC) subprogram provides courses in sustainable, multi-stakeholder design methods and tools that incorporate lifecycle assessment, project planning and entitlement, green architectural design, lighting, and energy analysis, power systems, transportation, water supply and wastewater treatment to educate students interested in promoting more sustainable development of buildings and infrastructure.

Admission is managed separately for these two subprograms; prospective students should indicate their preference on their application.

### Structural Engineering and Geomechanics

The Structural Engineering and Geomechanics (SEG) subprogram encompasses teaching and research in structural design and analysis, structural materials, earthquake engineering and structural dynamics, advanced sensing and structural health monitoring, risk and reliability analysis, computational science and engineering, solid mechanics, computational mechanics, and geomechanics. The SEG subprogram prepares students for industrial or academic careers.

Students can balance engineering fundamentals with modern computational and experimental methods to customize programs to launch careers as consultants on large and small projects, designers, and engineering analysts.

Structural design and analysis focuses on the conceptual design of structural systems and on computational methods for predicting the static and dynamic, linear and nonlinear responses of structures.

Structural materials research and teaching focuses on the design and analysis of high-performance as well as low-environmental impact materials.

Earthquake engineering and structural dynamics addresses earthquake phenomena, ground shaking, and the behavior, analysis, and design of structures under seismic and other dynamic forces.

Reliability and risk analysis focuses on assessing damage and losses to structures and lifeline systems under earthquakes, wind and other hazards; insights from these assessments are used to engineer more sustainable structures and more resilient communities.

Computational science and engineering emphasizes the application of modern computing methods to structural engineering and geomechanics, and encompasses numerical, structural, and geotechnical analysis.

In the area of geomechanics, students focus on the application of the principles of computational and applied mechanics to problems involving geologic materials including soil and rock, as well as on the use of computational methods for analysis and design of foundations and earth structures.

### **Sustainable Design and Construction**

The Sustainable Design and Construction (SDC) subprogram prepares students for careers in planning, designing, building, and operating sustainable buildings and infrastructure to maximize their lifecycle economic value, their net contribution to environmental functions and services, and their social equity. To give students the breadth and depth necessary to become leaders in practice or research in sustainable design and construction, the SDC program offers four tracks of study: construction, energy, structures, and water. In addition to providing critical skills and the necessary industry context, each track offers courses in the following areas of competency: Building and infrastructure development; structural performance, design, and analysis; water infrastructure systems; energy systems, energy efficiency, and atmosphere; and construction engineering and management.

Classes address advanced topics like cutting-edge information technology, metrics and tools to enhance lifecycle sustainability of the sustainable built environment, sensor networks embedded in intelligent buildings and infrastructure, strategy, economics, entrepreneurship and organization design for new businesses, and corporate or governmental initiatives aimed at enhancing the sustainability of buildings and infrastructure.

The SDC subprogram is intended for students with undergraduate degrees in architecture, engineering, science, construction management, economics or business who wish to pursue careers that enhance the sustainability of the built environment.

Employers of past SDC graduates include: architectural and engineering design firms, constructors, design-build firms and developers focused on delivering green buildings and infrastructure; energy and sustainability consultants; facility management or sustainability departments within large companies; clean-tech start ups, and clean-tech venture funds.

### **SDC Construction (SDC-C)**

The SDC-C track includes courses in construction engineering and management and introduces advanced modeling and visualization methods and tools known as virtual design and construction. This track prepares technically qualified students for responsible engineering and management roles in all phases of the development of major constructed facilities. It emphasizes management techniques useful in organizing, planning, and controlling the activities of diverse specialists working within the unique project environment of the construction industry, and it covers construction engineering aspects of heavy, industrial and building construction. Additional related course work is available from other programs within the department, from other engineering departments, and from other schools in the University such as Earth

Sciences and the Graduate School of Business. SDC-C allows students substantial flexibility to tailor their program of study for careers with general contractors, specialty contractors, real estate or infrastructure developers or facility owners and operators.

### **SDC-Energy (SDC-E)**

The SDC-Energy (SDC-E) track includes courses on design and construction of buildings and infrastructure systems to produce, distribute and consume energy sustainably. SDC-E prepares students for careers in design and construction of building energy systems, renewable power generating systems, and smart power grids connected to smart buildings and infrastructure, cleantech venture capital, sustainability-focused public policy, green real estate development, and sustainability management positions.

SDC-E includes courses from the CEE department and several other departments at Stanford on sustainable HVAC design and construction of small scale and large structures, the planning, design and construction of renewable power systems, and sensing and control technologies to link integrated smart grids with intelligent buildings, data centers and infrastructure systems.

### **SDC-Structures (SDC-S)**

The SDC-Structures (SDC-S) track includes courses from construction engineering and management and Structural Engineering and Geomechanics (SEG) to prepare students for careers in design and construction firms that provide integrated design-build project delivery, construction management, and pre-construction services.

This track prepares students for multidisciplinary collaborative teamwork in an integrated design and construction process. The subprogram extends a student's design or construction background with core courses in each of these areas and develops the background needed to understand the concerns and expertise of the many project stakeholders. It includes a comprehensive project-based learning experience.

The SDC-S track is intended for applicants with backgrounds in engineering and science. Applicants should also have a background in the planning, design, or construction of facilities by virtue of work experience and/or their undergraduate education. Knowledge in subjects from the traditional areas of civil engineering is necessary for students to receive the degree and to satisfy prerequisite requirements for some of the required graduate courses. Students with an undergraduate degree in Civil Engineering, and who expect to pursue careers with design or construction firms that emphasize design-build, EPC, or turnkey projects should consider SDC-S.

### **SDC-Water (SDC-W)**

The SDC-Water (SDC-W) track combines courses from our department's Environmental Engineering program with courses on sustainable design and construction methods and tools. The SDC-W track prepares students for careers in sustainable design, construction and operation of both centralized systems and emerging distributed systems for water supply and water and waste treatment that integrate the production of energy and a grown stream of valuable bio-engineered products recovered from the waste stream.

This track offers courses in physical and chemical treatment processes for water and wastewater treatment, environmental biotechnology for use in water resource management and bioremediation, watershed and wetland management, environmental engineering design, and sustainable water resource development.

This track is intended for students with a background and interest in environmental engineering and fluid mechanics who wish to pursue careers in the development and delivery of sustainable water and waste treatment facilities with large integrated design-building firms or progressive governmental agencies in this sector. Students wishing to focus on the physics, biology or chemistry of water resources engineering and treatment, or looking to become a practicing Environmental Engineer,

should enroll in the Environmental Engineering program. Students in the Environmental Engineering MS program may consult with their program adviser to design a program of study that focuses on environmental engineering while including relevant courses in the SDC-W track.

## Bachelor of Science in Civil Engineering

The B.S. in Civil Engineering is an ABET accredited program, which integrates research with engineering education. The B.S. in Civil Engineering offers the opportunity to focus on structures and construction, or on environmental and water studies. Three educational objectives structure the Civil Engineering degree program. Graduates of the program are expected within a few years of graduation to have the ability to:

1. Establish themselves as practicing professionals in civil or environmental engineering or a related field.
2. Pursue graduate study in civil or environmental engineering or other fields.
3. Work effectively as responsible professionals alone or in teams handling increasingly complex professional and societal expectations.

Students who major in Civil Engineering must complete the appropriate requirements for the B.S. degree listed. Each student has elective units, which may be used in any way the student desires, including additional studies in the department of Civil and Environmental Engineering or any other school or department in the University. Because the undergraduate engineering curriculum provides breadth of study, students who intend to enter professional practice in civil engineering should plan to obtain their professional education at the graduate level.

A number of undergraduate programs at Stanford may be of interest to students seeking to specialize in environmental studies. In addition to the Environmental and Water Studies track within the Civil Engineering major, students may consider related programs in the department such as Atmosphere/Energy and Environmental Systems Engineering, as well as programs offered in other departments and schools such as Earth Systems, Geological and Environmental Sciences, Urban Studies, and Human Biology.

## Civil Engineering (CE)

Completion of the undergraduate program in Civil Engineering leads to the conferral of the Bachelor of Science in Civil Engineering.

## Mission of the Undergraduate Program in Civil Engineering

The mission of the undergraduate program in Civil Engineering is to provide students with the principles of engineering and the methodologies necessary for civil engineering practice. This pre-professional program balances the fundamentals common to many specialties in civil engineering and allows for concentration in structures and construction or environmental and water studies. Students in the major learn to apply knowledge of mathematics, science, and civil engineering to conduct experiments, design structures and systems to creatively solve engineering problems, and communicate their ideas effectively. The curriculum includes course work in structural, construction, and environmental engineering. The major prepares students for careers in consulting, industry and government, as well as for graduate studies in engineering.

## Requirements

### Mathematics and Science

45

45 units minimum; see Basic Requirements 1 and 2<sup>1</sup>

### Technology in Society

One course; course chosen must be on the SoE Approved Courses list at <ughb.stanford.edu> the year taken; see Basic Requirement 4<sup>2</sup>

### Engineering Fundamentals

Two courses required

ENGR 14	Intro to Solid Mechanics	3
ENGR 90/CEE 70	Environmental Science and Technology	3

### Engineering Depth

Minimum of 68 Engineering Fundamentals plus Engineering Depth; see Basic Requirement 5

CEE 100	Managing Sustainable Building Projects <sup>3</sup>	4
CEE 101A	Mechanics of Materials	4
CEE 101B	Mechanics of Fluids (or CEE 101N)	4
CEE 101C	Geotechnical Engineering	4

Specialty courses in either: 36-39

Environmental and Water Studies (see below)

Structures and Construction (see below)

Other School of Engineering Electives 3-0

Total Units 109-111

<sup>1</sup> Mathematics must include CME 100 Vector Calculus for Engineers and CME 102 Ordinary Differential Equations for Engineers (or Math 51 Linear Algebra and Differential Calculus of Several Variables and MATH 53 Ordinary Differential Equations with Linear Algebra) and a Statistics course. Science must include Physics 41 Mechanics; either ENGR 31 Chemical Principles with Application to Nanoscale Science and Technology, CHEM31A Chemical Principles I or CHEM 31X Chemical Principles; two additional quarters in either chemistry or physics, and GS 1A Introduction to Geology: The Physical Science of the Earth (or GS 1B or 1C); for students in the Environmental and Water Studies track, the additional chemistry or physics must include CHEM 33; for students in the Structures and Construction track, it must include PHYSICS 43 or 45. Please note that the only quarter GS 1A is offered for AY 2015-16 is Spring Quarter.

<sup>2</sup> Chosen TiS class must specifically include an ethics component, as indicated in Figure 3-3 in the Engineering Undergraduate Handbook (<http://web.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Handbooks>)

<sup>3</sup> CEE 100 meets the Writing in the Major (WIM) requirement

## Environmental and Water Studies Focus

		Units
ME 30	Engineering Thermodynamics	3
CEE 101D	Computations in Civil and Environmental Engineering (or CEE 101S) <sup>2</sup>	3
CEE 162E	Rivers, Streams, and Canals	3
CEE 166A	Watersheds and Wetlands	4
CEE 166B	Floods and Droughts, Dams and Aqueducts	4
CEE 171	Environmental Planning Methods	3
CEE 172	Air Quality Management	3
CEE 177	Aquatic Chemistry and Biology	4
CEE 179A	Water Chemistry Laboratory	3
CEE 179C	Environmental Engineering Design	5
(or CEE 169) Capstone design experience course		
Remaining specialty units from:		
CEE 63	Weather and Storms <sup>2</sup>	3
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions <sup>2</sup>	3
CEE 107A	Understanding Energy	3-5
CEE 155	Introduction to Sensing Networks for CEE	4



CEE 161C	Natural Ventilation of Buildings	3
CEE 161I	Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation	3
CEE 162D	Introduction to Physical Oceanography	4
CEE 162F	Coastal Engineering	3
CEE 162I	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
CEE 165C	Water Resources Management	3
CEE 166D	Water Resources and Water Hazards Field Trips	2
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 178	Introduction to Human Exposure Analysis	3
CEE 199	Undergraduate Research in Civil and Environmental Engineering	1-4
CEE 162E	Rivers, Streams, and Canals	3-4
CEE 171	Environmental Planning Methods	3
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 195	Fundamentals of Structural Geology	3
CEE 196	Engineering Geology and Global Change	3
CEE 199	Undergraduate Research in Civil and Environmental Engineering	1-4
CEE 203	Probabilistic Models in Civil Engineering	3-4
One of the following can also count as remaining specialty units.		3-4
CEE 120B	Building Information Modeling Workshop	2-4
CEE 130	Architectural Design: 3-D Modeling, Methodology, and Process	
CEE 131A	Professional Practice: Mixed-Use Design in an Urban Setting	
CEE 134B	Intermediate Arch Studio	

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

## Structures and Construction Focus

CEE 102	Legal Principles in Design, Construction, and Project Delivery	3
CEE 120A	Building Information Modeling Workshop (or CEE 120S)	3-4
CEE 156	Building Systems	4
CEE 180	Structural Analysis	4
CEE 181	Design of Steel Structures	4
CEE 182	Design of Reinforced Concrete Structures	4
CEE 183	Integrated Civil Engineering Design Project	4
Select one of the following (beyond the 2 required Engineering Fundamentals):		4
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	
ENGR 50E	Introduction to Materials Science, Energy Emphasis	
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis	
Remaining specialty units from:		
ENGR 15	Dynamics	3
CME 104	Linear Algebra and Partial Differential Equations for Engineers	5
CEE 101D	Computations in Civil and Environmental Engineering (or CEE 101S)	3
CEE 112A	Industry Applications of Virtual Design & Construction	2-4
CEE 112B	Industry Applications of Virtual Design & Construction	2-4
CEE 122A	Computer Integrated Architecture/Engineering/Construction	2
CEE 122B	Computer Integrated A/E/C	2
CEE 131A	Professional Practice: Mixed Use Design in an Urban Setting (not given AY 2015-16)	
CEE 131B	Financial Management of Sustainable Urban Systems	3
CEE 141A	Infrastructure Project Development	3
CEE 141B	Infrastructure Project Delivery	3
CEE 151	Negotiation	3
CEE 155	Introduction to Sensing Networks for CEE	4
CEE 161C	Natural Ventilation of Buildings	3

Units

## Bachelor of Science in Environmental Systems Engineering

For undergraduate studies focusing on Environmental Engineering, two options are available. The undergraduate Civil Engineering major (which is ABET-accredited) offers an Environmental & Water Studies track, and the new Environmental Systems Engineering major (which is not ABET-accredited) offers a choice of focusing on coastal environments, freshwater environments, or urban environments.

## Environmental Systems Engineering (EnvSE)

Completion of the undergraduate program in Environmental Systems Engineering leads to the conferral of the Bachelor of Science in Environmental Systems Engineering.

## Mission of the Undergraduate Program in Environmental Systems Engineering

The mission of the undergraduate program in Environmental Systems Engineering is to prepare students for incorporating environmentally sustainable design, strategies and practices into natural and built systems and infrastructure involving buildings, water supply, and coastal regions. Courses in the program are multidisciplinary in nature, combining math/science/engineering fundamentals, and tools and skills considered essential for an engineer, along with a choice of one of three focus areas for more in-depth study: coastal environments, freshwater environments, or urban environments. This major offers the opportunity for a more focused curriculum than the Environmental and Water Studies concentration in the Civil Engineering degree program. The program of study, which includes a capstone experience, aims to equip engineering students to take on the complex challenges of the twenty-first century involving natural and built environments, in consulting and industry as well as in graduate school.

### Requirements

#### Mathematics and Science

See Basic Requirement 1 and 2<sup>1</sup> 36

#### Technology in Society (TiS)

One 3-5 unit course required, course chosen must be on the SoE Approved Courses list at [ughb.stanford.edu](http://ughb.stanford.edu) the year taken; see Basic Requirement 4 3-5

#### Engineering Fundamentals

Two courses minimum (see Basic Requirement 3), including:		
ENGR 70A	Programming Methodology	5
(or ENGR 70X)		
ENGR 14	Intro to Solid Mechanics	3
<b>Fundamental Tools/Skills</b> <sup>2</sup>		9
in visual, oral/written communication, and modeling/analysis		
<b>Specialty Courses, in either</b>		37
Coastal environments (see below)		
or freshwater environments (see below)		
or urban environments (see below)		
<b>Total Units</b>		96-100

<sup>1</sup> Math must include CME 100 Vector Calculus for Engineers (or MATH 51 Linear Algebra and Differential Calculus of Several Variables), and either a Probability/Statistics course or CME 102 Ordinary Differential Equations for Engineers (or MATH 53 Ordinary Differential Equations with Linear Algebra). Science must include PHYSICS 41 Mechanics; and either CHEM 31B Chemical Principles II or CHEM 31X Chemical Principles Accelerated (or PHYSICS 43 Electricity and Magnetism, for Urban focus area only).

<sup>2</sup> Fundamental tools/skills must include:

1. CEE 1 Introduction to Environmental Systems Engineering ;
2. at least one visual communication class from CEE 31 Accessing Architecture Through Drawing / CEE 31Q Accessing Architecture Through Drawing, CEE 133F Principles of Freehand Drawing, ME 101 Visual Thinking, ME 110 Design Sketching, ARTSTUDI 160 Intro to Digital / Physical Design, or OSPPARIS 44 EAP: Analytical Drawing and Graphic Art;
3. at least one oral/written communication class from ENGR 103 Public Speaking, ENGR 102W Writing for Engineers, ENGR 202W Technical Writing, CEE 151 Negotiation, CEE 175P Persuasive Communication for Environmental Scientists, Practitioners, and Entrepreneurs, EARTHSYS 191 Concepts in Environmental Communication or EARTHSYS 200 Environmental Communication in Action: The SAGE Project;
4. at least one modeling/analysis class from CEE 101D Computations in Civil and Environmental Engineering (or CEE 101S) if not counted as Math, CEE 120A Building Information Modeling Workshop (or CEE 120S Building Information Modeling Special Study), CEE 155 Introduction to Sensing Networks for CEE, CEE 226 Life Cycle Assessment for Complex Systems, CME 211 Software Development for Scientists and Engineers, CS 102 Big Data: Tools and Techniques, Discoveries and Pitfalls, EARTHSYS 142 Remote Sensing of Land, EARTHSYS 144 Fundamentals of Geographic Information Science (GIS), EARTHSYS 211 Fundamentals of Modeling, or ENGR 150 Data Challenge Lab.

### Urban Environments Focus Area (37 units)

#### Required

CEE 100	Managing Sustainable Building Projects	4
CEE 101B	Mechanics of Fluids	4
CEE 146S	Engineering Economics and Sustainability	3
CEE 176A	Energy Efficient Buildings	3-4

Electives (at least two of the 4 areas below must be included)

#### Building Systems

CEE 102	Legal Principles in Design, Construction, and Project Delivery	3
CEE 130	Architectural Design: 3-D Modeling, Methodology, and Process	5
CEE 156	Building Systems	4
CEE 161C	Natural Ventilation of Buildings	3

#### Energy Systems

CEE 107A	Understanding Energy	4-5
CEE 176B	Electric Power: Renewables and Efficiency	3-4
EE 151	Sustainable Energy Systems	3
ENERGY 171	Energy Infrastructure, Technology and Economics	3
or		
ENERGY 191	Optimization of Energy Systems	3-4

### Water Systems

CEE 165C	Water Resources Management	3
CEE 166A	Watersheds and Wetlands	4
CEE 166B	Floods and Droughts, Dams and Aqueducts	4
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3

### Urban Planning, Design, Analysis

CEE 6	Physics of Cities	3
CEE 171	Environmental Planning Methods	3
or		
CEE 265E	Adaptation to Sea Level Rise and Extreme Weather Events	3
CEE 177L	Smart Cities & Communities	3
URBANST 113	Introduction to Urban Design: Contemporary Urban Design in Theory and Practice	5

or

URBANST 164	Sustainable Cities	4-5
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or

URBANST 165	Sustainable Urban and Regional Transportation Planning	4-5
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### Capstone (one class required)

CEE 112A	Industry Applications of Virtual Design & Construction	3-4
CEE 122A	Computer Integrated Architecture/Engineering/Construction	2
CEE 122B	Computer Integrated A/E/C	2
CEE 126	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
CEE 131D	Urban Design Studio	5
CEE 141A	Infrastructure Project Development	3
CEE 141B	Infrastructure Project Delivery	3
CEE 224X	Disasters, Decisions, Development in Sustainable Urban Systems (CEE)	3-5
CEE 224Y	Sustainable Urban Systems Project	3-5
CEE 224Z	Sustainable Urban Systems Project	3-5
CEE 226E	Advanced Topics in Integrated, Energy-Efficient Building Design	3
CEE 243	Intro to Urban Sys Engrg	3
CEE 199	Undergraduate Research in Civil and Environmental Engineering	3-4

### Freshwater Environments Focus Area (37 units)

#### Required

CEE 70	Environmental Science and Technology	3
(if not counted as 3rd Engineering fundamental)		
CEE 101B	Mechanics of Fluids	4
CEE 177	Aquatic Chemistry and Biology	4
CEE 166A	Watersheds and Wetlands	4
or		
CEE 174A	Providing Safe Water for the Developing and Developed World	3

#### Electives

CEE 162E	Rivers, Streams, and Canals	3
CEE 165C	Water Resources Management	3
CEE 166A	Watersheds and Wetlands (if not counted as a req'd course)	4
CEE 166B	Floods and Droughts, Dams and Aqueducts	4

CEE 166D	Water Resources and Water Hazards Field Trips	2
CEE 171	Environmental Planning Methods	3
or		
CEE 265E	Adaptation to Sea Level Rise and Extreme Weather Events	3
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 179A	Water Chemistry Laboratory	3
CEE 265A	Sustainable Water Resources Development	3
CEE 265D	Water and Sanitation in Developing Countries	3
BIOHOPK 150H	Ecological Mechanics	3
GEOPHYS 191	Observing Freshwater	3
GS 130	Soil Physics and Hydrology	3
OSPAUSTL 25	Freshwater Systems	3
<b>Capstone (1 class required)</b>		
CEE 126	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
CEE 141A	Infrastructure Project Development	3
CEE 169	Environmental and Water Resources Engineering Design	5
CEE 179C	Environmental Engineering Design	5
CEE 224X	Disasters, Decisions, Development in Sustainable Urban Systems (CEE)	1-5
CEE 224Y	Sustainable Urban Systems Project	3-5
CEE 224Z	Sustainable Urban Systems Project	3-5
CEE 199	Undergraduate Research in Civil and Environmental Engineering	3-4

**Coastal Environments Focus Area (37 units)****Required**

CEE 70	Environmental Science and Technology	3
(if not counted as 3rd Engineering fundamental)		
CEE 101B	Mechanics of Fluids	4
CEE 162F	Coastal Engineering	3
CEE 175A	California Coast: Science, Policy, and Law	3-4

**Electives**

CEE 162I	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
CEE 166A	Watersheds and Wetlands	4
CEE 166B	Floods and Droughts, Dams and Aqueducts	4
CEE 171	Environmental Planning Methods	3
or		
CEE 265E	Adaptation to Sea Level Rise and Extreme Weather Events	3
CEE 174A	Providing Safe Water for the Developing and Developed World	3
CEE 174B	Wastewater Treatment: From Disposal to Resource Recovery	3
CEE 177	Aquatic Chemistry and Biology	4
CEE 272	Coastal Contaminants	3-4
BIO 30	Ecology for Everyone	4
or		
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems	5
or		
EARTHSYS 116	Ecology of the Hawaiian Islands	4
or		
OSPAUSTL 10	Coral Reef Ecosystems	3

or		
ESS 8	The Oceans: An Introduction to the Marine Environment	4
or		
BIOHOPK 182H	Stanford at Sea	16
EARTHSYS 141	Remote Sensing of the Oceans	3-4
EARTHSYS 151	Biological Oceanography	3-4
to be taken concurrently with		
EARTHSYS 152	Marine Chemistry	3-4
<b>Capstone (1 class required)</b>		
CEE 126	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
CEE 141A	Infrastructure Project Development	3
CEE 169	Environmental and Water Resources Engineering Design	5
CEE 179C	Environmental Engineering Design	5
CEE 224X	Disasters, Decisions, Development in Sustainable Urban Systems (CEE)	3-5
CEE 224Y	Sustainable Urban Systems Project	3-5
CEE 224Z	Sustainable Urban Systems Project	3-5
BIOHOPK 168H	Disease Ecology: from parasites evolution to the socio-economic impacts of pathogens on nations	3
CEE 199	Undergraduate Research in Civil and Environmental Engineering	3-4

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

## Honors Program

This program leads to a B.S. with honors for undergraduates majoring in Civil Engineering or in Environmental Systems Engineering. It is designed to encourage qualified students to undertake a more intensive study of civil and environmental engineering than is required for the normal majors through a substantial, independent research project.

The program involves an in-depth research study in an area proposed to and agreed to by a Department of Civil and Environmental Engineering faculty adviser and completion of a thesis of high quality. A written proposal for the research to be undertaken must be submitted and approved by the faculty advisor in the fourth quarter prior to graduation. At the time of application, the student must have an overall grade point average (GPA) of at least 3.3 for course work at Stanford; this GPA must be maintained to graduation. The thesis is supervised by a CEE faculty adviser and must involve input from the School of Engineering writing program by means of ENGR 202S Directed Writing Projects or its equivalent. The written thesis must be approved by the thesis adviser. Students are encouraged to present their results in a seminar for faculty and students. Up to 10 units of CEE 199H Undergraduate Honors Thesis, may be taken to support the research and writing (not to duplicate ENGR 202S). These units are beyond the normal Civil Engineering or Environmental Systems Engineering major program requirements.

## Minor in Civil Engineering or Environmental Systems Engineering

The department offers a minor in Civil Engineering and a minor in Environmental Systems Engineering. Departmental expertise and undergraduate course offerings are available in the areas of environmental engineering and science, environmental fluid mechanics and hydrology, and atmosphere/energy. The courses required for the minors typically have prerequisites. Minors are not ABET-accredited programs.

## Civil Engineering (CE) Minor

The civil engineering minor is intended to give students a focused introduction to one or more areas of civil engineering. Departmental expertise and undergraduate course offerings are available in the areas of Architectural Design, Construction Engineering and Management, and Structural and Geotechnical Engineering. Students interested in Environmental and Water Studies should refer to the Environmental Systems Engineering minor.

The minimum prerequisite for a civil engineering minor is MATH 19 Calculus (or MATH 20 Calculus or MATH 21 Calculus); however, many courses of interest require PHYSICS 41 Mechanics and/or MATH 51 Linear Algebra and Differential Calculus of Several Variables as prerequisites. The minimum prerequisite for a Civil Engineering minor focusing on architectural design is MATH 19 Calculus (or MATH 20 Calculus or MATH 21 Calculus) and a course in Statistics. Students should recognize that a minor in civil engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining a civil engineering minor, and the field itself is so broad, no single set of course requirements will be appropriate for all students. Instead, interested students are encouraged to propose their own set of courses within the guidelines listed below. Additional information, including example minor programs, are provided on the CEE web site ([http://cee.stanford.edu/prospective/undergrad/minor\\_overview.html](http://cee.stanford.edu/prospective/undergrad/minor_overview.html)) and in Chapter 6 of the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

General guidelines are:

1. A civil engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes of at least 3 units each of letter-graded work, except where letter grades are not offered.
2. The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another. Example programs are given on the CEE webpage.

Professor Anne Kiremidjian ([kiremidjian@stanford.edu](mailto:kiremidjian@stanford.edu)) is the CEE undergraduate minor adviser in Structural Engineering and Construction Engineering and Management. John Barton ([jhbarton@stanford.edu](mailto:jhbarton@stanford.edu) (<http://www.stanford.edu/dept/registrar/bulletin/jhbarton@stanford.edu>)), Program Director for Architectural Design, is the undergraduate minor adviser in Architectural Design. Students must consult the appropriate adviser when developing their minor program, and obtain approval of the finalized study list from them.

## Environmental Systems Engineering (EnvSE) Minor

The Environmental Systems Engineering minor is intended to give students a focused introduction to one or more areas of Environmental Systems Engineering. Departmental expertise and undergraduate course offerings are available in the areas of environmental engineering and science, environmental fluid mechanics and hydrology, and atmosphere/energy. The minimum prerequisite for an Environmental Systems Engineering minor is MATH 19 Calculus (or MATH 20 Calculus or MATH 21 Calculus); additionally, many courses of interest require PHYSICS 41 Mechanics and/or MATH 51 Linear Algebra and Differential Calculus of Several Variables as prerequisites. Students should recognize that a minor in Environmental Systems Engineering is not an ABET-accredited degree program.

Since undergraduates having widely varying backgrounds may be interested in obtaining an Environmental Systems Engineering minor, no single set of course requirements is appropriate for all students. Instead, interested students are encouraged to propose their own set of courses

within the guidelines listed below. Additional information on preparing a minor program is available in the Undergraduate Engineering Handbook (<http://web.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Handbooks>).

General guidelines are—

- An Environmental Systems Engineering minor must contain at least 24 units of course work not taken for the major, and must consist of at least six classes of at least 3 units each of letter-graded work, except where letter grades are not offered.
- The list of courses must represent a coherent body of knowledge in a focused area, and should include classes that build upon one another. Example programs are available on the CEE web site (<https://cee.stanford.edu/academics/undergraduate-programs/minor>).

Professor Nicholas Ouellette ([nto@stanford.edu](mailto:nto@stanford.edu)) is the CEE undergraduate minor adviser in Environmental Systems Engineering. Students must consult with Professor Ouellette (<https://cee.stanford.edu/people/nicholas-t-ouellette>) in developing their minor program, and obtain approval of the finalized study list from him.

## Coterminal M.S. Program in Civil and Environmental Engineering

Stanford undergraduates who wish to continue their studies for the Master of Science degree in the coterminal program at Stanford must have earned a minimum of 120 units towards graduation. This includes allowable Advanced Placement (AP) and transfer credit. Applicants must submit their application no later than the quarter prior to the expected completion of their undergraduate degree and are expected to meet the Department of Civil and Environmental Engineering application deadlines for coterminal applicants for graduate study (the third Friday of January). Applications are considered once a year during Winter Quarter. An application must display evidence of potential for strong academic performance as a graduate student.

It is recommended that students who contemplate advanced study at Stanford discuss their plans with their advisers in the junior year.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree

Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Science in Civil and Environmental Engineering

The following programs are available leading to the M.S. degree in Civil and Environmental Engineering:

- Atmosphere/Energy
- Environmental Engineering
- Structural Engineering and Geomechanics
- Sustainable Design and Construction

Students admitted to graduate study with a B.S. in Civil Engineering, or equivalent, from an accredited curriculum can satisfy the requirements for the M.S. degree in Civil and Environmental Engineering by completing a minimum of 45 units beyond the B.S. All 45 units must be taken at Stanford. A minimum 2.75 grade point average (GPA) is required for candidates to be recommended for the M.S. degree. No thesis is required.

The program of study must be approved by the faculty of the department and should include at least 45 units of courses in engineering, mathematics, science, and related fields unless it can be shown that other work is pertinent to the student's objectives. Additional program area requirements are available on the department web site and from the department's student services office (Y2E2 room 316).

Candidates for the M.S. in Civil and Environmental Engineering who do not have a B.S. in Civil Engineering may, in addition to the above, be required to complete those undergraduate courses deemed important to their graduate programs. In such cases, more than three quarters is often required to obtain the degree.

## Engineer in Civil and Environmental Engineering

A student with an M.S. in Civil Engineering may satisfy the requirements of the degree of Engineer in Civil and Environmental Engineering by completing 45 unduplicated course work and research units for a total of 90 units. Engineer candidates must submit an acceptable thesis (12-15 units) and maintain a minimum GPA of 3.0. The program of study must be approved by a faculty member in the department.

This degree is recommended for those desiring additional graduate education, especially those planning a career in professional practice. The thesis normally should be started in the first quarter of graduate study after the M.S. degree. Programs are offered in the fields of specialization mentioned for the M.S. degree. For students who will continue study toward a CEE Ph.D., the Engineer thesis topic must be significantly different from their doctoral research.

Graduate students who lack adequate background in their area of specialization (e.g. lack a prior degree in civil engineering, if required in their program) or who are not full-time students should expect to be enrolled for more than two years. Engineer degree candidates should develop individually tailored expected-progress timetables in consultation with their program advisers.

For graduate students not currently attending Stanford, admission to study for the Engineer degree in the Department of Civil and Environmental Engineering begins with the office of Graduate Admissions (<http://www.stanford.edu/home/admission/index/html>).

If you are currently pursuing a graduate degree at Stanford, and wish to apply for the Engineer degree program, submit an Application for Post-Masters Study (available in the department office, Y2E2 Room 314). This form is typically filed during your second quarter of graduate study, by

January 15, so that your application may be reviewed during the normal graduate admissions cycle. You may apply at a later date if your adviser feels that it is appropriate to do so.

A minimum of 90 quarter units of full-time graduate study (or equivalent part-time graduate study) is required for the Engineer degree. For most students, the master's degree supplies 45 of these units.

If your master's degree was obtained at another school, you can apply to transfer up to 45 quarter units of residency credit by completing an Application for Transfer Credit for Graduate Work Done Elsewhere. No units need to be transferred if you hold an M.S. degree from Stanford.

## Doctor of Philosophy in Civil and Environmental Engineering

The Ph.D. is offered under the general regulations of the University as set forth in the "Graduate Degrees" section of this bulletin. This degree is recommended for those who expect to engage in a professional career in research, teaching, or technical work of an advanced nature. The Ph.D. program requires a total of 135 units of graduate study, at least 90 units of which must be at Stanford. Up to 45 units of graduate study can be represented by the M.S. program described above. Additionally, up to 45 units of graduate study can be represented by the Engineer (ENG) program as described above if both the M.S. and ENG units were all completed at Stanford. Students must maintain a minimum GPA of 3.0 in post-M.S. course work. All candidates for the Ph.D. degree are required to complete CEE 200 in conjunction with a one-quarter teaching assistantship/course assistantship to gain training and instructional experience. Further information on Ph.D. requirements and regulations is found in the department Graduate Handbook.

The program of study is arranged via consultation between the prospective candidate and their dissertation research adviser. This program of study considers the interests of the student, and the background needed for their thesis topic, within the framework of the requirements of the department and the University.

By the end of a student's fourth quarter as an enrolled PhD student, excluding summers, the student is expected to pass the department's General Qualifying Examination (GQE) to be admitted to candidacy for the doctoral degree. The purpose of the GQE is to ensure that the student is adequately prepared to undertake doctoral research and has a well planned research topic. The exam include (1) a written and/or oral general examination of the candidate's doctoral major field, (2) a presentation and defense of the candidate's doctoral research dissertation proposal, or (3) a combination research proposal and general examination. The GQE is administered by an advisory committee consisting of at least three Stanford faculty members, including a chair who is a faculty member in Civil and Environmental Engineering. All members are normally on the Stanford Academic Council. A petition for appointment of one advisory committee member who is not on the Academic Council may be made if the proposed person contributes an area of expertise that is not readily available from the faculty. Such petitions are subject to approval by the department chair. When the primary research adviser is not a member of the CEE Academic Council faculty, the committee must consist of four examiners, with a minimum of two members who are Academic Council faculty in the CEE department.

## Ph.D. Minor in Civil and Environmental Engineering

A Ph.D. minor is a program outside a major department. Requirements for a minor are established by the minor department. Acceptance of the minor as part of the total Ph.D. program is determined by the major department. Application for the Ph.D. minor must be approved by both the major and the minor department, and the minor department must be represented at the University oral examination.

A student desiring a Ph.D. minor in Civil and Environmental Engineering (CEE) must have a minor program adviser who is both a CEE faculty member and a member of the Academic Council. The faculty member must be in the program of the designated minor subfield of CEE. This adviser must be a member of the student's University oral examination committee and the reading committee for the doctoral dissertation.

The program must include at least 20 units of graduate-level course work (courses numbered 200 or above, excluding special studies and thesis) in CEE completed at Stanford University. Units taken for the minor cannot be counted as part of the 45 unduplicated units for the PhD major. The list of courses must form a coherent program and must be approved by the minor program adviser and the CEE chair. A minimum GPA of 3.0 must be achieved in these courses.

*Emeriti: (Professors)* Raymond E. Levitt\*, Gilbert M. Masters\*, Perry L. McCarty\*, Henry W. Parker, Martin Reinhard\*, Haresh C. Shah, Robert L. Street\*, Clyde B. Tatum\*, Paul M. Teicholz

*Chair:* Lynn M. Hildemann

*Associate Chairs:* Ronaldo I. Borja, Raymond E. Levitt

*Professors:* Sarah L. Billington, Alexandria B. Boehm (on leave Autumn), Ronaldo I. Borja, Craig S. Criddle, John O. Dabiri, Gregory G. Deierlein, Martin A. Fischer, Lynn M. Hildemann, Mark Z. Jacobson, Anne S. Kiremidjian (on leave Autumn), Peter K. Kitanidis, Jeffrey R. Koseff, Kincho H. Law, James O. Leckie, Richard G. Luthy, Eduardo Miranda, William A. Mitch, Stephen G. Monismith (on leave Autumn), Leonard Ortolano, Alfred M. Spormann

*Associate Professors:* Jack W. Baker, Jennifer Davis, David L. Freyberg, Oliver B. Fringer (on leave Autumn), Michael D. Lepech, Nicholas T. Ouellette

*Assistant Professors:* Catherine Gorié, Rishie Jain, Christian Linder, Ram Rajagopal

*Courtesy Professor:* Peter M. Pinsky

*Courtesy Associate Professor:* Margot G. Gerritsen, Leif Thomas

*Courtesy Assistant Professor:* Jenny Suckale

*Senior Lecturer:* John Barton

*Lecturers:* Vivanco Antolin, Michael Azgour, Deborah Ballati, Thomas Beischer, Michael Bennon, Beverly Choe Harris, Stanley Christensen, Kyle Douglas, Derek Fong, Renate Fruchter, Diana Ginnebaugh, Darryl Goodson, Robert Groves, James Hawk, Kenneth Hayes, Daniel Johnson, Glenn Katz, David Kleiman, Karl Knapp, Nelson Koen Cohen, John Koester, Royal Kopperud, Amy Larimer, Eloi Laurent, Sophie Maisnier-Patin, Pedram Mokrian, Derek Ouyang, Jose Luis Moscovich, Brian O'Kelly, Allison Pieja, Alexander (Sandy) Robertson, Peter Rumsey, Bill Shelander, Bryan Shiles, Robert Soden, Charlotte Stanton, J.B. Straubel, Hattie Stroud, Isabella Tomanek, Allison Williams, Peter Williams, Ethen J. Wood

*Adjunct Lecturers:* Leo Chow, Charles Debbas, Erik Kolderup, Mark Sarkisian, Peter Rumsey, Robert Soden, Kristen Stasio, Christopher Wasney

*Adjunct Professors:* Howard Ashcraft, Vladimir Bazjanac, Terry Beaubois, James Cloern, Angelos Findikakis, Robert Hickey, Calvin Kam, Michael Kavanaugh, Karl Knapp, Andrew Manning, Martin McCann, William McDonough, Paul Meyer, Piotr Moncarz, Jose Luis Moscovitch, Wayne Ott, Benedict Schwegler, Brian Sedar, Patrick Shiel, Avram Tucker, Antonio Vives, Michael Walton, Jie Wang, Jane Woodward, John Wren

*Adjunct Associate Professors:* Jordan Brandt, Gloria T. Lau, Colin Ong

*Adjunct Assistant Professor:* Patrick Shiel

*UPS Visiting Professor:* Brian White

*Visiting Professor:* Ronita Bardhan

\* Recalled to active duty.

## Overseas Studies Courses in Civil and Environmental Engineering

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPAUSTL 10	Coral Reef Ecosystems	3
OSPAUSTL 25	Freshwater Systems	3
OSPAUSTL 30	Coastal Forest Ecosystems	3
OSPMADRD 8A	Cities and Creativity: Cultural and Architectural Interpretations of Madrid	4

Note: OSPAUSTL 10 may count towards the ENVEN-BS and the CE-BS with Specialty in Environmental & Water Studies, however it does not count towards the CE-BS with Specialty in Structures & Construction.

# COMPUTER SCIENCE

Courses offered by the Department of Computer Science are listed under the subject code CS on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Computer Science (CS) operates and supports computing facilities for departmental education, research, and administration needs. All CS students have access to the departmental student machine for general use (mail, news, etc.), as well as computer labs with public workstations located in the Gates Building. In addition, most students have access to systems located in their research areas.

Each research group in Computer Science has systems specific to its research needs. These systems include workstations (PCs, Macs), multi-CPU computer clusters, and local mail and file servers. Servers and workstations running Linux or various versions of Windows are commonplace. Support for course work and instruction is provided on systems available through U (<http://itservices.stanford.edu>) university IT (<https://uit.stanford.edu>) (UIT) and the School of Engineering (<http://engineering.stanford.edu>) (SoE).

## Mission of the Undergraduate Program in Computer Science

The mission of the undergraduate program in Computer Science is to develop students' breadth of knowledge across the subject areas of computer science, including their ability to apply the defining processes of computer science theory, abstraction, design, and implementation to solve problems in the discipline. Students take a set of core courses. After learning the essential programming techniques and the mathematical foundations of computer science, students take courses in areas such as programming techniques, automata and complexity theory, systems programming, computer architecture, analysis of algorithms, artificial intelligence, and applications. The program prepares students for careers in government, law, and the corporate sector, and for graduate study.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to be able to:

1. Apply the knowledge of mathematics, science, and engineering.
2. Design and conduct experiments, as well to analyze and interpret data.
3. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. Function on multidisciplinary teams.
5. Identify, formulate, and solve engineering problems.
6. Understand professional and ethical responsibility.
7. Communicate effectively.
8. Understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. Demonstrate a working knowledge of contemporary issues.
10. Apply the techniques, skills, and modern engineering tools necessary for engineering practice.
11. Transition from engineering concepts and theory to real engineering applications.

## Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course work in the foundational elements of the field and in at least one graduate specialization. Areas of specialization include artificial intelligence, biocomputation, computer and network security, human-computer interaction, information management and analytics, mobile and internet computing, real-world computing, software theory, systems, and theoretical computer science.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Computer Science and related fields.

## Graduate Programs in Computer Science

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

## Computer Science Course Catalog Numbering System

The first digit of a CS course number indicates its general level of sophistication:

Digit	Description
001-099	Service courses for nontechnical majors
100-199	Other service courses, basic undergraduate
200-299	Advanced undergraduate/beginning graduate
300-399	Advanced graduate
400-499	Experimental
500-599	Graduate seminars

The tens digit indicates the area of Computer Science it addresses:

Digit	Description
00-09	Introductory, miscellaneous
10-19	Hardware and Software Systems
20-39	Artificial Intelligence
40-49	Software Systems
50-59	Mathematical Foundations of Computing
60-69	Analysis of Algorithms
70-79	Computational Biology and Interdisciplinary Topics
90-99	Independent Study and Practicum

## Bachelor of Science in Computer Science

The department offers both a major in Computer Science and a minor in Computer Science. Further information is available in the *Handbook for Undergraduate Engineering Programs* published by the School of Engineering. The Computer Science major offers a number of tracks (programs of study) from which students can choose, allowing them to focus their program on the areas of most interest. These tracks also reflect the broad diversity of areas in computing disciplines. The department has an honors program.

In addition to Computer Science itself, Stanford offers several interdisciplinary degrees with a substantial computer science

component. The Symbolic Systems major (in the School of Humanities and Sciences) offers an opportunity to explore computer science and its relation to linguistics, philosophy, and psychology. The Mathematical and Computational Sciences major (also Humanities and Sciences) allows students to explore computer science along with more mathematics, statistics, and operations research.

## Computer Science (CS)

Completion of the undergraduate program in Computer Science leads to the conferral of the Bachelor of Science in Computer Science.

## Mission of the Undergraduate Program in Computer Science

The mission of the undergraduate program in Computer Science is to develop students' breadth of knowledge across the subject areas of computer science, including their ability to apply the defining processes of computer science theory, abstraction, design, and implementation to solve problems in the discipline. Students take a set of core courses. After learning the essential programming techniques and the mathematical foundations of computer science, students take courses in areas such as programming techniques, automata and complexity theory, systems programming, computer architecture, analysis of algorithms, artificial intelligence, and applications. The program prepares students for careers in government, law, the corporate sector, and for graduate study.

## Requirements

### Mathematics (26 units minimum)–

CS 103	Mathematical Foundations of Computing	5
CS 109	Introduction to Probability for Computer Scientists	5
MATH 19	Calculus <sup>1</sup>	3
MATH 20	Calculus <sup>1</sup>	3
MATH 21	Calculus <sup>1</sup>	4
Plus two electives <sup>2</sup>		

### Science (11 units minimum)–

PHYSICS 41	Mechanics	4
PHYSICS 43	Electricity and Magnetism	4
Science elective <sup>3</sup>		3

### Technology in Society (3-5 units)–

One course; course chosen must be on the SoE Approved Courses list at <ughb.stanford.edu> the year taken; see Basic Requirements 4 in the School of Engineering section

### Engineering Fundamentals (13 units minimum; see Basic Requirement 3 in the School of Engineering section)–

CS 106B	Programming Abstractions	5
or CS 106X	Programming Abstractions (Accelerated)	
ENGR 40M	An Intro to Making: What is EE (or ENGR 40A and ENGR 40B)	3-5
Fundamentals Elective (May be an ENGR fundamentals or an additional CS Depth course. See Fig. 3-4 in the UGHB for approved ENGR fundamentals list. May not be any CS 106)		3-5

\*Students who take ENGR 40A or 40M for fewer than 5 units are required to take 1-2 additional units of ENGR Fundamentals (13 units minimum), or 1-2 additional units of Depth (27 units minimum for track and elective courses).

### Writing in the Major–

Select one of the following:

CS 181W	Computers, Ethics, and Public Policy
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CS 191W	Writing Intensive Senior Project
CS 194W	Software Project
CS 210B	Software Project Experience with Corporate Partners
CS 294W	Writing Intensive Research Project in Computer Science

### Computer Science Core (15 units)–

CS 107	Computer Organization and Systems	5
or CS 107E	Computer Systems from the Ground Up	
CS 110	Principles of Computer Systems	5
CS 161	Design and Analysis of Algorithms	5

### Senior Project (3 units)–

CS 191	Senior Project
CS 191W	Writing Intensive Senior Project
CS 194	Software Project
CS 194H	User Interface Design Project
CS 194W	Software Project
CS 210B	Software Project Experience with Corporate Partners
CS 294	<sup>6</sup>
or CS 294W	Writing Intensive Research Project in Computer Science

## Computer Science Depth B.S.

Choose one of the following ten CS degree tracks (a track must consist of at least 25 units and 7 classes):

### Artificial Intelligence Track–

CS 221	Artificial Intelligence: Principles and Techniques	4
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Select two courses, each from a different area:

Area I, AI Methods:

CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 229	Machine Learning
CS 234	Reinforcement Learning
CS 238	Decision Making under Uncertainty

Area II, Natural Language Processing:

CS 124	From Languages to Information
CS 224N	Natural Language Processing with Deep Learning
CS 224S	Spoken Language Processing
CS 224U	Natural Language Understanding

Area III, Vision:

CS 131	Computer Vision: Foundations and Applications
CS 231A	Computer Vision: From 3D Reconstruction to Recognition
CS 231N	Convolutional Neural Networks for Visual Recognition

Area IV, Robotics:

CS 223A	Introduction to Robotics
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Select one additional course from the Areas above or from the following:

AI Methods:	
CS 157	Logic and Automated Reasoning
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics
STATS 315A	Modern Applied Statistics: Learning



STATS 315B	Modern Applied Statistics: Data Mining
Vision:	
CS 231B	
CS 231M	
CS 331A	
Comp Bio:	
CS 262	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells
CS 371	Computational Biology in Four Dimensions
CS 374	
Information and the Web:	
CS 276	Information Retrieval and Web Search
CS 224W	Analysis of Networks
Other:	
CS 227B	General Game Playing
CS 277	
CS 379	Interdisciplinary Topics
Robotics and Control:	
CS 327A	Advanced Robotic Manipulation
CS 329	Topics in Artificial Intelligence (with advisor approval)
ENGR 205	Introduction to Control Design Techniques
EE 209	
MS&E 251	Introduction to Stochastic Control with Applications
MS&E 351	Dynamic Programming and Stochastic Control
Track Electives: at least three additional courses selected from the Areas and lists above, general CS electives, or the following: <sup>4</sup>	
CS 238	Decision Making under Uncertainty
CS 275	Translational Bioinformatics
CS 326	Topics in Advanced Robotic Manipulation
CS 334A	Convex Optimization I
or EE 364A	Convex Optimization I
CS 428	Computation and cognition: the probabilistic approach
EE 278	Introduction to Statistical Signal Processing
EE 364B	Convex Optimization II
ECON 286	Game Theory and Economic Applications
MS&E 252	Decision Analysis I: Foundations of Decision Analysis
MS&E 352	Decision Analysis II: Professional Decision Analysis
MS&E 355	Influence Diagrams and Probabilistic Networks
PHIL 152	Computability and Logic
PSYCH 202	Cognitive Neuroscience
PSYCH 204A	Human Neuroimaging Methods
PSYCH 204B	Computational Neuroimaging: Methods & Analyses
PSYCH 209	Neural Network Models of Cognition: Principles and Applications
STATS 200	Introduction to Statistical Inference
STATS 202	Data Mining and Analysis
STATS 205	Introduction to Nonparametric Statistics

## Biocomputation Track—

Units

The Mathematics, Science, and Engineering Fundamentals requirements are non-standard for this track. See Handbook for Undergraduate Engineering Programs for details.

Select one of the following:		3-4
CS 221	Artificial Intelligence: Principles and Techniques	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229	Machine Learning	
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
Select one of the following:		
CS 262		
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
CS 273A	The Human Genome Source Code	
CS 274	Representations and Algorithms for Computational Molecular Biology	
CS 275	Translational Bioinformatics	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	
One additional course from the lists above or the following:		3-4
CS 124	From Languages to Information	
CS 145	Introduction to Databases	
CS 147	Introduction to Human-Computer Interaction Design	
CS 148	Introduction to Computer Graphics and Imaging	
CS 248	Interactive Computer Graphics	
One course selected from the following:		3-4
CS 108	Object-Oriented Systems Design	3-4
CS 124	From Languages to Information	3-4
CS 131	Computer Vision: Foundations and Applications	3-4
CS 140	Operating Systems and Systems Programming	3-4
or CS 140E	Operating systems design and implementation	
CS 142	Web Applications	3
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
or PHIL 151	Metalogic	
CS 164		
CS 166	Data Structures	3-4
CS 167		
CS 168	The Modern Algorithmic Toolbox	3-4
CS 190	Software Design Studio	3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 205B	Mathematical Methods for Fluids, Solids, and Interfaces	3
CS 210A	Software Project Experience with Corporate Partners	3-4

CS 221	Artificial Intelligence: Principles and Techniques	3-4	CS 371	Computational Biology in Four Dimensions	3
CS 223A	Introduction to Robotics	3	CS 374		
CS 224N	Natural Language Processing with Deep Learning	3-4	CME 108	Introduction to Scientific Computing	3
CS 224S	Spoken Language Processing	2-4	EE 180	Digital Systems Architecture	4
CS 224U	Natural Language Understanding	3-4	EE 263	Introduction to Linear Dynamical Systems	3
CS 224W	Analysis of Networks	3-4	EE 282	Computer Systems Architecture	3
CS 225A	Experimental Robotics	3	EE 364A	Convex Optimization I	3
CS 227B	General Game Playing	3	BIOE 101	Systems Biology	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4	MS&E 152	Introduction to Decision Analysis	3-4
CS 229	Machine Learning	3-4	MS&E 252	Decision Analysis I: Foundations of Decision Analysis	3-4
CS 229T	Statistical Learning Theory	3	STATS 206	Applied Multivariate Analysis	3
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3-4	STATS 315A	Modern Applied Statistics: Learning	2-3
CS 231B			STATS 315B	Modern Applied Statistics: Data Mining	2-3
CS 231M			BMI 231		
CS 231N	Convolutional Neural Networks for Visual Recognition	3-4	BMI 260		
CS 232	Digital Image Processing	3	GENE 211	Genomics	3
CS 233	Geometric and Topological Data Analysis	3	One course from the following:		3-5
CS 234	Reinforcement Learning	3	CS 145	Introduction to Databases	3-4
CS 238	Decision Making under Uncertainty	3-4	CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 240	Advanced Topics in Operating Systems	3	CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 240H			CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 242	Programming Languages	3	CS 229	Machine Learning	3-4
CS 243	Program Analysis and Optimizations	3-4	CS 262		
CS 244	Advanced Topics in Networking	3-4	CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 244B	Distributed Systems	3	CS 273A	The Human Genome Source Code	3
CS 245	Database Systems Principles	3	CS 273B	Deep Learning in Genomics and Biomedicine	3
CS 246	Mining Massive Data Sets	3-4	CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 247	Human-Computer Interaction Design Studio	3-4	CS 275	Translational Bioinformatics	4
CS 248	Interactive Computer Graphics	3-4	CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CS 249A			CS 371	Computational Biology in Four Dimensions	3
CS 251	Bitcoin and Crypto Currencies	3	CS 373	Statistical and Machine Learning Methods for Genomics	3
CS 254	Computational Complexity	3	CS 374		
CS 255	Introduction to Cryptography	3	EE 263	Introduction to Linear Dynamical Systems	3
CS 261	Optimization and Algorithmic Paradigms	3	EE 364A	Convex Optimization I	3
CS 262			MS&E 152	Introduction to Decision Analysis	3-4
CS 263	Algorithms for Modern Data Models	3	MS&E 252	Decision Analysis I: Foundations of Decision Analysis	3-4
CS 264	Beyond Worst-Case Analysis	3	STATS 206	Applied Multivariate Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3	STATS 315A	Modern Applied Statistics: Learning	2-3
CS 266			STATS 315B	Modern Applied Statistics: Data Mining	2-3
CS 267	Graph Algorithms	3	BMI 231		
CS 269I	Incentives in Computer Science	3	BMI 260		
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3	GENE 211	Genomics	3
CS 272	Introduction to Biomedical Informatics Research Methodology	3-5	One course selected from the list above or the following:		
CS 273A	The Human Genome Source Code	3	BIOE 222A		
CS 273B	Deep Learning in Genomics and Biomedicine	3	BIOE 222B		
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4	CHEMENG 150	Biochemical Engineering	3
CS 275	Translational Bioinformatics	4	CHEMENG 174	Environmental Microbiology I	3
CS 276	Information Retrieval and Web Search	3	APPPHYS 294	Cellular Biophysics	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3	BIO 104	Advanced Molecular Biology	5
CS 348B	Computer Graphics: Image Synthesis Techniques	3-4	BIO 118	Genetic Analysis of Biological Processes	4
CS 348C	Computer Graphics: Animation and Simulation	3			

BIO 129A		
BIO 129B		
BIO 188		
BIO 189		
BIO 214	Advanced Cell Biology	4
BIO 217		
BIO 230	Molecular and Cellular Immunology	4
CHEM 135		
CHEM 171	Physical Chemistry I	4
BIOC 218		
BIOC 241	Biological Macromolecules	3-5
SBIO 228		
One course from the following:		
BIOE 220	Introduction to Imaging and Image-based Human Anatomy	3
BIOE 222A		
BIOE 222B		
CHEMENG 150	Biochemical Engineering	3
CHEMENG 174	Environmental Microbiology I	3
CS 262		
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CS 371	Computational Biology in Four Dimensions	3
CS 374		
ME 281	Biomechanics of Movement	3
APPHYS 294		
BIO 104	Advanced Molecular Biology	5
BIO 112	Human Physiology	4
BIO 118	Genetic Analysis of Biological Processes	4
BIO 129A		
BIO 129B		
BIO 158	Developmental Neurobiology	4
BIO 183	Theoretical Population Genetics	3
BIO 188		
BIO 189		
BIO 214	Advanced Cell Biology	4
BIO 217		
BIO 230	Molecular and Cellular Immunology	4
CHEM 135		
CHEM 171	Physical Chemistry I	4
BIOC 218		
BIOC 241	Biological Macromolecules	3-5
DBIO 210	Developmental Biology	4
GENE 211	Genomics	3
SBIO 228		
SURG 101	Regional Study of Human Structure	5

### Computer Engineering Track—

For this track there is a 10 unit minimum for ENGR Fundamentals and a 31 unit minimum for Depth (for track and elective courses)

EE 108 & EE 180	Digital System Design and Digital Systems Architecture	6-8
Select two of the following:		
EE 101A	Circuits I	8

Units

EE 101B	Circuits II	
EE 102A	Signal Processing and Linear Systems I	
EE 102B	Signal Processing and Linear Systems II	
Satisfy the requirements of one of the following concentrations:		
1) Digital Systems Concentration		
CS 140	Operating Systems and Systems Programming or CS 140E or C	
EE 109	Digital Systems Design Lab	
EE 271	Introduction to VLSI Systems	
Plus two of the following (6-8 units):		
CS 140	Operating Systems and Systems Programming (if not counted above)	
or CS 140E or C		
CS 144	Introduction to Computer Networking	
CS 149	Parallel Computing	
CS 190	Software Design Studio	
CS 240E		
CS 244	Advanced Topics in Networking	
EE 273	Digital Systems Engineering	
EE 282	Computer Systems Architecture	
2) Robotics and Mechatronics Concentration		
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	
CS 223A	Introduction to Robotics	
ME 210	Introduction to Mechatronics	
ENGR 105	Feedback Control Design	
Plus one of the following (3-4 units):		
CS 225A	Experimental Robotics	
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
ENGR 205	Introduction to Control Design Techniques	
ENGR 207B	Linear Control Systems II	
3) Networking Concentration		
CS 140 & CS 144	Operating Systems and Systems Programming and Introduction to Computer Networking (CS 140E can substitute for CS 140)	
Plus three of the following (9-11 units):		
CS 240	Advanced Topics in Operating Systems	
CS 240E		
CS 241	Embedded Systems Workshop	
CS 244	Advanced Topics in Networking	
CS 244B	Distributed Systems	
CS 244E		
EE 179	Analog and Digital Communication Systems	

### Graphics Track—

		Units
CS 148 & CS 248	Introduction to Computer Graphics and Imaging and Interactive Computer Graphics	8
Select one of the following: <sup>5</sup>		
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics (strongly recommended as a preferred choice)	3-5
CME 104	Linear Algebra and Partial Differential Equations for Engineers (Note: students taking CME 104 are also required to take its prerequisite course, CME 102)	
CME 108	Introduction to Scientific Computing	

MATH 52	Integral Calculus of Several Variables	
MATH 113	Linear Algebra and Matrix Theory	
Select two of the following:		6-8
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
or CS 131	Computer Vision: Foundations and Applications	
CS 233	Geometric and Topological Data Analysis	
CS 268	Geometric Algorithms	
CS 348A	Computer Graphics: Geometric Modeling & Processing	
CS 348B	Computer Graphics: Image Synthesis Techniques	
CS 348C	Computer Graphics: Animation and Simulation	
CS 448	Topics in Computer Graphics	
Track Electives: at least two additional courses from the lists above, the general CS electives list, or the following: <sup>4</sup>		6-8
ARTSTUDI 160	Intro to Digital / Physical Design	
ARTSTUDI 170	PHOTOGRAPHY I: BLACK AND WHITE	
ARTSTUDI 179	Digital Art I	
CME 302	Numerical Linear Algebra	
CME 306	Numerical Solution of Partial Differential Equations	
EE 168	Introduction to Digital Image Processing	
EE 262	Two-Dimensional Imaging	
EE 264	Digital Signal Processing	
EE 278	Introduction to Statistical Signal Processing	
EE 368	Digital Image Processing	
ME 101	Visual Thinking	
PSYCH 30	Introduction to Perception	
PSYCH 221	Image Systems Engineering	

**Human-Computer Interaction Track—**

		<b>Units</b>
CS 147	Introduction to Human-Computer Interaction Design	4
CS 247	Human-Computer Interaction Design Studio	4
Any three of the following:		
CS 142	Web Applications	
CS 148	Introduction to Computer Graphics and Imaging	
CS 194H	User Interface Design Project	
CS 210A	Software Project Experience with Corporate Partners	
CS 376	Human-Computer Interaction Research	
Any CS 377 'Topics in HCI' of three or more units		
CS 448B	Data Visualization	
ME 216M	Introduction to the Design of Smart Products	
At least two additional courses from above list, the general CS electives list, or the following: <sup>4</sup>		3-6
Any d.school class of 3 or more units		
Any class of 3 or more units at hci.stanford.edu under the 'courses' link		
Communication-		
COMM 121	Behavior and Social Media	
COMM 124	Lies, Trust, and Tech	
or COMM 224	Lies, Trust, and Tech	
COMM 140		
or COMM 240		
COMM 166	Virtual People	
COMM 169		

or COMM 269		
COMM 172	Media Psychology	
or COMM 272	Media Psychology	
COMM 182		
COMM 324	Language and Technology	
Art Studio-		
ARTSTUDI 160	Intro to Digital / Physical Design	
ARTSTUDI 162	Embodied Interfaces	
ARTSTUDI 163	Drawing with Code	
ARTSTUDI 164	DESIGN IN PUBLIC SPACES	
ARTSTUDI 165	Social Media and Performative Practices	
ARTSTUDI 168	Data as Material	
ARTSTUDI 264	Advanced Interaction Design	
ARTSTUDI 266	Sculptural Screens / Malleable Media	
ARTSTUDI 267	Emerging Technology Studio	
Sym Sys-		
SYMSYS 245	Cognition in Interaction Design	
Psychology-		
PSYCH 30	Introduction to Perception	
PSYCH 45	Introduction to Learning and Memory	
PSYCH 70	Self and Society: Introduction to Social Psychology	
PSYCH 75	Introduction to Cultural Psychology	
PSYCH 110		
PSYCH 131		
PSYCH 154	Judgment and Decision-Making	
Empirical Methods-		
MS&E 125	Introduction to Applied Statistics	
PSYCH 252	Statistical Methods for Behavioral and Social Sciences	
PSYCH 254	Affective Neuroscience	
PSYCH 110		
STATS 203	Introduction to Regression Models and Analysis of Variance	
EDUC 191		
HUMBIO 82A	Qualitative Research Methodology	
ME Design-		
ME 101	Visual Thinking	
ME 115A	Introduction to Human Values in Design	
ME 203	Design and Manufacturing	
ME 210	Introduction to Mechatronics	
ME 216A	Advanced Product Design: Needfinding	
Learning Design + Tech-		
EDUC 236	Beyond Bits and Atoms: Designing Technological Tools	
EDUC 281	Technology for Learners	
EDUC 239	Educating Young STEM Thinkers	
EDUC 338	Innovations in Education	
EDUC 342	Child Development and New Technologies	
MS&E-		
MS&E 185	Global Work	
MS&E 331		
Computer Music-		
MUSIC 220A	Fundamentals of Computer-Generated Sound	
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music	
MUSIC 220C	Research Seminar in Computer-Generated Music	

MUSIC 250A	Physical Interaction Design for Music	
MUSIC 256A	Music, Computing, Design I: Art of Design for Computer Music	
Optional Elective <sup>4</sup>		

## Information Track—

		Units
CS 124	From Languages to Information	4
CS 145	Introduction to Databases	4
Two courses, from different areas:		6-9
1) Information-based AI applications		
CS 224N	Natural Language Processing with Deep Learning	
CS 224S	Spoken Language Processing	
CS 229	Machine Learning	
CS 233	Geometric and Topological Data Analysis	
CS 234	Reinforcement Learning	
2) Database and Information Systems		
CS 140	Operating Systems and Systems Programming	
or CS 140E	Operating systems design and implementation	
CS 142	Web Applications	
CS 245	Database Systems Principles	
CS 246	Mining Massive Data Sets	
CS 341	Project in Mining Massive Data Sets	
CS 345	(Offered occasionally)	
CS 346		
CS 347		
3) Information Systems in Biology		
CS 262		
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
CS 274	Representations and Algorithms for Computational Molecular Biology	
4) Information Systems on the Web		
CS 224W	Analysis of Networks	
CS 276	Information Retrieval and Web Search	
At least three additional courses from the above areas or the general CS electives list. <sup>4</sup>		

## Systems Track—

		Units
CS 140	Operating Systems and Systems Programming	4
or CS 140E	Operating systems design and implementation	
Select one of the following:		3-4
CS 143	Compilers	
EE 180	Digital Systems Architecture	
Two additional courses from the list above or the following:		6-8
CS 144	Introduction to Computer Networking	
CS 145	Introduction to Databases	
CS 149	Parallel Computing	
CS 155	Computer and Network Security	
CS 190	Software Design Studio	
CS 240	Advanced Topics in Operating Systems	
CS 242	Programming Languages	
CS 243	Program Analysis and Optimizations	
CS 244	Advanced Topics in Networking	
CS 245	Database Systems Principles	
EE 271	Introduction to VLSI Systems	

EE 282	Computer Systems Architecture	
Track Electives: at least three additional courses selected from the list above, the general CS electives list, or the following: <sup>4</sup>		9-12
CS 240E		
CS 241	Embedded Systems Workshop	
CS 244E		
CS 316	Advanced Multi-Core Systems	
CS 341	Project in Mining Massive Data Sets	
CS 343	(Not given this year)	
CS 344	Topics in Computer Networks (3 or more units, any suffix)	
CS 345	(Advanced Topics in Database Systems - 3 or more units, any suffix)	
CS 346		
CS 347		
CS 349	Topics in Programming Systems (with permission of undergraduate advisor)	
CS 448	Topics in Computer Graphics	
EE 108	Digital System Design	
EE 382C	Interconnection Networks	
EE 384A	Internet Routing Protocols and Standards	
EE 384B	Multimedia Communication over the Internet	
EE 384C	Wireless Local and Wide Area Networks	
EE 384S	Performance Engineering of Computer Systems & Networks	
EE 384X		

## Theory Track—

		Units
CS 154	Introduction to Automata and Complexity Theory	4
Select one of the following:		3
CS 167		
CS 168	The Modern Algorithmic Toolbox	
CS 255	Introduction to Cryptography	
CS 261	Optimization and Algorithmic Paradigms	
CS 264	Beyond Worst-Case Analysis	
CS 265	Randomized Algorithms and Probabilistic Analysis	
CS 268	Geometric Algorithms	
Two additional courses from the list above or the following:		6-8
CS 143	Compilers	
CS 155	Computer and Network Security	
CS 157	Logic and Automated Reasoning	
or PHIL 151	Metalogic	
CS 166	Data Structures	
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 233	Geometric and Topological Data Analysis	
CS 242	Programming Languages	
CS 250	Algebraic Error Correcting Codes	
CS 251	Bitcoin and Crypto Currencies	
CS 254	Computational Complexity	
CS 259	(with permission of undergraduate advisor)	
CS 262		
CS 263	Algorithms for Modern Data Models	
CS 266		
CS 267	Graph Algorithms	

CS 269I	Incentives in Computer Science
CS 352	Pseudo-Randomness
CS 354	(Not given this year)
CS 355	Advanced Topics in Cryptography (Not given this year)
CS 357	(Not given this year)
CS 358	
CS 359	Topics in the Theory of Computation (with permission of undergraduate advisor)
CS 364A	
CS 367	(Not given this year)
CS 369	Topics in Analysis of Algorithms (with permission of undergraduate advisor)
CS 374	
MS&E 310	Linear Programming

Track Electives: at least three additional courses from the lists above, 9-12 the general CS electives list, or the following:<sup>4</sup>

CS 269G	Almost Linear Time Graph Algorithms
CME 302	Numerical Linear Algebra
CME 305	Discrete Mathematics and Algorithms
PHIL 152	Computability and Logic

## Unspecialized Track—

	Units	
CS 154	Introduction to Automata and Complexity Theory	4
Select one of the following:		4
CS 140	Operating Systems and Systems Programming	
or CS 140E	Operating systems design and implementation	
CS 143	Compilers	
One additional course from the list above or the following:		3-4
CS 144	Introduction to Computer Networking	
CS 155	Computer and Network Security	
CS 190	Software Design Studio	
CS 242	Programming Languages	
CS 244	Advanced Topics in Networking	
EE 180	Digital Systems Architecture	
Select one of the following:		3-4
CS 221	Artificial Intelligence: Principles and Techniques	
CS 223A	Introduction to Robotics	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229	Machine Learning	
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
Select one of the following:		3-4
CS 145	Introduction to Databases	
CS 147	Introduction to Human-Computer Interaction Design	
CS 148	Introduction to Computer Graphics and Imaging	
CS 248	Interactive Computer Graphics	
CS 262		
At least two courses from the general CS electives list <sup>4</sup>		

## Individually Designed Track—

Students may propose an individually designed track. Proposals should include a minimum of 25 units and seven courses, at least four of which must be CS courses numbered 100 or above. See Handbook for Undergraduate Engineering Programs for further information.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>)

- MATH 19, MATH 20, and MATH 21 OR MATH 41 and MATH 42 OR AP Calculus Credit may be used as long as at least 26 MATH units are taken. AP Calculus Credit must be approved by the School of Engineering.
- The math electives list consists of: MATH 51, MATH 104, MATH 108, MATH 109, MATH 110, MATH 113; CS 157, CS 205A; PHIL 151; CME 100, CME 102, CME 103 (or EE103), CME 104. Completion of MATH 52 and MATH 53 will together count as one math elective. Restrictions: CS 157 and PHIL 151 may not be used in combination to satisfy the math electives requirement. Students who have taken both MATH 51 and MATH 52 may not count CME 100 as an elective. Courses counted as math electives cannot also count as CS electives, and vice versa.
- The science elective may be any course of 3 or more units from the School of Engineering Science list (Fig. 4-2 in the UGHB), PSYCH 30, or AP Chemistry Credit. Either of the PHYSICS sequences 61/63 or 21/23 may be substituted for 41/43 as long as at least 11 science units are taken. AP Chemistry Credit and AP Physics Credit must be approved by the School of Engineering.
- General CS Electives: CS 108, CS 124, CS 131, CS 140 (or CS 140E), CS 142, CS 143, CS 144, CS 145, CS 147, CS 148, CS 149, CS 154, CS 155, CS 157 (or PHIL 151), CS 164, CS 166, CS 167, CS 168, CS 190, CS 205A, CS 205B, CS 210A, CS 223A, CS 224N, CS 224S, CS 224U, CS 224W, CS 225A, CS 227B, CS 228, CS 229, CS 229T, CS 231A, CS 231B, CS 231M, CS 231N, CS 232, CS 233, CS 234, CS 238, CS 240, CS 240H, CS 242, CS 243, CS 244, CS 244B, CS 245, CS 246, CS 247, CS 248, CS 249A, CS 251, CS 254, CS 255, CS 261, CS 262, CS 263, CS 264, CS 265, CS 266, CS 267, CS 269I, CS 270, CS 272, CS 273A, CS 273B, CS 274, CS 276, CS 279, CS 348B, CS 348C, CS 352; CME 108; EE 180, EE 282, EE 364A.
- CS 205A Mathematical Methods for Robotics, Vision, and Graphics is strongly recommended in this list for the Graphics track. Students taking CME 104 Linear Algebra and Partial Differential Equations for Engineers are also required to take its prerequisite, CME 102 Ordinary Differential Equations for Engineers.
- Independent study projects (CS 191 Senior Project or CS 191W Writing Intensive Senior Project) require faculty sponsorship and must be approved by the adviser, faculty sponsor, and the CS senior project adviser (P. Young). A signed approval form, along with a brief description of the proposed project, should be filed the quarter before work on the project is begun. Further details can be found in the *Handbook for Undergraduate Engineering Programs*.

## Honors Program

The Department of Computer Science (CS) offers an honors program for undergraduates whose academic records and personal initiative indicate that they have the necessary skills to undertake high-quality research in computer science. Admission to the program is by application only. To apply for the honors program, students must be majoring in Computer Science, have a grade point average (GPA) of at least 3.6 in courses that count toward the major, and achieve senior standing (135 or more units) by the end of the academic year in which they apply. Coterminal master's students are eligible to apply as long as they have not already received their undergraduate degree. Beyond these requirements, students who apply for the honors program must find a Computer Science faculty member who agrees to serve as the thesis adviser for the project. Thesis advisers must be members of Stanford's Academic Council.

Students who meet the eligibility requirements and wish to be considered for the honors program must submit a written application to the CS undergraduate program office by May 1 of the year preceding the honors work. The application must include a letter describing the research

project, a letter of endorsement from the faculty sponsor, and a transcript of courses taken at Stanford. Each year, a faculty review committee selects the successful candidates for honors from the pool of qualified applicants.

In order to receive departmental honors, students admitted to the honors program must, in addition to satisfying the standard requirements for the undergraduate degree, do the following:

1. Complete at least 9 units of CS 191 or CS 191W under the direction of their project sponsor.
2. Attend a weekly honors seminar Winter and Spring quarters.
3. Complete an honors thesis deemed acceptable by the thesis adviser and at least one additional faculty member.
4. Present the thesis at a public colloquium sponsored by the department.
5. Maintain the 3.6 GPA required for admission to the honors program.

## Guide to Choosing Introductory Courses

Students arriving at Stanford have widely differing backgrounds and goals, but most find that the ability to use computers effectively is beneficial to their education. The department offers many introductory courses to meet the needs of these students.

For students whose principal interest is an exposure to the fundamental ideas behind computer science and programming, CS 101 or CS 105 are the most appropriate courses. They are intended for students in nontechnical disciplines who expect to make some use of computers, but who do not expect to go on to more advanced courses. CS 101 and CS 105 meet the new Ways of Thinking Ways of Doing breadth requirements in Formal Reasoning and include an introduction to programming and the use of modern Internet-based technologies. Students interested in learning to use the computer should consider CS 1C, Introduction to Computing at Stanford.

Students who intend to pursue a serious course of study in computer science may enter the program at a variety of levels, depending on their background. Students with little prior experience or those who wish to take more time to study the fundamentals of programming should take CS 106A followed by CS 106B. Students in CS 106A need not have prior programming experience. Students with significant prior exposure to programming or those who want an intensive introduction to the field should take CS 106X or may start directly in CS 106B. CS 106A uses Java, JavaScript, or Python as its programming language; CS 106B and X use C++. No prior knowledge of these languages is assumed, and the prior programming experience required for CS 106B or X may be in any language. In all cases, students are encouraged to discuss their background with the instructors responsible for these courses.

After the introductory sequence, Computer Science majors and those who need a significant background in computer science for related majors in engineering should take CS 103, CS 107 and CS 110. CS 103 offers an introduction to the mathematical and theoretical foundations of computer science. CS 107 exposes students to a variety of programming concepts that illustrate critical strategies used in systems development; CS 110 builds on this material, focusing on the development of larger-scale software making use of systems and networking abstractions.

### In summary:

For exposure:

CS 1C	Introduction to Computing at Stanford
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For nontechnical use:

CS 101 or CS 105	Introduction to Computing Principles Introduction to Computers
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For scientific use:

CS 106A	Programming Methodology
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For a technical introduction:

CS 106A	Programming Methodology
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For significant use:

CS 106A & CS 106B or CS 106X	Programming Methodology and Programming Abstractions Programming Abstractions (Accelerated)
CS 103	Mathematical Foundations of Computing
CS 107	Computer Organization and Systems
CS 110	Principles of Computer Systems

## Overseas Studies Courses in Computer Science

For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses web site (<http://explorecourses.stanford.edu>) or the Bing Overseas Studies web site (<http://bosp.stanford.edu>). Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## Joint Major Program: Computer Science and a Humanities Major

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

## Mission

The Joint Major provides a unique opportunity to gain mastery in two disciplines: Computer Science and a selected humanities field. Unlike the double major or dual major, the Joint Major emphasizes integration of the two fields through a cohesive, transdisciplinary course of study and integrated capstone experience. The Joint Major not only blends the intellectual traditions of two Stanford departments—it does so in a way that reduces the total unit requirement for each major.

## Computer Science Major Requirements in the Joint Major Program

(See the respective humanities department Joint Major Program section of this bulletin for details on humanities major requirements.)

The CS requirements for the Joint Major follow the CS requirements for the CS-BS degree with the following exceptions:

1. Two of the depth electives are waived. The waived depth electives are listed below for each CS track.
2. The Senior Project is fulfilled with a joint capstone project. The student enrolls in CS191 or 191W (3 units) during the senior year. Depending on the X department, enrollment in an additional Humanities capstone course may also be required. But, at a minimum, 3 units of CS191 or 191W must be completed.
3. There is no double-counting of units between majors. If a course is required for both the CS and Humanities majors, the student will work

with one of the departments to identify an additional course - one which will benefit the academic plan - to apply to that major's total units requirement.

4. For CS, WIM can be satisfied with CS181W or CS191W.

## Depth Electives for CS Tracks for students completing a Joint Major:

### Artificial Intelligence Track:

One Track Elective (rather than three).

### Biocomputation Track:

One course from Note 3 of the Department Program Sheet, plus one course from Note 4 of the Program Sheet..

### Computer Engineering Track:

- EE 108A and 108B
- One of the following: EE 101A, 101B, 102A, 102B
- Satisfy the requirements of one of the following concentrations:
  1. Digital Systems Concentration: CS 140 or 143; EE 109, 271; plus one of CS 140 or 143 (if not counted above), 144, 149, 240E, 244; EE 273, 282
  2. Robotics and Mechatronics Concentration: CS 205A, 223A; ME 210; ENGR 105
  3. Networking Concentration: CS 140, 144; plus two of the following, CS 240, 240E, 244, 244B, 244E, 249A, 249B, EE 179, EE 276

### Graphics Track:

No Track Electives required (rather than two)

### HCI Track:

No Interdisciplinary HCI Electives required

Information Track:

One Track Elective (rather than three)

### Systems Track:

One Track Elective (rather than three)

### Theory Track:

One Track Elective (rather than three)

### Unspecialized Track:

No Track Electives required (rather than two)

### Individually Designed Track:

Proposals should include a minimum of five (rather than seven) courses, at least four of which must be CS courses numbered 100 or above.

## Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

## Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) . Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

## Transcript and Diploma

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

## Computer Science (CS) Minor

The following core courses fulfill the minor requirements. Prerequisites include the standard mathematics sequence through MATH 51 (or CME 100).

	Units
Introductory Programming (AP Credit may be used to fulfill this requirement):	
CS 106B Programming Abstractions	5
or CS 106X Programming Abstractions (Accelerated)	
Core:	
CS 103 Mathematical Foundations of Computing	5
CS 107 Computer Organization and Systems	5
or CS 107E Computer Systems from the Ground Up	
CS 109 Introduction to Probability for Computer Scientists	5
Electives (choose two courses from different areas):	
Artificial Intelligence—	
CS 124 From Languages to Information	4
CS 221 Artificial Intelligence: Principles and Techniques	4
CS 229 Machine Learning	3-4
Human-Computer Interaction—	
CS 147 Introduction to Human-Computer Interaction Design	4
Software—	
CS 108 Object-Oriented Systems Design	4
CS 110 Principles of Computer Systems	5
Systems—	
CS 140 Operating Systems and Systems Programming	4
or CS 140E Operating systems design and implementation	
CS 143 Compilers	4
CS 144 Introduction to Computer Networking	4
CS 145 Introduction to Databases	4
CS 148 Introduction to Computer Graphics and Imaging	4
Theory—	
CS 154 Introduction to Automata and Complexity Theory	4
CS 157 Logic and Automated Reasoning	3
CS 161 Design and Analysis of Algorithms	5

*Note:* for students with no programming background and who begin with CS 106A, the minor consists of seven courses.

## Master of Science in Computer Science

In general, the M.S. degree in Computer Science is intended as a terminal professional degree and does not lead to the Ph.D. degree. Most students planning to obtain the Ph.D. degree should apply directly for admission to the Ph.D. program. Some students, however, may wish to complete the master's program before deciding whether to pursue the Ph.D. To give such students a greater opportunity to become familiar with research, the department has a program leading to a master's degree with distinction in research. This program is described in more detail below.

## Admission

Applications to the M.S. program and all supporting documents must be submitted and received online by the published deadline. Information on



admission requirements (<http://cs.stanford.edu/admissions>) is available on the department's web site; see also the department's deadlines page (<https://cs.stanford.edu/admissions/deadlines>). Exceptions are made for applicants who are already students at Stanford and are applying to the coterminal program (<https://cs.stanford.edu/admissions/current-stanford-students/coterminal-program>).

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Requirements

A candidate is required to complete a program of 45 units. At least 36 of these must be graded units, passed with a grade point average (GPA) of 3.0 (B) or better. The 45 units may include no more than 10 units of courses from those listed below in Requirement 1. Thus, students needing to take more than two of the courses listed in Requirement 1 actually complete more than 45 units of course work in the program. Only well-prepared students may expect to finish the program in one year; most students complete the program in six quarters. Students hoping to complete the program with 45 units should already have a substantial background in computer science, including course work or experience equivalent to all of Requirement 1 and some prior course work related to their specialization area.

### Requirement 1: Foundations—

Students must complete the following courses, or waive out of them by providing evidence to their advisers that similar or more advanced courses have been taken, either at Stanford or another institution (total units used to satisfy foundations requirement may not exceed 10):

Logic, Automata, and Computability

CS 103	Mathematical Foundations of Computing
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Probability

Select one of the following:

CS 109	Introduction to Probability for Computer Scientists
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STATS 116	Theory of Probability
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MS&E 220	Probabilistic Analysis
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CME 106	Introduction to Probability and Statistics for Engineers
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Algorithmic Analysis

CS 161	Design and Analysis of Algorithms
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Computer Organization and Systems

CS 107	Computer Organization and Systems
or CS 107E	Computer Systems from the Ground Up

Principles of Computer Systems

CS 110	Principles of Computer Systems
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### Requirement 2: Significant Software Implementation—

Students must complete at least one course designated as having a significant software implementation component. The list of such courses includes:

CS 140	Operating Systems and Systems Programming	3-4
or CS 140E	Operating systems design and implementation	
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
CS 145	Introduction to Databases	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 190	Software Design Studio	3
CS 210B	Software Project Experience with Corporate Partners	3-4
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 227B	General Game Playing	3
CS 243	Program Analysis and Optimizations	3-4
CS 248	Interactive Computer Graphics	3-4
CS 341	Project in Mining Massive Data Sets	3
CS 346	(Offered occasionally)	3-5

### Requirement 3: Specialization—

Students may choose to satisfy this requirement through one of two options, Single Depth or Dual Depth, outlined following. All courses taken for this requirement must be taken on a letter grade basis for three or more units.

#### Option 1—Single Depth

- A program of 27 units in a single area of specialization must be completed. A maximum of 9 units of independent study (CS 393, CS 395, CS 399) may be counted toward the specialization.
- Additionally, students must complete three breadth courses from the list of approved breadth courses associated with their chosen specialization. Individual specializations explicitly have different breadth requirements; see the individual specialization sheets on the department's web site (<http://cs.stanford.edu/degrees/mscs/programsheets>) for details.
- Breadth courses may not be waived, must be taken for at least 3 units each, and must be completed for a letter grade.

#### Option 2—Dual Depth

- Students select distinct primary and secondary areas.
- A program of 21 units in the primary area of specialization must be completed. A maximum of 9 units of independent study (CS 393, CS 395, CS 399) may be counted toward the primary specialization.
- Students must also complete a program of five courses satisfying the requirements for their secondary area of specialization.
- Breadth courses are not required.

### Specialization Areas—

Ten approved specialization areas which may be used to satisfy Requirement 3 are listed following. Students may propose to the M.S. program committee other coherent programs that meet their goals and satisfy the basic requirements.

Courses marked with an asterisk (\*) require consent of the faculty adviser. Courses marked with a double asterisk (\*\*) may be waived by

students with equivalent course work and with the approval of their adviser.

## 1. Artificial Intelligence—

A.

CS 221 Artificial Intelligence: Principles and Techniques \*\*

B. Select at least four of the following:

CS 223A Introduction to Robotics  
 CS 224N Natural Language Processing with Deep Learning  
 CS 224S Spoken Language Processing  
 CS 224U Natural Language Understanding  
 CS 224W Analysis of Networks  
 CS 228 Probabilistic Graphical Models: Principles and Techniques  
 CS 229 Machine Learning  
 CS 231A Computer Vision: From 3D Reconstruction to Recognition  
 CS 231N Convolutional Neural Networks for Visual Recognition  
 CS 234 Reinforcement Learning  
 CS 238 Decision Making under Uncertainty

C. A total of at least 27 units from categories A, B, and the following:

CS 205A Mathematical Methods for Robotics, Vision, and Graphics  
 CS 225A Experimental Robotics  
 CS 227B General Game Playing  
 CS 229T Statistical Learning Theory  
 CS 231B  
 CS 231M  
 CS 232 Digital Image Processing  
 CS 233 Geometric and Topological Data Analysis  
 CS 239 Advanced Topics in Sequential Decision Making  
 CS 246 Mining Massive Data Sets  
 CS 262  
 CS 270 Modeling Biomedical Systems: Ontology, Terminology, Problem Solving  
 CS 273A The Human Genome Source Code  
 CS 273B Deep Learning in Genomics and Biomedicine  
 CS 274 Representations and Algorithms for Computational Molecular Biology  
 CS 275 Translational Bioinformatics  
 CS 276 Information Retrieval and Web Search  
 CS 279 Computational Biology: Structure and Organization of Biomolecules and Cells  
 CS 294A Research Project in Artificial Intelligence \*  
 CS 323 Automated Reasoning: Theory and Applications  
 CS 325  
 CS 326 Topics in Advanced Robotic Manipulation  
 CS 327A Advanced Robotic Manipulation (Not given this year)  
 CS 328  
 CS 329 Topics in Artificial Intelligence  
 CS 331A  
 CS 331B Representation Learning in Computer Vision  
 CS 332 Advanced Survey of Reinforcement Learning  
 CS 333 Safe and Interactive Robotics  
 CS 334A Convex Optimization I  
 or EE 364A Convex Optimization I  
 CS 341 Project in Mining Massive Data Sets

CS 345 (Offered occasionally)  
 CS 362 (Not given this year)  
 CS 364A  
 CS 368 Algorithmic Techniques for Big Data  
 CS 371 Computational Biology in Four Dimensions  
 CS 373 Statistical and Machine Learning Methods for Genomics  
 CS 374 (not given this year)  
 CS 375 Large-Scale Neural Network Modeling for Neuroscience  
 CS 377 (CS 377 with any suffix) \*  
 CS 379 Interdisciplinary Topics (CS 379 with any suffix) \*  
 CS 393 Computer Laboratory \*  
 CS 395 Independent Database Project \*  
 CS 399 Independent Project \*  
 CS 428 Computation and cognition: the probabilistic approach  
 APPPHYS 293 Theoretical Neuroscience  
 BIOE 332  
 EE 263 Introduction to Linear Dynamical Systems  
 EE 278 Introduction to Statistical Signal Processing  
 EE 364B Convex Optimization II  
 EE 376A Information Theory  
 EE 377 Information Theory and Statistics  
 EE 378B Inference, Estimation, and Information Processing  
 ENGR 205 Introduction to Control Design Techniques  
 ENGR 209A Analysis and Control of Nonlinear Systems  
 MS&E 226 "Small" Data  
 MS&E 251 Introduction to Stochastic Control with Applications  
 MS&E 252 Decision Analysis I: Foundations of Decision Analysis  
 MS&E 351 Dynamic Programming and Stochastic Control  
 MS&E 352 Decision Analysis II: Professional Decision Analysis  
 MS&E 353 Decision Analysis III: Frontiers of Decision Analysis  
 PSYCH 202 Cognitive Neuroscience  
 PSYCH 209 Neural Network Models of Cognition: Principles and Applications  
 STATS 202 Data Mining and Analysis  
 STATS 315A Modern Applied Statistics: Learning  
 STATS 315B Modern Applied Statistics: Data Mining

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (A), (B), and (C) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Artificial Intelligence must take five total courses satisfying the area (A) and (B) requirements above.
- Those students who have waived out of CS 221 may take an additional course in either area (B) or (C).

### Artificial Intelligence Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 140 Operating Systems and Systems Programming 3-4  
 or CS 140E Operating systems design and implementation  
 CS 143 Compilers 3-4

CS 144 or EE 284	Introduction to Computer Networking Introduction to Computer Networks	3-4
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 166	Data Structures	3-4
CS 168	The Modern Algorithmic Toolbox	3-4
CS 240	Advanced Topics in Operating Systems	3
CS 240E		
CS 240H		3-4
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 244	Advanced Topics in Networking	3-4
CS 244B	Distributed Systems	3
CS 244E		
CS 249A		3
CS 255	Introduction to Cryptography	3
CS 261	Optimization and Algorithmic Paradigms	3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266		3
CS 267	Graph Algorithms	3
CS 268	Geometric Algorithms	3
CS 269I	Incentives in Computer Science	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

## 2. Biocomputation—

A. Select at least four of the following:

CS 262		
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
CS 272	Introduction to Biomedical Informatics Research Methodology	
CS 273A	The Human Genome Source Code	
CS 274	Representations and Algorithms for Computational Molecular Biology	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	

B. A total of at least 27 units from category (A) and the following:

CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229	Machine Learning	
CS 231N	Convolutional Neural Networks for Visual Recognition	
CS 233	Geometric and Topological Data Analysis	
CS 245	Database Systems Principles	
CS 246	Mining Massive Data Sets	
CS 261	Optimization and Algorithmic Paradigms	
CS 264	Beyond Worst-Case Analysis	
CS 265	Randomized Algorithms and Probabilistic Analysis	

CS 268	Geometric Algorithms	
CS 273B	Deep Learning in Genomics and Biomedicine	
CS 275	Translational Bioinformatics	
CS 325		
CS 341	Project in Mining Massive Data Sets (Offered occasionally)	
CS 345		
CS 346		
CS 362	(Not given this year)	
CS 371	Computational Biology in Four Dimensions	
CS 373	Statistical and Machine Learning Methods for Genomics	
CS 374		
CS 375	Large-Scale Neural Network Modeling for Neuroscience	
CS 393	Computer Laboratory *	
CS 395	Independent Database Project *	
CS 399	Independent Project *	
APPPHYS 293	Theoretical Neuroscience	
BIOC 218		
BIOE 332		
GENE 203		
GENE 211	Genomics	
SBIO 228		

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (A) and (B) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Biocomputation must take five total courses, three courses of which must come from area (A) and the remaining two courses may come from either area (A) or (B).

### Biocomputation Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 140 or CS 140E	Operating Systems and Systems Programming Operating systems design and implementation	3-4
CS 143	Compilers	3-4
CS 144 or EE 284	Introduction to Computer Networking Introduction to Computer Networks	3-4
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 166	Data Structures	3-4
CS 168	The Modern Algorithmic Toolbox	3-4
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Analysis of Networks	3

CS 227B	General Game Playing	3
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
or CS 231B		
CS 234	Reinforcement Learning	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E		
CS 240H		3-4
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 244	Advanced Topics in Networking	3-4
CS 244B	Distributed Systems	3
CS 244E		
CS 249A		3
CS 255	Introduction to Cryptography	3
CS 269I	Incentives in Computer Science	3
CS 276	Information Retrieval and Web Search	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

### 3. Computer and Network Security—

A.

CS 140	Operating Systems and Systems Programming **	
or CS 140E	Operating systems design and implementation	
CS 144	Introduction to Computer Networking **	
CS 155	Computer and Network Security	
CS 244	Advanced Topics in Networking	
CS 255	Introduction to Cryptography	

B. Select at least three of the following:

CS 142	Web Applications	
CS 190	Software Design Studio	
CS 240	Advanced Topics in Operating Systems	
CS 244B	Distributed Systems	
CS 261	Optimization and Algorithmic Paradigms	
CS 265	Randomized Algorithms and Probabilistic Analysis	
CS 340		
CS 344	Topics in Computer Networks (CS 344 with any suffix)	
CS 355	Advanced Topics in Cryptography (Not given this year)	

C. A total of at least 27 units from categories (A), (B), and the following:

CS 240E		
CS 244E		
CS 245	Database Systems Principles	
CS 251	Bitcoin and Crypto Currencies	
CS 264	Beyond Worst-Case Analysis	
CS 294S	Research Project in Software Systems and Security (Not given this year) *	
CS 341	Project in Mining Massive Data Sets	
CS 345	(Offered occasionally)	
CS 347		
CS 393	Computer Laboratory *	
CS 395	Independent Database Project *	
CS 399	Independent Project *	
EE 384A	Internet Routing Protocols and Standards	

EE 384C	Wireless Local and Wide Area Networks	
EE 384S	Performance Engineering of Computer Systems & Networks	

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (A), (B), and (C) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Computer and Network Security must take five courses; those five courses must satisfy the area (A) requirement and additional courses from area (B) should be taken if any area (A) requirements are waived.

### Computer and Network Security Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 143	Compilers	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
CS 166	Data Structures	3-4
CS 168	The Modern Algorithmic Toolbox	3-4
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Analysis of Networks	3
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
or CS 231B		
CS 233	Geometric and Topological Data Analysis	3
CS 234	Reinforcement Learning	3
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 246	Mining Massive Data Sets	3-4
CS 249A		3
CS 262		3
CS 267	Graph Algorithms	3
CS 268	Geometric Algorithms	3
CS 269I	Incentives in Computer Science	3
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 273A	The Human Genome Source Code	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4

CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

#### 4. Human-Computer Interaction—

A.

CS 147	Introduction to Human-Computer Interaction Design*
CS 247	Human-Computer Interaction Design Studio**

B. Select any three of the following:

CS 142	Web Applications
CS 148	Introduction to Computer Graphics and Imaging
CS 194H	User Interface Design Project
CS 210A	Software Project Experience with Corporate Partners
CS 248	Interactive Computer Graphics
CS 376	Human-Computer Interaction Research
CS 377	(CS 377 with any suffix)
CS 448B	Data Visualization
ME 216M	Introduction to the Design of Smart Products

C. A total of at least 27 units from categories (A), (B), and the following:

a. Broader CS

CS 221	Artificial Intelligence: Principles and Techniques
CS 224N	Natural Language Processing with Deep Learning
CS 224U	Natural Language Understanding
CS 224W	Analysis of Networks
CS 229	Machine Learning
CS 231A	Computer Vision: From 3D Reconstruction to Recognition
CS 231B	
CS 242	Programming Languages
CS 246	Mining Massive Data Sets
CS 341	Project in Mining Massive Data Sets
CS 393	Computer Laboratory*
CS 395	Independent Database Project*
CS 399	Independent Project*

b. Art Studio

ARTSTUDI 160	Intro to Digital / Physical Design
ARTSTUDI 162	Embodied Interfaces
ARTSTUDI 163	Drawing with Code
ARTSTUDI 164	DESIGN IN PUBLIC SPACES
ARTSTUDI 165	Social Media and Performative Practices
ARTSTUDI 168	Data as Material
ARTSTUDI 264	Advanced Interaction Design
ARTSTUDI 266	Sculptural Screens / Malleable Media
ARTSTUDI 267	Emerging Technology Studio

c. Communication

COMM 224	Lies, Trust, and Tech
COMM 240	
COMM 266	Virtual People
COMM 269	
COMM 272	Media Psychology
Comm 282	
COMM 324	Language and Technology

d. Empirical Methods

COMM 314	Ethnographic Methods
EDUC 200B	Introduction to Qualitative Research Methods

MS&E 125	Introduction to Applied Statistics
PSYCH 252	Statistical Methods for Behavioral and Social Sciences
PSYCH 254	Affective Neuroscience
STATS 203	Introduction to Regression Models and Analysis of Variance
e. Learning Design & Tech	
EDUC 236	Beyond Bits and Atoms: Designing Technological Tools
EDUC 239	Educating Young STEM Thinkers
EDUC 281	Technology for Learners
EDUC 338	Innovations in Education
EDUC 342	Child Development and New Technologies
f. Management Science & Engr	
MS&E 185	Global Work
MS&E 331	
MS&E 334	Topics in Social Data
g. Mechanical Engr	
ME 203	Design and Manufacturing
ME 210	Introduction to Mechatronics
ME 216A	Advanced Product Design: Needfinding
h. Music	
MUSIC 220A	Fundamentals of Computer-Generated Sound
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music
MUSIC 220C	Research Seminar in Computer-Generated Music
MUSIC 250A	Physical Interaction Design for Music
MUSIC 256A	Music, Computing, Design I: Art of Design for Computer Music
i. Psych	
PSYCH 204	Computation and cognition: the probabilistic approach
PSYCH 209	Neural Network Models of Cognition: Principles and Applications
j. Sym Sys	
SYMSYS 245	Cognition in Interaction Design
Additional courses <sup>1</sup>	

<sup>1</sup> Any d.school course (<http://dschool.stanford.edu>) or any HCI course (<http://hci.stanford.edu/courses>); such courses must be numbered 100 or above and be taken for at least 3 units to count for this requirement

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (A) through (C) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Human-Computer Interaction must take five courses satisfying the areas (A) through (C).

#### Human-Computer Interaction Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 140	Operating Systems and Systems Programming	3-4
or CS 140E	Operating systems design and implementation	
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
or EE 284	Introduction to Computer Networks	
CS 145	Introduction to Databases	3-4

CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 166	Data Structures	3-4
CS 168	The Modern Algorithmic Toolbox	3-4
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 223A	Introduction to Robotics	3
CS 224S	Spoken Language Processing	2-4
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 233	Geometric and Topological Data Analysis	3
CS 234	Reinforcement Learning	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E		
CS 240H		3-4
CS 243	Program Analysis and Optimizations	3-4
CS 244	Advanced Topics in Networking	3-4
CS 244B	Distributed Systems	3
CS 244E		
CS 249A		3
CS 255	Introduction to Cryptography	3
CS 261	Optimization and Algorithmic Paradigms	3
CS 262		3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266		3
CS 267	Graph Algorithms	3
CS 268	Geometric Algorithms	3
CS 269I	Incentives in Computer Science	3
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 273A	The Human Genome Source Code	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

## 5. Information Management and Analytics—

A.

CS 145	Introduction to Databases **	3-4
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B. Select at least four of the following:

CS 224N	Natural Language Processing with Deep Learning	
CS 224W	Analysis of Networks	
CS 229	Machine Learning	
CS 245	Database Systems Principles	
CS 246	Mining Massive Data Sets	
CS 276	Information Retrieval and Web Search	
CS 345	(Offered occasionally)	
CS 346	(no longer offered)	
CS 347		

C. A total of at least 27 units from categories (A), (B) and the following:

CS 144	Introduction to Computer Networking	
CS 190	Software Design Studio	
CS 224S	Spoken Language Processing	
CS 224U	Natural Language Understanding	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229T	Statistical Learning Theory	
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	
CS 231N	Convolutional Neural Networks for Visual Recognition	
CS 233	Geometric and Topological Data Analysis	
CS 234	Reinforcement Learning	
CS 240	Advanced Topics in Operating Systems	
CS 242	Programming Languages	
CS 243	Program Analysis and Optimizations	
CS 244	Advanced Topics in Networking	
CS 244B	Distributed Systems	
CS 249A		
CS 251	Bitcoin and Crypto Currencies	
CS 255	Introduction to Cryptography	
CS 262		
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
CS 272	Introduction to Biomedical Informatics Research Methodology	
CS 273A	The Human Genome Source Code	
CS 274	Representations and Algorithms for Computational Molecular Biology	
CS 275	Translational Bioinformatics	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	
CS 316	Advanced Multi-Core Systems	
CS 325		
CS 341	Project in Mining Massive Data Sets	
CS 344	Topics in Computer Networks (CS 344 with any suffix)	
CS 362	(Not given this year)	
CS 374		
CS 393	Computer Laboratory *	
CS 395	Independent Database Project *	
CS 399	Independent Project *	
MS&E 226	"Small" Data	
STATS 315A	Modern Applied Statistics: Learning	
STATS 315B	Modern Applied Statistics: Data Mining	

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (A), (B), and (C) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Information Management and Analytics must take five courses satisfying the area (A) and (B) requirements above. Note that if CS145 was waived in area (A), students should take an additional course from either area (B) or (C) in its place.

### Information Management and Analytics Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 140 or CS 140E	Operating Systems and Systems Programming Operating systems design and implementation	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 166	Data Structures	3-4
CS 168	The Modern Algorithmic Toolbox	3-4
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 223A	Introduction to Robotics	3
CS 227B	General Game Playing	3
CS 240E		
CS 244E		
CS 261	Optimization and Algorithmic Paradigms	3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266		3
CS 267	Graph Algorithms	3
CS 268	Geometric Algorithms	3
CS 269I	Incentives in Computer Science	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

## 6. Mobile and Internet Computing—

A. Select two of the following:

CS 140 or CS 140E	Operating Systems and Systems Programming ** Operating systems design and implementation
CS 144	Introduction to Computer Networking
CS 244	Advanced Topics in Networking

B. Select one of the following:

CS 142	Web Applications
CS 147	Introduction to Human-Computer Interaction Design
CS 247	Human-Computer Interaction Design Studio

C. Select one of the following:

CS 155	Computer and Network Security
CS 255	Introduction to Cryptography

D.

CS 294S	Research Project in Software Systems and Security
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E. A total of 27 units from categories (A), (B), (C), (D) and the following:

CS 190	Software Design Studio
CS 224W	Analysis of Networks
CS 241	Embedded Systems Workshop
CS 244E	
CS 246	Mining Massive Data Sets
CS 251	Bitcoin and Crypto Currencies
CS 344	Topics in Computer Networks (CS 344 with any suffix)

CS 364A	
CS 376	Human-Computer Interaction Research
CS 393	Computer Laboratory *
CS 395	Independent Database Project *
CS 399	Independent Project *
EE 359	Wireless Communications
EE 384A	Internet Routing Protocols and Standards
EE 384B	Multimedia Communication over the Internet (not given this year)
EE 384C	Wireless Local and Wide Area Networks
EE 384E	Networked Wireless Systems
EE 384S	Performance Engineering of Computer Systems & Networks
COMM 268	
PSYCH 252	Statistical Methods for Behavioral and Social Sciences

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (A) through (E) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Mobile and Internet Computing must take five courses satisfying the area (A) through (D) requirements above.

## Mobile and Internet Computing Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 143	Compilers	3-4
CS 145	Introduction to Databases	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
CS 166	Data Structures	3-4
CS 168	The Modern Algorithmic Toolbox	3-4
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
or CS 231B		
CS 233	Geometric and Topological Data Analysis	3
CS 234	Reinforcement Learning	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E	(no longer offered)	
CS 240H		3-4
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 244B	Distributed Systems	3
CS 249A		3

CS 261	Optimization and Algorithmic Paradigms	3
CS 262		3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266		3
CS 267	Graph Algorithms	3
CS 268	Geometric Algorithms	3
CS 269I	Incentives in Computer Science	3
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 273A	The Human Genome Source Code	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

## 7. Real-World Computing—

A. Select at least three of the following:

CS 148	Introduction to Computer Graphics and Imaging
CS 223A	Introduction to Robotics
CS 231A	Computer Vision: From 3D Reconstruction to Recognition
CS 248	Interactive Computer Graphics

B. Select at least three of the following:

CS 205A	Mathematical Methods for Robotics, Vision, and Graphics
CS 233	Geometric and Topological Data Analysis
CS 249A	
CS 262	
CS 268	Geometric Algorithms
CS 348A	Computer Graphics: Geometric Modeling & Processing
CS 348B	Computer Graphics: Image Synthesis Techniques
CS 348C	Computer Graphics: Animation and Simulation
CS 374	
CME 302	Numerical Linear Algebra
CME 306	Numerical Solution of Partial Differential Equations

C. A total of at least 27 units from categories (A), (B), and the following:

CS 225A	Experimental Robotics
CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 229	Machine Learning
CS 231B	
CS 231M	
CS 232	Digital Image Processing
or EE 368	Digital Image Processing
CS 247	Human-Computer Interaction Design Studio
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving
CS 272	Introduction to Biomedical Informatics Research Methodology
CS 273A	The Human Genome Source Code

CS 274	Representations and Algorithms for Computational Molecular Biology
CS 294A	Research Project in Artificial Intelligence *
CS 326	Topics in Advanced Robotic Manipulation
CS 327A	Advanced Robotic Manipulation (Not given this year)
CS 328	
CS 331A	
CS 331B	Representation Learning in Computer Vision
CS 333	Safe and Interactive Robotics
CS 393	Computer Laboratory *
CS 395	Independent Database Project *
CS 399	Independent Project *
CS 448	Topics in Computer Graphics (CS 448 with any suffix)
EE 267	Virtual Reality

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (A), (B), and (C) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Real-World Computing must take five total courses satisfying area (A) and two of the three courses in the area (B) requirements above (i.e., three courses in area (a) and two courses in area (B)).

## Real-World Computing Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 140	Operating Systems and Systems Programming	3-4
or CS 140E		
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
or EE 284	Introduction to Computer Networks	
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 166	Data Structures	3-4
CS 168	The Modern Algorithmic Toolbox	3-4
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Analysis of Networks	3
CS 227B	General Game Playing	3
CS 234	Reinforcement Learning	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E	(no longer offered)	
CS 240H		3-4
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 244	Advanced Topics in Networking	3-4
CS 244B	Distributed Systems	3
CS 244E		
CS 246	Mining Massive Data Sets	3



CS 255	Introduction to Cryptography	3
CS 261	Optimization and Algorithmic Paradigms	3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266		3
CS 267	Graph Algorithms	3
CS 269I	Incentives in Computer Science	3
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

**8. Software Theory—**

A.

CS 243	Program Analysis and Optimizations	
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B. Select at least one of the following:

CS 244	Advanced Topics in Networking	
CS 245	Database Systems Principles	
CS 341	Project in Mining Massive Data Sets	
CS 343	(Offered occasionally)	
CS 345	(Offered occasionally)	

C. Select at least two courses from the following:

CS 242	Programming Languages	
CS 255	Introduction to Cryptography	
CS 261	Optimization and Algorithmic Paradigms	
CS 263	Algorithms for Modern Data Models	
CS 264	Beyond Worst-Case Analysis	
CS 265	Randomized Algorithms and Probabilistic Analysis	
CS 266		
CS 267	Graph Algorithms	
CS 268	Geometric Algorithms	
CS 355	Advanced Topics in Cryptography (Not given this year)	
CS 367	(Not given this year)	

D. A total of at least 27 units from (A), (B), (C), or the following:

CS 250	Algebraic Error Correcting Codes	
CS 251	Bitcoin and Crypto Currencies	
CS 294S	Research Project in Software Systems and Security (Not given this year) *	
CS 346		
CS 362	(Not given this year)	
CS 393	Computer Laboratory *	
CS 395	Independent Database Project *	
CS 399	Independent Project *	

- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (A) through (D) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Software Theory need to take 5 total courses satisfying the area (A) through (D) requirements above.

**Software Theory Breadth Courses**

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 140	Operating Systems and Systems Programming	3-4

or CS 140E	Operating systems design and implementation	
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Analysis of Networks	3
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
or CS 231B		
CS 233	Geometric and Topological Data Analysis	3
CS 234	Reinforcement Learning	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E	(no longer offered)	
CS 240H		3-4
CS 244B	Distributed Systems	3
CS 244E		
CS 246	Mining Massive Data Sets	3-4
CS 249A		3
CS 262		3
CS 269I	Incentives in Computer Science	3
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 273A	The Human Genome Source Code	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

**9. Systems—**

A.

CS 140	Operating Systems and Systems Programming **	
or CS 140E	Operating systems design and implementation	
CS 144	Introduction to Computer Networking **	
CS 240	Advanced Topics in Operating Systems	

B. Select at least four of the following:

CS 190	Software Design Studio	
CS 242	Programming Languages	
CS 243	Program Analysis and Optimizations	
CS 244	Advanced Topics in Networking	

CS 245	Database Systems Principles
CS 248	Interactive Computer Graphics
CS 348B	Computer Graphics: Image Synthesis Techniques
EE 271	Introduction to VLSI Systems
EE 282	Computer Systems Architecture

C. A total of at least 27 units from categories (A), (B), and the following:

CS 240E	(no longer offered)
CS 240H	
CS 241	Embedded Systems Workshop
CS 244B	Distributed Systems
CS 244E	
CS 246	Mining Massive Data Sets
CS 249A	
CS 251	Bitcoin and Crypto Currencies
CS 255	Introduction to Cryptography
CS 262	
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving
CS 272	Introduction to Biomedical Informatics Research Methodology
CS 276	Information Retrieval and Web Search
CS 294S	Research Project in Software Systems and Security (Not given this year)
CS 315B	Parallel Computing Research Project
CS 316	Advanced Multi-Core Systems
CS 340	
CS 341	Project in Mining Massive Data Sets
CS 343	(Not given this year)
CS 344	Topics in Computer Networks (CS 344 with any suffix)
CS 345	(Offered occasionally)
CS 346	
CS 347	
CS 348A	Computer Graphics: Geometric Modeling & Processing
CS 348C	Computer Graphics: Animation and Simulation
CS 349	Topics in Programming Systems (CS 349 with any suffix)
CS 374	
CS 393	Computer Laboratory *
CS 395	Independent Database Project *
CS 399	Independent Project *
CS 448	Topics in Computer Graphics (CS 448 with any suffix)
EE 267	Virtual Reality
EE 273	Digital Systems Engineering
EE 382C	Interconnection Networks
EE 384A	Internet Routing Protocols and Standards
EE 384B	Multimedia Communication over the Internet (not given this year)
EE 384C	Wireless Local and Wide Area Networks
EE 384S	Performance Engineering of Computer Systems & Networks

- Students with a 27-unit depth option (Option 1 above) must take 27 units subject to satisfying the area (A), (B), and (C) requirements above.

- Students with a 21-unit depth option (Option 2 above) must take that many units subject to satisfying the area (A) and (B) requirements above, and additional courses may be taken from area (C) if any courses in the area (A) requirement are waived.
- Students with a secondary area of specialization (per Option 2 above) in Systems need to take five courses; those courses must satisfy the area (A) requirement and additional courses may be taken from area (B).

### Systems Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 166	Data Structures	3-4
CS 168	The Modern Algorithmic Toolbox	3-4
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Analysis of Networks	3
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
or CS 231B		
CS 233	Geometric and Topological Data Analysis	3
CS 234	Reinforcement Learning	3
CS 261	Optimization and Algorithmic Paradigms	3
CS 264	Beyond Worst-Case Analysis	3
CS 265	Randomized Algorithms and Probabilistic Analysis	3
CS 266		3
CS 267	Graph Algorithms	3
CS 268	Geometric Algorithms	3
CS 269I	Incentives in Computer Science	3
CS 273A	The Human Genome Source Code	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3

### 10. Theoretical Computer Science—

A.		
	CS 154	Introduction to Automata and Complexity Theory **
	CS 261	Optimization and Algorithmic Paradigms
B. A total of at least 27 units from category (A) and the following:		
	CS 166	Data Structures
	CS 168	The Modern Algorithmic Toolbox

CS 228	Probabilistic Graphical Models: Principles and Techniques	CS 143	Compilers	3-4
CS 233	Geometric and Topological Data Analysis	CS 144	Introduction to Computer Networking	3-4
CS 246	Mining Massive Data Sets	or EE 284	Introduction to Computer Networks	
CS 250	Algebraic Error Correcting Codes	CS 145	Introduction to Databases	3-4
CS 251	Bitcoin and Crypto Currencies	CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 254	Computational Complexity	CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 255	Introduction to Cryptography	CS 149	Parallel Computing	3-4
CS 262		CS 155	Computer and Network Security	3
CS 263	Algorithms for Modern Data Models	CS 157	Logic and Automated Reasoning	3
CS 264	Beyond Worst-Case Analysis	CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 265	Randomized Algorithms and Probabilistic Analysis	CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 266		CS 223A	Introduction to Robotics	3
CS 267	Graph Algorithms	CS 224N	Natural Language Processing with Deep Learning	3-4
CS 268	Geometric Algorithms	CS 224S	Spoken Language Processing	2-4
CS 269G	Almost Linear Time Graph Algorithms	CS 224U	Natural Language Understanding	3-4
CS 269I	Incentives in Computer Science	CS 224W	Analysis of Networks	3
CS 334A	Convex Optimization I	CS 227B	General Game Playing	3
or EE 364A	Convex Optimization I	CS 229	Machine Learning	3-4
CS 341	Project in Mining Massive Data Sets	CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
CS 345	(Offered occasionally)	or CS 231B		
CS 352	Pseudo-Randomness	CS 234	Reinforcement Learning	3
CS 354	(Not given this year)	CS 240	Advanced Topics in Operating Systems	3
CS 355	Advanced Topics in Cryptography (Not given this year)	CS 240E		
CS 357	(Not given this year)	CS 240H		3-4
CS 358		CS 242	Programming Languages	3
CS 359	Topics in the Theory of Computation *	CS 243	Program Analysis and Optimizations	3-4
CS 362	(Not given this year)	CS 244	Advanced Topics in Networking	3-4
CS 364A		CS 244B	Distributed Systems	3
CS 366	(Not given this year)	CS 244E		
CS 367	(Not given this year)	CS 249A		3
CS 368	Algorithmic Techniques for Big Data	CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 369	Topics in Analysis of Algorithms *	CS 273A	The Human Genome Source Code	3
CS 374	(not given this year)	CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 393	Computer Laboratory *	CS 276	Information Retrieval and Web Search	3
CS 395	Independent Database Project *	CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CS 399	Independent Project *	CME 108	Introduction to Scientific Computing	3-4
CS 468	Topics in Geometric Algorithms: Machine Learning for 3D Data *	CME 302	Numerical Linear Algebra	3
MS&E 310	Linear Programming	EE 180	Digital Systems Architecture	3-4
MS&E 319	Approximation Algorithms	EE 282	Computer Systems Architecture	3

- Multiple CS 359, CS 369, and/or CS 468 courses may be taken as long as they are each on different topics, denoted by different letter suffixes for the courses.
- Students with a 27- or 21-unit depth option (Option 1 or 2 above) must take 27 or 21 units respectively subject to satisfying the area (A) and (B) requirements above.
- Students with a secondary area of specialization (per Option 2 above) in Theoretical Computer Science need to take 5 total courses satisfying the area (A) and (B) requirements above.

### Theoretical Computer Science Breadth Courses

Students in the single depth specialization must complete three of the following breadth courses and receive a letter grade for each.

CS 124	From Languages to Information	3-4
CS 140	Operating Systems and Systems Programming	3-4
or CS 140E	Operating systems design and implementation	

CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
or EE 284	Introduction to Computer Networks	
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 224W	Analysis of Networks	3
CS 227B	General Game Playing	3
CS 229	Machine Learning	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3
or CS 231B		
CS 234	Reinforcement Learning	3
CS 240	Advanced Topics in Operating Systems	3
CS 240E		
CS 240H		3-4
CS 242	Programming Languages	3
CS 243	Program Analysis and Optimizations	3-4
CS 244	Advanced Topics in Networking	3-4
CS 244B	Distributed Systems	3
CS 244E		
CS 249A		3
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 273A	The Human Genome Source Code	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 108	Introduction to Scientific Computing	3-4
CME 302	Numerical Linear Algebra	3
EE 180	Digital Systems Architecture	3-4
EE 282	Computer Systems Architecture	3

\* With consent of faculty adviser.

\*\* Students with equivalent course work may waive with approval of their adviser.

### Requirement 4

Additional elective units must be technical courses (numbered 100 or above) related to the degree program and approved by the adviser and MS program administrator. All CS courses numbered above 110 (with the exception of CS 196 and 198) taken for 3 or more units are pre-approved as elective courses. Additionally, up to a maximum of 3 units of 500-level CS seminars, CS 300, EE 380, EE 385A, or other 1-2 unit seminars offered in the School of Engineering may be counted as electives. Elective

courses may be taken on a satisfactory/no credit basis provided that a minimum of 36 graded units is presented within the 45-unit program.

## Master of Science with Distinction in Research

A student who wishes to pursue the M.S. in CS with distinction in research must first identify a faculty adviser who agrees to supervise and support the research work. The research adviser must be a member of the Academic Council and must hold an appointment in Computer Science. The student and principal adviser must also identify another faculty member, who need not be in the Department of Computer Science, to serve as a secondary adviser and reader for the research report. In addition, the student must complete the following requirements beyond those for the regular M.S. in CS degree:

1. *Research Experience*—The program must include significant research experience at the level of a half-time commitment over the course of three academic quarters. In any given quarter, the half-time research commitment may be satisfied by a 50 percent appointment to a departmentally supported research assistantship, 6 units of independent study (CS 393, CS 395, or CS 399), or a prorated combination of the two (such as a 25 percent research assistantship supplemented by 3 units of independent study). This research must be carried out under the direction of the primary or secondary adviser.
2. *Supervised Writing and Research*—In addition to the research experience outlined in the previous requirement, students must enroll in at least 3 units of independent research (CS 393, CS 395, or CS 399) under the direction of their primary or secondary adviser. These units should be closely related to the research described in the first requirement, but focused more directly on the preparation of the research report described in the next section. The writing and research units described in parts (1) and (2) may be counted toward the 45 units required for the degree.
3. All independent study units (CS 393, CS 395, CS 399) must be taken for letter grades and a GPA of 3.0 (B) or better must be maintained.
4. *Research Report*—Students must complete a significant report describing their research and its conclusions. The research report represents work that is publishable in a journal or at a high-quality conference, although it is presumably longer and more expansive in scope than a typical conference paper. A copy of the research report must be submitted to the student services office in the department three weeks before the beginning of the examination period in the student's final quarter. Both the primary and secondary adviser must approve the research report before the distinction-in-research designation can be conferred.

## Master of Science in Computer Science Education

Candidates for the MS specialization in Computer Science Education will be admitted from a separate pool of applicants and will be eligible only for this specialization. The qualifications for admission are:

- A doctorate in an academic discipline other than Computer Science
- Experience and evidence of excellence in college-level teaching
- Successful completion of a standard introductory programming sequence (CS 106B or equivalent)

Admitted candidates will complete the following courses (45 units) over the course of four quarters:

CS 103, Mathematical Foundations of Computing  
CS 107, Computer Organization and Systems

CS 108, Object-oriented Systems Design

CS 109, Introduction to Probability for Computer Scientists

CS 110, Principles of Computer Systems

CS 161, Design and Analysis of Algorithms

CS 198, Teaching Computer Science

CS 208E, Great Ideas in Computer Science

Two CS elective courses and a final project

**Admission:** In addition to the strong academic preparation required for any graduate program at Stanford, we are looking for candidates who are excellent teachers and who are able to supply evidence of successful university teaching. Applicants should submit a list of courses taught along with the associated teaching evaluations. In addition, applicants should ask their recommenders to concentrate on teaching experience and expertise; recommendation letters that focus on research strengths will carry relatively little weight.

Applications to the MS specialization in Computer Science Education and all supporting documents must be submitted and received online by the published deadline. Information on admission requirements and deadlines is available on the department's web site (<http://cs.stanford.edu/admissions/>.html).

## Joint M.S. and MBA Degree

The joint MS in Computer Science/MBA degree links two of Stanford University's world-class programs. This joint degree offers students an opportunity to develop advanced technical and managerial skills for a broader perspective on both existing technologies and new technology ventures.

Admission to the joint MSCS/MBA program requires that students apply and be accepted independently to both the Computer Science Department in the School of Engineering and the Graduate School of Business. Students may apply concurrently, or elect to begin their course of study in CS and apply to the GSB during their first year.

Additional information on the MS in Computer Science/MBA Joint Degree Program and its requirements is available on the department's web site (<https://cs/academics/current-masters/joint-cs-msmba-degree>).

## Joint M.S. and Law Degree

Law students interested in pursuing an M.S. in Computer Science must apply for admission to the Computer Science Department either (i) concurrently with applying to the Law School; or (ii) after being admitted to the Law School, but no later than the earlier of: (a) the end of the second year of Law School; or (b) the Computer Science Department's admission deadline for the year following that second year of Law School.

In addition to being admitted separately to the Law School and the Computer Science Department, students must secure permission from both academic units to pursue degrees in those units as part of a joint degree program.

J.D./M.S. students may elect to begin their course of study in either the Law School or the Computer Science Department. Faculty advisors from each academic unit participate in the planning and supervising of the student's joint program. Students must be enrolled full-time in the Law School for the first year of law studies. Otherwise, enrollment may be in the graduate school or the Law School, and students may choose courses from either program regardless of where enrolled. Students must

satisfy the requirements for both the J.D. degree as specified by the Law School and the M.S. degree as specified in this Bulletin.

The Law School approves courses from the Department of Computer Science that may count toward the J.D. degree, and the Computer Science Department approves courses from the Law School that may count toward the M.S. degree in Computer Science. In either case, approval may consist of a list applicable to all joint-degree students or may be tailored to each individual student program. No more than 45 units of approved courses may be counted toward both degrees. No more than 36 units of courses that originate outside the Law School may count toward the Law degree. To the extent that courses under this joint degree program originate outside of the Law School but count toward the Law degree, the Law School credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis, but not below zero. The maximum number of Law School credits that may be counted toward the M.S. in Computer Science is the greater of: (i) 12 units; or (ii) the maximum number of units from courses outside of the department that M.S. candidates in Computer Science are permitted to count toward the M.S. in the case of a particular student's individual program. Tuition and financial aid arrangements are normally through the school in which the student is then enrolled.

## Teaching and Research Assistantships in Computer Science

Graduate student assistantships are available. Half-time assistants receive a tuition scholarship for 8, 9, or 10 units per quarter during the academic year, and in addition receive a monthly stipend.

Duties for half-time assistants during the academic year involve approximately 20 hours of work per week. Course assistants (CAs) help an instructor teach a course by conducting discussion sections, consulting with students, and grading examinations. Research assistants (RAs) help faculty and senior staff members with research in computer science. Many MS students are hired to staff teaching and research assistantships. However, MS students should not plan on being appointed to an assistantship.

Students with fellowships may have the opportunity to supplement their stipends by serving as graduate student assistants.

## Doctor of Philosophy in Computer Science

The University's basic requirements for the Ph.D. degree are outlined in the "Graduate Degrees (p. 50)" section of this bulletin. Department requirements are stated below.

### Requirements

Applications to the Ph.D. program and all supporting documents must be submitted and received online by the published deadline. See the department's web site for admissions requirements and the application deadline (<https://cs.stanford.edu/admissions/general-information>). Changes or updates to the admission process are posted in September.

The following are general department requirements. Contact the Computer Science Ph.D. administrator for details.

1. A student should plan and complete a coherent program of study covering the basic areas of computer science and related disciplines. The student's adviser has primary responsibility for the adequacy of the program, which is subject to review by the Student Services Office.
2. The first year of the Ph.D. program is spent working with 1-3 different professors on a rotating basis. The intent is to allow the first-year Ph.D. student to work with a variety of professors before aligning with a permanent program adviser. Students who don't need the full year

to find a professor to align with will have the option of aligning within the first or second quarter.

3. The CS 300 Departmental Lecture Series seminar gives faculty the opportunity to explain their research to first year CS Ph.D. students. First year CS Ph.D. students are required to attend 2/3 of the classes to receive credit.
4. A student must complete 135 course units for graduation. Computer Science Ph.D. students take 8-10 units per quarter. Credit for coursework done elsewhere (up to the maximum of 45 course units) may be applied to graduation requirements. Students must also take at least three units of coursework from four different faculty members. There are NO courses specifically required by the CS Ph.D. program except for the 1 unit CS 300 Departmental Lecture Series and CS 499 Advanced Reading and Research or its equivalent. At least one course must be taken for a letter grade. A 3.0 GPA must be maintained.
5. Each student, to remain in the Ph.D. program, must satisfy the breadth requirement covering introductory-level graduate material in major areas of computer science. A student must fulfill two breadth-area requirements in each of three general areas by the end of the second year in the program. If students have fulfilled the six breadth-area requirements, and taken courses from at least four different faculty members, they are eligible to apply for candidacy prior to the second year in the program. An up-to-date list of courses that satisfy the breadth requirements (<http://cs.stanford.edu/education/phd>) can be found on the department's web site. The student must completely satisfy the breadth requirement by the end of the second year in the program and must pass a qualifying exam in the general area of their expected dissertation by the end of the third year in the program.
6. University policy requires that all doctoral students declare candidacy by the end of the sixth quarter in residence, excluding summers. However, after aligning with a permanent adviser, passing six breadth requirements, and taking classes with four different faculty, a student is eligible to file for candidacy prior to the sixth quarter. The candidacy form serves as a "contract" between the department and the student. The department acknowledges that the student is a *bona fide* candidate for the Ph.D. and agrees that the program submitted by the student is sufficient to warrant granting the Ph.D. upon completion. Candidacy expires five years from the date of submission of the candidacy form, rounded to the end of the quarter. In special cases, the department may extend a student's candidacy, but is under no obligation to do so.
7. Each student is required to pass a qualifying exam in their area by the end of their third year in the program. A student may only take the qualifying exam twice. If the student fails the qualifying exam a second time, the Ph.D. program committee is convened to discuss the student's lack of reasonable academic progress. Failing the exam a second time is cause for dismissal from the Computer Science Ph.D. program and the committee meets to discuss the final outcome for the student.
8. As part of the training for the Ph.D., the student is also required to complete at least four units (a unit is ten hours per week for one quarter) as a course assistant or instructor for courses in Computer Science numbered 100 or above.
9. The Reading Committee form and Oral Thesis Proposal must be submitted within one year of passing the qualifying exam.
10. The Oral Thesis Proposal must be submitted before the end of the fourth year.
11. The most important requirement is the dissertation. After passing the required qualifying examination, each student must secure the agreement of a member of the department faculty to act as the dissertation adviser. The dissertation adviser is often the student's program adviser.

12. The student must pass a University oral examination in the form of a defense of the dissertation. This is typically held after all or a substantial portion of the dissertation research has been completed.
13. The student is expected to demonstrate the ability to present scholarly material orally in the dissertation defense.
14. The dissertation must be accepted by a reading committee composed of the principal dissertation adviser, a second member from within the department, and a third member chosen from within or outside of the University. The department requires at least two committee members to be affiliated with the Computer Science department. The principal adviser and at least one of the other committee members must be Academic Council members.

## Guidelines for Reasonable Progress

By the end of the first academic year, a student should be aligned with a permanent research advisor.

By Spring Quarter of the second year, a student should complete all six breadth area requirements, two breadth area requirements in each of three areas, and file for candidacy.

By Spring Quarter of the third year, a student should pass a Qualifying Examination (<https://cs.stanford.edu/academics/phd/qualifying-exams>) in the area of his or her intended dissertation.

Within one year of passing the Qualifying Examination, a student should submit a signed Reading Committee Form (<https://stanford.app.box.com/v/docdiss-reading-committee-form>).

By Spring Quarter of the fourth year, a student should submit the Thesis Proposal Form (<http://cs.stanford.edu/degrees/phd/PhD/ThesisProposalForm.pdf>).

The teaching requirement may be satisfied at any time. The research requirement is routinely satisfied by participation in research throughout the student's career.

## Ph.D. Minor in Computer Science

For a minor in Computer Science, a candidate must complete 20 units of Computer Science coursework numbered 200 or above, except for the 100-level courses listed on the Ph.D. Minor Worksheet (<http://cs.stanford.edu/degrees/phd/admissions/Worksheet.pdf>) (pdf). At least three of the courses must be master's core courses to provide breadth and one course numbered 300 or above to provide depth. One of the courses taken must include a significant programming project to demonstrate programming efficiency. Courses must be taken for a letter grade and passed with a grade of 'B' or better. Applications for a minor in Computer Science are submitted at the same time as admission to candidacy.

*Emeriti (Professors):* Tom Binford, Edward Feigenbaum (<http://ksl-web.stanford.edu/people/eaf>), Richard Fikes (<http://www.stanford.edu/~fikes>), Donald E. Knuth (<http://www-cs-faculty.stanford.edu/~knuth>)\*, Jean-Claude Latombe (<http://robotics.stanford.edu/~latombe>), Marc Levoy (<http://graphics.stanford.edu/~levoy>)\*, Zohar Manna, Teresa Meng (<http://dualist.stanford.edu/~thm>), William F. Miller, Nils J. Nilsson (<http://robotics.stanford.edu/~nilsson>), Serge Plotkin (<http://trollw.stanford.edu/plotkin>), Vaughan Pratt (<http://boole.stanford.edu/pratt.html>)\*, Eric Roberts (<http://cs.stanford.edu/people/eroberts>)\*, Yoav Shoham (<http://robotics.stanford.edu/~shoham>), Jeffrey D. Ullman (<http://infolab.stanford.edu/~ullman>), Gio Wiederhold (<http://infolab.stanford.edu/people/gio.html>), Terry Winograd (<http://hci.stanford.edu/winograd>), Ken Salisbury (<https://profiles.stanford.edu/john-salisbury>), David Dill (<https://profiles.stanford.edu/david-dill>)\*

*Chair:* Alex Aiken (<http://theory.stanford.edu/~aiken>)

*Associate Chair for Education:* Mehran Sahami (<http://robotics.stanford.edu/users/sahami/bio.html>)

*Professors:* Maneesh Agrawala (<http://graphics.stanford.edu/~maneesh>), Alex Aiken (<http://theory.stanford.edu/~aiken>), Serafim Batzoglou (<http://www.serafimb.org/people.html>), Dan Boneh (<http://crypto.stanford.edu/~dabo>), Moses Charikar, David Cheriton (<http://www.stanford.edu/~cheriton>), David Dill (<http://verify.stanford.edu/dill>), Ronald P. Fedkiw (<http://physbam.stanford.edu/~fedkiw>), Hector Garcia-Molina (<http://infolab.stanford.edu/people/hector.html>), Leonidas J. Guibas (<http://geometry.stanford.edu/member/guibas>), Patrick Hanrahan (<http://www-graphics.stanford.edu/~hanrahan>), John Hennessy, Mark A. Horowitz (<http://www-vlsi.stanford.edu/~horowitz>), Doug James (<http://www.cs.cornell.edu/~djames>), Dan Jurafsky (<http://web.stanford.edu/~jurafsky>), Oussama Khatib (<http://robotics.stanford.edu/~ok>), Monica Lam (<http://suif.stanford.edu/~lam>), James Landay (<https://profiles.stanford.edu/james-landay>), Nick McKeown (<http://tiny-tera.stanford.edu/~nickm>), Christopher Manning (<http://nlp.stanford.edu/~manning>), David Mazieres (<http://www.scs.stanford.edu/~dm>), John Mitchell (<http://theory.stanford.edu/people/jcm/home.html>), Kunle Olukotun (<http://ogun.stanford.edu/~kunle>), John Ousterhout (<http://www.stanford.edu/~ouster/cgi-bin/home.php>), Balaji Prabhakar (<http://www.stanford.edu/~balaji>), Omer Reingold (<https://profiles.stanford.edu/omer-reingold>), Mendel Rosenblum (<http://web.stanford.edu/~mendel>), Jennifer Widom (<http://infolab.stanford.edu/~widom>), Tim Roughgarden (<http://theory.stanford.edu/~tim>), Subhasish Mitra (<http://www.stanford.edu/~subh>)

*Associate Professors:* Gill Bejerano (<http://bejerano.stanford.edu>), Ron Dror (<http://cs.stanford.edu/people/rondror>), Dawson Engler (<http://www.stanford.edu/~engler>), Michael Genesereth (<http://logic.stanford.edu/people/genesereth/genesereth.html>), Christoforos Kozyrakis (<http://csl.stanford.edu/~christos>), Jure Leskovec (<http://cs.stanford.edu/people/jure>), Philip Levis (<http://csl.stanford.edu/~pal>), Fei-Fei Li (<http://vision.stanford.edu>), Christopher Re (<http://cs.stanford.edu/people/chrisre>), Silvio Savarese (<http://cvgl.stanford.edu/silvio>), Sachin Katti (<http://web.stanford.edu/~skatti>), Noah Goodman (<http://cocolab.stanford.edu/ndg.html>)

*Assistant Professors:* Peter Bailis (<https://profiles.stanford.edu/peter-bailis>), Michael Bernstein (<http://people.csail.mit.edu/msbernst>), Jeannette Bogh, Emma Brunskill (<https://profiles.stanford.edu/emma-brunskill?tab=bio>), Stefano Ermon (<http://cs.stanford.edu/~ermon>), Anshul Kundaje (<https://sites.google.com/site/anshulkundaje>), Percy Liang (<http://cs.stanford.edu/~pliang>), Greg Valiant (<http://theory.stanford.edu/~valiant>), Keith Winstein (<http://web.mit.edu/keithw>), Mary Wootters (<https://profiles.stanford.edu/mary-wootters>), Matei Zaharia (<https://profiles.stanford.edu/matei-zaharia>), Dorsa Sadigh (<https://profiles.stanford.edu/dorsa-sadigh>), Kayvon Fatahalian

*Professors (Research):* Clark Barrett (<http://www.cs.nyu.edu/~barrett>), William J. Dally ([http://cva.stanford.edu/billd\\_webpage\\_new.html](http://cva.stanford.edu/billd_webpage_new.html)),

*Professor (Teaching):* Mehran Sahami (<http://robotics.stanford.edu/users/sahami/bio.html>)

*Associate Professor (Teaching):*

*Courtesy Professors:* Russ Altman ([http://bmir.stanford.edu/people/view.php/russ\\_b\\_altman](http://bmir.stanford.edu/people/view.php/russ_b_altman)), Stephen Boyd (<http://www.stanford.edu/~boyd>), Patrick Hayden, Michael Levitt, Roy Pea

*Courtesy Associate Professors:* Ashish Goel (<http://www.stanford.edu/~ashishg>), Allison Okamura, Chris Potts, Ge Wang (<https://ccrma.stanford.edu/~ge>),

*Courtesy Assistant Professors:* John Duchi, Sean Follmer, Sharad Goel, Thomas Icard, Ramesh Johari, Mykel Kochenderfer (<http://mykel.kochenderfer.com>), Stephen Montgomery (<http://montgomerylab.stanford.edu>), Camille Utterback, Gordon Wetzstein, Aaron Sidford, Dan Yamins, James Zou

*Lecturers:* Gerald Cain, Chris Gregg, Victoria Kirst, Cynthia Lee, Nicholas J. Parlante (<http://www-cs-faculty.stanford.edu/~nick>), Chris Piech, Keith Schwarz, Marty Stepp (<http://www.martystepp.com>), Patrick Young (<http://www.stanford.edu/~psyong>), Julie Zelenski (<http://www-cs-faculty.stanford.edu/~zelenski>)

*Adjunct Professors:* Pei Cao, Stuart Card, Tom Dean, Daphne Koller, P. Pandurang Nayak, Andrew Ng (<http://www.andrewng.org>), Bill MacCartney (<http://nlp.stanford.edu/~wcmac>), Sebastian Thrun (<http://robots.stanford.edu>)

*Visiting Professors:* Thomas Funkhouser

*Visiting Assistant Professors:*

*Secondary Appointment in CS:* Anshul Kundaje

\* Recalled to active duty.

# ELECTRICAL ENGINEERING

Courses offered by the Department of Electrical Engineering are listed under the subject code EE (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&q=EE&filter-departmentcode=EE=on&filter-coursestatus=Active=on&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&page=0>) on the *Stanford Bulletin's* ExploreCourses web site.

The Department of Electrical Engineering (EE) at Stanford innovates by conducting fundamental and applied research to develop physical technologies, hardware and software systems, and information technologies; it educates future academic and industry leaders; and it prepares students for careers in industry, academia, and research labs.

Electrical Engineering has effected societal changes at the heart of the information revolution. All forms of electrical and electronic devices—both hardware and software—are a part of daily lives, whether these are in the home, personal devices, or the infrastructure of communications, information, and computation. Electrical engineers use theories and tools from mathematics and physics to develop systems ranging from smart electric grids, wired and wireless communications and networking, embedded systems, integrated electronics, imaging and sensing devices, to Internet-based information technology.

The Electrical Engineering Department offers the following degrees: Bachelor of Science, Master of Science, and Doctor of Philosophy. The department also offers joint degrees in Electrical Engineering and Law (M.S./J.D.) and Electrical Engineering and Business Administration (M.S./M.B.A.). A minor can be obtained for the Bachelor of Science and Doctor of Philosophy.

## Undergraduate Program in Electrical Engineering

The mission of the undergraduate program of the Department of Electrical Engineering is to augment the liberal education expected of all Stanford undergraduates, to impart basic understanding of electrical engineering, and to develop skills in the design and building of systems that directly impact societal needs.

The program includes a balanced foundation in the physical sciences, mathematics and computing; core courses in electronics, information systems and digital systems; and develops specific skills in the analysis and design of systems. Students in the major have broad flexibility to select from disciplinary areas beyond the core, including hardware and software, information systems and science, and physical technology and science, as well as electives in multidisciplinary areas, including bio-electronics and bio-imaging, energy and environment and music.

The program prepares students for a broad range of careers—both industrial and government—as well as for professional and academic graduate education.

### Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. The educational objectives of the program are:

1. Technical knowledge—provide a knowledge of electrical engineering principles along with the required supporting knowledge of computing, engineering fundamentals, mathematics, and science. The program must include depth in at least one disciplinary area, currently including hardware and software, information systems and science, and physical technology and science.

2. Laboratory and design skills—develop the basic skills needed to perform and design experimental projects. Develop the ability to formulate problems and projects and to plan a process for solution, taking advantage of diverse technical knowledge and skills.
3. Communications skills—develop the ability to organize and present information and to write and speak effective English.
4. Preparation for further study—provide sufficient breadth and depth for successful subsequent graduate study, postgraduate study, or lifelong learning programs.
5. Preparation for the profession—provide an appreciation for the broad spectrum of issues arising in professional practice, including economics, ethics, leadership, professional organizations, safety, service, and teamwork.

## Graduate Programs in Electrical Engineering

University regulations governing the M.S. and Ph.D. degrees are described in the “Graduate Degrees” section of this bulletin.

The profession of electrical engineering demands a strong foundation in physical science and mathematics, a broad knowledge of engineering techniques, and an understanding of the relationship between technology and society. Curricula at Stanford are planned to offer the breadth of education and depth of training necessary for leadership in the profession. To engage in this profession with competence, four years of undergraduate study and at least one year of postgraduate study are recommended. For those who plan to work in highly technical development or fundamental research, additional graduate study is desirable.

The degree of Master of Science is offered under the general regulations of the University. The master's program, requiring a minimum of 45 units of graduate study, should be considered by those with the ability and desire to make a life work of professional practice or continued graduate study.

The degree of Doctor of Philosophy is offered under the general regulations of the University. The doctoral program, requiring a minimum of 135 units of graduate study, should be considered by those with the ability and desire to make a life work of research or teaching.

### Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course work providing specialization in one area of Electrical Engineering and breadth in several other areas. Areas of specialization include Circuits, Software and Hardware Systems, Communications and Networking, Physical Technology and Science, and Signal Processing, Control and Optimization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Electrical Engineering and related fields.

### Application for Admission

Applications for graduate admission in Electrical Engineering (EE) should be completed electronically at the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site. See the Electrical Engineering graduate admissions (<http://ee.stanford.edu/admissions>) web site for department specific information.



## Disciplinary Areas in Electrical Engineering

Electrical Engineering spans a diverse set of intellectual disciplines and applications. The disciplines can be grouped into three overlapping and interrelated areas:

### Hardware/Software Systems

- Data Science
- Embedded Systems
- Energy-Efficient Hardware Systems
- Integrated Circuits and Power Electronics
- Secure Distributed Systems
- Software Defined Networking
- Mobile Networking

### Information Systems and Science

- Biomedical Imaging
- Communications Systems
- Control, Optimization, and Machine Learning
- Data Science
- Information Theory and Applications
- Societal Networks
- Signal Processing and Multimedia

### Physical Technology and Science

- Biomedical Devices, Sensors and Systems
- Electronic Devices
- Energy Harvesting and Conversion
- Integrated Circuits and Power Electronics
- Nanotechnology, Nanofabrication and NEMS/MEMS
- Photonics, Nanoscience and Quantum Technology

## Multidisciplinary Research

EE faculty collaborate with researchers from other departments and schools across campus. While the main applications of electrical engineering in the past four decades have been in information technology, EE tools and techniques are being increasingly applied more broadly to address major societal problems in areas such as:

### Biomedical

Research in the biomedical area utilizes engineering approaches to meet the unmet needs in diagnosis, staging, treatment, and mitigation of illnesses including cancer, diabetes, heart diseases, as well as brain disorders. These challenges are addressed by discovering and creating fundamentally new devices and systems for critical diagnostics (sensors, imaging), therapeutic (lasers, pacemakers, and neural interfaces), and analytical (high-throughput sequencing, healthcare IT) technologies.

### Energy

Research in energy is motivated at the macro level by the rapid rise in worldwide demand for electricity and the threat of global climate change and on the micro level by the explosion in the number of mobile devices and sensors whose performance and lifetimes are limited by energy.

For additional information, see the Department of Electrical Engineering's Research (<https://ee.stanford.edu/research/the-big-picture>) web site.

## Electrical Engineering Course Catalog Numbering System

Electrical Engineering courses are typically numbered according to the year in which the courses are normally taken.

Number	Year
010-099	first or second year undergraduate
100-199	second through fourth year undergraduate
200-299	mezzanine courses for advanced undergraduate or first-year graduate
300-399	second through fourth year graduate
400-499	specialized courses for advanced graduate
600-799	special summer courses

## Undergraduate Programs in Electrical Engineering

To major in Electrical Engineering (EE), undergraduates should follow the requirements below. Students must have a program planning sheet approved by their adviser and the department before the end of the quarter following the quarter in which they declare the EE major. A final version of the completed and signed program sheet is due to the department no later than one month prior to the last quarter of senior year. Program sheets are available at <http://ughb.stanford.edu>. Students must receive at least a 2.0 grade point average (GPA) in courses taken for the EE major; all classes must be taken for a letter grade.

Students interested in a minor should consult the "Minor in Electrical Engineering (p. 299)" tab of this section of this bulletin.

A Stanford undergraduate may work simultaneously toward the B.S. and M.S. degrees. See the Master's tab (p. 300) of this section of the bulletin.

## Electrical Engineering (EE)

Completion of the undergraduate program in Electrical Engineering leads to the conferral of the Bachelor of Science in Electrical Engineering.

### Mission of the Undergraduate Program in Electrical Engineering

The mission of the undergraduate program of the Department of Electrical Engineering is to augment the liberal education expected of all Stanford undergraduates, to impart basic understanding of electrical engineering and to develop skills in the design and building of systems that directly impact societal needs.

The program includes a balanced foundation in the physical sciences, mathematics and computing; core courses in electronics, information systems and digital systems; and develops specific skills in the analysis and design of systems. Students in the major have broad flexibility to select from disciplinary areas beyond the core, including hardware and software, information systems and science, and physical technology and science, as well as electives in multidisciplinary areas, including bio-electronics and bio-imaging, energy and environment and music.

The program prepares students for a broad range of careers—both industrial and government—as well as for professional and academic graduate education.

## Requirements

### Mathematics <sup>1</sup>

Select one sequence: May also be satisfied with AP Calculus. 10

MATH 19 Calculus  
& MATH 20 and Calculus  
& MATH 21 and Calculus

Select one 2-course sequence: 10

CME 100 Vector Calculus for Engineers  
& CME 102 and Ordinary Differential Equations for Engineers  
(Same as ENGR 154 and ENGR 155A)

MATH 51 Linear Algebra and Differential Calculus of Several  
& MATH 53 Variables  
and Ordinary Differential Equations with Linear  
Algebra <sup>2</sup>

EE Math. One additional 100-level course. Select one: 3

EE 103 Introduction to Matrix Methods (Preferred)

MATH 113 Linear Algebra and Matrix Theory

CS 103 Mathematical Foundations of Computing

Statistics/Probability. Select one: 3-4

EE 178 Probabilistic Systems Analysis (Preferred)

CS 109 Introduction to Probability for Computer Scientists

### Science

Minimum 12 units

Select one sequence: 12

PHYSICS 41 Mechanics  
& EE 42 and Introduction to Electromagnetics and Its  
Applications <sup>3</sup>

PHYSICS 41 Mechanics  
& PHYSICS 43 and Electricity and Magnetism <sup>3</sup>

PHYSICS 61 Mechanics and Special Relativity  
& PHYSICS 63 and Electricity, Magnetism, and Waves

Science elective. One additional 4-5 unit course from approved list in Undergraduate Handbook, Figure 4-2. 4-5

### Technology in Society

One course, see Basic Requirement 4 in the School of Engineering section. The course taken must be on the School of Engineering Approved Courses list, Fig 4-3, the year it is taken. 3-5

### Engineering Topics

Minimum 60 units comprised of: Engineering Fundamentals (minimum 10 units), Core Electrical Engineering Courses (minimum 16 units) Disciplinary Area (minimum 17 units), Electives (maximum 17 units, restrictions apply).

### Engineering Fundamentals

2 courses required; minimum 10 units

Select one:

CS 106B/ Programming Abstractions 5  
ENGR 70B

or CS 106X/ Programming Abstractions (Accelerated)  
ENGR 70X

Choose one Fundamental from the Approved List; Recommended: ENGR 40A and ENGR 40B or ENGR 40M (recommended before taking EE 101A); taking CS 106A or a second ENGR 40-series course not allowed for the Fundamentals elective. Choose from table in Undergraduate Handbook, Approved List. 5

### Core Electrical Engineering Courses

EE 100 The Electrical Engineering Profession <sup>4</sup>

EE 101A Circuits I

EE 102A Signal Processing and Linear Systems I

EE 108 Digital System Design

Physics of Electrical Engineering. 4

EE 65 Modern Physics for Engineers <sup>5</sup>

**Disciplinary Area** 17

Minimum 17 units, 5 courses: 1-2 Required, 1 WIM/Design and 2-3 disciplinary area electives.

**Writing in the Major (WIM)** 3-5

Select one. A single course can concurrently meet the WIM and Design Requirements.

EE 109 Digital Systems Design Lab (WIM/Design)

EE 133 Analog Communications Design Laboratory (WIM/Design)

EE 134 Introduction to Photonics (WIM/Design)

EE 153 Power Electronics (WIM/Design)

EE 155 Green Electronics (WIM/Design)

EE 168 Introduction to Digital Image Processing (WIM/Design)

EE 191W Special Studies and Reports in Electrical Engineering (WIM; Department approval required) <sup>6</sup>

EE 264W Digital Signal Processing (WIM/Design)

CS 194W Software Project (WIM/Design)

**Design Course** 3-5

Select one. Students may select their Design course from any Disciplinary Area.

EE 109 Digital Systems Design Lab (WIM/Design)

EE 133 Analog Communications Design Laboratory (WIM/Design)

EE 134 Introduction to Photonics (WIM/Design)

EE 153 Power Electronics (WIM/Design)

EE 155 Green Electronics (WIM/Design)

EE 168 Introduction to Digital Image Processing (WIM/Design)

EE 262 Two-Dimensional Imaging (Design)

EE 264 Digital Signal Processing (Design) <sup>7</sup>

EE 264W Digital Signal Processing (WIM/Design)

EE 267 Virtual Reality (Design) <sup>7</sup>

CS 194 Software Project (Design)

CS 194W Software Project (WIM/Design)

**Electives** 17

Minimum 17 units. Students may select electives from the disciplinary areas; from the multidisciplinary elective areas; or any combination of disciplinary and multidisciplinary areas. May include up to two additional Engineering Fundamentals, any CS 193 course and any letter graded EE courses (minus any previously noted restrictions). Freshman and Sophomore seminars, EE 191 and CS 106A do not count toward the 60 units. Students may have fewer elective units if they have more units in their disciplinary area.

<sup>1</sup> Math 41 and Math 42 are no longer offered and have been replaced by Math 19, Math 20, and Math 21.

<sup>2</sup> MATH 52 may be taken in place of MATH 51. CME 102 can be taken in place of MATH 53.

<sup>3</sup> EE 42 may be used in place of PHYSICS 43 (if not used in EE electives area). The EE introductory class ENGR 40A and ENGR 40B or ENGR 40M may be taken concurrently with either EE 42 or PHYSICS 43. There are no prerequisites for ENGR 40A and ENGR 40B or ENGR 40M.

<sup>4</sup> For upper division students, a 200-level seminar in their disciplinary area will be accepted, on petition.

<sup>5</sup> Students may petition to have either PHYSICS 65 or the combination of PHYSICS 45 and PHYSICS 70 count as an alternative to EE 65.

<sup>6</sup> EE 191W may satisfy WIM only if it is a follow-up to an REU, independent study project or as part of an honors thesis project where a faculty agrees to provide supervision of writing a technical paper and with suitable support from the Writing Center.

<sup>7</sup> To satisfy Design, must take EE 264 or EE 267 for 4 units and complete the laboratory project.

## Disciplinary Areas

### Hardware and Software

		Units
EE 180	Digital Systems Architecture (Required)	4
EE 107	Embedded Networked Systems	3
EE 109	Digital Systems Design Lab (WIM/Design)	4
EE 118	Introduction to Mechatronics	4
EE 155	Green Electronics (Design)	4
EE 213	Digital MOS Integrated Circuits	3
EE 264	Digital Signal Processing (Design)	3-4
EE 264W	Digital Signal Processing	5
EE 267	Virtual Reality	3-4
EE 271	Introduction to VLSI Systems	3
EE 272	Design Projects in VLSI Systems	3-4
EE 273	Digital Systems Engineering	3
EE 282	Computer Systems Architecture	3
EE 285	Embedded Systems Workshop	2
CS 107	Computer Organization and Systems (Required prerequisite for EE 180; CS 107E preferred)	3-5
or CS 107E	Computer Systems from the Ground Up	
CS 108	Object-Oriented Systems Design	3-4
CS 110	Principles of Computer Systems	3-5
CS 131	Computer Vision: Foundations and Applications	3-4
CS 140	Operating Systems and Systems Programming	3-4
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
CS 145	Introduction to Databases	3-4
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 155	Computer and Network Security	3
CS 194W	Software Project (WIM/Design)	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 225A	Experimental Robotics	3
CS 229	Machine Learning	3-4
CS 231A	Computer Vision: From 3D Reconstruction to Recognition	3-4
CS 231N	Convolutional Neural Networks for Visual Recognition	3-4
CS 241	Embedded Systems Workshop	2
CS 244	Advanced Topics in Networking	3-4

### Information Systems and Science

EE 102B	Signal Processing and Linear Systems II (Required)	4
EE 103	Introduction to Matrix Methods	3-5
EE 104	Introduction to Machine Learning	3-5
EE 107	Embedded Networked Systems	3
EE 118	Introduction to Mechatronics	4
EE 124	Introduction to Neuroelectrical Engineering	3

EE 133	Analog Communications Design Laboratory (WIM/Design)	3-4
EE 155	Green Electronics (WIM/Design)	4
EE 168	Introduction to Digital Image Processing (WIM/Design)	3-4
EE 169	Introduction to Bioimaging	3
EE 179	Analog and Digital Communication Systems	3
EE 261	The Fourier Transform and Its Applications	3
EE 262	Two-Dimensional Imaging (Design)	3
EE 263	Introduction to Linear Dynamical Systems	3
EE 264	Digital Signal Processing (Design)	3-4
EE 264W	Digital Signal Processing (WIM/Design)	5
EE 267	Virtual Reality (Design)	3-4
EE 278	Introduction to Statistical Signal Processing	3
EE 279	Introduction to Digital Communication	3
CS 107	Computer Organization and Systems	3-5
CS 229	Machine Learning	3-4
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3

### Physical Technology and Science

EE 101B	Circuits II (Required)	4
EE 107	Embedded Networked Systems	3
EE 114	Fundamentals of Analog Integrated Circuit Design	3-4
EE 116	Semiconductor Devices for Energy and Electronics	3
EE 118	Introduction to Mechatronics	4
EE 124	Introduction to Neuroelectrical Engineering	3
EE 133	Analog Communications Design Laboratory (WIM/Design)	3-4
EE 134	Introduction to Photonics (WIM/Design)	4
EE 136		
EE 142	Engineering Electromagnetics	3
EE 153	Power Electronics (WIM/Design)	3-4
EE 155	Green Electronics (WIM/Design)	4
EE 212	Integrated Circuit Fabrication Processes	3
EE 213	Digital MOS Integrated Circuits	3
EE 214B	Advanced Analog Integrated Circuit Design	3
EE 216	Principles and Models of Semiconductor Devices	3
EE 222	Applied Quantum Mechanics I	3
EE 223	Applied Quantum Mechanics II	3
EE 228	Basic Physics for Solid State Electronics	3
EE 236A	Modern Optics	3
EE 236B	Guided Waves	3
EE 242	Electromagnetic Waves	3
EE 247	Introduction to Optical Fiber Communications	3
EE 267	Virtual Reality (Design)	3-4
EE 271	Introduction to VLSI Systems	3
EE 272	Design Projects in VLSI Systems	3-4
EE 273	Digital Systems Engineering	3
EE 282	Computer Systems Architecture	3
CS 107	Computer Organization and Systems	3-5

### Multidisciplinary Area Electives

#### Bio-electronics and Bio-imaging

EE 101B	Circuits II	4
EE 102B	Signal Processing and Linear Systems II	4
EE 107	Embedded Networked Systems	3
EE 124	Introduction to Neuroelectrical Engineering	3

EE 134	Introduction to Photonics (WIM/Design)	4
EE 168	Introduction to Digital Image Processing (WIM/Design)	4
EE 169	Introduction to Bioimaging	3
EE 225	Biochips and Medical Imaging	3
BIOE 248	Neuroengineering Laboratory	3
BIOE 131	Ethics in Bioengineering	3
MED 275B	Biodesign Fundamentals	4
<b>Energy and Environment</b>		
EE 101B	Circuits II	4
EE 103	Introduction to Matrix Methods	3-5
EE 116	Semiconductor Devices for Energy and Electronics	3
EE 134	Introduction to Photonics (WIM/Design)	4
EE 151	Sustainable Energy Systems	3
EE 153	Power Electronics (WIM/Design)	3-4
EE 155	Green Electronics (WIM/Design)	4
EE 168	Introduction to Digital Image Processing (WIM/Design)	3-4
EE 180	Digital Systems Architecture	4
EE 263	Introduction to Linear Dynamical Systems	3
EE 293A	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
EE 293B	Fundamentals of Energy Processes	3
CEE 107A	Understanding Energy (Formerly CEE 173A)	3-5
CEE 155	Introduction to Sensing Networks for CEE	3-4
CEE 176A	Energy Efficient Buildings	3-4
CEE 176B	Electric Power: Renewables and Efficiency	3-4
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3
MATSCI 142	Quantum Mechanics of Nanoscale Materials (Formerly MATSCI 157)	4
MATSCI 152	Electronic Materials Engineering	4
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution	3-4
ME 185	Electric Vehicle Design	3
ME 227	Vehicle Dynamics and Control	3
ME 271E	Aerial Robot Design	3
<b>Music</b>		
EE 102B	Signal Processing and Linear Systems II	4
EE 109	Digital Systems Design Lab (WIM/Design)	4
EE 264	Digital Signal Processing (Design)	3-4
EE 264W	Digital Signal Processing (WIM/Design)	5
MUSIC 250A	Physical Interaction Design for Music	3-4
MUSIC 250B	Interactive Sound Art	1-4
MUSIC 256A	Music, Computing, Design I: Art of Design for Computer Music	3-4
MUSIC 256B	Music, Computing, Design II: Virtual and Augmented Reality for Music	3-4
MUSIC 257	Neuroplasticity and Musical Gaming	3-5
MUSIC 320A	Introduction to Audio Signal Processing Part I: Spectrum Analysis	3-4
MUSIC 320B	Introduction to Audio Signal Processing Part II: Digital Filters	3-4
MUSIC 420A	Signal Processing Models in Musical Acoustics <sup>1</sup>	3-4
MUSIC 421A	Audio Applications of the Fast Fourier Transform <sup>1</sup>	3-4
MUSIC 422	Perceptual Audio Coding <sup>1</sup>	3
MUSIC 424	Signal Processing Techniques for Digital Audio Effects <sup>1</sup>	3-4

<sup>1</sup> Best taken as a coterm student.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

### Honors Program

The Department of Electrical Engineering offers a program leading to a Bachelor of Science in Electrical Engineering with Honors. This program offers a unique opportunity for qualified undergraduate majors to conduct independent study and research at an advanced level with a faculty mentor, graduate students, and fellow undergraduates.

Admission to the honors program is by application. Declared EE majors with a grade point average (GPA) of at least 3.5 in Electrical Engineering are eligible to submit an application. Applications must be submitted by Autumn quarter of the senior year, be signed by the thesis adviser and second reader (one must be a member of the EE Faculty), and include an honors proposal. Students need to declare honors on Axess.

In order to receive departmental honors, students admitted to the honors program must:

1. Submit an application, including the thesis proposal, by autumn quarter of senior year signed by the thesis advisor and second reader (one must be a member of the Electrical Engineering faculty).
2. Declare the EE Honors major in Axess before the end of autumn quarter of senior year.
3. Maintain a grade point average of at least 3.5 in Electrical Engineering courses.
4. Complete at least 10 units of EE 191 or EE 191W with thesis advisor for a letter grade. EE 191 units do not count toward the required 60 units, with the exception of EE 191W if approved to satisfy WIM.
5. Submit one final copy of the honors thesis approved by the advisor and second reader to the EE Degree Progress Officer by May 15.
6. Attend poster and oral presentation held at the end of spring quarter or present in another suitable forum approved by the faculty adviser.

### Electrical Engineering (EE) Minor

The options for completing a minor in EE are outlined below. Students must complete a minimum of 23-25 units, as follows:

	<b>Units</b>
Select one:	5
EE 42	Introduction to Electromagnetics and Its Applications
EE 65	Modern Physics for Engineers
ENGR 40A & ENGR 40B	Introductory Electronics and Introductory Electronics Part II
ENGR 40M	An Intro to Making: What is EE
Select one:	8
Option I:	
EE 101A	Circuits I
EE 101B	Circuits II
Option II:	
EE 102A	Signal Processing and Linear Systems I
EE 102B	Signal Processing and Linear Systems II
Option III:	
EE 102A	Signal Processing and Linear Systems I
EE 103	Introduction to Matrix Methods
Option IV:	
EE 108	Digital System Design
EE 180	Digital Systems Architecture

In addition, four letter-graded EE courses at the 100-level or higher must be taken (12 units minimum). CS 107 is required as a prerequisite for EE 180, but can count as one of the four classes.

## Master of Science in Electrical Engineering

Students with undergraduate degrees in physics, mathematics, or related sciences, as well as in various branches of engineering, are invited to apply for admission. They should typically be able to complete the master's degree in five quarters; note that many courses are not taught during the summer. Capable students without formal undergraduate preparation in electrical engineering may also be admitted for graduate study. Such students may have graduated in any field and may hold either the B.S. or B.A. degree. Graduate study in electrical engineering demands that students be adequately prepared in areas such as circuits, digital systems, fields, lab work, mathematics, and physics.

It is the student's responsibility, in consultation with an adviser, to determine whether the prerequisites for advanced courses have been met. Prerequisite courses ordinarily taken by undergraduates may be included as part of the graduate program of study. However, if the number of these is large, the proposed program may contain more than the minimum 45 units, and the time required to meet the degree requirements may be increased.

The master's degree program may provide advanced preparation for professional practice or for teaching at the junior college level. The faculty does not prescribe specific courses to be taken. Each student, with the help of a program adviser, prepares an individual program and submits it to the department for approval. The Program Proposal must be submitted to the Degree Progress Office before the end of the first quarter of graduate study (second quarter for Honors Cooperative Program students); a final revised version is due early in the final quarter of study, prior to degree conferral. Detailed requirements and instructions are available at <http://ee.stanford.edu/gradhandbook>. All requirements for a master's degree must be completed within three years after the student's first term of enrollment in the master's program (five years for Honors Cooperative Program students).

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

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## Master of Science with Distinction in Research

A student who wishes to pursue the M.S. in EE with distinction in research must first identify a faculty adviser who agrees to supervise and support the research work. The research adviser must be a member of the Academic Council and must hold an appointment in Electrical Engineering. The student and principal adviser must also identify another faculty member, who need not be in the Department of Electrical Engineering, to serve as a secondary adviser and reader for the research report. In addition, the student must complete the following requirements beyond those for the regular M.S. in EE degree:

1. *Research Experience*—The program must include significant research experience at the level of a half-time commitment over the course of three academic quarters. In any given quarter, the half-time research commitment may be satisfied by:
  - a. a 50 percent appointment to a departmentally supported research assistantship,
  - b. 6 units of independent study (EE 300 or EE 391)
  - c. a prorated combination of the two (such as a 25 percent research assistantship supplemented by 3 units of independent study).
  - d. An equivalent research experience while fully supported on a Stanford-funded or externally funded fellowship. Student and research adviser must document the planned research experience before the quarter starts and its completion at the end. Note: Fellowship must provide full support at the 10-unit tuition level, and allow the student to pursue degree-related research in addition to his/her fulltime course enrollment. This research must be carried out under the direction of the primary or secondary adviser.
2. *Supervised Writing and Research*—In addition to the research experience outlined in the previous requirement, students must enroll in at least 3 units of independent research (EE 300 or EE 391) under the direction of their primary or secondary adviser. These units should be closely related to the research described in the first requirement, but focused more directly on the preparation of the research report described in the next section. The writing and research units described in parts (1) and (2) may be counted toward the 45 units required for the degree.
3. All independent study units (EE 300 or EE 391) must be taken for letter grades and a GPA of 3.0 (B) or better must be maintained.
4. *Research Report*—Students must complete a significant report describing their research and its conclusions. The research report represents work that is publishable in a journal or at a high-quality conference, although it is presumably longer and more expansive in scope than a typical conference paper. A copy of the research report must be submitted to the student services office in the department three weeks before the beginning of the examination period in the student's final quarter. Both the primary and secondary adviser must approve the research report before the distinction-in-research designation can be conferred.

## The Honors Cooperative Program

Many of the department's graduate students are supported by the Honors Cooperative Program (HCP), which makes it possible for academically qualified engineers and scientists in nearby companies to be part-time master's students in Electrical Engineering while continuing nearly full-time professional employment. Prospective HCP students follow the same admission process and must meet the same admission requirements as full-time master's students. For more information regarding the Honors Cooperative Program, see the "School of Engineering" section of this bulletin.

## Joint Electrical Engineering and Law Degree (M.S./J.D.)

The Department of Electrical Engineering and the School of Law offer a joint degree program leading to an M.S. degree in EE combined with a J.D. degree. The J.D./M.S. program is designed for students who wish to prepare themselves for careers that involve both Law and Electrical Engineering.

Students interested in this joint degree program must apply to and gain admission separately from the Department of Electrical Engineering and the School of Law, and as an additional step, secure consent from both academic units to pursue both degrees simultaneously. Interest in the program should be noted on a student's application to each academic unit. A student currently enrolled in either the Department of Electrical Engineering or the School of Law may apply for admission to the other academic unit and for joint degree status after commencing study in that unit.

## Joint Electrical Engineering and Master's in Business Administration Degree (M.S./M.B.A.)

The Department of Electrical Engineering and the Graduate School of Business offer a joint degree program leading to an M.S. degree in EE combined with an M.B.A. degree. The joint program offers students an opportunity to develop advanced technical and managerial skills in preparation for careers in existing and new technology ventures.

Admission to the joint M.S./M.B.A. program requires that students apply and be accepted independently to both the Electrical Engineering Department at the School of Engineering and the Graduate School of Business. Students may apply concurrently, or elect to begin their course of study in EE and apply to the GSB during their first year.

See the EE Graduate Handbook (<https://stanford.box.com/s/dhubl4flfcpuj49zn1k9b8py57197bp>) for more information about the joint degree programs.

## Doctor of Philosophy in Electrical Engineering

The University requirements for the Ph.D. degree are described in the "Graduate Degrees" section of this bulletin.

Admission to a graduate program does not imply that the student is a candidate for the Ph.D. degree. Advancement to candidacy requires superior academic achievement, satisfactory performance on a qualifying examination, and sponsorship by two faculty members. Enrollment in EE 391, Special Studies, is recommended as a means for getting acquainted with a faculty member who might be willing to serve as the dissertation advisor.

Students admitted to the Ph.D. program must sign up to take the department qualifying examination, given once a year in winter quarter. Students are allowed two attempts to pass the examination. Students are required to take the exam in their first year of study. Students who have never taken the qualifying examination by the end of the second year of study will be dismissed from the Ph.D. program for failure to progress. Such students may be allowed to complete a master's degree in Electrical Engineering instead. Students who do not pass the qualifying examination after two attempts will be dismissed from the Ph.D. program for failure to progress. Such students may be allowed to complete a master's degree in Electrical Engineering instead.

Upon completion of the qualifying examination and after securing agreement by two faculty members to serve as dissertation adviser and

second reader, the student files an Application for Candidacy for Doctoral Degree. The dissertation adviser must be a member of the Academic Council. One of the two faculty members must have either a full, joint or courtesy appointment in the Electrical Engineering department. Students are required to advance to candidacy prior to the end of their second year in the graduate program. Students who do not advance to candidacy by the end of their second year will be dismissed from the Ph.D. program for failure to progress.

Only after receiving department approval of the Application for Candidacy does the student become a candidate for the Ph.D. degree.

For complete requirements and additional information, see the department's web site (<http://ee.stanford.edu/gradhandbook>).

### Financial Assistance

The department awards a limited number of fellowships, teaching and course assistantships, and research assistantships to incoming graduate students. Applying for financial assistance is part of the admission application.

## Ph.D. Minor in Electrical Engineering

For a minor in Electrical Engineering, students must fulfill the M.S. degree depth requirement, complete at least 20 units of lecture course work at the 200-level or higher in Electrical Engineering courses (of which 15 units must be letter-graded), and have the Application for Ph.D. Minor approved by the EE department and the major department. A grade point average of at least 3.35 on these courses is required.

*Emeriti: (Professors)* Clayton W. Bates, Richard Bube, John Cioffi\*, Donald C. Cox, Von R. Eshleman, Michael J. Flynn\*, James F. Gibbons\*, Joseph W. Goodman, Robert M. Gray, Stephen E. Harris, Martin E. Hellman, Umran S. Inan\*, Thomas Kailath\*, Gordon S. Kino, Gregory T.A. Kovacs\*, Marc Levoy\*, Albert Macovski\*, Malcolm M. McWhorter, James D. Meindl, Teresa Meng, Richard H. Pantell, R. Fabian W. Pease, Leonard Tyler, Robert L. White, Bernard Widrow, Bruce A. Wooley, Yoshihisa Yamamoto; *(Associate Professor)* Bruce B. Lusignan; *(Professors, Research)* Donald L. Carpenter, Antony Fraser-Smith\*, C. Robert Helms, Leonid Kazovsky\*, Ingolf Lindau\*, David Luckham, Yoshio Nishi\*, Arogyaswami J. Paulraj, Calvin F. Quate (\*Recalled to active duty)

*Chair:* Abbas El Gamal (through December 2017); Stephen Boyd (effective January 2018)

*Associate Chairs:* Robert W. Dutton (*Undergraduate Education*), Olav Solgaard (*Graduate Education*), Howard Zebker (*Admissions*)

*Academic Affairs Committee Chair:* Joseph M. Kahn

*Professors:* Nicholas Bambos, Kwabena Boahen, Dan Boneh, Stephen P. Boyd, Robert W. Dutton, Abbas El Gamal, Shanhui Fan, Hector Garcia-Molina, Bernd Girod, Andrea G. Goldsmith, Patrick Hanrahan, James S. Harris, John L. Hennessy, Lambertus Hesselink, Mark A. Horowitz, Roger T. Howe, Joseph M. Kahn, Christoforos E. Kozyrakis, Sanjay Lall, Thomas H. Lee, Nick McKeown, David A. B. Miller, Subhasish Mitra, Andrea Montanari, Boris Murmann, Dwight G. Nishimura, Oyekunle Olukotun, Brad G. Osgood, John M. Pauly, James D. Plummer, Ada Poon, Balaji Prabhakar, Mendel Rosenblum, Krishna Saraswat, Krishna V. Shenoy, Hyongsok Tom Soh, Olav Solgaard, Fouad A. Tobagi, David Tse, Benjamin Van Roy, Jelena Vuckovic, Shan X. Wang, Tsachy Weissman, Jennifer Widom, H. S. Philip Wong, S. Simon Wong, Howard Zebker

*Associate Professors:* Audrey Bowden, Dawson Engler, John T. Gill III, Sachin Katti, Philip Levis, Eric Pop

*Assistant Professors:* Amin Arbabian, John Duchi, Jonathan Fan, Ayfer Ozgur Aydin, Juan Rivas, Gordon Wetzstein, Mary Wootters

*Professors (Research):* William J. Dally, Butrus Khuri-Yakub, Piero Pianetta

*Courtesy Professors:* Stacey Bent, Kim Butts-Pauly, Emmanuel Candes, Amir Dembo, Utkan Demirci, David L. Dill, Per Enge, Gary Glover, Peter Glynn, Leonidas Guibas, Monica S. Lam, Craig Levin, David Liang, Michael McConnell, John C. Mitchell, Sandy Napel, John Ousterhout, Daniel Palanker, Norbert Pelc, Julius Smith, Dan Spielman, Brian Wandell, Yinyu Ye

*Courtesy Associate Professors:* Mohsen Bayati, Sigrid Close, Brian Hargreaves, Ramesh Johari, Jin Hyung Lee, Amin Saberi

*Courtesy Assistant Professors:* Adam de la Zerda, Surya Ganguli, Paul Nuyujukian, Marco Pavone, Ram Rajagopal, Debbie Senesky, Kuang Xu, James Zou

*Lecturers:* Dennis Allison, Andrea Di Blas, Abbas Emami-Naeini, Trevor Feagin, Leslie Field, J. Andrew Freeman, Fred Gibbons, My T. Le, Roger Melen, Dante Muratore, Reza Nasiri, David Obershaw, Dan O'Neill, Christopher Rowen, Jatinder Singh, James Weaver

*Adjunct Professors:* Ahmad Bahai, Rick Bahr, Fred M. Gibbons, Dimitry Gorinevsky, Bob S. Hu, Theodore Kamins, Fred Kish, David Leeson, Fernando Mujica, Guru Parulkar, Stephen Ryu, Ronald Schafer, Ashok Srivastava, David Sussillo, John Wenstrand

*Visiting Associate Professors:* Chan-Byoung Chae, Hyuk-Jun Lee, Van Tam Nguyen, Jin Hong Park, Changho Suh, Shobha Vasudevan

# INSTITUTE FOR COMPUTATIONAL AND MATHEMATICAL ENGINEERING

Courses offered by the Institute for Computational and Mathematical Engineering are listed under the subject code CME on the (<http://explorecourses.stanford.edu/search;jsessionid=14DE1634FEFCBE32542A001C07860506?view=catalog&catalog=&page=0&q=CME&filter-catalognumber-CME=on&filter-coursestatus-Active=on>) *Stanford Bulletin's* ExploreCourses web site.

ICME is a degree granting (M.S./Ph.D.) interdisciplinary institute at the intersection of mathematics, computing, engineering and applied sciences. ICME was founded in 2004, building upon the Scientific Computing and Computational Mathematics Program (est. 1989).

At ICME, we design state-of-the-art mathematical and computational models, methods, and algorithms for engineering and science applications. The program collaborates closely with engineers and scientists in academia and industry to develop improved computational approaches and advance disciplinary fields. In particular, it leverages Stanford's strength in engineering applications in the physical, biological, mathematical, and information sciences, and has established connections with nearly 20 departments across five schools at Stanford.

The program identifies research areas that would benefit from a multidisciplinary approach in which computational mathematics plays a role. This multidisciplinary intellectual environment is a core strength of ICME, with interaction among students and faculty with diverse backgrounds and expertise. Students and faculty are active in many research areas: aerodynamics and space applications, fluid dynamics, protein folding, data science including machine learning and recommender systems, ocean dynamics, climate modeling, reservoir engineering, computer graphics, financial mathematics, and many more.

The program trains students and scholars from across Stanford in mathematical modeling, scientific computing, and advanced computational algorithms at the undergraduate and graduate levels. Courses typically provide strong theoretical foundations for the solution of real world problems and numerical computations to facilitate application of mathematical techniques and theories. Training offered includes matrix computations, computational probability and combinatorial optimization, optimization, stochastics, numerical solution of partial differential equations, parallel computer algorithms, and new computing paradigms, amongst others.

ICME offers service courses for undergraduates and graduate students to fulfill departmental requirements, core courses for master's and doctoral students in Computational and Mathematical Engineering, and specialized electives in various application areas.

The ICME master's program offers both specialized and general tracks. Currently, the program is offering specialized tracks in Computational Geosciences, Data Science, Imaging Science, and Mathematical and Computational Finance.

## Graduate Programs in Computational and Mathematical Engineering

University regulations governing the M.S. and Ph.D. degrees are described in the "Graduate Degrees (p. 50)" section of this bulletin.

## Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through coursework in mathematical modeling, scientific computing, advanced computational algorithms, and a set of courses from a specific area of application or field. The latter includes computational geoscience, data sciences, imaging sciences, mathematical and computational finance and other interdisciplinary areas that combine advanced mathematics with the classical physical sciences or with challenging interdisciplinary problems emerging within disciplines such as business, biology, medicine, and information.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Computational and Mathematical Engineering and related fields.

## Master of Science in Computational and Mathematical Engineering

The University's basic requirements for the M.S. degree are discussed in the "Graduate Degrees" (p. 50) section of this bulletin. The following are specific departmental requirements.

The M.S. degree in Computational and Mathematical Engineering is intended as a terminal professional degree and does not lead to the Ph.D. program. Students interested in the doctoral program should apply directly to the Ph.D. program. Master's students who have maintained a minimum grade point average (GPA) of 3.5 are eligible to take the Ph.D. qualifying exam; those who pass this examination and secure a research adviser (three quarters of continuous documented research) may continue into the Ph.D. program upon acceptance by the institute.

### Admission

Prospective applicants should consult the Graduate Admissions (<https://studentaffairs.stanford.edu/gradadmissions>) and the ICME admissions web pages (<https://icme.stanford.edu/admissions>) for complete information on admission requirements and deadlines.

### Prerequisites

Fundamental courses in mathematics and computing may be needed as prerequisites for other courses in the program. Check the prerequisites of each required course. Recommended preparatory courses include advanced undergraduate level courses in linear algebra, probabilities, introductory courses in PDEs, stochastics, and numerical methods and proficiency in programming.

Applications to the M.S. program and all supporting documents must be submitted and received online by January 9, 2018, the deadline published on ICME admissions web page (<https://icme.stanford.edu/admissions/deadlines>).

### Coterminal Master's Program

Stanford undergraduates who want to apply for the coterminal master's degree must submit their application no later than eight weeks before the start of the proposed admit quarter. The application must give evidence that the student possesses a potential for strong academic performance at the graduate level. Graduate Record Examination (GRE) General Test scores are required for application review. A student is eligible to apply for admission once the following conditions have been met:

- completion of six non-Summer quarters at Stanford or two non-Summer quarters at Stanford for transfer students



- completion of 120 units toward graduation (UTG) as shown on the undergraduate transcript, including transfer, Advanced Placement exam, and other external test credit
- declaration of an undergraduate major

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken two quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

### Requirements for the Master of Science in Computational and Mathematical Engineering

The master's program consists of 45 units of course work taken at Stanford. No thesis is required; however, students may become involved in research projects during the master's program, particularly to explore an interest in continuing to the doctoral program. Although there is no specific background requirement, significant exposure to mathematics and engineering course work is necessary for successful completion of the program.

There are five tracks in the master's program:

- General CME
- Computational Geosciences
- Data Science
- Imaging Science
- Mathematical and Computational Finance

### General CME Track

This track is designed for students interested in studying and developing computational tools in those aspects of applied mathematics central to modeling in the physical and engineering sciences. The curriculum consists of core computational and mathematical engineering courses and programming course work, extensive breadth and depth electives, and seminars. Core courses provide instruction in mathematical and computational tools applicable to a wide range of scientific, industrial and engineering disciplines and augment breadth and depth electives of one's choosing. Programming requirement ensures proficiency in scientific computing and professional computing skills. Seminars highlight emerging research in engineering and sciences.

### Requirements

A candidate is required to complete a program of 45 units of courses numbered 200 or above. Courses below 200 level require special approval

from the program office. At least 36 of these must be graded units, passed with a grade point average (GPA) of 3.0 (B) or better. Master's students interested in continuing to the doctoral program must maintain a 3.5 or better grade point average in the program.

### Requirement 1: Foundational (12 units)

Students must demonstrate foundational knowledge in the field by completing four of the six core courses. Courses in this area must be taken for letter grades. Deviations from the core curriculum must be justified in writing and approved by the student's ICME adviser and the chair of the ICME curriculum committee. Courses that are waived may not be counted towards the master's degree.

		Units
CME 302	Numerical Linear Algebra	3
CME 303	Partial Differential Equations of Applied Mathematics	3
CME 305	Discrete Mathematics and Algorithms	3
CME 306	Numerical Solution of Partial Differential Equations	3
CME 307	Optimization	3
CME 308 or CME 298	Stochastic Methods in Engineering Basic Probability and Stochastic Processes with Engineering Applications	3

### Requirement 2: Programming (3 units)

Three units of programming course work demonstrating programming proficiency. All graduate students in the program are required to complete this programming course for letter grade. Programming proficiency at the level of CME 211 is a hard prerequisite; CME 211 can be applied towards elective requirement.

		Units
CME 211	Software Development for Scientists and Engineers (*can only be counted as an elective)	3
CME 212	Advanced Software Development for Scientists and Engineers	3

### Requirement 3: Breadth Electives (18 units)

18 units of general electives to demonstrate breadth of knowledge in technical area. The elective course list represents automatically accepted electives within the program. However, electives are not limited to the list below, and the list is expanded on a continuing basis. The elective part of the ICME program is meant to be broad and inclusive of relevant courses of comparable rigor to ICME courses. It is recommended that the selected courses include offerings from (at least) two engineering departments, in addition to CME course work. Courses outside this list can be accepted as electives subject to approval by the student's ICME adviser.

		Units
Aeronautics and Astronautics		
AA 214B	Numerical Methods for Compressible Flows	3
AA 214C	Numerical Computation of Viscous Flow	3
AA 218	Introduction to Symmetry Analysis	3
Computational and Mathematical Engineering		
CME 215A/215B	Advanced Computational Fluid Dynamics	3
CME 263	Introduction to Linear Dynamical Systems	3
CME 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 342	Parallel Methods in Numerical Analysis	3
CME 364A	Convex Optimization I	3
CME 371	Computational Biology in Four Dimensions	3
Computer Science		

CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 255	Introduction to Cryptography	3
CS 261	Optimization and Algorithmic Paradigms	3
CS 340		3-4
CS 348A	Computer Graphics: Geometric Modeling & Processing	3-4
Electrical Engineering		
EE 223	Applied Quantum Mechanics II	3
EE 256	Numerical Electromagnetics	3
EE 376A	Information Theory	3
Management Science and Engineering		
MS&E 220	Probabilistic Analysis	3-4
MS&E 221	Stochastic Modeling	3
MS&E 223	Simulation	3
MS&E 238	Leading Trends in Information Technology	3
MS&E 251	Introduction to Stochastic Control with Applications	3
MS&E 310	Linear Programming	3
MS&E 316	Discrete Mathematics and Algorithms	3
MS&E 321	Stochastic Systems	3
MS&E 322	Stochastic Calculus and Control	3
Mathematics		
MATH 136	Stochastic Processes	3
MATH 171	Fundamental Concepts of Analysis	3
MATH 221B	Mathematical Methods of Imaging	3
MATH 236	Introduction to Stochastic Differential Equations	3
MATH 238	Mathematical Finance	3
Mechanical Engineering		
ME 335A/335B/335C	Finite Element Analysis	3
ME 346B	Introduction to Molecular Simulations	3
ME 408	Spectral Methods in Computational Physics	3
ME 412	Engineering Functional Analysis and Finite Elements	3
ME 469	Computational Methods in Fluid Mechanics	3
ME 484	Computational Methods in Cardiovascular Bioengineering	3
Statistics		
STATS 208	Introduction to the Bootstrap	3
STATS 217	Introduction to Stochastic Processes I	3
STATS 219	Stochastic Processes	3
STATS 250	Mathematical Finance	3
STATS 305A	Introduction to Statistical Modeling	3
STATS 310A/310B/310C	Theory of Probability I	2-4
STATS 362	Topic: Monte Carlo	3
Other		
CEE 281	Mechanics and Finite Elements	3
CEE 362G	Imaging with Incomplete Information	3-4
ENGR 209A	Analysis and Control of Nonlinear Systems	3
ENERGY 274	Complex Analysis for Practical Engineering	3

**Requirement 4: Specialized Electives (9 units)**

Nine units of focused graduate application electives, approved by the ICME graduate adviser, in the areas of engineering, mathematics, physical, biological, information, and other quantitative sciences. These courses should be foundational depth courses relevant to the student's professional development and research interests.

**Requirement 5: Seminar (3 units)**

One unit of seminar must come from CME 500; two units are up to the student's choice of ICME graduate seminars or other approved seminars. Additional seminar units may not be counted towards the 45-unit requirement.

**Computational Geosciences Track**

The Computational Geosciences (CompGeo) track is designed for students interested in the skills and knowledge required to develop efficient and robust numerical solutions to Earth Science problems using high-performance computing. The CompGeo curriculum is based on four fundamental areas: modern programming methods for Science and Engineering, applied mathematics with an emphasis on numerical methods, algorithms and architectures for high-performance computing and computationally oriented Earth Sciences courses. Earth Sciences/ computational project courses give practice in applying methodologies and concepts. CompGeo students are required to complete general and focused application electives (Requirements 3 and 4) from the approved list of courses from the Computational Geosciences program. All other requirements remain the same as set forth above.

*Note:* Students interested in pursuing the ICME M.S. in the Computational Geosciences (CompGeo) track are encouraged to contact the Computational Geosciences Program Director before applying.

Students are required to take 45 units of course work, and research credits to earn a master's degree in Computational Geosciences track. The course work follows the requirements of the ICME M.S. degree as above with additional restrictions placed on the general and focused electives.

**Requirement 1: Foundational (12 units)**

Identical to the general CME master's track requirement .

**Requirement 2: Programming (3 units)**

3 units of programming course work demonstrating programming proficiency. All graduate students in the program are required to complete programming course for letter grade. Programming proficiency at the level of CME 211 is a hard prerequisite for CME 212; CME 211 can be applied towards elective requirement.

		Units
CME 211	Software Development for Scientists and Engineers (*can only be used as an elective)	3
CME 212	Advanced Software Development for Scientists and Engineers	3
CME 214	Software Design in Modern Fortran for Scientists and Engineers	3
GEOPHYS 257	Introduction to Computational Earth Sciences	2-4

**Requirement 3: Breadth Electives in Geosciences (18 units)**

18 units of general electives to demonstrate breadth of knowledge in technical area. Courses are currently offered but are not limited to the following specific areas of the School of Earth Sciences:

1. Reservoir Simulation
2. Geophysical Imaging
3. Tectonophysics/Geomechanics
4. Climate/Atmosphere/Ocean

## 5. Ecology/Geobiology.

The Earth Science courses, offered in EESS, ERE, GES, and Geophysics is selected based on the area of the student's interest and their research/thesis work, along with the advice and consent of the student's adviser. Students are encouraged to choose a range of courses in order to guarantee breadth of knowledge in Earth Sciences. A maximum of one non-computationally-oriented course can be counted towards the master's degree requirements. Following is a list of recommended courses (grouped by area) that can be taken to fulfill the Geosciences course requirement.

		Units
Environmental/Climate/Hydrogeology		
ESS 220	Physical Hydrogeology	4
ESS 221	Contaminant Hydrogeology and Reactive Transport	4
ESS 246B	Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation	3
CEE 262A	Hydrodynamics	3-4
CEE 262B	Transport and Mixing in Surface Water Flows	3-4
CEE 262C	Hydrodynamics and Sediment Transport Modeling	3
CEE 263A	Air Pollution Modeling	3-4
CEE 361	Turbulence Modeling for Environmental Fluid Mechanics	2-4
Geophysical Imaging		
EE 256	Numerical Electromagnetics	3
GEOPHYS 210	Basic Earth Imaging	2-3
GEOPHYS 211	Environmental Soundings Image Estimation	3
GEOPHYS 280	3-D Seismic Imaging	2-3
GEOPHYS 287	Earthquake Seismology	3-5
General Computational/Mathematical Geosciences		
CEE 362G	Imaging with Incomplete Information	3-4
CHEM 275	Advanced Physical Chemistry	3
CME 372	Applied Fourier Analysis and Elements of Modern Signal Processing	3
CME 321B	Mathematical Methods of Imaging	3
ESS 211	Fundamentals of Modeling	3-5
ENERGY 291	Optimization of Energy Systems	3-4
GS 240	Data science for geoscience	2-3
ME 335A	Finite Element Analysis	3
ME 346B	Introduction to Molecular Simulations	3
ME 361	Turbulence	3
ME 469B	Computational Methods in Fluid Mechanics	3
Reservoir Simulation/Fluid Flow		
ENERGY 223	Reservoir Simulation	3-4
ENERGY 224	Advanced Reservoir Simulation	3
Subsurface/Reservoir Characterization		
ENERGY 241	Seismic Reservoir Characterization	3-4
GEOPHYS 202	Reservoir Geomechanics	3
GEOPHYS 260	Rock Physics for Reservoir Characterization	3
Structural/Tectonophysics/Geomechanics		
CEE 292	Continuum Mechanics	3
CEE 294	Computational Poromechanics	3
GEOPHYS 220	Ice, Water, Fire	3-5
GEOPHYS 288A	Crustal Deformation	3-5
GEOPHYS 288B	Crustal Deformation	3-5
GEOPHYS 290	Tectonophysics	3

**Requirement 4: Practical Component (9 units)**

9 units of focused research in computational geosciences. Students are required to either complete a Research Project or an Internship as described below.

Internship and/or Research Project, enrolling in a course such as:

EARTH 400	Directed Research	3
EARTH 401	Curricular Practical Training	1

**Research Project**

Students who plan to apply to the Ph.D. program need to take 9 units of research. Students will work with the CompGeo program director to find an appropriate adviser and research topic and then enroll in EARTHSCI 400: Directed Research (or a similar SES research course). The successful outcome of a Research Project can be:

1. an oral presentation at an international meeting requiring an extended abstract
2. a publication submission in a peer reviewed journal.
3. a written report

**Internship**

As an alternative to the Research Project students have the option of an internship which is recommended for those students interested in a terminal degree. The individual student is responsible for securing and organizing the internship and is required to obtain a faculty adviser and submit a written report on the internship project. Credit for the internship will be obtained through EARTHSCI401: Curricular Practical Training (1 unit) and in this case only 8 units of research are required.

**Requirement 5: Seminar (3 units)**

3 units of ICME graduate seminars or other approved seminars. Additional seminar units may not be counted towards the 45-unit requirement. One of the required seminars for CompGeo must be a seminar course chosen in concert with the student's academic adviser among the seminars offered by the the School of Earth, Energy and Environmental Sciences.

**Data Science Track**

The Data Science track develops strong mathematical, statistical, computational and programming skills through the foundational and programming requirements. In addition, it provides a fundamental data science education through general and focused electives requirement from courses in data sciences and related areas. Course choices are limited to predefined courses from the data sciences and related courses group. Programming requirement (requirement 2) is extended to 6 units and includes course work in advanced scientific programming and high performance computing. The final requirement is a practical component (requirement 5) for 6 units to be completed through capstone project, data science clinic, or other courses that have strong hands-on or practical component such as statistical consulting.

**Requirement 1: Foundational (12 units)**

Students must demonstrate foundational knowledge in the field by completing the following core courses. Courses in this area must be taken for letter grades. Deviations from the core curriculum must be justified in writing and approved by the student's ICME adviser and the chair of the ICME curriculum committee. Courses that are waived may not be counted towards the master's degree.

		Units
CME 302	Numerical Linear Algebra	3
CME 305	Discrete Mathematics and Algorithms	3
CME 307	Optimization	3
CME 308	Stochastic Methods in Engineering	3

or CME 309 Randomized Algorithms and Probabilistic Analysis

### Requirement 2: Programming (6 units)

To ensure that students have a strong foundation in programming, 3 units of advanced scientific programming for letter grade at the level of CME 212 and three units of parallel computing for letter grades are required. Programming proficiency at the level of CME 211 is a hard prerequisite for CME 212; CME 211 can be applied towards elective requirement.

Advanced Scientific Programming; take 3 units

CME 211	Software Development for Scientists and Engineers (*can only be used as an elective)	3
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CME 212	Advanced Software Development for Scientists and Engineers	3
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Parallel/HPC Computing; take 3 units

CME 213	Introduction to parallel computing using MPI, openMP, and CUDA	3
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CME 323	Distributed Algorithms and Optimization	3
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CME 342	Parallel Methods in Numerical Analysis	3
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CS 149	Parallel Computing	3-4
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CS 315A	Parallel Computer Architecture and Programming	3
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CS 316	Advanced Multi-Core Systems	3
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### Requirement 3: Data Science electives (12 units)

Data Science electives should demonstrate breadth of knowledge in the technical area. The elective course list is defined. Courses outside this list can be accepted as electives subject to approval. Petitions for approval should be submitted to student services.

STATS 200	Introduction to Statistical Inference	3
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STATS 203	Introduction to Regression Models and Analysis of Variance	3
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or STATS 305A	Introduction to Statistical Modeling	
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STATS 315A	Modern Applied Statistics: Learning	3
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STATS 315B	Modern Applied Statistics: Data Mining	3
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### Requirement 4: Specialized electives (9 units)

Choose three courses in specialized areas from the following list. Courses outside this list can be accepted as electives subject to approval. Petitions for approval should be submitted to student services.

BIOE 214	Representations and Algorithms for Computational Molecular Biology	3-4
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BIOMEDIN 215	Data Driven Medicine	3
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BIOS 221	Modern Statistics for Modern Biology	3
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CS 224W	Analysis of Networks	3-4
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CS 229	Machine Learning	3-4
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CS 231N	Convolutional Neural Networks for Visual Recognition	3-4
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CS 246	Mining Massive Data Sets	3-4
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ENERGY 240	Data science for geoscience	3
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CS 448	Topics in Computer Graphics	3-4
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OIT 367	Business Intelligence from Big Data	3
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PSYCH 204A	Human Neuroimaging Methods	3
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STATS 290	Computing for Data Science	3
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STATS 366	Modern Statistics for Modern Biology	3
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### Requirement 5: Practical component (6 units)

Students are required to take 6 units of practical component that may include any combination of:

- Master's Research( CME 291): A capstone project, supervised by a faculty member and approved by the steering committee; should be taken for letter grade only. The capstone project should be computational in nature. Students should submit a one-page proposal, supported by the faculty member, to ICME student services for approval at least one quarter before.
- Project labs offered by Stanford Data Lab: ENGR 150 Data Challenge Lab, ENGR 350 Data Impact Lab. (Limited enrollment; application required.)
- Other courses that have a strong hands-on and practical component, such as STATS 390 Consulting Workshop up to 1 unit.

## Imaging Science Track

The Imaging Science track is designed for students interested in the skills and knowledge required to develop efficient and robust computational tools for imaging science. The curriculum is based on four fundamental areas: mathematical models and analysis for imaging sciences and inverse problems, tools and techniques from modern imaging sciences from medicine, biology, physics/chemistry, and earth science, algorithms in numerical methods and scientific computing and high performance computing skills and architecture oriented towards imaging sciences.

The course work follows the requirements of the general master's degree in the core course requirement. The general and focused elective requirements (requirements 3 and 4 below) are limited to approved courses listed below. Programming requirement (requirement 2) is extended to 6 units and includes course work in advanced scientific programming and high performance computing.

### Requirement 1: Foundational (12 units)

Identical to the general ICME master's program; see above.

### Requirement 2: Programming (6 units)

To ensure that students have a strong foundation in programming, 3 units of advanced scientific programming for letter grade at the level of CME 212 and three units of parallel computing for letter grades are required. Programming proficiency at the level of CME 211 is a hard prerequisite for CME 212; CME 211 can be applied towards elective requirement.

	Units	Units
CME 211	Software Development for Scientists and Engineers (*can only be used as an elective)	3
Advanced Scientific Programming; take 3 units		
CME 212	Advanced Software Development for Scientists and Engineers	3
CME 214	Software Design in Modern Fortran for Scientists and Engineers	3
Parallel /HPC Computing; take 3 units		
CME 213	Introduction to parallel computing using MPI, openMP, and CUDA	3
CME 323	Distributed Algorithms and Optimization	3
CME 342	Parallel Methods in Numerical Analysis	3
GEOPHYS 257	Introduction to Computational Earth Sciences	2-4

### Requirement 3: Imaging Sciences electives (18 units)

Imaging Sciences electives should demonstrate breadth of knowledge in the technical area. The elective course list is defined. Courses outside

this list can be accepted as electives subject to approval. Petitions for approval should be submitted to student services.

Take 18 units of the following:

		Units
APPPHYS 232	Advanced Imaging Lab in Biophysics	4
BIOE 220	Introduction to Imaging and Image-based Human Anatomy	3
CEE 362G	Imaging with Incomplete Information	3-4
CME 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 371	Computational Biology in Four Dimensions	3
CS 231N	Convolutional Neural Networks for Visual Recognition	3-4
EE 236A	Modern Optics	3
EE 262	Two-Dimensional Imaging	3
EE 355	Imaging Radar and Applications	3
EE 367	Computational Imaging and Display	3
EE 368	Digital Image Processing	3
EE 369A	Medical Imaging Systems I	3
EE 369B	Medical Imaging Systems II	3
EE 369C	Medical Image Reconstruction	3
GEOPHYS 210	Basic Earth Imaging	2-3
GEOPHYS 211	Environmental Soundings Image Estimation	3
GEOPHYS 280	3-D Seismic Imaging	2-3
MATH 221B	Mathematical Methods of Imaging	3
MATH 262	Applied Fourier Analysis and Elements of Modern Signal Processing	3
PSYCH 204A	Human Neuroimaging Methods	3

#### Requirement 4: Specialized electives (6 units)

6 units of focused graduate application electives, approved by the ICME graduate adviser, in the areas of engineering, mathematics, physical, biological, information, and other quantitative sciences. These courses should be foundational depth courses relevant to the student's professional development and research interests.

#### Requirement 5: Seminar (3 units)

One unit of seminar must come from CME 500; two units are up to the student's choice of ICME graduate seminars or other approved seminars. Additional seminar units may not be counted towards the 45-unit requirement.

## Mathematical and Computational Finance Track

The Mathematical & Computational Finance (MCF) track is an interdisciplinary program that provides education in applied and computational mathematics, statistics, and financial applications for individuals with strong mathematical skills. Upon successful completion of the MCF track in the ICME master's program, students will be prepared to assume positions in the financial industry as data and information scientists, quantitative strategists, risk managers, regulators, financial technologists, or to continue on to their Ph.D. in ICME, MS&E, Mathematics, Statistics, Finance, and other disciplines.

The Institute for Computational and Mathematical Engineering, in close cooperation with Mathematics, Management Science and Engineering and Statistics provides many of the basic courses. All 45 units must be taken for letter grade only.

Note: This new track in the ICME master's program supersedes, beginning in the Autumn Quarter of 2014, the interdisciplinary master's program (IDP) in Financial Mathematics in the School of Humanities & Sciences.

#### Requirement 1: Foundational (9 units)

Students must demonstrate foundational knowledge in the field by completing the following core courses. Courses in this area must be taken for letter grades. Deviations from the core curriculum must be justified in writing and approved by the student's ICME adviser and the chair of the ICME curriculum committee. Courses that are waived may not be counted towards the master's degree.

		Units
CME 302	Numerical Linear Algebra	3
or CME 303	Partial Differential Equations of Applied Mathematics	
or CME 305	Discrete Mathematics and Algorithms	
CME 307	Optimization	3
or CME 364A	Convex Optimization I	
CME 308	Stochastic Methods in Engineering	3
or MATH 236	Introduction to Stochastic Differential Equations	

#### Requirement 2: Programming (9 units)

To ensure that students have a strong foundation in programming, six units of advanced programming for letter grade at the level of CME 212 and 3 units of parallel computing for letter grade are required. Programming proficiency at the level of CME 211 is a hard prerequisite for CME 212.

		Units
Advanced Scientific Programming; take 3-6 units		
CME 211	Software Development for Scientists and Engineers	3
CME 212	Advanced Software Development for Scientists and Engineers	3
CME 214	Software Design in Modern Fortran for Scientists and Engineers	3
Parallel/HPC Computing; take 3 units		
CME 213	Introduction to parallel computing using MPI, openMP, and CUDA	3
CME 323	Distributed Algorithms and Optimization	3
CME 342	Parallel Methods in Numerical Analysis	3
CS 149	Parallel Computing	3-4
CS 315A	Parallel Computer Architecture and Programming	3
CS 316	Advanced Multi-Core Systems	3

#### Requirement 3: Finance electives (9 units)

Choose three courses from the following list; all nine units must be taken for letter grades.

		Units
Financial Mathematics		
MATH 238	Mathematical Finance	3
Financial Markets		
FINANCE 320	Debt Markets	3
FINANCE 620	Financial Markets I	3
STATS 244	Quantitative Trading: Algorithms, Data, and Optimization	2-4
Other		
CS 251	Bitcoin and Crypto Currencies	3
MS&E 347	Credit Risk: Modeling and Management	3
MS&E 348	Optimization of Uncertainty and Applications in Finance	3

MS&E 349	Financial Statistics	3
STATS 240	Statistical Methods in Finance	3-4
STATS 241	Data-driven Financial and Risk Econometrics	3-4
STATS 244P	Quantitative Trading: Algorithms, Data and Optimization	3

#### Requirement 4: Data Science electives (9 units)

Data Science electives should demonstrate breadth of knowledge in the technical area; all nine units should be taken for letter grade. The elective course list is defined below. Courses outside this list can be accepted as electives subject to approval prior to taking the course. Petitions for approval should be submitted to student services.

		Units
Learning		
CS 229	Machine Learning	3-4
STATS 315A	Modern Applied Statistics: Learning	2-3
Mining		
STATS 315B	Modern Applied Statistics: Data Mining	2-3
CS 246	Mining Massive Data Sets	3-4
Other		
CS 224N	Natural Language Processing with Deep Learning	3-4
STATS 240	Statistical Methods in Finance	3-4
STATS 244	Quantitative Trading: Algorithms, Data, and Optimization	3-4
STATS 241	Data-driven Financial and Risk Econometrics	3-4

#### Requirement 5: Practical component (9 units)

Students are required to take nine units of practical and project courses for letter grade ONLY from the courses listed below.

		Units
CME 291	Master's Research	1-6
MS&E 246	Financial Risk Analytics	3
MS&E 347	Credit Risk: Modeling and Management	3
MS&E 348	Optimization of Uncertainty and Applications in Finance	3
MS&E 349	Financial Statistics	3
MS&E 447	Systemic and Market Risk : Notes on Recent History, Practice, and Policy	3
MS&E 448	Big Financial Data and Algorithmic Trading	3

## Doctor of Philosophy in Computational and Mathematical Engineering

The University's basic requirements for the Ph.D. degree are outlined in the "Graduate Degrees" (p. 50) section of this bulletin.

Applications to the Ph.D. program and all required supporting documents must be received by December 5, 2017. See Graduate Admissions (<http://gradadmissions.stanford.edu>) for information and application materials. See the institute's admissions site (<https://icme.stanford.edu/admissions>) for additional details. Applicants should take the Graduate Record Examination by October of the academic year in which the application is submitted.

Admission to the Ph.D. program does not imply that the student is a candidate for the Ph.D. degree. Advancement to candidacy requires superior academic achievement and passing the qualifying examination.

### Requirements

1. Complete a minimum of 135 units of residency at Stanford, including:

- a. 45 units from the master's program requirements; all six core courses have to be completed for letter grade.
  - b. 27 units of electives for letter grade in an area planned with the student's Ph.D. adviser; 12 of these units should come from ICME specialized electives with significant computational content such as the CME 320-380 series. The focused and specialized elective component of the ICME program is meant to be broad and inclusive of relevant courses of comparable rigor to ICME courses. The elective course list following represents automatically accepted electives within the program. However, electives are not limited to the list below, and the list is expanded on a continuing basis; courses outside the list can be accepted as electives subject to approval by the student's ICME adviser. Research, directed study, and seminar units are excluded.
  - c. 3 units of programming elective demonstrating programming proficiency. Students are required to complete programming course at the level of CME 213 Introduction to parallel computing using MPI, openMP, and CUDA or higher for letter grade.
  - d. 60 units of thesis research
2. Maintain a grade point average (GPA) of 3.5.
  3. Pass the ICME qualifying examination before the beginning of the second year.
  4. Declare candidacy by the end of the second year
  5. File dissertation reading committee form by the end of third year
  6. Complete an approved program of original research.
  7. Complete a written dissertation based on research.
  8. Pass the oral examination that is a defense of the dissertation research.

### Specialized Elective List

See requirement 1b above.

		Units
CEE 362G	Imaging with Incomplete Information	3-4
CME 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3
CME 364B	Convex Optimization II	3
CME 371	Computational Biology in Four Dimensions	3
CS 348A	Computer Graphics: Geometric Modeling & Processing	3-4
EE 368	Digital Image Processing	3
MATH 205A	Real Analysis	3
MATH 215A	Algebraic Topology	3
MATH 221A	Mathematical Methods of Imaging	3
MATH 221B	Mathematical Methods of Imaging	3
MATH 227	Partial Differential Equations and Diffusion Processes	3
MATH 236	Introduction to Stochastic Differential Equations	3
MATH 238	Mathematical Finance	3
ME 335A/335B/335C	Finite Element Analysis	3
ME 346B	Introduction to Molecular Simulations	3
ME 351A/351B	Fluid Mechanics	3
ME 361	Turbulence	3
ME 408	Spectral Methods in Computational Physics	3
ME 412	Engineering Functional Analysis and Finite Elements	3
ME 469	Computational Methods in Fluid Mechanics	3
MS&E 319	Approximation Algorithms	3
MS&E 336	Platform and Marketplace Design	3
STATS 305A	Introduction to Statistical Modeling	3

STATS 305B	Methods for Applied Statistics I: Exponential Families in Theory and Practice	3
STATS 305C	Methods for Applied Statistics II: Applied Multivariate Statistics	2-3
STATS 318	Modern Markov Chains	3
STATS 366	Modern Statistics for Modern Biology	3

*Note:* Students who need to complete 135 units at Stanford, should necessarily complete the CME master's requirements (p. 303). All courses listed under "Requirement 2" under the "Master of Science in Computational and Mathematical Engineering (p. 303)" section can be used for fulfilling the general elective requirement.

## Financial Assistance

The department awards a limited number of fellowships, course assistantships, and research assistantships to incoming graduate students. Applying for such assistance is part of submitting the application for admission to the program. Students are appointed for half-time assistantships which provide a tuition scholarship at the 8, 9, 10 unit rate during the academic year and a monthly stipend. Half-time appointments generally require 20 hours of work per week. Most course assistantships and research assistantships are awarded to students in the doctoral program in ICME. If the number of Ph.D. students is not sufficient to staff all course and research assistantship positions available, these positions may be open to master's students. However, master's students are not guaranteed financial assistance.

## Ph.D. Minor in Computational and Mathematical Engineering

For a minor in Computational and Mathematical Engineering (CME), a doctoral candidate must complete 21 units of approved graduate level courses. These should include three ICME core courses and three ICME graduate electives at the 300 level or above and a programming course at the level of CME212 or higher. All courses must be taken for a letter grade and passed with a grade of 'B' or better. Elective courses cannot be cross listed with the primary department. Minor programs should be developed in close discussion between the student and the student's primary Ph.D. adviser.

*Emeriti: (Professors)* Gunnar Carlsson (Mathematics), *(Professors, Research)* Walter Murray (Management Science and Engineering), Arogyaswami Paulraj (Electrical Engineering), Michael Saunders (Management Science and Engineering)

*Director:* Margot Gerritsen (Energy Resources Engineering)

*Co-Director:* Gianluca Iaccarino (Mechanical Engineering)

*Professors:* Juan Alonso (Aeronautics and Astronautics), Biondo Biondi (Geophysics), Stephen Boyd (Electrical Engineering), Carlos D. Bustamante (Biomedical Data Science, Genetics), Emanuel Candes (Mathematics, Statistics), Persi Diaconis (Mathematics, Statistics), David Donoho (Statistics), Charbel Farhat (Aeronautics and Astronautics, Mechanical Engineering), Ronald Fedkiw (Computer Science), Peter Glynn (Management Science and Engineering), Ashish Goel (Management Science and Engineering), Leonidas Guibas (Computer Science), Pat Hanrahan (Computer Science, Electrical Engineering), Jerry Harris (Geophysics), Trevor Hastie (Mathematics, Statistics), Doug James (Computer Science), Peter Kitanidis (Civil and Environmental Engineering), Tze Leung Lai (Statistics), Sanjiva Lele (Mechanical Engineering, Aeronautics and Astronautics), Parviz Moin (Mechanical Engineering), Brad Osgood (Electrical Engineering), Vijay Pande (Chemistry), George Papanicolaou (Mathematics), Peter Pinsky (Mechanical Engineering), Lenya Ryzhik (Mathematics), Eric Shaqfeh (Chemical Engineering, Mechanical Engineering), Jonathan Taylor (Statistics), Hamdi Tchepeli (Energy Resources Engineering), Benjamin

Van Roy (Management Science and Engineering, Electrical Engineering), Andras Vasy (Mathematics), Lawrence Wein (Graduate School of Business), Wing Wong (Statistics), Yinyu Ye (Management Science and Engineering), Lexing Ying (Mathematics, Institute for Computational and Mathematical Engineering)

*Associate Professors:* Eric Darve (Mechanical Engineering), Ron Dror (CS, Institute for Computational and Mathematical Engineering), Eric Dunham (Geophysics), Oliver Fringer (Civil and Environmental Engineering), Margot Gerritsen (Energy Resources Engineering), Kay Giesecke (Management Science and Engineering), Gianluca Iaccarino (Mechanical Engineering), Ramesh Johari (Management Science and Engineering), Adrian Lew (Mechanical Engineering), Alison Marsden (Pediatrics, Bioengineering), Amin Saberi (Management Science and Engineering), Andrew Spakowitz (Chemical Engineering)

*Assistant Professors:* Ali Mani (Mechanical Engineering), Marco Pavone (Aeronautics and Astronautics), Bala Rajaratnam (Statistics, Environmental and Earth System Sciences), Aaron Daniel Sidford (Management Science and Engineering), Jenny Suckale (Geophysics), Johan Ugander (Management Science and Engineering)

*Professors (Research):* Antony Jameson (Aeronautics and Astronautics)

*Senior Lecturer:* Vadim Khayms

*Lecturer:* Hung Le

*Adjunct Professor:* Reza Bosagh-Zadeh, Hadley Wickham

*Academic Staff:* William Behrman, Kapil Jain

Courses of interest to students in the department may include:

		Units
CEE 262A	Hydrodynamics	3-4
CEE 262B	Transport and Mixing in Surface Water Flows	3-4
CEE 263A	Air Pollution Modeling	3-4
CEE 263B	Numerical Weather Prediction	3-4
CEE 294	Computational Poromechanics	3
CEE 362	Numerical Modeling of Subsurface Processes	3-4
CEE 362G	Imaging with Incomplete Information	3-4
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 232	Digital Image Processing	3
CS 261	Optimization and Algorithmic Paradigms	3
CS 268	Geometric Algorithms	3
CS 348A	Computer Graphics: Geometric Modeling & Processing	3-4
EE 256	Numerical Electromagnetics	3
EE 368	Digital Image Processing	3
ENERGY 223	Reservoir Simulation	3-4
ENERGY 224	Advanced Reservoir Simulation	3
ENERGY 241	Seismic Reservoir Characterization	3-4
ENERGY 281	Applied Mathematics in Reservoir Engineering	3
ENERGY 284	Optimization and Inverse Modeling	3
GEOPHYS 190	Near-Surface Geophysics	3
GEOPHYS 202	Reservoir Geomechanics	3
GEOPHYS 210	Basic Earth Imaging	2-3
GEOPHYS 211	Environmental Soundings Image Estimation	3

GEOPHYS 240	Borehole Seismic Modeling and Imaging	3
GEOPHYS 257	Introduction to Computational Earth Sciences	2-4
GEOPHYS 260	Rock Physics for Reservoir Characterization	3
GEOPHYS 262	Rock Physics	3
GEOPHYS 280	3-D Seismic Imaging	2-3
GEOPHYS 281	Geophysical Inverse Problems	3
GEOPHYS 287	Earthquake Seismology	3-5
GEOPHYS 288A	Crustal Deformation	3-5
GEOPHYS 288B	Crustal Deformation	3-5
GEOPHYS 290	Tectonophysics	3
MATH 136	Stochastic Processes	3
MATH 205A	Real Analysis	3
MATH 215A	Algebraic Topology	3
MATH 236	Introduction to Stochastic Differential Equations	3
MATH 238	Mathematical Finance	3
ME 335A	Finite Element Analysis	3
ME 335B	Finite Element Analysis	3
ME 335C	Finite Element Analysis	3
ME 346B	Introduction to Molecular Simulations	3
ME 351A	Fluid Mechanics	3
ME 351B	Fluid Mechanics	3
ME 361	Turbulence	3
ME 408	Spectral Methods in Computational Physics	3
ME 469	Computational Methods in Fluid Mechanics	3
STATS 219	Stochastic Processes	3
STATS 250	Mathematical Finance	3
STATS 310A	Theory of Probability I	2-4
STATS 310B	Theory of Probability II	2-3
STATS 310C	Theory of Probability III	2-4
STATS 318	Modern Markov Chains	3
ENERGY 274	Complex Analysis for Practical Engineering	3



# MANAGEMENT SCIENCE AND ENGINEERING

Courses offered by the Department of Management Science and Engineering are listed under the subject code MS&E on the (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=MS%26E&filter=departmentcode-MS%26E=on&filter-coursestatus-Active=on&filter-term-Autumn=on>) *Stanford Bulletin's* ExploreCourses web site.

The Department of Management Science and Engineering leads at the interface of engineering, business, and public policy. The department's mission is, through education and research, to advance the design, management, operation, and interaction of technological, economic, and social systems. The department's engineering research strength is integrated with its educational program at the undergraduate, master's, and doctoral levels: graduates of the program are trained as engineers and future leaders in technology, policy, and industry. Research and teaching activities are complemented by an outreach program that encourages the transfer of ideas to the environment of Silicon Valley and beyond.

Management Science and Engineering (MS&E) provides programs of education and research by integrating three basic strengths:

1. depth in conceptual and analytical foundations
2. comprehensive coverage of functional areas of application
3. interaction with other Stanford departments, Silicon Valley industry, and organizations throughout the world.

The analytical and conceptual foundations include decision and risk analysis, dynamic systems, economics, optimization, organizational science, and stochastic systems. The functional areas of application include entrepreneurship, finance, information, marketing, organizational behavior, policy, production, and strategy. Close associations with other engineering departments and with industry enrich the programs by providing opportunities to apply MS&E methods to important problems and by motivating new theoretical developments from practical experience. MS&E's programs also provide a basis for contributing to other areas such as biotechnology, defense policy, environmental policy, information systems, and telecommunications.

## Mission of the Undergraduate Program in Management Science and Engineering

The mission of the undergraduate program in Management Science and Engineering is to provide students with the fundamentals of engineering systems analysis so that they are able to plan, design, and implement complex economic and technical management systems. The program builds on the foundational courses for engineering including calculus, engineering fundamentals, and physics or chemistry as well as management science. Students complete core courses in accounting, computer science, economics, ethics, organizational theory, mathematical modeling, optimization, probability, and statistics. To personalize their exploration, students select additional courses from different areas of the department, with greater emphasis in one of them. The major prepares students for a variety of career paths, including investment banking, management consulting, facilities and process management, or for graduate school in industrial engineering, operations research, business, economics, law, medicine, or public policy.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning

outcomes are used in evaluating students and the department's undergraduate program. Students are expected to be able:

1. to apply the knowledge of mathematics, science, and engineering;
2. to design and conduct experiments;
3. to design a system or components to meet desired needs;
4. to identify, formulate, and solve engineering problems;
5. to use techniques, skills, and modern engineering tools necessary for engineering practice;
6. to function on multidisciplinary teams;
7. to communicate effectively;
8. to recognize the need for and demonstrate an ability to engage in lifelong learning;
9. to obtain the background necessary for admission to top professional graduate engineering or business programs;
10. to understand professional and ethical responsibility;
11. to obtain the broad education necessary to understand the impact of engineering solutions in a global and societal context; and
12. to obtain a knowledge of contemporary issues pertinent to the field of management science and engineering.

## Graduate Programs in Management Science and Engineering

MS&E offers programs leading to the degrees of Master of Science and Doctor of Philosophy. The department also offers a coterminal B.S./M.S. degree, a dual master's degree in cooperation with each of the other departments in the School of Engineering, and joint master's degrees with the School of Law and the Public Policy Program.

For University coterminal degree program rules and University application forms, see the Registrar's coterminal degrees web site (<http://studentaffairs.stanford.edu/registrar/publications/#Coterm>).

Applicants for admission as graduate students in MS&E must submit the results of the verbal, quantitative, and analytical parts of the Graduate Record Examination. The deadline for application to the doctoral program is December 5, 2017, and the deadline for application to the master's program is January 16, 2018.

Except in unusual circumstances, admission is limited to the Autumn Quarter because courses are arranged sequentially with basic courses and prerequisites offered early in the academic year.

## Assistantships and Fellowships

A limited number of fellowships and assistantships are awarded each year. Applicants admitted to the doctoral program, who have indicated on their application that they would like to be considered for financial aid, are automatically considered for these assistantships and fellowships. New and returning master's students may apply for course assistantships each quarter, but priority is given to MS&E doctoral students.

Information about loan programs and need-based aid for U.S. citizens and permanent residents can be obtained from the Financial Aid Office.

## Learning Outcomes (Graduate)

The M.S. prepares engineers for a lifelong career addressing the critical technical and managerial needs of private and public organizations. The program emphasizes developing analytic abilities, making better decisions, developing and executing strategies while also leading people who innovate. Unlike an MBA, our master's program addresses the technical as well as the behavioral challenges of running organizations

and complex systems. We emphasize quantitative analytic skills and an entrepreneurial spirit.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Management Science and Engineering and related fields.

## Careers in MS&E

MS&E students are candidates for careers in consulting, product and project management, financial analysis, and work in policy arenas. A significant number join or found start-ups. Many have become leaders in technology-based businesses which have an increasing need for analytically oriented people who understand both business and technology. Other graduates make careers tackling the problems faced by local, national, and international governments by developing new healthcare systems, new energy systems and a more sustainable environment. The major problems of the day demand an ability to integrate the technical, social and economic ways of thinking. This is precisely what the department educates its students to do.

## Bachelor of Science in Management Science and Engineering

The program leading to the B.S. degree in Management Science and Engineering (MS&E) is outlined in the School of Engineering section of this bulletin; more information is contained in the School of Engineering's *Handbook for Undergraduate Engineering Programs*. Students are encouraged to plan their academic programs as early as possible, ideally in the freshman or sophomore year. Students should not wait until they are declaring a major to consult with the department's student services staff. This is particularly important for students who would like to study overseas or pursue another major or minor.

The undergraduate curriculum in Management Science and Engineering provides students training in the fundamentals of engineering systems analysis to prepare them to plan, design, and implement complex economic and technological management systems where a scientific or engineering background is necessary or desirable. The major prepares students for a variety of career paths, including investment banking, management consulting, facilities and process management, or for graduate school in industrial engineering, operations research, business, economics, law, medicine, or public policy.

The educational objectives of the undergraduate degree program are:

- *Principles and Skills*—provide students with a basic understanding of management science and engineering principles, including analytical problem solving and communications skills.
- *Preparation for Practice*—prepare students for practice in a field that sees rapid changes in tools, problems, and opportunities.
- *Preparation for Continued Growth*—prepare students for graduate study and self development over an entire career.
- *Preparation for Service*—develop in students the awareness, background, and skills necessary to become responsible citizens, employees, and leaders.

See also the department's undergraduate Learning Outcomes (p. ) for additional learning objectives.

The program builds on the foundational courses for engineering, including calculus, mathematical modeling, probability, statistics, engineering fundamentals, and physics or chemistry.

Students interested in a minor should see the Minor tab in this section.

MS&E also participates with the departments of Computer Science, Mathematics, and Statistics in a program leading to a B.S. in Mathematical and Computational Science. See the "Mathematical and Computational Science (p. 648)" section of this bulletin.

## Core

The department core, taken for all areas, includes courses in accounting, computer science, deterministic optimization, economics, organization theory, and a capstone senior project. Through the core, students in the program are exposed to the breadth of faculty interests, and are in a good position to choose an area during the junior year.

## Areas

The major is designed to allow a student to explore all three areas of the department in greater depth.

1. *Finance and Decision*: focuses on the design and analysis of financial and strategic plans.
2. *Operations and Analytics*: focuses on algorithms, theory, and the design and analysis of manufacturing, production, and service systems.
3. *Organizations, Technology, and Policy*: focuses on understanding, design, and analysis of organizations and public policy, particularly technology-based issues.

## Management Science and Engineering (MS&E)

Completion of the undergraduate program in Management Science and Engineering leads to the conferral of the Bachelor of Science in Management Science and Engineering.

## Requirements

	Units
<b>Mathematics and Science</b>	
All required; see SoE Basic Requirements 1 and 2 <sup>1</sup>	23
CME 100 Vector Calculus for Engineers or MATH 51 Linear Algebra and Differential Calculus of Several Variables	
CME 103 Introduction to Matrix Methods	
MS&E 120 Probabilistic Analysis	
MS&E 121 Introduction to Stochastic Modeling	
MS&E 125 Introduction to Applied Statistics	
Select one of the following sequences:	8
CHEM 31B Chemical Principles II & CHEM 33 and Structure and Reactivity of Organic Molecules	
CHEM 31X Chemical Principles Accelerated & CHEM 33 and Structure and Reactivity of Organic Molecules	
PHYSICS 21 Mechanics, Fluids, and Heat & PHYSICS 23 and Electricity, Magnetism, and Optics & PHYSICS 22 and Mechanics, Fluids, and Heat Laboratory or PHYSICS 24 Electricity, Magnetism, and Optics Laboratory	
PHYSICS 41 Mechanics & PHYSICS 43 and Electricity and Magnetism	
Up to ten units of AP/IB Calculus, MATH 19, 20, 21, 41, or 42.	10
Math, Science, or Statistics Elective from SoE approved lists. <sup>1</sup>	3
<b>Technology in Society</b>	
Select one of the following; see SoE Basic Requirement 4	3-5
AA 252 Techniques of Failure Analysis	
COMM 120W Digital Media in Society	
CS 181 Computers, Ethics, and Public Policy	
ENGR 131 Ethical Issues in Engineering	

ENGR 311C			
ME 267	Ethics and Equity in Transportation Systems		
MS&E 193	Technology and National Security		
STS 1	The Public Life of Science and Technology		
<b>Engineering Fundamentals</b> <sup>2</sup>			
Two courses; see SoE Basic Requirement 3		8-10	
CS 106A	Programming Methodology <sup>3</sup>		
Select one of the following:			
ENGR 10	Introduction to Engineering Analysis		
ENGR 14	Intro to Solid Mechanics		
ENGR 15	Dynamics		
ENGR 20	Introduction to Chemical Engineering		
ENGR 25B	Biotechnology		
ENGR 21	Engineering of Systems		
ENGR 25E	Energy: Chemical Transformations for Production, Storage, and Use		
ENGR 40	Introductory Electronics		
ENGR 40A	Introductory Electronics		
ENGR 40M	An Intro to Making: What is EE		
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis		
ENGR 50E	Introduction to Materials Science, Energy Emphasis		
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis		
ENGR 80	Introduction to Bioengineering (Engineering Living Matter)		
ENGR 90	Environmental Science and Technology		
<b>Engineering Depth</b> <sup>2</sup>			
Core Courses (all six required)		25-27	
CS 106B	Programming Abstractions		
or CS 106X	Programming Abstractions (Accelerated)		
ECON 50	Economic Analysis I		
MS&E 108	Senior Project (WIM)		
MS&E 111	Introduction to Optimization <sup>4</sup>		
or MS&E 111X	Introduction to Optimization (Accelerated)		
MS&E 140	Accounting for Managers and Entrepreneurs		
or MS&E 140X	Financial Accounting Concepts and Analysis		
MS&E 180	Organizations: Theory and Management		
Area Courses (see below)		27	
Choose four or five courses (minimum 15 units) from a primary area and two courses (minimum 6 units) from each of the other two areas.			
<b>Depth Areas</b>			
<b>Finance and Decision Area</b>		Units	
Students choosing F&D as their primary area must take at least two of ECON 51, MS&E 145 (or 245A), and MS&E 152 (or 252), as part of their 15 units		6-15	
Introductory (no prerequisites)			
MS&E 147	Finance and Society for non-MBAs		
MS&E 152	Introduction to Decision Analysis		
Intermediate (has prerequisites and/or appropriate for juniors and seniors)			
MS&E 145	Introduction to Investment Science		
MS&E 146	Corporate Financial Management		
MS&E 252	Decision Analysis I: Foundations of Decision Analysis		
Advanced (intended primarily for graduate students, but may be taken by advanced undergraduates)			
MS&E 245A	Investment Science		
MS&E 245B	Advanced Investment Science		
MS&E 246	Financial Risk Analytics		
MS&E 250A	Engineering Risk Analysis		
MS&E 250B	Project Course in Engineering Risk Analysis		
<b>Operations and Analytics Area</b>			6-15
Students choosing O&A as their primary area may also include CS 161, CS 229, and STATS 202 in their selections <sup>4</sup>			
Methods			
MS&E 112	Mathematical Programming and Combinatorial Optimization		
MS&E 135	Networks		
MS&E 213	Introduction to Optimization Theory		
MS&E 223	Simulation		
MS&E 226	"Small" Data		
MS&E 231	Introduction to Computational Social Science		
MS&E 237	Networks, Markets, and Crowds		
MS&E 251	Introduction to Stochastic Control with Applications		
Applications			
MS&E 130	Information Networks and Services		
MS&E 233	Networked Markets		
MS&E 234	Data Privacy and Ethics		
MS&E 235	Network Analytics		
MS&E 260	Introduction to Operations Management		
MS&E 262	Supply Chain Management		
MS&E 263	Healthcare Operations Management		
MS&E 267	Service Operations and the Design of Marketplaces		
MS&E 330	Law, Order & Algorithms		
<b>Organizations, Technology, and Policy Area</b>			6-15
Students choosing OT&P as their primary area must take at least two of ENGR 145, MS&E 175, MS&E 184, and MS&E 185 as part of their 15 units			
Introductory (no prerequisites)			
ENGR 131	Ethical Issues in Engineering <sup>4</sup>		
MS&E 190	Methods and Models for Policy and Strategy Analysis		
MS&E 193	Technology and National Security <sup>4</sup>		
Advanced (has prerequisites and/or appropriate for juniors and seniors)			
ENGR 145	Technology Entrepreneurship		
MS&E 175	Innovation, Creativity, and Change		
or MS&E 177	Creativity Rules		
MS&E 183	Leadership in Action		
MS&E 184	Future of Work: Issues in Organizational Learning and Design		
MS&E 185	Global Work		
MS&E 188	Organizing for Good		
MS&E 243	Energy and Environmental Policy Analysis		
MS&E 292	Health Policy Modeling		
MS&E 294	Systems Modeling for Climate Policy Analysis		
MS&E 295	Energy Policy Analysis		

- <sup>1</sup> Math and Science must total a minimum of 44 units. Electives must come from the School of Engineering approved list, or, PSYCH 50 Introduction to Cognitive Neuroscience, or PSYCH 70 Self and Society: Introduction to Social Psychology, and may not repeat material from any other requirement. AP/IB credit for Chemistry and Physics may be used.
- <sup>2</sup> Engineering fundamentals plus engineering depth must total a minimum of 60 units. Recommended engineering fundamentals are E25B, E25E, E40A, E40M, and E80.
- <sup>3</sup> Students may petition to place out of CS 106A Programming Methodology.
- <sup>4</sup> Courses used to satisfy the Math, Science, Technology in Society, or Engineering Fundamental requirement may not also be used to satisfy an engineering depth requirement.

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

### Management Science and Engineering (MS&E) Minor

The following courses are required to fulfill the minor requirements:

#### Background requirements (two courses)

		Units
CME 100	Vector Calculus for Engineers	5
or MATH 51	Linear Algebra and Differential Calculus of Several Variables	
CS 106A	Programming Methodology	5

#### Minor requirements (seven courses, letter-graded)

MS&E 111	Introduction to Optimization	3-4
or MS&E 111X	Introduction to Optimization (Accelerated)	
MS&E 120	Probabilistic Analysis	5
MS&E 121	Introduction to Stochastic Modeling	4
MS&E 125	Introduction to Applied Statistics	4
MS&E 180	Organizations: Theory and Management	4
Electives (select any two 100- or 200-level MS&E courses)		6

#### Recommended courses

In addition to the required background and minor courses, it is recommended that students also take the following courses.

ECON 50	Economic Analysis I	5
MS&E 140	Accounting for Managers and Entrepreneurs (may be used as one of the required electives above)	2-4
or MS&E 140X	Financial Accounting Concepts and Analysis	

## Coterminal Program in Management Science and Engineering

This program allows Stanford undergraduates an opportunity to work simultaneously toward a B.S. in Management Science and Engineering or another quantitative major, and an M.S. in Management Science and Engineering.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer

of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Science in Management Science and Engineering

The M.S. degree programs require a minimum of 45 units beyond the equivalent of a B.S. degree at Stanford. All programs represent substantial progress in the major field beyond the bachelor's degree.

University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The master's in Management Science and Engineering prepares engineers for a lifelong career addressing the technical and managerial needs of private and public organizations. The program emphasizes developing analytic abilities, making better decisions, and developing and executing strategies while also leading people who innovate. Unlike an M.B.A., the department's master's program addresses the technical as well as the behavioral challenges of running organizations and complex systems, emphasizing quantitative analytic skills and an entrepreneurial spirit.

MS&E students know math, engineering, as well as behavioral science. They can conduct experiments to design better systems, organizations and work processes. They understand how to analyze data to solve real world problems. They can develop mathematical and computational models to inform action. They know how to surface and examine unarticulated assumptions and root causes. These students can communicate effectively in the team environments found in so many contemporary organizations.

MS&E master's students have breadth as well as depth. All are required to develop competence in optimization and analytics, organizations and decisions, and probability. In addition every student pursues a specialty in one of six areas:

1. *Financial Analytics*: Students who concentrate in Financial Analytics are prepared for careers requiring analytical rigor and the ability to innovate around market challenges. Example career paths include financial services, risk management, investment management, financial technology and data processing, financial regulation and policy, exchanges and clearing houses, and auditing and compliance. The concentration combines the in-depth study of quantitative techniques with practical, hands-on business problem solving. Students learn to use mathematical models and quantitative tools to solve complex problems in finance practice. The concentration exploits the intellectual ties between finance, operations research, computer science, and engineering. It offers a high level of flexibility and a range of elective courses that allow students to tailor the program to their specific career goals. Required courses immerse students in quantitative methods and deepen their understanding of finance fundamentals. Projects courses feature practical, data-driven team projects and case studies, fostering group learning and interaction with peers.

2. *Operations and Analytics*: Students following the Operations and Analytics track become prepared in the fundamentals and applications that are critical to careers in a fields ranging from operations management in the service, health care, production, manufacturing, computer, telecommunications, banking, industries to modern Silicon Valley information technology and data analytics. The program emphasizes a balance between the technical rigor of methodologies with lasting value and insightful modern applications and design challenges in a variety of established and emerging industries and operations environments. It offers a portfolio of courses in probabilistic modeling, optimization, simulation, algorithms, data science, networks, markets, and corresponding applications.
3. *Technology and Engineering Management*: Students who concentrate in Technology and Engineering Management are prepared for careers including product and project management, management consulting, and entrepreneurship. They acquire skills to manage technical organizations, foster innovation, and deal with rapidly evolving technologies and dynamic markets. Specialized coursework is flexible, allowing students to explore and gain depth, understanding technical organizations to develop a culture of successful innovation and entrepreneurship, along with methods for decision making under uncertainty, financial analysis, and strategic planning.
4. *Computational Social Science*: The Computational Social Science track teaches students how to apply rigorous statistical and computational methods to address problems in economics, sociology, political science, and beyond. The program prepares students for a diverse set of career paths in data science, information technology, and policy analysis. The core coursework covers fundamental statistical concepts, large-scale computation, and network analysis. Through electives, students can explore topics such as experimental design, algorithmic economics, and machine learning.
5. *Decision and Risk Analysis*: Students who specialize in Decision and Risk Analysis are prepared for careers including management consulting, policy analysis, and risk management, applying engineering systems analysis to tackle complex economic and technical management problems in the private and public sectors. They acquire the skills to identify and develop opportunities in uncertain situations while recognizing and hedging the downside risks. Specialized course work includes the mathematical foundations for modeling in dynamic uncertain environments to value and manage uncertain opportunities and risks, applications to public policy, and an opportunity to work on a client project under faculty guidance.
6. *Energy and Environment*: The Energy and Environment track is designed for students interested in energy and environmental issues from the perspectives of public policy, nongovernmental organizations, or corporations. This track includes core courses; courses in economic analysis, energy resources, and energy/environmental policy analysis; and an individually designed concentration, typically emphasizing policy, strategy, or technology. Seminars provide insights into current corporate strategy, public policy, and research community developments. Energy/environmental project courses give practice in applying methodologies and concepts.
7. *Health Systems Modeling*: The Health Systems Modeling track is designed for students interested in healthcare operations and policy. The courses in this track emphasize the application of mathematical and economic analysis to problems in public health policy and the design and operation of healthcare services.

The master's degree is designed to be a terminal degree program with a professional focus. The M.S. degree can be earned in one academic year (three academic quarters) of full-time work, although most students choose to complete the program in five academic quarters, or eighteen months, and work as an intern in the Summer Quarter.

## Background Requirements

Students are expected to have completed both MATH 51 Linear Algebra and Differential Calculus of Several Variables, or an equivalent multivariable differential calculus course, and CS 106A Programming Methodology, or an equivalent general programming course, before beginning graduate study. These courses do not count toward degree requirements.

## Degree Requirements

Students must take a minimum of 45 course units as follows:

- Three core courses (9-12 units)
- A primary or specialized concentration (12-24 units)
- One project course or two integrated project courses (0-8 units)
- Elective courses (1-24 units; see restrictions below)

## Core Courses (three courses required) Optimization and Analytics (select one)

		Units
MS&E 211	Introduction to Optimization	
MS&E 211X	Introduction to Optimization (Accelerated)	
MS&E 226	"Small" Data	
Relevant 200 or 300 level MS&E course in optimization or analytics if a comparable introductory course in optimization or analytics has already been completed.		

## Organizations and Decisions (select one)

		Units
MS&E 252	Decision Analysis I: Foundations of Decision Analysis	
MS&E 270	Strategy in Technology-Based Companies	
MS&E 280	Organizational Behavior: Evidence in Action	
Relevant 200 or 300 level MS&E course in organizations or decisions if a comparable introductory course in organizations or decisions has already been completed.		

## Probability (select one)

		Units
MS&E 220	Probabilistic Analysis	
MS&E 221	Stochastic Modeling	
Relevant 200 or 300 level MS&E course in probability or stochastics if a comparable introductory course in probability or stochastics has already been completed.		

## Primary Concentrations

### Financial Analytics Concentration (five courses required)

		Units
Financial Theory and Modeling (select one):		
MS&E 245A	Investment Science	
MS&E 245B	Advanced Investment Science	
MS&E 246	Financial Risk Analytics	
Quantitative Methods (two required):		
Select one (whichever wasn't taken for core):		
MS&E 211	Introduction to Optimization	
or MS&E 211X	Introduction to Optimization (Accelerated)	
MS&E 226	"Small" Data	
Select one:		
MS&E 223	Simulation	
MS&E 245B	Advanced Investment Science (if not used above)	
MS&E 246	Financial Risk Analytics (if not used above)	
MS&E 322	Stochastic Calculus and Control	
MS&E 349	Financial Statistics	

STATS 207	Introduction to Time Series Analysis
STATS 240	Statistical Methods in Finance
STATS 241	Data-driven Financial and Risk Econometrics
Financial Applications (select two):	
MS&E 347	Credit Risk: Modeling and Management
MS&E 348	Optimization of Uncertainty and Applications in Finance
MS&E 447	Systemic and Market Risk : Notes on Recent History, Practice, and Policy
MS&E 448	Big Financial Data and Algorithmic Trading

### Operations and Analytics Concentration (four courses required)

#### Required Courses

MS&E 211	Introduction to Optimization (whichever course wasn't taken for core)
or MS&E 211X	Introduction to Optimization (Accelerated)
or MS&E 226	"Small" Data
MS&E 221	Stochastic Modeling (or a more advanced course in probability (i.e. MS&E 223 Simulation) if a student has taken an equivalent class in stochastic modeling)
MS&E 235	Network Analytics
or MS&E 251	Introduction to Stochastic Control with Applications
MS&E 260	Introduction to Operations Management
or MS&E 263	Healthcare Operations Management
or MS&E 267	Service Operations and the Design of Marketplaces

#### Recommended Elective Courses:

MS&E 212	Mathematical Programming and Combinatorial Optimization
MS&E 213	Introduction to Optimization Theory
MS&E 223	Simulation
MS&E 231	Introduction to Computational Social Science
MS&E 233	Networked Markets
MS&E 234	Data Privacy and Ethics
MS&E 235	Network Analytics
MS&E 237	Networks, Markets, and Crowds
MS&E 243	Energy and Environmental Policy Analysis
MS&E 245A	Investment Science
MS&E 250A	Engineering Risk Analysis
MS&E 251	Introduction to Stochastic Control with Applications
MS&E 252	Decision Analysis I: Foundations of Decision Analysis
MS&E 260	Introduction to Operations Management
MS&E 262	Supply Chain Management
MS&E 263	Healthcare Operations Management
MS&E 267	Service Operations and the Design of Marketplaces
MS&E 270	Strategy in Technology-Based Companies
MS&E 292	Health Policy Modeling

### Technology and Engineering Management Concentration (four courses beyond core required)

The course used to satisfy the Organizations and Decisions Core satisfies one of the areas below, but the course units do not double-count.

#### Organizations and Strategy (select at least one):

MS&E 270	Strategy in Technology-Based Companies
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MS&E 274	Dynamic Entrepreneurial Strategy
MS&E 278	Patent Law and Strategy for Innovators and Entrepreneurs
MS&E 280	Organizational Behavior: Evidence in Action
MS&E 282	Transformational Leadership
MS&E 284	Designing Modern Work Organizations
Entrepreneurship and Innovation (select at least one):	
MS&E 270	Strategy in Technology-Based Companies
MS&E 271	Global Entrepreneurial Marketing
MS&E 272	Entrepreneurship without Borders
MS&E 273	Technology Venture Formation
MS&E 275	Foundations for Large-Scale Entrepreneurship
MS&E 276	Entrepreneurial Management and Finance
MS&E 277	Creativity and Innovation
ENGR 245	The Lean LaunchPad: Getting Your Lean Startup Off the Ground

#### Finance and Decisions (select at least one):

MS&E 240	Accounting for Managers and Entrepreneurs
MS&E 245A	Investment Science
MS&E 245B	Advanced Investment Science
MS&E 246	Financial Risk Analytics
MS&E 250A	Engineering Risk Analysis
MS&E 250B	Project Course in Engineering Risk Analysis
MS&E 252	Decision Analysis I: Foundations of Decision Analysis
MS&E 352	Decision Analysis II: Professional Decision Analysis

### Specialized Concentrations (must have approval of the academic adviser)

#### Computational Social Science (four courses required)

Units

#### Statistics (select at least one)

MS&E 226	"Small" Data (may not be duplicated in core)
STATS 203	Introduction to Regression Models and Analysis of Variance
STATS 305A	Introduction to Statistical Modeling

#### Computation (select at least one)

MS&E 231	Introduction to Computational Social Science
MS&E 235	Network Analytics
CS 246	Mining Massive Data Sets

#### Networks (select at least one)

MS&E 233	Networked Markets
CS 224W	Analysis of Networks
ECON 291	Social and Economic Networks
MS&E 334	Topics in Social Data

#### Social Science (select at least one)

MS&E 270	Strategy in Technology-Based Companies
MS&E 280	Organizational Behavior: Evidence in Action
MS&E 284	Designing Modern Work Organizations
ECON 202N	Microeconomics I For Non-Economics PhDs
ECON 203N	Microeconomics II For Non-Economics PhDs
PSYCH 212	Classic and contemporary social psychology research
PSYCH 265	Social Psychology and Social Change
SOC 220	Interpersonal Relations
SOC 224B	Relational Sociology

#### Recommended Elective Courses

## Causal Inference

COMM 382	Research in Computational Social Science
POLISCI 355C	Causal Inference for Social Science

## Computation

CS 147	Introduction to Human-Computer Interaction Design
CS 229	Machine Learning
CS 448B	Data Visualization
MS&E 234	Data Privacy and Ethics

## Economics

MS&E 241	Economic Analysis
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## Natural Language Processing

CS 124	From Languages to Information
CS 224N	Natural Language Processing with Deep Learning
CS 224S	Spoken Language Processing
POLISCI 452	Text as Data
LINGUIST 278	Programming for Linguists
LINGUIST 281	Computational Models of Linguistic Formalism

## Networks

OB 622	Topics in Social Network Analysis: Structure and Dynamics
SOC 369	Social Network Methods

## Psychology

PSYCH 216	Public Policy and Social Psychology: Implications and Applications
PSYCH 238	Wise Interventions

## Sociology

OB 637	Modeling Culture
SOC 214	Economic Sociology
SOC 218	Social Movements and Collective Action
SOC 262	The Social Regulation of Markets
SOC 270	Classics of Modern Social Theory
SOC 271	Organizational Analysis

## Statistics

STATS 209	Statistical Methods for Group Comparisons and Causal Inference
STATS 263	Design of Experiments
STATS 315A	Modern Applied Statistics: Learning
STATS 315B	Modern Applied Statistics: Data Mining

**Decision and Risk Analysis Concentration (four courses required)**

Core Courses are restricted as follows:

MS&E 211	Introduction to Optimization
or MS&E 211X	Introduction to Optimization (Accelerated)
MS&E 221	Stochastic Modeling
MS&E 252	Decision Analysis I: Foundations of Decision Analysis

Required Courses (select two):

MS&E 241	Economic Analysis
MS&E 250A	Engineering Risk Analysis
MS&E 352	Decision Analysis II: Professional Decision Analysis

Policy Course (select one):

MS&E 243	Energy and Environmental Policy Analysis
MS&E 292	Health Policy Modeling
MS&E 293	Technology and National Security
MS&E 294	Systems Modeling for Climate Policy Analysis

MS&E 295	Energy Policy Analysis
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Project Course:

MS&E 250B	Project Course in Engineering Risk Analysis
MS&E 297	"Hacking for Defense": Solving National Security issues with the Lean Launchpad

**Energy and Environment Concentration (six courses required)**

Units

Required Courses:

CEE 207A	Understanding Energy
MS&E 241	Economic Analysis
MS&E 243	Energy and Environmental Policy Analysis

Three additional courses from energy, policy, or strategy areas below.

Policy:

ECON 251	Natural Resource and Energy Economics
ENERGY 158	Bringing New Energy Technologies to Market: Optimizing Technology Push and Market Pull
GSBGEN 336	Energy Markets and Policy
MS&E 293	Technology and National Security
MS&E 294	Systems Modeling for Climate Policy Analysis
MS&E 295	Energy Policy Analysis

Strategy:

ECON 203N	Microeconomics II For Non-Economics PhDs
ENERGY 158	Bringing New Energy Technologies to Market: Optimizing Technology Push and Market Pull
GSBGEN 538	
MS&E 270	Strategy in Technology-Based Companies
MS&E 271	Global Entrepreneurial Marketing
MS&E 272	Entrepreneurship without Borders
MS&E 273	Technology Venture Formation
MS&E 274	Dynamic Entrepreneurial Strategy
MS&E 275	Foundations for Large-Scale Entrepreneurship
MS&E 276	Entrepreneurial Management and Finance
MS&E 277	Creativity and Innovation
MS&E 278	Patent Law and Strategy for Innovators and Entrepreneurs

Energy:

ENERGY 102	Fundamentals of Renewable Power
ENERGY 104	Sustainable Energy for 9 Billion
ENERGY 158	Bringing New Energy Technologies to Market: Optimizing Technology Push and Market Pull
ME 370A	Energy Systems I: Thermodynamics
ME 370B	Energy Systems II: Modeling and Advanced Concepts
PHYSICS 240	Introduction to the Physics of Energy
PHYSICS 241	Introduction to Nuclear Energy

Recommended Seminars:

ECON 341	Public Economics and Environmental Economics Seminar
ENERGY 301	The Energy Seminar
MS&E 441	Policy and Economics Research Roundtable
MS&E 472	Entrepreneurial Thought Leaders' Seminar

Recommended Elective Courses:

ECON 250	Environmental Economics
ECON 270	Intermediate Econometrics I
ECON 278	Behavioral and Experimental Economics I
MGTECON 603	Econometric Methods I
MS&E 201	Dynamic Systems

Units

MS&E 211	Introduction to Optimization
MS&E 244	Economic Growth and Development
MS&E 251	Introduction to Stochastic Control with Applications

### Health Systems Modeling Concentration (four courses required)

#### Required Courses (select four)

HRP 263	Advanced Decision Science Methods and Modeling in Health
HRP 392	Analysis of Costs, Risks, and Benefits of Health Care
MS&E 263	Healthcare Operations Management
MS&E 292	Health Policy Modeling
MS&E 463	Healthcare Systems Design

#### Recommended Elective Courses:

HRP 256	Economics of Health and Medical Care
HRP 391	Health Law: Finance and Insurance
MS&E 256	Technology Assessment and Regulation of Medical Devices

### Projects

Select one project course or two integrated project courses; may double-count as part of the core or concentration.

#### Project Courses

MS&E 250B	Project Course in Engineering Risk Analysis	3
MS&E 403	Integrative Modeling	3
MS&E 447	Systemic and Market Risk : Notes on Recent History, Practice, and Policy	3
MS&E 448	Big Financial Data and Algorithmic Trading	3
MS&E 463	Healthcare Systems Design	3-4

#### Integrated Project Courses

ENGR 245	The Lean LaunchPad: Getting Your Lean Startup Off the Ground	3-4
MS&E 201	Dynamic Systems	3-4
MS&E 226	"Small" Data	3
MS&E 233	Networked Markets	3
MS&E 243	Energy and Environmental Policy Analysis	3
MS&E 245A	Investment Science	3-4
MS&E 245B	Advanced Investment Science	3
MS&E 246	Financial Risk Analytics	3
MS&E 252	Decision Analysis I: Foundations of Decision Analysis	3-4
MS&E 256	Technology Assessment and Regulation of Medical Devices	3
MS&E 260	Introduction to Operations Management	3
MS&E 265	Product Management Fundamentals	3
MS&E 267	Service Operations and the Design of Marketplaces	3
MS&E 270	Strategy in Technology-Based Companies	3-4
MS&E 271	Global Entrepreneurial Marketing	3-4
MS&E 272	Entrepreneurship without Borders	3-4
MS&E 273	Technology Venture Formation	3-4
MS&E 274	Dynamic Entrepreneurial Strategy	3
MS&E 275	Foundations for Large-Scale Entrepreneurship	3
MS&E 277	Creativity and Innovation	3-4
MS&E 280	Organizational Behavior: Evidence in Action	3-4
MS&E 282	Transformational Leadership	3

Units

Units

MS&E 284	Designing Modern Work Organizations	3
MS&E 294	Systems Modeling for Climate Policy Analysis	3
MS&E 295	Energy Policy Analysis	3
MS&E 311	Optimization	3
MS&E 338	Reinforcement Learning	3
MS&E 347	Credit Risk: Modeling and Management	3
MS&E 348	Optimization of Uncertainty and Applications in Finance	3
MS&E 349	Financial Statistics	3
MS&E 355	Influence Diagrams and Probabilistics Networks	3

### Additional Requirements

- At least 45 units must be in courses numbered 100 and above.
- The degree program must be completed with a grade point average (GPA) of 3.0 or higher.
- At least 27 units must be in courses numbered 200 and above in MS&E, taken for a letter grade and a minimum of two units each.
- At least 36 letter-graded units must be in MS&E or closely related fields. Closely related fields include any department in the School of Engineering, mathematics, statistics, economics, sociology, psychology, or business.
- All courses used to satisfy core, concentration, or project requirements must be taken for a letter grade.
- A maximum of three units of 1-unit courses such as seminars, colloquia, workshops, in any department, including MS&E 208A, B, and C, Curricular Practical Training.
- A maximum of 18 non-degree option (NDO) units through the Stanford Center for Professional Development (SCPD).
- Courses taken in Health and Human Performance (Athletics, Club Sports, Martial Arts, Outdoor Education, Physical Education, and Wellness Education) may not be applied toward the degree.

## Professional Education

The Stanford Center for Professional Development (SCPD) provides opportunities for employees of some local and remote companies to take courses at Stanford.

The Honors Cooperative Program (HCP) provides opportunities for employees of SCPD member companies to earn an M.S. degree, over a longer period, by taking one or two courses per academic quarter. Some courses are only offered on campus; HCP students may attend those courses at Stanford to meet the degree requirements. It is possible to complete this program as a remote HCP student although the remote offerings are limited. Students must apply for a degree program through the standard application process, and must meet the standard application deadlines.

The non-degree option (NDO) allows employees of some local companies to take courses for credit from their company sites before being admitted to a degree program. Students apply to take NDO courses each quarter through the Stanford Center for Professional Development. Up to 18 units taken as an NDO student may be applied toward a degree program. For additional information about the NDO application process and deadlines, see the SCPD web site (<http://scpd.stanford.edu>), or contact SCPD at (650) 725-3000.

## Certificate

The department offers a certificate program within the framework of the NDO program. A certificate can be obtained by completing three MS&E core courses, plus one MS&E elective course for a total of four courses. For further information, see <http://scpd.stanford.edu/scpd/programs/certs/managementSci.htm>.



## Dual Master's Degree Program

The dual degree program enables a small group of graduate students to obtain two master's degrees simultaneously. Students complete the course requirements for each department. A total of 90 units is required to complete the dual master's degree.

### Admission

For the dual degree, admission to two departments is required, but is coordinated by designated members of both admissions committees who make recommendations to the committees of their respective departments. Students may apply to only one department initially. After the first quarter at Stanford, students may apply to be admitted to the second department.

### Advising

Every student in the dual degree program has one adviser in each department.

## Joint MS&E and Law Degrees

The School of Law and the Department of Management Science and Engineering offer joint degree programs leading to a J.D. degree and an M.S. degree in MS&E, or to a J.D. and Ph.D. in MS&E. These programs are designed for students who wish to prepare themselves for careers in areas relating to both law and to the decision making, policy making, and problem solving knowledge and skills developed in the MS&E program. Students interested in either joint degree program must apply and gain admission separately to the School of Law and the Department of Management Science and Engineering and, as an additional step, must secure consent from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or MS&E may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or MS&E. Students are assigned to a joint program committee composed of at least one faculty member from Law and one from MS&E. This committee plans the student's program jointly with the student. Students must be enrolled full time in the Law School for the first year of law studies, and it is recommended that students devote exclusively one Autumn Quarter to the MS&E M.S. program to initiate their MS&E work. After that time, enrollment may be in MS&E or Law, and students may choose courses from either program regardless of where enrolled. A candidate in the joint J.D./Ph.D. program should spend a substantial amount of full time residency in MS&E. Students must satisfy the requirements for both the J.D. and the M.S. or Ph.D. degrees as specified in this bulletin or by the School of Law. The Law School may approve courses from MS&E or courses in the student's MS&E program from outside of the Department of Management Science and Engineering that may count toward the J.D. degree, and MS&E may approve courses from the Law School that may count toward the M.S. or Ph.D. degree in MS&E. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The lists may differ depending on whether the student is pursuing an M.S. or a Ph.D. in MS&E.

In the case of a J.D./M.S. program, no more than 45 units of approved courses may be counted toward both degrees. In the case of a J.D./Ph.D. program, no more than 54 units of approved courses may be counted toward both degrees. In either case, no more than 36 units of courses that originate outside the Law School may count toward the law degree. To the extent that courses under this joint degree program originate outside the Law School but count toward the law degree, the law credits permitted under Section 17(1) of the Law School Regulations are reduced

on a unit-per-unit basis, but not below zero. The maximum number of law school credits that may be counted toward the M.S. in MS&E is the greater of: (a) 18 units in the case of the M.S., or (b) the maximum number of hours from courses outside the department that an M.S. candidate in MS&E is permitted to count toward the applicable degree under general departmental guidelines or under departmental rules that apply in the case of a particular student.

Tuition and financial aid arrangements are normally through the school in which the student is then enrolled.

## Joint MS&E and Master of Public Policy Degree

MS MS&E students who wish to apply their analytical and management skills to the field of public policy can simultaneously pursue a master degree in MS&E and a master degree in Public Policy. The MPP is a two-year degree program, but MS MS&E students who pursue the joint program can earn both degrees in a minimum of two years, depending on prior preparation and elective choices, by counting up to 45 quarter units of course work toward both degrees. After admission to the Department of Management Science and Engineering, incoming or current MS students request that their application file be forwarded to the MPP program director for review.

Students in the joint program normally will spend most of their first year taking MS&E core courses. The second year is typically devoted to the MPP core, concentration, and practicum. The joint degree requires 90 quarter units. Tuition for the first year of study is paid at the Graduate Engineering rate, the remaining time at the graduate rate.

## Doctor of Philosophy in Management Science and Engineering

University requirements for the Ph.D. degree are described in the "Graduate Degrees" section of this bulletin.

The Ph.D. degree in MS&E is intended for students primarily interested in a career of research and teaching, or high-level technical work in universities, industry, or government. The program requires three years of full-time graduate study, at least two years of which must be at Stanford. Typically, however, students take four to five years after entering the program to complete all Ph.D. requirements. The Ph.D. is organized around the expectation that the students acquire a certain breadth across all areas of the department, and depth in one of them. The current areas are:

- Computational Social Science
- Decision and Risk Analysis
- Energy and Environmental Policy
- Financial Analytics
- Health Policy
- National Security Policy
- Operations Management
- Optimization and Stochastics
- Organizations
- Strategy, Innovation, and Entrepreneurship

Doctoral students are required to take a number of courses, both to pass a qualifying exam in one of these areas, and to complete a dissertation based on research which must make an original contribution to knowledge.

Each student admitted to the Ph.D. program must satisfy a breadth requirement and pass a qualification procedure. The purpose of the qualification procedure is to assess the student's command of the

field and to evaluate his or her potential to complete a high-quality dissertation in a timely manner. The student must complete specified course work in one of the areas of the department.

The qualification decision is based on the student's course work and grade point average (GPA), on the one or two preliminary papers prepared by the student with close guidance from two faculty members, at least one of whom must be an MS&E faculty member, the student's performance in an area examination or defense of the written paper(s), and an overall assessment by the faculty of the student's ability to conduct high-quality Ph.D. research. Considering this evidence, the department faculty vote on advancing the student to candidacy in the department at large. The Ph.D. requires a minimum of 135 units, up to 45 units of which may be transferred from another graduate program.

All courses used to satisfy breadth and depth requirements must be taken for a letter grade, if the letter graded option is available. Prior to candidacy, at least 3 units of work must be taken with each of four Stanford faculty members. Finally, the student must pass a University oral examination and complete a Ph.D. dissertation. During the course of the Ph.D. program, students who do not have a master's degree are strongly encouraged to complete one, either in MS&E or in another Stanford department.

### Breadth Requirement

All first year students are required to attend and participate in MS&E 302 Fundamental Concepts in Management Science and Engineering, which meets in the Autumn Quarter.

Each course session is devoted to a specific MS&E Ph.D. research area. At a given session several advanced P.h.D students in that area make carefully prepared presentations designed for first-year doctoral students regardless of area. The presentations are devoted to: (a) illuminating how people in the area being explored that day think about and approach problems, and (b) illustrating what can and cannot be done when addressing problems by deploying the knowledge, perspectives, and skills acquired by those who specialize in the area in question.

Faculty in the focal area of the week comment on the student presentations. The rest of the session is devoted to questions posed and comments made by the first year Ph.D. students.

During the last two weeks of the quarter, groups of first year students make presentations on how they would approach a problem drawing on two or more of the perspectives to which they have been exposed earlier in the class.

Attendance is mandatory and performance is assessed on the basis of the quality of the students' presentations and class participation

### Qualification Procedure Requirements

The qualification procedure is based on depth in an area of the student's choice and preparation for dissertation research. The qualification process must be completed by the end of the month of May of the student's second year of graduate study in the department. The performance of all doctoral students is reviewed every year at a department faculty meeting at the end of May or beginning of June. Ph.D. qualification decisions are made at that time and individual feedback is provided.

The Ph.D. qualification requirements comprise these elements:

1. *Courses and GPA:* Students must complete the depth requirements of one of the areas of the MS&E department. (The Ph.D. area course requirements are below).  
All courses used to satisfy depth requirements must be taken for a letter grade, if the letter graded option is available. Course substitutions may be approved by the doctoral program adviser or the MS&E dissertation adviser on the candidacy form or on a request for graduate course waiver/substitution form. A student must maintain

a GPA of at least 3.4 in the set of all courses taken by the student within the department. The GPA is computed on the basis of the nominal number of units for which each course is offered.

2. *Paper(s):* A student may choose between two options. The first option involves one paper supervised by a primary faculty adviser and a second faculty reader. This paper should be written in two quarters. The second option involves two shorter sequential tutorials, with two different faculty advisers. Each tutorial should be completed in one quarter. In both options, the student chooses the faculty adviser(s)/reader with the faculty members' consent. There must be two faculty members, at least one of whom must be an MS&E faculty member, supervising and evaluating this requirement for advancement to candidacy. The paper/tutorials must be completed before the Spring Quarter of the student's second year of graduate study in the department if the student's qualifying exam is during the Spring Quarter, and before the end of May of that year otherwise. A student may register for up to 3 units per tutorial and up to 6 units for a paper.
3. *Area Qualification:* In addition, during the second year, a student must pass an examination in one of the areas of the MS&E department, or defense of the written paper(s). The student chooses the area/program in which to take the examination. This area examination is written, oral, or both, at the discretion of the area faculty administering the exam. Most areas offer the qualifying exam only once per year, which may be early in the second year.

### Degree Progress and Student Responsibility

Each student's progress is reviewed annually by the MS&E faculty. Typically, this occurs at a faculty meeting at the end of Spring Quarter, and email notifications are sent over the summer.

1. First-year students should complete 30 units of breadth and depth courses, including MS&E 302, and develop relationships with faculty members who might serve as dissertation adviser and reading committee.
2. Second-year students should complete most, if not all, of the required depth courses, work with two faculty members, at least one of whom must be an MS&E faculty member, on tutorials/research paper, and pass an area qualifying exam. Most areas offer the qualifying exam only once per year, which may be early in the second year. Students should continue to develop relationships with faculty members who might serve as dissertation advisers and reading committee, and select a dissertation adviser before the beginning of the third year.
3. Third-year students should complete any remaining depth courses, select a dissertation topic, and make progress on the dissertation.
4. Fourth-year students should select a reading committee, and complete, or nearly complete, the oral exam and dissertation.

It is the responsibility of the student to initiate each step in completing the Ph.D. program.

It is strongly recommended that each student, in the first year of graduate study at Stanford, make it a special point to become well acquainted with MS&E faculty members and to seek advice and counsel regarding possible Ph.D. candidacy. A faculty member is more likely to accept the responsibility of supervising the research of a student whom he or she knows fairly well than a student whose abilities, initiative, and originality the faculty member knows less.

It is expected that advanced students regularly report to their full reading committee on the progress of their dissertation. It is also expected that the student avail him/herself of the different expertise represented on the committee continually. Each member of this committee must certify approval of both the scope and quality of the dissertation.

The doctoral dissertation reading committee consists of the principal dissertation adviser and two other readers. At least one member must be from the student's major department.

As administered in this department, the University oral examination is a defense of the dissertation; however, the candidate should be prepared to answer any question raised by any members of the Academic Council who choose to be present. Students should schedule three hours for the oral examination, which usually consists of a 45-minute public presentation, followed by closed-session questioning of the examinee by the committee, and committee deliberation. The University oral examination may be scheduled after the dissertation reading committee has given tentative approval to the dissertation. The student must be enrolled in the quarter of their oral examination.

The examining committee usually consists of the three members of the reading committee as well as a fourth faculty member and an orals chair.

It is the responsibility of the student's adviser to find an appropriate orals chair. The chair must be an Academic Council member and may not be affiliated with either the Department of Management Science and Engineering nor any department in which the student's adviser has a regular appointment. Emeriti professors are eligible to serve as an orals chair. The student needs to reserve a room, and meet with the student services manager to complete the oral examination schedule and pick up other paper work. This paperwork, along with an abstract, needs to be delivered to the orals chair at least one week prior to the oral examination.

## Course Requirements

### Computational Social Science

The Computational Social Science track teaches students how to apply rigorous statistical and computational methods to address problems in economics, sociology, political science and beyond. The core course work covers fundamental statistical concepts, large-scale computation, and network analysis. Through electives, students can explore topics such as experimental design, algorithmic economics, and machine learning.

Select at least one class from each of four different core areas.

#### Statistics core:

MS&E 226	"Small" Data
STATS 203	Introduction to Regression Models and Analysis of Variance
STATS 305A	Introduction to Statistical Modeling

#### Computation core:

MS&E 231	Introduction to Computational Social Science
MS&E 235	Network Analytics
CS 246	Mining Massive Data Sets

#### Networks core:

MS&E 233	Networked Markets
MS&E 334	Topics in Social Data
CS 224W	Analysis of Networks
ECON 291	Social and Economic Networks

#### Social Science core:

MS&E 270	Strategy in Technology-Based Companies
MS&E 280	Organizational Behavior: Evidence in Action
MS&E 274	Dynamic Entrepreneurial Strategy
ECON 202N	Microeconomics I For Non-Economics PhDs
ECON 203N	Microeconomics II For Non-Economics PhDs
PSYCH 212	Classic and contemporary social psychology research
PSYCH 265	Social Psychology and Social Change
SOC 220	Interpersonal Relations
SOC 224B	Relational Sociology

#### Recommended:

Causal Inference	
COMM 382	Research in Computational Social Science
POLISCI 355C	Causal Inference for Social Science
Computation	
CS 147	Introduction to Human-Computer Interaction Design
CS 229	Machine Learning
CS 448B	Data Visualization
MS&E 234	Data Privacy and Ethics
Economics	
MS&E 241	Economic Analysis
Natural Language Processing	
CS 124	From Languages to Information
CS 224N	Natural Language Processing with Deep Learning
CS 224S	Spoken Language Processing
LINGUIST 278	Programming for Linguists
LINGUIST 281	Computational Models of Linguistic Formalism
POLISCI 452	Text as Data
Networks	
OB 622	Topics in Social Network Analysis: Structure and Dynamics
SOC 369	Social Network Methods
Psychology	
PSYCH 216	Public Policy and Social Psychology: Implications and Applications
PSYCH 238	Wise Interventions
Sociology	
OB 637	Modeling Culture
SOC 214	Economic Sociology
SOC 218	Social Movements and Collective Action
SOC 262	The Social Regulation of Markets
SOC 270	Classics of Modern Social Theory
SOC 271	Organizational Analysis
Statistics	
STATS 209	Statistical Methods for Group Comparisons and Causal Inference
STATS 263	Design of Experiments
STATS 315A	Modern Applied Statistics: Learning
STATS 315B	Modern Applied Statistics: Data Mining

Students may substitute other classes (including those from other departments) from the same general area on a case-by-case basis, subject to approval by the student's program/dissertation adviser. The students must obtain a GPA of 3.50 or better in the core courses to qualify. The core courses must be completed in or before the Spring Quarter of the student's second year.

#### Computational Social Science Qualifying Procedure

The student does two quarter-length tutorials with CSS faculty. At the end of these tutorials, the student must make a 45-minute presentation of one of their tutorials to a committee of three CSS faculty members. The student can do both tutorials with the same faculty member, in which case the presentation can be of the two tutorials together, and another committee member must be kept informed of the student's progress on a regular basis during the two quarters. The presentation should take place in the Spring Quarter of the student's second year, or earlier. The presentation must include original research or promising directions towards original research. During this presentation, the student must also provide the name of their chosen focus area, and the list of courses that the student has completed and intends to complete in

the core as well as in the chosen focus area. The committee then makes a recommendation to the CSS area and the MS&E department regarding qualification of the student for the Ph.D. program in CSS.

### Decision Analysis and Risk Analysis

Prerequisites:

CS 106A	Programming Methodology
CME 100	Vector Calculus for Engineers
CME 103	Introduction to Matrix Methods

Required:

MS&E 201	Dynamic Systems
or EE 263	Introduction to Linear Dynamical Systems
MS&E 211	Introduction to Optimization
or MS&E 211X	Introduction to Optimization (Accelerated)
or MS&E 311	Optimization
MS&E 220	Probabilistic Analysis
MS&E 221	Stochastic Modeling
or STATS 217	Introduction to Stochastic Processes I
MS&E 223	Simulation
MS&E 241	Economic Analysis
MS&E 250A	Engineering Risk Analysis
MS&E 250B	Project Course in Engineering Risk Analysis
MS&E 251	Introduction to Stochastic Control with Applications
or MS&E 351	Dynamic Programming and Stochastic Control
MS&E 252	Decision Analysis I: Foundations of Decision Analysis
MS&E 352	Decision Analysis II: Professional Decision Analysis
MS&E 353	Decision Analysis III: Frontiers of Decision Analysis
MS&E 355	Influence Diagrams and Probabilistic Networks

Recommended:

MS&E 245A	Investment Science
MS&E 254	The Ethical Analyst
MS&E 270	Strategy in Technology-Based Companies
MS&E 280	Organizational Behavior: Evidence in Action
MS&E 299	Voluntary Social Systems
MS&E 321	Stochastic Systems
or STATS 218	Introduction to Stochastic Processes II
CS 228	Probabilistic Graphical Models: Principles and Techniques
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving
ECON 286	Game Theory and Economic Applications
ECON 290	Multiperson Decision Theory
MGTECON 332	
STATS 200	Introduction to Statistical Inference
or STATS 201	Design and Analysis of Experiments
or STATS 202	Data Mining and Analysis
or ECON 271	Intermediate Econometrics II

### Finance

The finance area focuses on the quantitative and statistical study of financial risks, institutions, markets, and technology. Students take courses in probability, statistics, optimization, finance, economics, and computational mathematics as well as a variety of other courses. Recent dissertation topics include studies of machine learning methods for risk management; systemic financial risk; algorithmic trading; optimal order execution; large-scale portfolio optimization; mortgage markets; and

statistical testing of financial models. PhD students in the area typically are affiliated with the Center for Financial and Risk Analytics (CFRA).

Prerequisites (may be waived based on prior coursework)

Mathematics	
MATH 113	Linear Algebra and Matrix Theory
MATH 115	Functions of a Real Variable
or MATH 171	Fundamental Concepts of Analysis

Probability

MS&E 220	Probabilistic Analysis
or STATS 116	Theory of Probability
MS&E 221	Stochastic Modeling

Statistics

STATS 110	Statistical Methods in Engineering and the Physical Sciences
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Programming

CS 106A	Programming Methodology
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Economics

MS&E 241	Economic Analysis
or ECON 50	Economic Analysis I

Required Core Courses

Optimization

MS&E 211	Introduction to Optimization
or MS&E 211X	Introduction to Optimization (Accelerated)
or MS&E 310	Linear Programming
or MS&E 311	Optimization

Stochastics

MS&E 321	Stochastic Systems
or MS&E 322	Stochastic Calculus and Control

Statistics

STATS 200	Introduction to Statistical Inference
or STATS 305A	Introduction to Statistical Modeling
or STATS 315A	Modern Applied Statistics: Learning

Numerical Methods

MS&E 223	Simulation
or CME 200	Linear Algebra with Application to Engineering Computations
or CME 206	Introduction to Numerical Methods for Engineering

Strongly Recommended

STATS 300A	Theory of Statistics I
STATS 310A	Theory of Probability I

Elective Courses (select at least 4)

MS&E 245A	Investment Science
MS&E 245B	Advanced Investment Science
MS&E 246	Financial Risk Analytics
MS&E 347	Credit Risk: Modeling and Management
MS&E 348	Optimization of Uncertainty and Applications in Finance
MS&E 349	Financial Statistics
ECON 236	Financial Economics I
ECON 237	Financial Economics II
ECON 273	Advanced Econometrics I
ECON 274	Advanced Econometrics II
ECON 276	Computational Econometrics
FINANCE 622	Dynamic Asset Pricing Theory
FINANCE 625	Empirical Asset Pricing
FINANCE 632	Empirical Dynamic Asset Pricing
MATH 238	Mathematical Finance

STATS 231	Statistical Learning Theory
STATS 240	Statistical Methods in Finance
STATS 243	Risk Analytics and Management in Finance and Insurance
STATS 315B	Modern Applied Statistics: Data Mining

Students should discuss their course schedule with their dissertation advisors. Other courses in MS&E, Economics, Finance, Scientific Computing, or Statistics at the MS&E 300-level (or comparable in other departments) may be chosen after consulting with the dissertation advisor.

#### Finance Qualifying Procedure

In addition to beginning an appropriate course program, students must pass two quarters of tutorial and an oral examination to obtain qualification. The tutorials emphasize basic research skills. The oral examination emphasizes command of basic concepts as represented in the required courses as well as the modeling of practical situations.

#### Energy and Environment Policy (see Policy and Strategy)

#### Health Policy (see Policy and Strategy)

#### National Security Policy (see Decision and Risk Analysis)

#### Operations Management

Foundation courses (may be waived based on prior coursework):

MS&E 211	Introduction to Optimization
or MS&E 211X	Introduction to Optimization (Accelerated)
MS&E 241	Economic Analysis
or ECON 202N	Microeconomics I For Non-Economics PhDs
MS&E 260	Introduction to Operations Management

Methodology courses (all):

MS&E 221	Stochastic Modeling
or STATS 217	Introduction to Stochastic Processes I
MS&E 223	Simulation
or STATS 362	Topic: Monte Carlo
MS&E 251	Introduction to Stochastic Control with Applications
or MS&E 351	Dynamic Programming and Stochastic Control
MS&E 311	Optimization
or EE 364A	Convex Optimization I
MS&E 321	Stochastic Systems
MS&E 335	Queueing and Scheduling in Processing Networks
ECON 203N	Microeconomics II For Non-Economics PhDs

OM research courses (any four):

MS&E 336	Platform and Marketplace Design
MS&E 365	Advanced Topics in Market Design
Faculty-approved GSB OIT Ph.D. courses (about six are offered every two years).	

#### Optimization and Stochastics

Prerequisites:

MS&E 220	Probabilistic Analysis
or STATS 116	Theory of Probability
MS&E 221	Stochastic Modeling
or STATS 217	Introduction to Stochastic Processes I
MS&E 241	Economic Analysis
or ECON 50	Economic Analysis I
CS 106A	Programming Methodology
or CS 106X	Programming Abstractions (Accelerated)
MATH 113	Linear Algebra and Matrix Theory
MATH 115	Functions of a Real Variable
or MATH 171	Fundamental Concepts of Analysis

Strongly Recommended:

CME 108	Introduction to Scientific Computing
STATS 200	Introduction to Statistical Inference
STATS 203	Introduction to Regression Models and Analysis of Variance

Core (four courses):

MS&E 310	Linear Programming
MS&E 321	Stochastic Systems
Two of the following three courses:	
MS&E 311	Optimization
MS&E 316	Discrete Mathematics and Algorithms
STATS 310A	Theory of Probability I

Three to four courses in some coherent area of specialization.

In addition to the four core courses, students should take at least four 3-4 unit courses in some coherent area of specialization. The area of specialization may be methodological; examples include (but are not limited to) optimization, stochastic systems, stochastic control, algorithms, economic analysis, statistical inference, scientific computing, etc. The area of specialization could also have a significant modeling and application component, such as (but not limited to) information services, telecommunications, financial engineering, supply chains, health care, energy, etc. Independent of the choice of specialization, students are encouraged to take a range of courses covering methodology, modeling, and applications. Any MS&E courses satisfying this requirement must be at the 300-level, while courses outside MS&E must be at a comparable level. Students are expected to earn a letter grade of A- or better in all courses counted for the requirements. A student's plan for completing these requirements must be discussed with and approved by their faculty adviser by the beginning of Autumn Quarter of their second year.

#### Optimization and Stochastics Qualifying Procedure

Students take the area qualifying exam at the beginning of their second year of study. The qualifying exam consists of two written exams: one in Optimization and one in Stochastic Systems. The first exam covers the material in MS&E 310 and related prerequisites. The second exam covers the material in MS&E 321 and related prerequisites.

The student does two quarter-length tutorials with Optimization and Stochastics faculty (or affiliated faculty). A written report approved by the supervising faculty member is required on each tutorial. In addition, at the end of the second year, students are expected to make a 30-minute presentation to the broader Optimization and Stochastics faculty. The presentation must include original research or promising directions towards original research. The student can do both tutorials with the same faculty member; in this case a single written report is sufficient, and the presentation can be of the two tutorials together.

#### Organizations, Strategy, Innovation, and Entrepreneurship

Foundation in Organizational Behavior (five courses):

OB 671	Social Psychology of Organizations
SOC 363A	Seminar on Organizational Theory
or OB 672	Organization and Environment

Plus three of the following, which must include at least one 37x course and one 38x course:

MS&E 371	Innovation and Strategic Change
MS&E 372	Entrepreneurship Doctoral Research Seminar
MS&E 376	Strategy Doctoral Research Seminar
MS&E 380	Doctoral Research Seminar in Organizations
MS&E 384	Groups and Teams
MS&E 387	Design of Field Research Methods
MS&E 388	Contemporary Themes in Work and Organization Studies

**Statistics and Research Methods (examples; three courses required)**

MS&E 231	Introduction to Computational Social Science
MS&E 379	Social Data Analysis
MS&E 387	Design of Field Research Methods
PSYCH 252	Statistical Methods for Behavioral and Social Sciences
SOC 381	Sociological Methodology I: Introduction
SOC 382	Sociological Methodology II: Principles of Regression Analysis
SOC 383	Sociological Methodology III: Models for Discrete Outcomes
SOC 384	New Models and Methods in the Social Sciences

In their first two years in the Ph.D. program, all students are expected to work with faculty on research. To ensure an early start, all students must work at least 25% of their time in their first year as a research assistant with a faculty member. Students on fellowships can earn course credit for the work. With approval from the students' adviser, one quarter of the requirement may be fulfilled by working as a Course Assistant (CA).

Ph.D. students in organizational behavior must take 3 courses in statistics and research methods. Two of these courses must be statistics courses.

Ph.D. students are required to take a minimum of 2 advanced-content courses chosen with input from their adviser.

Students are expected to complete a yearly plan, of no more than two typed pages in length, detailing the student's plans for the next year in terms of education (e.g., courses and seminars), research (e.g., RAships), and teaching (e.g., TAships). This plan should be provided to the students' academic adviser for review no later than May 15 each calendar year.

**Policy and Strategy**

The Policy and Strategy (P&S) Area addresses policy and strategy questions in a variety of organizational and societal settings. In order to approach interdisciplinary research questions in application domains as diverse as energy, environment, health, information technology, innovation, and government regulation, P&S faculty members rely on a broad range of analytical and empirical tools, such as decision analysis, optimization and operations research methods, formal economic modeling, econometrics, case studies, and simulation. After having been exposed to foundational knowledge of economics, strategy, and organizational theory, doctoral students in the P&S Area can select from a variety of courses to deepen their understanding of the specific application domains. The P&S Area's mission is to provide a first-class learning and research environment preparing doctoral students for careers at research universities, government institutions, and in the private sector.

**Foundation in Policy and Strategy (three):**

MS&E 241	Economic Analysis
MS&E 375	
or MS&E 376	Strategy Doctoral Research Seminar
or MS&E 390	Doctoral Research Seminar in Health Systems Modeling
or MS&E 391	Doctoral Research Seminar in Energy-Environmental Systems Modeling and Analysis

**Statistics and Research Methods (three):**

MS&E 201	Dynamic Systems
MS&E 211	Introduction to Optimization
or MS&E 211X	Introduction to Optimization (Accelerated)
MS&E 212	Mathematical Programming and Combinatorial Optimization

MS&E 221	Stochastic Modeling
MS&E 223	Simulation
MS&E 352	Decision Analysis II: Professional Decision Analysis
PSYCH 252	Statistical Methods for Behavioral and Social Sciences
SOC 383	Sociological Methodology III: Models for Discrete Outcomes
SOC 384	New Models and Methods in the Social Sciences

The student must select a program of four or more electives including disciplinary depth courses that reflects his or her interests and this approved by the Policy and Strategy faculty. The following are a number of sample programs:

**Sample Program: Modeling Emphasis****Research Methods**

MS&E 201	Dynamic Systems
MS&E 252	Decision Analysis I: Foundations of Decision Analysis
MS&E 311	Optimization
MS&E 321	Stochastic Systems

**Domain Depth**

MS&E 292	Health Policy Modeling
HRP 392	Analysis of Costs, Risks, and Benefits of Health Care

**Two of the following:**

MS&E 263	Healthcare Operations Management
MS&E 463	Healthcare Systems Design
HRP 256	Economics of Health and Medical Care
HRP 263	Advanced Decision Science Methods and Modeling in Health

**Sample Program: Economics Emphasis****Research Methods**

ECON 282	Contracts, Information, and Incentives
ECON 286	Game Theory and Economic Applications

**Domain Depth**

ECON 257	Industrial Organization 1
ECON 285	Matching and Market Design

**Sample Program: Strategy Emphasis****Research Methods**

MS&E 408	Directed Reading and Research ( (Methods Apprenticeship))
SOC 369	Social Network Methods

**Domain Depth**

MS&E 371	Innovation and Strategic Change
MS&E 376	Strategy Doctoral Research Seminar
SOC 314	Economic Sociology

**Sample Program: Risk Analysis Emphasis****Research Methods**

MS&E 250A	Engineering Risk Analysis
MS&E 251	Introduction to Stochastic Control with Applications
MS&E 252	Decision Analysis I: Foundations of Decision Analysis
MS&E 355	Influence Diagrams and Probabilistics Networks

**Domain Depth**

MS&E 250B	Project Course in Engineering Risk Analysis
MS&E 353	Decision Analysis III: Frontiers of Decision Analysis

Students are expected to complete a yearly plan, of no more than two typed pages in length, detailing the student's plans for the next year in terms of education (e.g., courses and seminars), research (e.g., RAships), and teaching (e.g., TAs). This plan should be provided to the students' academic adviser for review no later than May 15 each calendar year.

#### **Policy and Strategy Qualifying Procedure**

Advancement to Ph.D. candidacy is determined at the end of the student's second year of studies, based on the following three components:

1. the student's overall grade point average in the program (a GPA of 3.5 or higher is required);
2. a second-year research paper that is written by the student under the supervision of a faculty member, and that is presented to examining faculty members in the second year;
3. a written and an oral qualifying examination taken by the student in the spring quarter of the second year.

## **Ph.D. Minor in Management Science and Engineering**

Students pursuing a Ph.D. in another department who wish to receive a Ph.D. minor in Management Science and Engineering should consult the MS&E student services office. A minor in MS&E may be obtained by completing 20 units of approved graduate-level MS&E courses, of which at least 6 units must be at the 300-level. Courses approved for the minor must form a coherent program, and include a breadth of courses from across the department. The program must include a minimum of 16 letter-graded units, and a minimum grade point average of 3.3 must be achieved in these courses.

*Emeriti: (Professors)* James L. Adams, Stephen R. Barley, Richard W. Cottle, B. Curtis Eaves, Warren H. Hausman, Frederick S. Hillier, Donald L. Iglehart, David G. Luenberger, Michael M. May, William J. Perry, David A. Thompson; *(Professor, Research)* Siegfried S. Hecker, Walter Murray, Michael A. Saunders,

*Chair:* Nicholas Bambos

*Professors:* Nicholas Bambos, Margaret L. Brandeau, Kathleen M. Eisenhardt, Peter W. Glynn, Ashish Goel, Pamela J. Hinds, Ronald A. Howard, Riitta Katila, M. Elisabeth Paté-Cornell, Robert I. Sutton, James L. Sweeney, Benjamin Van Roy, Yinyu Ye

*Associate Professors:* Jose Blanchet, Samuel S. Chiu, Charles E. Easley, Kay Giesecke, Ramesh Johari, Amin Saberi, Ross D. Shachter, Edison T. S. Tse

*Assistant Professors:* Itai Ashlagi, Sharad Goel, Markus Pelger, Aaron Sidford, Johan Ugander, Melissa A. Valentine

*Professors (Research):* John P. Weyant

*Professors (Teaching):* Thomas H. Byers, Robert E. McGinn

*Professor of the Practice:* Tina L. Seelig

*Courtesy Professors:* Stephen P. Boyd, Douglas K. Owens, Walter Powell, Balaji Prabhakar, Alvin Roth, Tim Roughgarden

# MATERIALS SCIENCE AND ENGINEERING

Courses offered by the Department of Materials Science and Engineering are listed under the subject code MATSCI on the *Stanford Bulletin's* ExploreCourses (<http://explorecourses.stanford.edu/browse>) web site.

The Department of Materials Science and Engineering is concerned with the relation between the structure and properties of materials, factors that control the internal structure of solids, and processes for altering their structure and properties, particularly at the nanoscale.

## Mission of the Undergraduate Program in Materials Science and Engineering

The mission of the undergraduate program in Materials Science and Engineering is to provide students with a strong foundation in materials science and engineering with emphasis on the fundamental scientific and engineering principles which underlie the knowledge and implementation of material structure, processing, properties, and performance of all classes of materials used in engineering systems. Courses in the program develop students' knowledge of modern materials science and engineering, teach them to apply this knowledge analytically to create effective and novel solutions to practical problems, and develop their communication skills and ability to work collaboratively. The program prepares students for careers in industry and for further study in graduate school.

The B.S. in Materials Science and Engineering provides training for the materials engineer and also preparatory training for graduate work in materials science. Capable undergraduates are encouraged to take at least one year of graduate study to extend their course work through the coterminal degree program which leads to an M.S. in Materials Science and Engineering. Coterminal degree programs are encouraged both for undergraduate majors in Materials Science and Engineering and for undergraduate majors in related disciplines.

## Graduate Programs in Materials Science Engineering

Graduate programs lead to the degrees of Master of Science, Engineer, and Doctor of Philosophy. Graduate students can specialize in any of the areas of materials science and engineering.

## Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course and laboratory work in solid state fundamentals and materials engineering, and further course work in a technical depth area which may include a master's Research Report. Typical depth areas include nanocharacterization, electronic and photonic materials, energy materials, nano and biomaterials.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Materials Science and Engineering and related fields.

## Facilities

The department is located in the William F. Durand Building, with extensive facilities in the Jack A. McCullough Building and the Gordon and Betty Moore Materials Research Building. These buildings house offices for the chair, majority of the faculty, administrative and technical

staff, graduate students as well as lecture and seminar rooms. The research facilities are equipped to conduct electrical measurements, mechanical testing of bulk and thin film materials, fracture and fatigue of advanced materials, metallography, optical, scanning, transmission electron microscopy, atomic force microscopy, UHV sputter deposition, vacuum annealing treatments, wet chemistry, and x-ray diffraction.

The McCullough/Moore Complex is also the home for the Center for Magnetic Nanotechnology (CMN ([http://www.stanford.edu/group/nanomag\\_center](http://www.stanford.edu/group/nanomag_center))), Stanford Nanocharacterization Laboratory (SNL (<http://www.stanford.edu/group/snl>)) and Nanoscale Prototyping Laboratory (NPL (<http://npl-web.stanford.edu>); joint facility with Mechanical Engineering in Building 530). The department maintains a microcomputer cluster for its students, which is linked to the internet.

Depending on the needs of their programs, students and faculty also conduct research in a number of other departments and independent laboratories. Chief among these are the Stanford Nanofabrication Facility (SNF (<http://snf.stanford.edu>)), Geballe Laboratory for Advanced Materials (GLAM (<http://stanford.edu/group/glam>)), and Stanford Synchrotron Radiation Laboratory (SSRL (<http://www-ssl.slac.stanford.edu>)).

The Stanford Nanofabrication Facility (SNF) is a laboratory joining government and industrially funded research on microelectronic materials, devices, and systems. It houses a 10,000 sq. ft., class 100 clean room for Si and GaAs integrated circuit fabrication, a large number of electronic test, materials analysis, and computer facilities, and office space for faculty, staff, and students. In addition, the Center for Integrated Systems (CIS (<http://cis.stanford.edu>)) provides start-up research funds and maintains a fellow-mentor program with industry.

## Bachelor of Science in Materials Science and Engineering

### Mission Statement

The mission of the Materials Science and Engineering Program is to provide students with a strong foundation in materials science and engineering. The program's curriculum places special emphasis on the fundamental scientific and engineering principles which underlie the knowledge and implementation of materials structure, processing, properties, and performance of all classes of materials used in engineering systems. Courses in the program develop students' knowledge of modern materials science and engineering and teach them to apply this knowledge analytically to create effective and novel solutions to practical problems. The program prepares students for careers in industry or for further study in graduate school.

The undergraduate program provides training in solid state fundamentals and materials engineering. Students desiring to specialize in this field during their undergraduate period may do so by following the curriculum outlined in the Bachelor of Science in Materials Science and Engineering section of this bulletin as well as the School of Engineering Undergraduate Handbook ([http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Main\\_Page](http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Main_Page)). The University's basic requirements for the bachelor's degree are discussed in the Bachelor of Science in Materials Science and Engineering section of this bulletin. Electives are available so that students with broad interests can combine materials science and engineering with work in another science or engineering department.

Students interested in the minor should see the Materials Science and Engineering Minor section of this bulletin.



## Materials Science and Engineering (MATSCI)

Completion of the undergraduate program in Materials Science and Engineering leads to the conferral of the Bachelor of Science in Materials Science and Engineering.

### Mission of the Undergraduate Program in Materials Science and Engineering

The mission of the undergraduate program in Materials Science and Engineering is to provide students with a strong foundation in materials science and engineering with emphasis on the fundamental scientific and engineering principles which underlie the knowledge and implementation of material structure, processing, properties, and performance of all classes of materials used in engineering systems. Courses in the program develop students' knowledge of modern materials science and engineering, teach them to apply this knowledge analytically to create effective and novel solutions to practical problems, and develop their communication skills and ability to work collaboratively. The program prepares students for careers in industry and for further study in graduate school.

The B.S. in Materials Science and Engineering provides training for the materials engineer and also preparatory training for graduate work in materials science. Capable undergraduates are encouraged to take at least one year of graduate study to extend their course work through the coterminal degree program which leads to an M.S. in Materials Science and Engineering. Coterminal degree programs are encouraged both for undergraduate majors in Materials Science and Engineering and for undergraduate majors in related disciplines.

### Requirements

#### Mathematics

20 units minimum; see Basic Requirement 1<sup>1</sup>

Select one of the following: 5

MATH 51 Linear Algebra and Differential Calculus of Several Variables

CME 100/  
ENGR 154 Vector Calculus for Engineers

Select one of the following: 5

MATH 52 Integral Calculus of Several Variables

CME 104/  
ENGR 155B Linear Algebra and Partial Differential Equations for Engineers

Select one of the following: 5

MATH 53 Ordinary Differential Equations with Linear Algebra

CME 102/  
ENGR 155A Ordinary Differential Equations for Engineers

One additional course 5

#### Science

20 units minimum; see Basic Requirement 2<sup>2</sup> 20

Must include a full year of physics or chemistry, with one quarter of study in the other subject.

#### Technology in Society

One course; course chosen must be on the SoE Approved Courses list at <ughb.stanford.edu> the year taken; see Basic Requirement 3<sup>3</sup> 3-5

#### Engineering Fundamentals

Two courses minimum; see Basic Requirement 4<sup>4</sup>

Select one of the following: 4

ENGR 50 Introduction to Materials Science, Nanotechnology Emphasis<sup>4</sup>

ENGR 50E Introduction to Materials Science, Energy Emphasis<sup>4</sup>

ENGR 50M Introduction to Materials Science, Biomaterials Emphasis<sup>4</sup>

At least one additional courses 6-9

#### Materials Science and Engineering Depth

Materials Science Fundamentals: All of the following

MATSCI 142 Quantum Mechanics of Nanoscale Materials 4

MATSCI 143 Materials Structure and Characterization 4

MATSCI 144 Thermodynamic Evaluation of Green Energy Technologies 4

MATSCI 145 Kinetics of Materials Synthesis 4

Two of the following courses: 8

MATSCI 151 Microstructure and Mechanical Properties

MATSCI 152 Electronic Materials Engineering

MATSCI 156 Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution

MATSCI 158 Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life

MATSCI 190 Organic and Biological Materials

MATSCI 192 Materials Chemistry

MATSCI 193 Atomic Arrangements in Solids

MATSCI 194 Thermodynamics and Phase Equilibria

MATSCI 195 Waves and Diffraction in Solids

MATSCI 196 Defects in Crystalline Solids

MATSCI 197 Rate Processes in Materials

MATSCI 198 Mechanical Properties of Materials

MATSCI 199 Electronic and Optical Properties of Solids

Engineering Depth 16

Units Four laboratory courses for Sixteen units; Four units must be WIM

MATSCI 161 Energy Materials Laboratory (WIM)

MATSCI 164 Electronic and Photonic Materials and Devices Laboratory (WIM)

MATSCI 160 Nanomaterials Laboratory

MATSCI 162 X-Ray Diffraction Laboratory

MATSCI 163 Mechanical Behavior Laboratory

MATSCI 165 Nanoscale Materials Physics Computation Laboratory

Focus Area Options<sup>6</sup> 10

<sup>1</sup> Basic Requirement 1 (20 units minimum): see a list of approved Math Courses ([http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved\\_Courses](http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses)).

<sup>2</sup> Basic Requirement 2 (20 units minimum): see a list of approved Science Courses ([http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved\\_Courses](http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses)).

<sup>3</sup> Basic Requirement 3 (one course minimum): see a list of approved Technology in Society Courses ([http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved\\_Courses](http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses)).

<sup>4</sup> Basic Requirement 4 (3 courses minimum): see a list of approved Engineering Fundamentals ([http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved\\_Courses](http://www.stanford.edu/group/ughb/cgi-bin/handbook/index.php/Approved_Courses)) Courses. If both ENGR 50 Introduction to Materials Science, Nanotechnology Emphasis, ENGR 50E Introduction to Materials Science, Energy Emphasis, and/or ENGR 50M Introduction to Materials Science, Biomaterials Emphasis are taken, one may be used for the Materials Science Fundamentals requirement.

<sup>5</sup> ENGR 30 may be substituted for MATSCI 144 Thermodynamic Evaluation of Green Energy Technologies as long as the total MATSCI program units total 50 or more.

<sup>6</sup> Focus Area Options: 10 units from one of the following Focus Area Options below.

### Focus Area Options (Four courses for a minimum of 13 units; select from one of the ten Focus Areas.)

#### Bioengineering

BIOE 220	Introduction to Imaging and Image-based Human Anatomy
BIOE 281	Biomechanics of Movement
BIOE 284B	Cardiovascular Bioengineering
BIOE 333	Interfacial Phenomena and Bionanotechnology
BIOE 381	Orthopaedic Bioengineering
MATSCI 158	Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life
MATSCI 190	Organic and Biological Materials
MATSCI 380	Nano-Biotechnology
MATSCI 381	Biomaterials in Regenerative Medicine
MATSCI 382	Biochips and Medical Imaging

#### Chemical Engineering

CHEM 171	Physical Chemistry I
CHEMENG 130	Separation Processes
CHEMENG 140	Micro and Nanoscale Fabrication Engineering
CHEMENG 150	Biochemical Engineering
CHEMENG 160	Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life

#### Chemistry

CHEM 151	Inorganic Chemistry I
CHEM 153	Inorganic Chemistry II
CHEM 171	Physical Chemistry I
CHEM 173	Physical Chemistry II
CHEM 175	Physical Chemistry III
CHEM 181	Biochemistry I
CHEM 183	Biochemistry II
CHEM 185	Biophysical Chemistry

#### Electronics & Photonics

EE 101A	Circuits I
EE 101B	Circuits II
EE 102A	Signal Processing and Linear Systems I
EE 102B	Signal Processing and Linear Systems II
EE 116	Semiconductor Devices for Energy and Electronics
EE 134	Introduction to Photonics
EE 142	Engineering Electromagnetics (Formerly EE 141)
MATSCI 343	Organic Semiconductors for Electronics and Photonics

#### Energy Technology

EE 293B	Fundamentals of Energy Processes
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
MATSCI 302	Solar Cells
MATSCI 303	Principles, Materials and Devices of Batteries
ME 260	Fuel Cell Science and Technology

#### Materials Characterization Techniques

MATSCI 320	Nanocharacterization of Materials
MATSCI 321	Transmission Electron Microscopy
MATSCI 322	Transmission Electron Microscopy Laboratory
MATSCI 323	Thin Film and Interface Microanalysis
MATSCI 326	X-Ray Science and Techniques

#### Mechanical Behavior & Design

AA 240A	Analysis of Structures
AA 240B	Analysis of Structures
AA 256	Mechanics of Composites
MATSCI 198	Mechanical Properties of Materials
MATSCI 358	Fracture and Fatigue of Materials and Thin Film Structures
ME 80	Mechanics of Materials
or CEE 101A	Mechanics of Materials
ME 203	Design and Manufacturing

#### Nanoscience

BIOE 333	Interfacial Phenomena and Bionanotechnology
ENGR 240	Introduction to Micro and Nano Electromechanical Systems
MATSCI 316	Nanoscale Science, Engineering, and Technology
MATSCI 320	Nanocharacterization of Materials
MATSCI 346	Nanophotonics
MATSCI 347	Magnetic materials in nanotechnology, sensing, and energy
MATSCI 380	Nano-Biotechnology

#### Physics

PHYSICS 70	Foundations of Modern Physics
PHYSICS 110	Advanced Mechanics
PHYSICS 120	Intermediate Electricity and Magnetism I
PHYSICS 121	Intermediate Electricity and Magnetism II
PHYSICS 130	Quantum Mechanics I
PHYSICS 131	Quantum Mechanics II
PHYSICS 134	Advanced Topics in Quantum Mechanics
PHYSICS 170	Thermodynamics, Kinetic Theory, and Statistical Mechanics I
PHYSICS 171	Thermodynamics, Kinetic Theory, and Statistical Mechanics II
PHYSICS 172	Solid State Physics

#### Self-Defined Option

Petition for a self-defined cohesive program.
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For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

### Materials Science and Engineering (MATSCI) Minor

A minor in Materials Science and Engineering allows interested students to explore the role of materials in modern technology and to gain an understanding of the fundamental processes that govern materials behavior.

The following courses fulfill the minor requirements:

Units

#### Engineering Fundamentals

Select one of the following:	4
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis
ENGR 50E	Introduction to Materials Science, Energy Emphasis
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis

#### Materials Science Fundamentals and Engineering Depth

Select six of the following:	24
MATSCI 142	Quantum Mechanics of Nanoscale Materials
MATSCI 143	Materials Structure and Characterization
MATSCI 144	Thermodynamic Evaluation of Green Energy Technologies

MATSCI 145	Kinetics of Materials Synthesis
MATSCI 151	Microstructure and Mechanical Properties
MATSCI 152	Electronic Materials Engineering
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
MATSCI 158	Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life
MATSCI 160	Nanomaterials Laboratory
MATSCI 161	Energy Materials Laboratory
MATSCI 162	X-Ray Diffraction Laboratory
MATSCI 163	Mechanical Behavior Laboratory
MATSCI 164	Electronic and Photonic Materials and Devices Laboratory
MATSCI 165	Nanoscale Materials Physics Computation Laboratory
MATSCI 190	Organic and Biological Materials
MATSCI 192	Materials Chemistry
MATSCI 193	Atomic Arrangements in Solids
MATSCI 194	Thermodynamics and Phase Equilibria
MATSCI 195	Waves and Diffraction in Solids
MATSCI 196	Defects in Crystalline Solids
MATSCI 197	Rate Processes in Materials
MATSCI 198	Mechanical Properties of Materials
MATSCI 199	Electronic and Optical Properties of Solids

Total Units 28

## Master of Science in Materials Science Engineering

The University's basic requirements for the M.S. degree are discussed in the "Graduate Degrees (p. 50)" section of this bulletin. The following are specific departmental requirements.

The Department of Materials Science and Engineering requires a minimum of 45 units for a master's degree to be taken in residence at Stanford. A Master's Program Proposal (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/progpropma.pdf>) form should be filled out, signed by the student's academic adviser, and submitted to the department's student services manager by the end of the student's first quarter of study. Final revisions to the master's program proposal must be submitted no later than one academic quarter prior to the quarter of expected degree conferral. Stanford Materials Science undergraduates who are pursuing or who plan to pursue a Coterminal M.S. degree may have more flexibility in their programs and should consult with their academic advisers regarding appropriate core course and elective choices.

Degree requirements are as follows:

1. A minimum of 30 units of Materials Science and Engineering (MATSCI) course work, including core and lab courses specified below, all taken for a letter grade. Research units, one-unit seminars, MATSCI 299 Practical Training and courses in other departments (i.e., where students cannot enroll in a class with a MATSCI subject code) cannot be counted for this requirement.
2. Of these 30 units Materials Science requirements, students must include a or b.
  - a. three classes from MATSCI 201-210 core courses and three MATSCI 171, 172, 173, 174, 175 laboratory courses. One laboratory requirement may be fulfilled by taking a lab course from another engineering department.

**Select three of the following core courses:**

MATSCI 201	Applied Quantum Mechanics I	3
MATSCI 202	Materials Chemistry	3
MATSCI 203	Atomic Arrangements in Solids	3
MATSCI 204	Thermodynamics and Phase Equilibria	3
MATSCI 205	Waves and Diffraction in Solids	3
MATSCI 206	Defects in Crystalline Solids	3
MATSCI 207	Rate Processes in Materials	3
MATSCI 208	Mechanical Properties of Materials	3
MATSCI 209	Electronic and Optical Properties of Solids	3
MATSCI 210	Organic and Biological Materials	3
<b>Total core course units</b>		<b>9</b>

**Select three of the following lab courses:**

MATSCI 171	Energy Materials Laboratory	3
MATSCI 172	X-Ray Diffraction Laboratory	3
MATSCI 173	Mechanical Behavior Laboratory	3
MATSCI 174	Electronic and Photonic Materials and Devices Laboratory	3
MATSCI 175	Nanoscale Materials Physics Computation Laboratory	3

One laboratory requirement may be fulfilled by taking lab courses from another engineering dept.

**Total lab course units** 9  
**TOTAL** 18

- b. four classes from MATSCI 201-210 core courses and two MATSCI 171, 172, 173, 174, 175 laboratory courses. One laboratory requirement may be fulfilled by taking a lab course from another engineering department.

**Select four of the following core courses:**

MATSCI 202	Materials Chemistry	3
MATSCI 203	Atomic Arrangements in Solids	3
MATSCI 204	Thermodynamics and Phase Equilibria	3
MATSCI 205	Waves and Diffraction in Solids	3
MATSCI 206	Defects in Crystalline Solids	3
MATSCI 207	Rate Processes in Materials	3
MATSCI 208	Mechanical Properties of Materials	3
MATSCI 209	Electronic and Optical Properties of Solids	3
MATSCI 210	Organic and Biological Materials	3
<b>Total core course units</b>		<b>12</b>

**Select two of the following lab courses:**

MATSCI 171	Energy Materials Laboratory	3
MATSCI 172	X-Ray Diffraction Laboratory	3
MATSCI 173	Mechanical Behavior Laboratory	3
MATSCI 174	Electronic and Photonic Materials and Devices Laboratory	3
MATSCI 175	Nanoscale Materials Physics Computation Laboratory	3

One laboratory requirement may be fulfilled by taking lab courses from another engineering dept.

**Total lab course units** 6  
**TOTAL** 18

3. 15 units of approved course electives to result in a technically cohesive program. Of the 15 units of elective courses:
  - a. 12 units must be taken for a letter grade (except for those submitting a M.S. thesis report).
  - b. a maximum of three units may be seminars.
  - c. if writing a master's thesis report, a minimum of 6 and a maximum of 15 units of MATSCI 200 Master's Research may be

Units

Units

counted. Master's research units may be counted only if writing a M.S. thesis report. The final version of the thesis report must be signed off by two faculty and submitted to student services manager by last day of classes of the graduation quarter. See student services manager for details and approval.

- d. a maximum of three units may be undergraduate units, but not courses below the 100 level offering.
  - e. a maximum of five units may be used for a foreign language course (not including any remedial English or courses in the student's native language if other than English). Students must plan to enroll in an upper level designation of a foreign language course offering.
  - f. the combination of seminar, undergraduate, and language units may not exceed six units total.
  - g. the combination of research, seminar, undergraduate, and language units may not exceed 15 units total.
  - h. activity units may not be counted toward M.S. degree.
4. A minimum grade point average (GPA) of 2.75 for degree course work.

All proposed degree programs are subject to approval by student's academic adviser, and department's student services manager, who has responsibility for assuring that each proposal is a technically cohesive program. The M.S. degree is expected to be completed within two years during the University's candidacy period for completion of a master's degree.

## Master's Thesis Report

Students wishing to take this option must consult with a MATSCI faculty member initially. Out of the 45 units M.S. degree requirements, 6-15 units may be taken in Materials Science Master's research by enrolling in MATSCI 200. Students using 15 units of research toward the degree must participate in a more complex and demanding research project than those using lesser units.

The M.S. thesis report must be approved and signed off by two faculty members. In general, one is student's research adviser, if adviser is a non MATSCI faculty member, a second MATSCI faculty is required to sign off on the thesis report. Consult with student services manager about faculty criteria, and requirements. Three copies of M.S. thesis report in final format should be submitted to two faculty advisers, and the department. The report is not an official University thesis but is intended to demonstrate to the department and faculty student's ability to conduct and report a directed research.

As a general guide line, a 6-9 units of master's research is a normal load for most students. The report should reflect the number of units taken. For instance, 3-4 laboratory reports are required for a 3-unit laboratory course. Accordingly, the level expected for 9 units of research would be at least equivalent to three such courses.

Students are advised to submit their thesis draft to faculty adviser readers by the end of fifth week of the quarter in which the units are to be assigned to allow time for faculty comments and revisions. A collated final version of the thesis report should be submitted to faculty and student services manager by last day of classes of student's graduation quarter. The appropriate grade for satisfactory progress in the research project prior to submission of the final report is 'N' (continuing); the 'S' (Satisfactory) final grade is given only when the report is fully approved and signed off by both faculty members.

In cases where students decide to pursue research after the initial program submission deadline, they should submit a revised M.S. Program Proposal at least two quarters before the degree is granted. The total combined units of Materials Science research units, seminars, language courses, and undergraduate courses cannot exceed 15. If a master's thesis report is not submitted, units in MATSCI 200 Master's

Research cannot be applied to the department's requirement of 45 units for the conferral of the master's degree.

## Honors Cooperative Program

Some of the department's graduate students participate in the Honors Cooperative Program (HCP), which makes it possible for academically qualified engineers and scientists in industry to be part-time graduate students in Materials Science while continuing professional employment. Prospective HCP students follow the same admissions process and must meet the same admissions requirements as full-time graduate students. For information regarding the Honors Cooperative Program, see Graduate Programs in the "School of Engineering (p. 198)" section of this bulletin.

## Petition Process for Transfer from M.S. to Ph.D. Degree Program

Students admitted to graduate programs are admitted specifically into either the terminal M.S. or the Ph.D. program. A student admitted to the terminal M.S. program should not assume admission to the Ph.D. program. Admission to the Ph.D. program is required for a student to be eligible to work towards the Ph.D. degree.

A student in the terminal M.S. program may petition to be admitted to the Ph.D. program by filing an M.S. to Ph.D. petition form. Petition must include a one-page statement of purpose explaining why the student wishes to transfer to the Ph.D. program, most recent unofficial transcript, and two letters of recommendation from members of the Stanford faculty, including one from the student's prospective research adviser and at least one from a Materials Science faculty member belonging to the Academic Council. The M.S. to Ph.D. petition to transfer should be submitted to the student services manager by June of the first year in the M.S. program. Students who wish to submit a petition to the Ph.D. degree, should plan to complete at least six of the MATSCI 200 series (including MATSCI 203 Atomic Arrangements in Solids, MATSCI 204 Thermodynamics and Phase Equilibria, MATSCI 207 Rate Processes in Materials) core courses during their first year of admission. A grade point average (GPA) of 3.5 or better in the core courses is requirement.

Transferring to the Ph.D. program is a competitive process and only highly qualified M.S. students may be admitted. Student's original application to the graduate program as well as the materials provided for the transfer petition are reviewed. Students must adhere to requirements for the terminal M.S. degree, and plan to confer the M.S. degree in the event that the Ph.D. petition to transfer is not approved.

## Coterminal Master of Science Program in Materials Science and Engineering

Stanford undergraduates who wish to continue their studies for the Master of Science degree in Materials Science and Engineering through the Coterminal program may apply for admission after they have earned 120 units toward graduation (UTG) as shown on the undergraduate unofficial transcript. Applicants must submit their application no later than eight weeks before the start of the proposed admit quarter. The application must give evidence that student possesses a potential for strong academic performance at the graduate level. Scores from the Graduate Record Examination (GRE) General Test must be reported before action can be taken on an application.

Materials science is a highly integrated and interdisciplinary subject, therefore students of any engineering or science undergraduate major are encouraged to apply.

Information and other requirements pertaining to the Coterminal program in Materials Science and Engineering may be obtained from the department's student services manager.

## University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Engineer in Materials Science Engineering

The University's basic requirements for the degree of Engineer are outlined in the "Graduate Degrees" section of this bulletin.

A student wishing to enter the Engineer program must have completed the requirements of the M.S. in Materials Science and Engineering, and must file a petition requesting admission to the program, stating the type of research to be done and the proposed supervising professor. Once approved, the Application for Candidacy must be submitted to the department's student services manager by the end of the second quarter in the Engineer program. Final changes in the Application for Candidacy form must be submitted no later than one academic quarter prior to degree conferral.

The 90-unit program must include 9 units of graduate courses in Materials Science with a MATSCI subject code (no research units, seminars, colloquia, and MATSCI 400 Participation in Materials Science Teaching, Participation in Teaching) beyond the requirements for the M.S. degree, and additional research or other units to meet the 90-unit University minimum requirement. A grade point average (GPA) of 3.0 must be maintained for all degree course work taken at Stanford.

The Engineer thesis must be approved and signed off by two Academic Council faculty members, one must be a MATSCI faculty member.

## Doctor of Philosophy in Materials Science Engineering

The University's basic requirements for the Ph.D. degree are outlined in the "Graduate Degrees (p. 50)" section of this bulletin.

The Ph.D. degree is awarded after the completion of a minimum of 135 units of graduate work as well as satisfactory completion of any additional University requirements. Degree requirements for the department are as follows:

### Core Courses<sup>1</sup>

EE 222	Applied Quantum Mechanics I
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### Units

30

MATSCI 202	Materials Chemistry
MATSCI 203	Atomic Arrangements in Solids
MATSCI 204	Thermodynamics and Phase Equilibria
MATSCI 205	Waves and Diffraction in Solids
MATSCI 206	Defects in Crystalline Solids
MATSCI 207	Rate Processes in Materials
MATSCI 208	Mechanical Properties of Materials
MATSCI 209	Electronic and Optical Properties of Solids
MATSCI 210	Organic and Biological Materials

<b>Five Elective Graduate Technical Courses<sup>2</sup></b>	<b>15</b>
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<b>Materials Science Colloquia<sup>3</sup></b>	<b>3</b>
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MATSCI 230	Materials Science Colloquium (Autumn 2014)
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MATSCI 230	Materials Science Colloquium (Winter 2015)
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MATSCI 230	Materials Science Colloquium (Spring 2015)
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<b>Research &amp; Electives</b>	<b>87</b>
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75 Units of MATSCI 300: Ph.D. Research
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12 Units of Electives <sup>4</sup>
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<sup>1</sup> At least six of these courses must be taken during the first year (including MATSCI 203 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering>) Atomic Arrangements in Solids, MATSCI 204 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering>) Thermodynamics and Phase Equilibria, and MATSCI 207 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering>) Rate Processes in Materials). All core courses must be completed for a letter grade, and taken during the first two years in the program.

<sup>2</sup> Elective technical courses must be in areas related directly to student's research interest in Materials Science and Engineering, and may not include MATSCI 230 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering>) Materials Science Colloquium, MATSCI 299 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering>) Practical Training, MATSCI 300 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering>) Ph.D. Research or MATSCI 400 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering>) Participation in Materials Science Teaching. All courses must be completed for a letter grade.

<sup>3</sup> Materials Science & Engineering Ph.D. students are required to take MATSCI 230 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering>) Materials Science Colloquium during each quarter of their first year. Attendance is required, roll is taken, and more than two absences results to an automatic "No Pass" grade.

<sup>4</sup> May include other engineering courses, or MATSCI 400 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering>) Participation in Materials Science Teaching or a maximum of 3 units MATSCI 299 (<http://exploreddegrees.stanford.edu/schoolofengineering/materialsscienceandengineering>) Practical Training

- Students must consult with their academic adviser on Ph.D. course selection planning. For students with a non-MATSCI research adviser, the MATSCI academic/co-adviser must also approve the list of proposed courses. Any proposed deviations from the requirements can only be considered by petition.
- Ph.D. students are required to apply for and have conferred a MATSCI M.S. degree normally by the end of their third year of studies. A Graduate Program Authorization Petition (in Axxess) and an M.S. Program Proposal (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/progpropma.pdf>) must be submitted after taking the Ph.D. qualifying examination.
- A departmental oral qualifying examination must be passed by the end of January of the second year. A grade point average (GPA) of 3.5 in core courses MATSCI 201-210 is required for admission to

the Ph.D. qualifying examination. Students who have passed the Ph.D. qualifying examination are required to complete the Application for Candidacy to the Ph.D. degree by June of the second year after passing the qualifying examination. Final changes in the Application for Candidacy form must be submitted no later than one academic quarter prior to the TGR status.

- Maintain a cumulative GPA of 3.0 in all courses taken at Stanford.
- Students must present the results of their research dissertation at the University Ph.D. oral defense examination.
- Current students subject to either this set of requirements or a prior set must obtain the approval of their adviser before filing a revised program sheet, and should as far as possible adhere to the intent of the new requirements.
- Students may refer the list of "Advanced Specialty Courses and Cognate Courses" provided below as guidelines for their selection of technical elective units. As noted above, academic adviser approval is required.
- At least 90 units must be taken in residence at Stanford. Students entering with an M.S. degree in Materials Science from another university may request to transfer up to 45 units of equivalent work toward the total of 135 Ph.D. degree requirement units.
- Students may propose a petition for exemption from a required core course if they have taken a similar course in the past. To petition, a student must consult and obtain academic and/or research adviser approval, and consent of the instructor of the proposed core course. To assess a student's level of knowledge, the instructor may provide an oral or written examination on the subject matter. The student must pass the examination in order to be exempt from core course requirement. If the petition is approved, the student is required to complete the waived number of units by taking other relevant upper level MATSCI courses.

## Advanced Specialty Courses

### Biomaterials

APPPHYS 292 (Offered previous years, may be counted)

BIOPHYS 228

CHEMENG 260

CHEMENG 310 Microhydrodynamics

CHEMENG 355 Advanced Biochemical Engineering

ME 284A (Offered previous years, may be counted)

ME 284B (Offered previous years, may be counted)

ME 381 Orthopaedic Bioengineering

ME 385

ME 457 Fluid Flow in Microdevices

MATSCI 380 Nano-Biotechnology

MATSCI 381 Biomaterials in Regenerative Medicine

MATSCI 382 Biochips and Medical Imaging

### Electronic Materials Processing

EE 212 Integrated Circuit Fabrication Processes

EE 216 Principles and Models of Semiconductor Devices

EE 311 Advanced Integrated Circuits Technology

EE 316 Advanced VLSI Devices

EE 410

MATSCI 312 New Methods in Thin Film Synthesis

### Materials Characterization

APPPHYS 216

CHEMENG 345 Fundamentals and Applications of Spectroscopy

EE 329 (Not offered in 2013-2014)

MATSCI 312 New Methods in Thin Film Synthesis

MATSCI 320 Nanocharacterization of Materials

MATSCI 321	Transmission Electron Microscopy
MATSCI 322	Transmission Electron Microscopy Laboratory
MATSCI 323	Thin Film and Interface Microanalysis
MatSci 325	(Not offered in 2013-2014)
MATSCI 326	X-Ray Science and Techniques

### Mechanical Behavior of Solids

AA 252	Techniques of Failure Analysis
AA 256	Mechanics of Composites
MATSCI 251	Microstructure and Mechanical Properties
MATSCI 353	Mechanical Properties of Thin Films
MATSCI 358	Fracture and Fatigue of Materials and Thin Film Structures
ME 335A	Finite Element Analysis
ME 335B	Finite Element Analysis
ME 335C	Finite Element Analysis
ME 340	Mechanics - Elasticity and Inelasticity
ME 340A	(Offered previous years, may be counted)
ME 340B	(Offered previous years, may be counted)
ME 345	Fatigue Design and Analysis

### Physics of Solids and Computation

APPPHYS 272	Solid State Physics
APPPHYS 273	Solid State Physics II
EE 222	Applied Quantum Mechanics I
EE 223	Applied Quantum Mechanics II
EE 228	Basic Physics for Solid State Electronics
EE 327	Properties of Semiconductor Materials
EE 328	Physics of Advanced Semiconductor Devices
EE 329	The Electronic Structure of Surfaces and Interfaces
EE 335	(Offered previous years, may be counted)
MATSCI 331	Atom-based computational methods for materials
MATSCI 343	Organic Semiconductors for Electronics and Photonics
MATSCI 347	Magnetic materials in nanotechnology, sensing, and energy
ME 344A	(Offered previous years, may be counted)
ME 344B	(Offered previous years, may be counted)

### Soft Materials

CHEMENG 260	
CHEMENG 310	Microhydrodynamics
CHEMENG 460	(Offered previous years, may be counted)
MATSCI 343	Organic Semiconductors for Electronics and Photonics
ME 455	Complex Fluids and Non-Newtonian Flows

## Ph.D. Minor in Materials Science and Engineering

The University's basic requirements for the Ph.D. minor are outlined in the "Graduate Degrees (p. 52)" section of this bulletin. A minor requires 20 units of graduate work of quality and depth at the 200-level or higher in the Materials Science and Engineering course offering. Courses must be taken for a letter grade. The proposed list of courses must be approved by department's advanced degree committee. Individual programs must be submitted to the student services manager at least one quarter prior to the quarter of the degree conferral. None of the units taken for the Ph.D. minor may overlap with any M.S. degree units.

*Chair:* Paul C. McIntyre (<http://engineering.stanford.edu/profile/bobsinc>)

*Associate Chair:* Shan Xiang Wang (<http://engineering.stanford.edu/profile/rhd>)

*Professors:* Mark L. Brongersma (<http://engineering.stanford.edu/profile/markb29>), Bruce M. Clemens (<http://engineering.stanford.edu/profile/bmc>), Reinhold H. Dauskardt (<http://engineering.stanford.edu/profile/rhd>), Persis S. Drell, (<https://engineering.stanford.edu/about/persis-s-drell-dean>) Michael D. McGehee (<http://engineering.stanford.edu/profile/mmcgehee>), Paul C. McIntyre (<http://engineering.stanford.edu/profile/pcm1>), Friedrich B. Prinz (<http://engineering.stanford.edu/profile/fprinz>), Robert Sinclair (<http://engineering.stanford.edu/profile/bobsinc>), Yi Cui (<http://engineering.stanford.edu/profile/yicui>), Shan X. Wang (<http://engineering.stanford.edu/profile/sxwang>)

*Associate Professors:* Sarah C. Heilshorn, (<http://engineering.stanford.edu/profile/sarah7>) Nicholas A. Melosh (<http://engineering.stanford.edu/profile/nmelosh>), Alberto Salleo (<http://engineering.stanford.edu/profile/asalleo>), Jennifer A. Dionne, (<http://engineering.stanford.edu/profile/jdionne>) Aaron M. Lindenberg, Andrew Spakowitz (<http://engineering.stanford.edu/profile/aaronl>)

*Assistant Professors:* William Chueh ([http://chuehlab.stanford.edu/Chueh\\_Lab/Home.html](http://chuehlab.stanford.edu/Chueh_Lab/Home.html)), Evan J. Reed, (<http://engineering.stanford.edu/profile/evanreed>) Eric Appel (<https://profiles.stanford.edu/eric-appel>)

*Courtesy Professors:* Zhenan Bao (<https://mse.stanford.edu/people/zhenan-bao>), Stacey F. Bent (<https://profiles.stanford.edu/stacey-bent>), Ian R. Fisher (<http://web.stanford.edu/group/fisher>), Curtis W. Frank ([http://web.stanford.edu/group/frankgroup/people\\_overview.html](http://web.stanford.edu/group/frankgroup/people_overview.html)), Sanjiv Gambhir (<https://med.stanford.edu/profiles/sanjiv-gambhir>), Geoffrey C. Gurtner (<https://med.stanford.edu/profiles/geoffrey-gurtner>), James S. Harris (<http://www-ee.stanford.edu/~harris>), Michael T. Longaker (<https://med.stanford.edu/profiles/michael-longaker>), Arunava Majumdar, (<https://profiles.stanford.edu/arun-majumdar>) Yoshio Nishi (<http://nanodevice.stanford.edu/people.html>), James D. Plummer (<https://profiles.stanford.edu/jim-plummer>), Krishna Saraswat (<http://saraswatgroup.stanford.edu/>), Jonathan Stebbins (<http://www.stanford.edu/~caiwei>), Wei Cai, (<https://mse.stanford.edu/people/wei-cai>) Andrew Spakowitz, (<http://web.stanford.edu/~ajspakow>) Peter Yang (<https://mse.stanford.edu/people/peter-yang>), Eric Pop (<https://mse.stanford.edu/people/eric-pop>), Matteo Cargnello (<https://mse.stanford.edu/people/matteo-cargnello>), Christopher Chidsey (<https://mse.stanford.edu/people/christopher-chidsey>)

*Lecturers:* Ann Marshall, Arturas Vaionis, Ryan Brock (<http://web.stanford.edu/group/glam/xlab/Contact.htm>)

*Adjunct Professors:* Turgut M. Gur (<http://www.stanford.edu/~turgut>), (<http://web.stanford.edu/~turgut>) Michael A. Kelly (<https://med.stanford.edu/profiles/63114>), Kristin Persson (<http://eetd.lbl.gov/people/kristin-persson>), Baylor Triplett, Robert M. White, Geraud Jean-Michel Dubois (<http://researcher.watson.ibm.com/researcher/view.php?person=us-gdubois>), Khalil Amine (<https://mse.stanford.edu/people/khalil-amine>)

*Emeriti: (Professors)* Clayton W. Bates Jr., John C. Bravman, Richard H. Bube (<http://engineering.stanford.edu/profile/bube>), Theodore H. Geballe (<http://www.stanford.edu/dept/app-physics/cgi-bin/person/geballe-theodore-h>), Robert A. Huggins\*, William D. Nix \*, John C. Shyne, William A. Tiller, Robert L. White\*, (<http://engineering.stanford.edu/profile/barnett>) David M. Barnett, Robert S. Feigelson (<http://engineering.stanford.edu/profile/feigel>)\* (*Professor, Research*)

\* Recalled to active duty.

## Cognate Courses

AA 252 Techniques of Failure Analysis

AA 256	Mechanics of Composites	3
APPPHYS 216		
APPPHYS 270	Magnetism and Long Range Order in Solids	3
APPPHYS 272	Solid State Physics	3
APPPHYS 273	Solid State Physics II	3
APPPHYS 292	(Offered previous years, may be counted)	
BIOPHYS 228		
CHEMENG 260		
CHEMENG 310	Microhydrodynamics	3
CHEMENG 345	Fundamentals and Applications of Spectroscopy	3
CHEMENG 355	Advanced Biochemical Engineering	3
CHEMENG 460	(Offered previous years, may be counted)	
EE 212	Integrated Circuit Fabrication Processes	3
EE 216	Principles and Models of Semiconductor Devices	3
EE 222	Applied Quantum Mechanics I	3
EE 223	Applied Quantum Mechanics II	3
EE 228	Basic Physics for Solid State Electronics	3
EE 311	Advanced Integrated Circuits Technology	3
EE 312	(Offered in previous years, may be counted)	
EE 316	Advanced VLSI Devices	3
EE 327	Properties of Semiconductor Materials	3
EE 328	Physics of Advanced Semiconductor Devices	3
EE 329	The Electronic Structure of Surfaces and Interfaces	3
EE 335	(Offered in previous years, may be counted)	
EE 410		
ENGR 31		
ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	4
ENGR 50E	Introduction to Materials Science, Energy Emphasis	4
ENGR 50M	Introduction to Materials Science, Biomaterials Emphasis	4
ME 284A	(Offered in previous years, may be counted)	
ME 284B	(Offered in previous years, may be counted)	
ME 329	(Offered in previous years, may be counted)	
ME 335A	Finite Element Analysis	3
ME 335B	Finite Element Analysis	3
ME 335C	Finite Element Analysis	3
ME 340A	(Offered in previous years, may be counted)	
ME 340B	(Offered in previous years, may be counted)	
ME 344A	(Offered in previous years, may be counted)	
ME 344B	(Offered in previous years, may be counted)	
ME 345	Fatigue Design and Analysis	3
ME 381	Orthopaedic Bioengineering	3
ME 385		
ME 455	Complex Fluids and Non-Newtonian Flows	3
ME 457	Fluid Flow in Microdevices	3
PHYSICS 230	Graduate Quantum Mechanics I	3
PHYSICS 231	Graduate Quantum Mechanics II	3

### Units

3

# MECHANICAL ENGINEERING

Courses offered by the Department of Mechanical Engineering are listed under the subject code ME on the *Stanford Bulletin's* ExploreCourses web site.

The programs in the Department of Mechanical Engineering (ME) emphasize a mix of applied mechanics, biomechanical engineering, computer simulations, design, and energy science and technology. Since mechanical engineering is a broad discipline, the undergraduate program can be a springboard for graduate study in business, law, medicine, political science, and other professions where understanding technology is important. Both undergraduate and graduate programs provide technical background for work in biomechanical engineering, environmental pollution control, ocean engineering, transportation, and other multidisciplinary problems that concern society. In all programs, emphasis is placed on developing systematic procedures for analysis, communication of work and ideas, practical and aesthetic aspects in design, and responsible use of technology.

## Mission of the Undergraduate Program in Mechanical Engineering

The mission of the undergraduate program in Mechanical Engineering is to provide students with a balance of intellectual and practical experiences that enable them to address a variety of societal needs. The curriculum encompasses elements from a wide array of disciplines built around the themes of biomedicine, computational engineering, design, energy, and multiscale engineering. Course work may include mechatronics, computational simulation, solid and fluid dynamics, microelectromechanical systems, biomechanical engineering, energy science and technology, propulsion, sensing and control, nano- and micro-mechanics, and design. The program prepares students for entry-level work as mechanical engineers and for graduate studies in either an engineering discipline or another field where a broad engineering background is useful.

## Learning Objectives (Undergraduate)

These outcomes are operationalized through learning objectives, which students are expected to demonstrate:

1. Graduates of the program will have the scientific and technical background for successful careers in diverse organizations.
2. Graduates of the program will be leaders, and effective communicators, both in the profession and in the community.
3. Graduates of the program will be motivated and equipped to successfully pursue postgraduate study whether in engineering, or in other fields.
4. Graduates of the program will have a professional and ethical approach to their careers with a strong awareness of the social contexts in which they work.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes:

1. an ability to apply knowledge of science, engineering and mathematics including multivariate calculus and differential equations.
2. an ability to design and conduct experiments, as well as to analyze and interpret data
3. an ability to design a system, component, or process to meet desired needs within realistic constraints

4. an ability to identify, formulate, and solve engineering problems
5. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice
6. professional level design experience in both thermal and mechanical systems including the design and realization of either type of system
7. an ability to function on multidisciplinary teams
8. an understanding of professional and ethical responsibility
9. an ability to communicate effectively
10. an ability to understand the impact of engineering solutions in a global and societal context
11. a recognition of the need for, and an ability to engage in life-long learning
12. a broad education that includes knowledge of contemporary issues and awareness of global, economic, environmental and societal context .

## Learning Outcomes (Graduate)

The purpose of the master's program is to provide students with the knowledge and skills necessary for a professional career or doctoral studies. This is done through course work providing depth in one area of specialization and breadth in complementary areas. Areas of specialization range from automatic controls, energy systems, fluid mechanics, heat transfer, and solid mechanics to biomechanical engineering, MEMS, and design.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research. Through course work and guided research, the program prepares students to make original contributions in Mechanical Engineering and related fields.

## Graduate Programs in Mechanical Engineering

### Admission and Financial Assistance

Mechanical engineering is a varied profession, ranging from primarily aesthetic aspects of design to highly technical scientific research. Disciplinary areas of interest to mechanical engineers include biomechanics, energy conversion, fluid mechanics, materials, nuclear reactor engineering, propulsion, rigid and elastic body mechanics, systems engineering, scientific computing, thermodynamics, robotics, and controls, to name a few. Our graduate programs provide advanced depth and breadth in the field.

### Graduate degree programs and admission

- Master of Science (M.S.) in Mechanical Engineering
- Master of Science (M.S.) in Engineering — Design Impact
- Doctor of Philosophy (Ph.D.) in Mechanical Engineering

To be eligible for admission to graduate study to the department, a student must have a B.S. degree in engineering, physics, or a comparable science program. M.S. and Ph.D. applications must be received by the first Tuesday in December, and admitted students must matriculate in the following Autumn. In rare circumstances, with the support of an ME faculty member who is a potential Ph.D. adviser, Ph.D. applications from students who have completed or are currently in an M.S. program are reviewed for Winter or Spring Quarter start. In addition, M.S. applicants eligible for the Honors Cooperative Program (on-campus courses required for Mechanical Engineering) can apply in Autumn, Winter, or Spring quarters.

### Additional degree programs available to currently enrolled students

- Master of Science (M.S.) in Engineering — Biomechanical Engineering



- Master of Science (M.S.) in Engineering – Individually Designed Major
- Engineer in Mechanical Engineering

For additional information about these programs, see the Mechanical Engineering Department Graduate Handbook.

### Financial Assistance

The department annually awards, on a competitive basis, a limited number of fellowships, teaching assistantships, and research assistantships to incoming graduate students. For M.S. students, limited financial aid in the form of fellowships and short-term research assistantships are provided at the time of admission, and course assistantships can sometimes be arranged with individual course instructors after admission. All Ph.D. students receive financial support for the duration of their program, given satisfactory degree progress.

### Post-Master's Degree Programs

The department offers two post-master's degrees: Engineer and Doctor of Philosophy. Post-master's research generally requires some evidence that a student has research potential before a faculty member agrees to supervision and a research assistantship appointment. It is most efficient to carry out preliminary research during the M.S. degree program, if interested in a post-master's degree.

### Departmental Groups

The department has five groups: Biomechanical Engineering; Design; Flow Physics and Computation; Mechanics and Computation; and Thermosciences. Each maintains its own labs, shops, and offices.

*The Biomechanical Engineering (BME) Group* has teaching and research activities which focus primarily on musculoskeletal biomechanics, neuromuscular biomechanics, cardiovascular biomechanics, and rehabilitation engineering. Research in other areas including hearing, ocean, plant, and vision biomechanics exists in collaboration with associated faculty in biology, engineering, and medicine. The group has strong research interactions with the Mechanics and Computation and the Design groups, and the departments of Neurology, Radiology, and Surgery in the School of Medicine.

*The Design Group* is devoted to the imaginative application of science, technology, and art to the conception, visualization, creation, analysis and realization of useful devices, products, and objects. Courses and research focus on topics such as kinematics, applied finite elements, microprocessors, medical devices, fatigue and fracture mechanics, dynamics and simulation, micro-electromechanical systems (MEMS), rehabilitation, optimization, high-speed devices, product design, vehicle dynamics, experimental mechanics, robotics, creativity, idea visualization, computer-aided design, manufacturing, design analysis, and engineering education.

*The Flow Physics and Computational Engineering Group (FPCE)* The Flow Physics and Computational Engineering Group (FPCE) blends research on flow physics and modeling with algorithm development, scientific computing, and numerical database construction. FPCE is contributing new theories, models and computational tools for accurate engineering design analysis and control of complex flows (including multi phase flows, micro-fluidics, chemical reactions, acoustics, plasmas, interactions with electromagnetic waves and other phenomena) in aerodynamics, propulsion and power systems, materials processing, electronics cooling, environmental engineering, and other areas. A significant emphasis of research is on modeling and analysis of physical phenomena in engineering systems.

*The Mechanics and Computational Group* covers biomechanics, continuum mechanics, dynamics, experimental and computational mechanics, finite element analysis, fluid dynamics, fracture mechanics, micromechanics, nanotechnology, and simulation based design. Qualified students

can work as research project assistants, engaging in thesis research in association with the faculty director and fellow students. Projects include analysis, synthesis, and control of systems; biomechanics; flow dynamics of liquids and gases; fracture and micro-mechanics, vibrations, and nonlinear dynamics; and original theoretical, computational, and experimental investigations in the strength and deformability of elastic and inelastic elements of machines and structures.

*The Thermosciences Group* conducts experimental and analytical research on both fundamental and applied topics in the general area of thermal and fluid systems. Research strengths include high Reynolds number flows, microfluidics, combustion and reacting flows, multiphase flow and combustion, plasma sciences, gas physics and chemistry, laser diagnostics, microscale heat transfer, convective heat transfer, and energy systems. Research motivation comes from applications including air-breathing and space propulsion, bioanalytical systems, pollution control, electronics fabrication and cooling, stationary and mobile energy systems, biomedical systems, and materials processing. Emphasis is on fundamental experiments leading towards advances in modeling, optimization, and control of complex systems.

### Facilities

The department groups maintain modern laboratories that support undergraduate and graduate instruction and graduate research work.

The Structures and Composites Laboratory, a joint activity with the Department of Aeronautics and Astronautics, studies structures made of fiber-reinforced composite materials. Equipment for fabricating structural elements includes autoclave, filament winder, and presses. X-ray, ultrasound, and an electron microscope are available for nondestructive testing. The lab also has environmental chambers, a high speed impactor, and mechanical testers. Lab projects include designing composite structures, developing novel manufacturing processes, and evaluating environmental effects on composites.

Experimental facilities are available through the interdepartmental Structures and Solid Mechanics Research Laboratory, which includes an electrohydraulic materials testing system, a vehicle crash simulator, and a shake table for earthquake engineering and related studies, together with highly sophisticated auxiliary instrumentation. Facilities to study the micromechanics of fracture areas are available in the Micromechanics/Fracture Laboratory, and include a computer-controlled materials testing system, a long distance microscope, an atomic force microscope, and other instrumentation. Additional facilities for evaluation of materials are available through the Center for Materials Research, Center for Integrated Circuits, and the Ginzton Laboratory. Laboratories for biological experimentation are accessible through the School of Medicine. Individual accommodation is available for the work of each research student.

Major experimental and computational laboratories engaged in bioengineering work are located in the Biomechanical Engineering Group. Other Biomechanical Engineering Group activities and resources are associated with the Rehabilitation Research and Development Center of the Veterans Administration Palo Alto Health Care System. This major national research center has computational and prototyping facilities. In addition, the Rehabilitation Research and Development Center houses the Electrophysiology Laboratory, Experimental Mechanics Laboratory, Human Motor Control Laboratory, Rehabilitation Device Design Laboratory, and Skeletal Biomechanics Laboratory. These facilities support graduate course work as well as Ph.D. student research activities.

Computational and experimental work is also conducted in various facilities throughout the School of Engineering and the School of Medicine, particularly the Advanced Biomaterials Testing Laboratory of the Department of Materials Science and Engineering, the Orthopaedic Research Laboratory in the Department of Functional Restoration, and the Vascular Research Laboratory in the Department of Surgery.

In collaboration with the School of Medicine, facilities throughout the Stanford Medical Center and the Veterans Administration Palo Alto Health Care System conduct biological and clinical work.

The Design Group has facilities for lab work in experimental mechanics and experimental stress analysis. Additional facilities, including MTS electrohydraulic materials test systems, are available in the Solid Mechanics Research Laboratory. Design Group students also have access to Center for Integrated Systems (CIS) and Gintzon Lab microfabrication facilities.

The group also maintains the Product Realization Laboratory (PRL), a teaching facility offering students integrated experiences in market definition, product design, and prototype manufacturing. The PRL provides coaching, design manufacturing tools, and networking opportunities to students interested in product development. The ME 310 Design Project Laboratory has facilities for CAD, assembly, and testing of original designs by master's students in the engineering design program. A Smart Product Design Laboratory supports microprocessor application projects. The Center for Design Research (CDR) has an excellent facility for concurrent engineering research, development, and engineering curriculum creation and assessment. Resources include a network of high-performance workstations. For worldwide web mediated concurrent engineering by virtual, non-located, design development teams, see the CDR web site at <http://cdr.stanford.edu>. In addition, CDR has several industrial robots for student projects and research. These and several NC machines are part of the CDR Manufacturing Sciences Lab. The Manufacturing Modeling Laboratory (MML) addresses various models and methods that lead to competitive manufacturing. MML links design for manufacturing (dfm) research at the Department of Mechanical Engineering with supply chain management activities at the Department of Management Science and Engineering. The Rapid Prototyping Laboratory consists of seven processing stations including cleaning, CNC milling, grit blasting, laser deposition, low temperature deposition, plasma deposition, and shot peening. Students gain experience by using ACIS and Pro Engineer on Hewlett Packard workstations for process software development. The Design Group also has a Product Design Loft in which students in the Joint Program in Design develop graduate thesis projects.

The Flow Physics and Computation Group has a 32 processor Origin 2000, 48-node and 85-node Linux cluster with high performance interconnection and an array of powerful workstations for graphics and data analysis. Several software packages are available, including all the major commercial CFD codes. FPC is strongly allied with the Center for Turbulence Research (CTR), a research consortium between Stanford and NASA, and the Center for Integrated Turbulence Simulations (CITS), which is supported by the Department of Energy (DOE) under its Accelerated Strategic Computing Initiative (ASCI). The Center for Turbulence Research has direct access to major national computing facilities located at the nearby NASA-Ames Research Center, including massively parallel super computers. The Center for Integrated Turbulence Simulations has access to DOE's vast supercomputer resources. The intellectual atmosphere of the Flow Physics and Computation Group is greatly enhanced by the interactions among CTR's and CITS's postdoctoral researchers and distinguished visiting scientists.

The Mechanics and Computation Group has a Computational Mechanics Laboratory that provides an integrated computational environment for research and research-related education in computational mechanics and scientific computing. The laboratory houses Silicon Graphics, Sun, and HP workstations and servers, including an 8-processor SGI Origin2000 and a 16-processor networked cluster of Intel-architecture workstations for parallel and distributed computing solutions of computationally intensive problems. Software is available on the laboratory machines, including commercial packages for engineering analysis, parametric geometry and meshing, and computational mathematics. The laboratory supports basic research in computational mechanics as well as the

development of related applications such as simulation-based design technology.

The Thermosciences Group has four major laboratory facilities. The Heat Transfer and Turbulence Mechanics Laboratory concentrates on fundamental research aimed at understanding and improved prediction of turbulent flows and high performance energy conversion systems. The laboratory includes two general-purpose wind tunnels, a pressurized high Reynolds number tunnel, two supersonic cascade flow facilities, three specialized boundary layer wind tunnels, and several other flow facilities. Extensive diagnostic equipment is available, including multiple particle-image velocimetry and laser-Doppler anemometry systems.

The High Temperature Gas Dynamics Laboratory includes research on sensors, plasma sciences, cool and biomass combustion and gas pollutant formation, and reactive and non-reactive gas dynamics. Research facilities include diagnostic devices for combustion gases, a spray combustion facility, laboratory combustors including a coal combustion facility and supersonic combustion facilities, several advanced laser systems, a variety of plasma facilities, a pulsed detonation facility, and four shock tubes and tunnels. The Thermosciences Group and the Design Group share the Microscale Thermal and Mechanical Characterization laboratory (MTMC). MTMC is dedicated to the measurement of thermal and mechanical properties in thin-film systems, including microfabricated sensors and actuators and integrated circuits, and features a nanosecond scanning laser thermometry facility, a laser interferometer, a near-field optical microscope, and an atomic force microscope. The activities at MTMC are closely linked to those at the Heat Transfer Teaching Laboratory (HTTL), where undergraduate and master's students use high-resolution probe stations to study thermal phenomena in integrated circuits and thermally-actuated microvalves. HTTL also provides macroscopic experiments in convection and radiative exchange.

The Energy Systems Laboratory is a teaching and research facility dedicated to the study of energy conversion systems. The lab includes three dynamometers for engine testing, a computer-controlled variable engine valve controller, a fuel-cell experimental station, a small rocket testing facility, and a small jet engine thrust stand.

The Guidance and Control Laboratory, a joint activity of the Department of Aeronautics and Astronautics and the Department of Mechanical Engineering, specializes in construction of electromechanical systems and instrumentation, particularly where high precision is a factor. Work ranges from robotics for manufacturing to feedback control of fuel injection systems for automotive emission control. The faculty and staff work in close cooperation with both the Design and Thermosciences Groups on device development projects of mutual interest.

Many computation facilities are available to department students. Three of the department's labs are equipped with super-minicomputers. Numerous smaller minicomputers and microcomputers are used in the research and teaching laboratories.

Library facilities at Stanford beyond the general library include Engineering, Mathematics, and Physics department libraries.

## Mechanical Engineering Course Catalog Numbering System

The department uses the following course numbering system:

Number	Level
001-099	Freshman and Sophomore
100-199	Junior and Senior
200-299	Advanced Undergraduate and Beginning Graduate
300-399	Graduate

400-499	Advanced Graduate
500	Ph.D. Thesis

## Bachelor of Science in Mechanical Engineering

Undergraduates seeking to major in Mechanical Engineering should see the curriculum outlined in the "Undergraduate Degree in Mechanical Engineering" section of this bulletin. The University's basic requirements for the bachelor's degree are discussed in the "Undergraduate Degrees" section of this bulletin. Courses taken for the departmental major (mathematics; science; science, technology, and society; engineering fundamentals; and engineering depth) must be taken for a letter grade if the instructor offers the option.

A Product Design program offered by the Design Group leads to the B.S. in Engineering (Product Design). A major in Biomechanical Engineering offered by the Biomechanical Engineering Group leads to the B.S. in Engineering (Biomechanical Engineering); this may be appropriate for students preparing for medical school or graduate bioengineering studies.

### Grade Requirements

To be recommended by the department for a B.S. in Mechanical Engineering, a student must achieve the minimum grade point average (GPA) set by the School of Engineering (2.0 in engineering fundamentals and mechanical engineering depth).

Students interested in the minor should see the "Minor in Mechanical Engineering" section of this bulletin.

## Mechanical Engineering (ME)

Completion of the undergraduate program in Mechanical Engineering leads to the conferral of the Bachelor of Science in Mechanical Engineering.

## Mission of the Undergraduate Program in Mechanical Engineering

The mission of the undergraduate program in Mechanical Engineering is to provide students with a balance of theoretical and practical experiences that enable them to address a variety of societal needs. The curriculum encompasses elements from a wide range of disciplines built around the themes of biomedicine, computational engineering, design, energy, and multiscale engineering. Course work may include mechatronics, computational simulation, solid and fluid dynamics, microelectromechanical systems, biomechanical engineering, energy science and technology, propulsion, sensing and control, nano- and micro-mechanics, and design. The program prepares students for entry-level work as mechanical engineers and for graduate studies in either an engineering discipline or other fields where a broad engineering background is useful.

### Requirements

#### Mathematics

24 units minimum; see Basic Requirement 1<sup>1</sup>

CME 102/ ENGR 155A	Ordinary Differential Equations for Engineers	5
or MATH 53	Ordinary Differential Equations with Linear Algebra	

Select one of the following: 3-5

CME 106/ ENGR 155C	Introduction to Probability and Statistics for Engineers	
STATS 110	Statistical Methods in Engineering and the Physical Sciences	
STATS 116	Theory of Probability	

Plus additional courses to total min. 24 16

#### Science

20 units minimum; see Basic Requirement 2<sup>1</sup>

CHEM 31X	Chemical Principles Accelerated	5
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Plus additional required courses<sup>1</sup> 15

#### Technology in Society

One course required; must be on SoE Approved Courses list at <ughb.stanford.edu> the year taken.; see Basic Requirement 4 3-5

#### Engineering Fundamentals

Two courses minimum; see Basic Requirement 3

ENGR 40M	An Intro to Making: What is EE	5
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ENGR 70A	Programming Methodology (same as CS 106A)	5
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#### Engineering Depth

Minimum of 68 Engineering Science and Design ABET units; see Basic Requirement 5

ENGR 14	Intro to Solid Mechanics	3
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ENGR 15	Dynamics	3
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ME 30	Engineering Thermodynamics	3
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ME 70	Introductory Fluids Engineering	4
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ME 80	Mechanics of Materials	4
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ME 101	Visual Thinking	4
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ME 103D	Engineering Drawing and Design <sup>2</sup>	1
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ME 112	Mechanical Systems Design <sup>4</sup>	4
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Take one of the following:

ME 113	Mechanical Engineering Design	
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ME 170B	Mechanical Engineering Design: Integrating Context with Engineering <sup>3</sup>	
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ME 131A	Heat Transfer <sup>4</sup>	3-5
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ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	4
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ME 140	Advanced Thermal Systems <sup>4</sup>	5
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or ME 141	Alternative Energy Systems	
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ME 161	Dynamic Systems, Vibrations and Control	4
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ME 203	Design and Manufacturing <sup>2</sup>	4
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<sup>1</sup> Math and science must total 45 units.

- Math: 24 units required and must include a course in differential equations (CME 102 Ordinary Differential Equations for Engineers or MATH 53 Ordinary Differential Equations with Linear Algebra; one of these required) and calculus-based Statistics (CME 106 Introduction to Probability and Statistics for Engineers or STATS 110 Statistical Methods in Engineering and the Physical Sciences or STATS 116 is required).
- Science: 20 units minimum and requires courses in calculus-based Physics and Chemistry, with at least a full year (3 courses) in one or the other. CHEM 31A Chemical Principles I/CHEM 31B Chemical Principles II are considered one course because they cover the same material as CHEM 31X Chemical Principles Accelerated but at a slower pace. CHEM 31X Chemical Principles Accelerated is recommended.

<sup>2</sup> Courses ME 103D and ME 203 must be taken concurrently.

<sup>3</sup> ME 170A and ME 170B are a 2-quarter Capstone Design Sequence and must be taken in consecutive quarters. Students that take the Capstone Design Sequence may use ME 170B as an alternative to ME 113. ME 170A will then be counted as an ME Elective Course.

<sup>4</sup> ME 112, ME 131A, and ME 140 or ME 141, together fulfill the WIM requirement.

Options to complete the ME depth sequence: see the list of options in the ME major section of the Handbook for Undergraduate Engineering Programs (<http://ughb.stanford.edu>).

For additional information and sample programs see the Handbook for Undergraduate Engineering Programs (UGHB) (<http://ughb.stanford.edu>).

## Honors Program

The Department of Mechanical Engineering offers a program leading to a B.S. in Mechanical Engineering with honors. This program offers a unique opportunity for qualified undergraduate engineering majors to conduct independent study and research at an advanced level with a faculty mentor.

Mechanical Engineering majors who have a grade point average (GPA) of 3.5 or higher in the major may apply for the honors program. Students who meet the eligibility requirement and wish to be considered for the honors program must submit a written application to the Mechanical Engineering student services office no later than the second week of Autumn Quarter in the senior year. The application to enter the program can be obtained from the ME student services office, and must contain a one-page statement describing the research topic and include an unofficial Stanford transcript. In addition, the application must be approved by a Mechanical Engineering faculty member who agrees to serve as the thesis adviser for the project. Thesis advisers must be members of Stanford's Academic Council.

In order to receive departmental honors, students admitted to the program must:

1. maintain the 3.5 GPA required for admission to the honors program.
2. submit a completed thesis draft to the adviser by April 25. Further revisions and final endorsement by the adviser are to be finished by May 15, when two bound copies are to be submitted to the Mechanical Engineering student services office.
3. present the thesis at the Mechanical Engineering Poster Session held in mid-April.

## Mechanical Engineering (ME) Minor

The following courses fulfill the minor requirements:

### General Minor \*

ENGR 14	Intro to Solid Mechanics	3
ENGR 15	Dynamics	3
ME 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 101	Visual Thinking	4
Plus two of the following:		8-9
ME 80	Mechanics of Materials	
ME 131A	Heat Transfer	
ME 161	Dynamic Systems, Vibrations and Control	
ME 203	Design and Manufacturing	

Total Units: 26

### Thermosciences Minor \*\*

ENGR 14	Intro to Solid Mechanics	3
ME 30	Engineering Thermodynamics	3
ME 70	Introductory Fluids Engineering	4
ME 131A	Heat Transfer	5
ME 131B	Fluid Mechanics: Compressible Flow and Turbomachinery	4
ME 140	Advanced Thermal Systems	5

Total units: 24

### Mechanical Design Minor \*\*\*

ENGR 14	Intro to Solid Mechanics	3
ENGR 15	Dynamics	3
ME 80	Mechanics of Materials	4
ME 101	Visual Thinking	4

ME 112	Mechanical Systems Design	4
ME 203	Design and Manufacturing	4
Plus one of the following:		3-4
ME 113	Mechanical Engineering Design	
ME 210	Introduction to Mechatronics	
ME 220	Introduction to Sensors	
Total units: 25-26		

\* This minor aims to expose students to the breadth of ME in terms of topics and analytic and design activities. Prerequisites: MATH 19 Calculus, MATH 20 Calculus, MATH 21 Calculus, and PHYSICS 41 Mechanics.

\*\* Prerequisites: MATH 19 Calculus, MATH 20 Calculus, MATH 21 Calculus, MATH 51 Linear Algebra and Differential Calculus of Several Variables (or CME 100 Vector Calculus for Engineers) and PHYSICS 41 Mechanics.

\*\*\* This minor aims to expose students to design activities supported by analysis. Prerequisites: MATH 19 Calculus, MATH 20 Calculus, MATH 21 Calculus, PHYSICS 42 Classical Mechanics Laboratory, and PHYSICS 41 Mechanics.

## Coterminal Master of Science Program in Mechanical Engineering

Stanford undergraduates who wish to continue their studies for the master of science degree in the coterminal program must have earned a minimum of 120 units towards graduation. This includes allowable Advanced Placement (AP) and transfer credit. Applicants must submit the Coterminal Online Application (<https://applyweb.com/stanterm>) no later than the quarter prior to the expected completion of their undergraduate degree. This is normally Winter Quarter (mid January) prior to Spring Quarter graduation.

**Units** The application must provide evidence of potential for strong academic performance as a graduate student. The Mechanical Engineering department graduate admissions committee makes decisions on each application. Typically, a GPA of at least 3.5 in engineering, science, and math is expected. Applicants must have completed two of ME 80 Mechanics of Materials, ME 112 Mechanical Systems Design, ME 131A Heat Transfer, and ME 131B Fluid Mechanics: Compressible Flow and Turbomachinery, and must take the Graduate Record Examination (GRE) before action is taken on the application.

Coterminal information, applications deadlines, and forms can be obtained from the ME student services office.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Science in Mechanical Engineering

The basic University requirements for the M.S. degree are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

The master's program consists of 45 units of course work taken at Stanford. No thesis is required, although many students become involved in research projects during the master's program, particularly to explore their interests in working towards a Ph.D. degree. Students whose undergraduate backgrounds are entirely devoid of some of the major subject disciplines of engineering (for example, applied mechanics, applied thermodynamics, fluid mechanics, ordinary differential equations) may need to take some undergraduate courses to fill obvious gaps and prepare themselves to take graduate courses in these areas. Such students may require more than three quarters to fulfill the master's degree requirements, as the makeup courses may only be used as unrestricted electives (see item 4 below) in the M.S. degree program. However, it is not the policy to require fulfillment of mechanical engineering B.S. degree requirements to obtain an M.S. degree.

### Mechanical Engineering

The master's degree program requires 45 units of course work taken as a graduate student at Stanford. No thesis is required. However, students who want some research experience during the master's program may participate in research through ME 391 Engineering Problems and ME 392 Experimental Investigation of Engineering Problems.

Students are encouraged to refer to the most recent *Mechanical Engineering Graduate Student Handbook* provided by the student services office. The department's requirements for the M.S. in Mechanical Engineering are as follows:

- 1. Mathematical Fundamentals:** two mathematics courses for a total of at least 6 units from the following list are required: ME 300A, 300B, 300C, 408; CME 302; EE 261, 263; ENGR 155C/CME106. Only MATH courses with catalog numbers greater than 100 and CME courses with catalog numbers greater than 200 will count towards the math requirement. However, courses must cover two different areas out of the following choices: partial differential equations, linear algebra, numerical analysis and statistics. This excludes programming classes such as CS 106; CME 211, 212, 213, 214, 292. Those classes can counted towards the Approved Electives category. Courses taken for the math requirement must be taken for a letter grade.
- 2. Depth in Mechanical Engineering:** a set of graduate-level courses in Mechanical Engineering to provide depth in one area. The faculty have approved these sets as providing depth in specific areas as well as a significant component of applications of the material in the context of engineering synthesis. These sets are outlined in the *Mechanical Engineering Graduate Student Handbook*. Depth courses must be taken for a letter grade.
- 3. Breadth in Mechanical Engineering:** two additional graduate level courses (outside the depth) from the depth/breadth charts listed in the *Mechanical Engineering Graduate Handbook*. Breadth courses must be taken for a letter grade.
- 4. Sufficient Mechanical Engineering Course Work:** students must take a minimum of 24 units of course work in mechanical engineering topics. For the purposes of determining mechanical engineering

topics, any course on approved lists for the mathematics, depth, and breadth requirements counts towards these units. In addition, any graduate-level course with an ME course number is considered a mechanical engineering topic.

- 5. Approved Electives** (to bring the total number of units to at least 39): electives must be approved by an adviser. Graduate engineering, mathematics, and science courses are normally approved. Approved electives must be taken for a letter grade. No more than 6 of the 39 units may come from ME 391/392 (or other independent study/research courses), and no more than 3 may come from seminars. Students planning a Ph.D. should discuss with their advisers the option of taking 391 or 392 during the master's program. ME 391/392 (and other independent study courses) may only be taken on a credit/no credit basis.
- 6. Unrestricted electives** (to bring the total number of units submitted for the M.S. degree to 45): students are encouraged to take these units outside engineering, mathematics, or the sciences. Students should consult their advisers on course loads and on ways to use the unrestricted electives to make a manageable program. Unrestricted electives must have catalog numbers greater than 100. Unrestricted electives may be taken CR/NC.
- 7. Within the courses satisfying the requirements above, there must be at least one graduate-level course with a laboratory component. Courses which satisfy this requirement are:**

		Units
ENGR 341	Micro/Nano Systems Design and Fabrication	3-5
ME 203	Design and Manufacturing	4
ME 210	Introduction to Mechatronics	4
ME 220	Introduction to Sensors	3-4
ME 218A	Smart Product Design Fundamentals	4-5
ME 218B	Smart Product Design Applications	4-5
ME 218C	Smart Product Design Practice	4-5
ME 218D	Smart Product Design: Projects	3-4
ME 250	Internal Combustion Engines	3-5
ME 310A	Engineering Design Entrepreneurship and Innovation: exploring the problem space	4
ME 310B	Engineering Design Entrepreneurship and Innovation: exploring the solution space	4
ME 310C	Engineering Design Entrepreneurship and Innovation: making it REAL	4
ME 318	Computer-Aided Product Creation	4
ME 323	Modeling and Identification of Mechanical Systems for Control	3
ME 324	Precision Engineering	4
ME 348	Experimental Stress Analysis	3
ME 354	Experimental Methods in Fluid Mechanics	4
ME 367	Optical Diagnostics and Spectroscopy Laboratory	4
ME 391/392	Engineering Problems	1-10
Or other independent study courses may satisfy this requirement if 3 units are taken for work involving laboratory experiments		

Candidates for the M.S. in Mechanical Engineering are expected to have the approval of the faculty; they must maintain a minimum grade point average (GPA) of 3.0 in the 45 units presented for fulfillment of degree requirements (exclusive of independent study courses). All courses used to fulfill mathematics, depth, breadth, approved electives, and lab studies must be taken for a letter grade (excluding seminars, independent study, and courses for which a letter grade is not an option for any student).

Students falling below a GPA of 2.5 at the end of 20 units may be disqualified from further registration. Students failing to meet the complete degree requirements at the end of 60 units of graduate

registration are disqualified from further registration. Courses used to fulfill deficiencies arising from inadequate undergraduate preparation for mechanical engineering graduate work may not be applied to the 45 units required for completion of the MS degree.

## Engineering

As described in the "School of Engineering" section of this bulletin, each department in the school may sponsor students in a more general degree, the M.S. in Engineering. Sponsorship by the Department of Mechanical Engineering (ME) requires (1) filing a petition for admission to the program by no later than the day before instruction begins, and (2) that the center of gravity of the proposed program lies in ME. No more than 18 units used for the proposed program may have been previously completed. The program must include at least 9 units of graduate-level work in the department other than ME 300A,B,C, seminars, and independent study. The petition must be accompanied by a statement explaining the program objectives and how it is coherent, contains depth, and fulfills a well-defined career objective. The grade requirements are the same as for the M.S. in Mechanical Engineering.

## Master of Science in Engineering, Biomechanical Engineering

The Master of Science in Engineering: Biomechanical Engineering (MSE:BME) promotes the integration of engineering mechanics and design with the life sciences. Applicants are expected to have an additional exposure to biology and/or bioengineering in their undergraduate studies. Students planning for subsequent medical school studies are advised to contact Stanford's Premedical Advising Office in Sweet Hall.

Students wishing to pursue this program must complete the Graduate Program Authorization form and get approval from the Student Services Office. This form serves to officially add the field to the student's record. This form must be filled out electronically on AxBSS. The Mechanical Engineering Department does not have a coterminal Biomechanical Engineering Master's program.

## Degree Requirements

1. Mathematical competence (minimum 6 units) in two of the following areas: partial differential equations, linear algebra, complex variables, or numerical analysis, as demonstrated by completion of two appropriate courses from the following list: ME300A,B,C; MATH106, 109, 113, 131M/P, 132; STATS110, or ENGR155C; CME108, 302. Students who have completed comparable graduate-level courses as an undergraduate, and who can demonstrate their competence to the satisfaction of the instructors of the Stanford courses, may be waived via petition from this requirement by their adviser and the Student Services Office. The approved equivalent courses should be placed in the approved electives category of the program proposal.
2. Graduate Level Engineering Courses (minimum 21 units), consisting of:
  - a. Biomechanical engineering restricted electives (9 units) to be chosen from:

ME 239	Mechanics of the Cell	3
ME 281	Biomechanics of Movement	3
ME 287	Mechanics of Biological Tissues	4
ME 337	Mechanics of Growth	3
ME 381	Orthopaedic Bioengineering	3
ME 387	Soft Tissue Mechanics	3

- b. Specialty in engineering (9-12 units): A set of three or four graduate level courses in engineering mechanics, materials, controls, or design (excluding bioengineering courses) selected to provide depth in one area. Such sets are approved by the Mechanical Engineering Faculty. Comparable specialty sets composed of graduate engineering courses outside the Mechanical Engineering Department can be used with the

approval of the student's adviser. Examples can be obtained from the Biomechanical Engineering Group Office (Durand 223).

- c. Graduate engineering electives (to bring the total number of graduate level engineering units to at least 21). These electives must contribute to a cohesive degree program, and be approved by the student's adviser. No units may come from bioengineering courses, mathematics courses, or seminars.
3. Life science approved electives (minimum 6 units): Undergraduate or graduate biological/medical science/chemistry courses which contribute to a cohesive program.
4. Biomechanical engineering seminar ME 389 Biomechanical Research Symposium.
5. General approved electives (to bring the total number of units to 39): These courses must be approved by the student's adviser. Graduate level engineering, math, and physical science courses and upper division undergraduate or graduate life science courses are normally approved.
6. Unrestricted electives (to bring the total number of units to 45): Students without undergraduate biology are encouraged to use some of these unrestricted units to strengthen their biology background. Students should consult their adviser for recommendations on course loads and on ways to use the unrestricted electives to create a manageable program. Unrestrictive electives must have catalog numbers greater than 100.

All courses except unrestricted electives must be taken for a letter grade unless letter grades are not an option. A minimum cumulative GPA of 3.0 is required for degree conferral.

## Master of Science in Engineering, Design Impact

**Note: The Master of Science, Product Design has been discontinued. For the most up to date description, please review AY 2016-17 bulletin.**

The Master's Program in Design Impact is project-driven, highly immersive, and based on design thinking, the human-centered design process pioneered at Stanford. We teach the process, mindsets and skills needed to lead high-impact design teams. In our work on products, services, systems, and experiences, empathy is our guiding principle. Students completing the two-year program will earn a Master's of Science in Engineering degree with a concentration in Design Impact (MSE-Design Impact).

### Degree Requirements

In the first year, students take all their classes together as a cohort. In the second year, students will continue to work together in the year-long "Design Impact" course (ME316A,B,C: Design Master's Project), each selecting to work on a project related to one of the two Impact themes. This sequence of classes will be the culmination of their educational experience and launch them into their individual careers as designers.

The student will select electives in second year with their advisor. The elective will be one of two types: focused on building a deep learning in the student's chosen Impact theme area and expanding the student's skill set and design toolkit. Appropriate electives are described below (5).

Candidates for the Design Impact Engineering Master's Degree are expected to have the approval to graduate from the faculty, and a minimum GPA of 3.0 in the 58 units completed in the program.

		Units
ME 313	Human Values and Innovation in Design	3
ME 203	Design and Manufacturing <sup>1</sup>	4
ME 277	Graduate Design Research Techniques	3
CS 106A	Programming Methodology <sup>2</sup>	3

ME 341	Design Experiments	3
ME 311	Leading Design Teams <sup>3</sup>	3
ME 216M	Introduction to the Design of Smart Products	4
ME 312	Communication in Design	3
ME or MS&E -Business Considerations in Design <sup>4</sup>		3
ME 316A	Product Design Master's Project <sup>5</sup>	4
ME 316B	Product Design Master's Project <sup>5</sup>	4
ME 316C	Product Design Master's Project <sup>5</sup>	4
ME 391	Engineering Problems	2
Approved Elective Units <sup>6</sup>		15

<sup>1</sup> ME 203 should be completed in the first year, Autumn Quarter of the degree program.

<sup>2</sup> CS106A is should be completed in the first year, Winter Quarter of the degree program. It is for students who have had limited exposure to computer programming and want to start at the introductory level. Students who have already had an introduction to computer science, or who have professional programming experience, should consider taking CS106B or consult with their advisor on the best-fit computer science class. If a different CS course is selected, it must be completed in the Winter term of the first year of the Master's degree program.

<sup>3</sup> May substitute ME 368 d. Leadership: Design Leadership in Context .

<sup>4</sup> A course that teaches Business Considerations in Design will be selected by the student in consultation with their advisor. Options include: ME 215C Analytical Product Design , MS&E 140X Financial Accounting Concepts and Analysis, and ACCT 317 Managerial Accounting: Performance Measurement, Compensation, and Governance.

<sup>5</sup> ME 316A, B & C are taken sequentially for three quarters during the second year.

<sup>6</sup> Students will choose courses at the 200 level or higher, from any of the Schools at the University to fulfill their elective requirement. Electives must be selected to fulfill education and career objectives and be related to their selected theme area within the Design Impact program. The advisor must sign off on electives prior to the students committing to taking them.

Note: All required classes and electives must be taken for a letter grade unless:

1) The class is not offered for a letter grade, OR

2) Prior approval has been granted to take a class CR/NC.

## Engineer in Mechanical Engineering

The basic University requirements for the degree of Engineer are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

This degree requires an additional year of study beyond the M.S. degree and includes a research thesis. The program is designed for students who wish to do professional engineering work upon graduation and who want to engage in more specialized study than is afforded by the master's degree alone.

Admission standards are substantially the same as indicated under the master's degree. However, since thesis supervision is required and the availability of thesis supervisors is limited, admission is not granted until the student has personally engaged a faculty member to supervise a research project. This most often involves a paid research assistantship awarded by individual faculty members (usually from the funds of sponsored research projects under their direction). Thus, individual arrangement between student and faculty is necessary. Students studying for the M.S. degree at Stanford who wish to continue to the Engineer degree ordinarily make such arrangements during the

M.S. degree program. Students holding master's degrees from other universities are invited to apply and may be admitted providing they are sufficiently well qualified and have made thesis supervision and financial aid arrangements.

Department requirements for the degree include a thesis; up to 18 units of credit are allowed for thesis work (ME 400 Thesis). In addition to the thesis, 27 units of approved advanced course work in mathematics, science, and engineering are expected beyond the requirements for the M.S. degree; the choice of courses is subject to approval of the adviser. Students who have not fulfilled the Stanford M.S. degree requirements are required to do so, with allowance for approximate equivalence of courses taken elsewhere; up to 45 units may be transferable. A total of 90 units is required for degree conferral.

Candidates for the degree must have faculty approval and have a minimum grade point average (GPA) of 3.0 for all courses (exclusive of thesis credit and other independent study courses) taken beyond those required for the master's degree.

## Doctor of Philosophy in Mechanical Engineering

The basic University requirements for the Ph.D. degree are discussed in the "Graduate Degree" section of this bulletin. The Ph.D. degree is intended primarily for students who desire a career in research, advanced development, or teaching; for this type of work, a broad background in mathematics and the engineering sciences, together with intensive study and research experience in a specialized area, are the necessary requisites.

Ph.D. students must have a master's degree from another institution, or must fulfill the requirements for the Stanford M.S. degree in Mechanical Engineering or another discipline.

In special situations dictated by compelling academic reasons, Academic Council members who are not members of the department's faculty may serve as the principal dissertation adviser when approved by the department. In such cases, a member of the department faculty must serve as program adviser and as a member of the reading committee, and agree to accept responsibility that department procedures are followed and standards maintained.

Admission involves much the same consideration described under the Engineer degree. Since thesis supervision is required, admission is not granted until the student has personally engaged a member of the faculty to supervise a research project. Once a student has obtained a research supervisor, this supervisor becomes thereafter the student's academic adviser. Research supervisors may require that the student pass the departmental qualifying examination before starting research and before receiving a paid research assistantship. Note that research assistantships are awarded by faculty research supervisors and not by the department.

Prior to being formally admitted to candidacy for the Ph.D. degree, the student must demonstrate knowledge of engineering fundamentals by passing a qualifying examination. The academic level and subject matter of the examination correspond approximately to the M.S. program described above. Typically, the exam is taken shortly after the student completes the M.S. degree requirements. The student is required to have a minimum graduate Stanford GPA of 3.5 to be eligible for the exam (grades from independent study courses are not included in the GPA calculation). Once the student's faculty sponsor has agreed that the exam should be scheduled, the student must submit an application folder containing several items including a curriculum vitae, research project abstract, and preliminary dissertation proposal. Information, examination dates, and deadlines may be obtained from the department's student services office.

Ph.D. candidates must complete a minimum of 21 units (taken for a letter grade) of approved formal course work (excluding research, directed study, and seminars) in advanced study beyond the M.S. degree. The courses should consist primarily of graduate courses in engineering and sciences, although the candidate's adviser may approve a limited number of upper-level undergraduate courses and courses outside of engineering and sciences, as long as such courses contribute to a strong and coherent program. In addition to this 21-unit requirement, all Ph.D. candidates must participate each quarter in one of the following (or equivalent) seminars:

		Units
ME 389	Biomechanical Research Symposium	1
ME 390	Thermosciences Research Project Seminar	1
ME 395	Seminar in Solid Mechanics	1
ME 397	Design Theory and Methodology Seminar	1-3
AA 297	Seminar in Guidance, Navigation, and Control	1
ENGR 298	Seminar in Fluid Mechanics	1
ENGR 311A/311B	Women's Perspectives	1

The department has a breadth requirement for the Ph.D. degree. This may be satisfied either by a formal minor in another department (generally 20 units) or by at least 9 units of course work (outside of the primary research topic) which are approved by the principal dissertation adviser. If a minor is taken, 9 units from the minor requirements can be counted towards the depth requirement.

The Ph.D. thesis normally represents at least one full year of research work and must be a substantial contribution to the field. Students may register for course credit for thesis work (ME 500) to help fulfill University academic unit requirements, but there is no minimum limit on registered dissertation units, as long as students are registered in at least 8 units (10 is recommended) per quarter prior to TGR. Candidates should note that only completed course units are counted toward the requirement, so ungraded courses or courses with an "N" grade must be cleared before going TGR. Questions should be directed to the department student services office.

The final University oral examination (dissertation defense) is conducted by a committee consisting of a chair from another department and four faculty members of the department or departments with related interests. Usually, the committee includes the candidate's adviser, reading committee members, plus two more faculty. The examination consists of two parts. The first is open to the public and is scheduled as a seminar talk, usually for one of the regular meetings of a seminar series. The second is conducted in private and covers subjects closely related to the dissertation topic.

## Ph.D. Minor in Mechanical Engineering

Students who wish a Ph.D. minor in ME should consult with the ME student services office. A minor in ME may be obtained by completing 20 units of approved graduate-level ME courses. Courses approved for the minor must form a coherent program and must be chosen from those satisfying requirement 2 for the M.S. in Mechanical Engineering.

See the *Mechanical Engineering Graduate Student Handbook* produced by the Mechanical Engineering student services office for more information.

*Emeriti:* (Professors) James L. Adams, Thomas P. Andriacchi, David M. Barnett, Peter Bradshaw, Brian J. Cantwell, Dennis R. Carter, Daniel B. DeBra, Robert H. Eustis, Thomas J. R. Hughes, James P. Johnston, Thomas R. Kane, William M. Kays, Joseph B. Keller, Charles H. Kruger, Robert H. McKim, Robert J. Moffat,\* M. Godfrey Mungal, J. David Powell, Charles R. Steele\*, Douglass J. Wilde; (*Professors, Research*) Richard M. Christensen, Sidney A. Self, Kenneth J. Waldron, Felix E. Zajac

*Chair:* Kenneth E. Goodson

*Group Chairs:* Mark R. Cutkosky & Sheri D. Sheppard (Design), Marc Levenston (Biomechanical Engineering), Gianluca Iaccarino & Parviz Moin (Flow Physics and Computational Engineering), Wei Cai (Mechanics and Computation), Christopher F. Edwards (Thermosciences)

*Professors:* Craig T. Bowman, Mark A. Cappelli, Mark R. Cutkosky, John Dabiri, Scott L. Delp, John K. Eaton, Christopher F. Edwards, Charbel Farhat, J. Christian Gerdes, Kenneth E. Goodson, Ronald K. Hanson, Gianluca Iaccarino, David M. Kelley, Thomas W. Kenny, Ellen Kuhl, Larry J. Leifer, Sanjiva K. Lele, Arun Majumdar, Reginald E. Mitchell, Parviz Moin, Drew V. Nelson, Allison M. Okamura, Peter M. Pinsky, Friedrich B. Prinz, Beth L. Pruitt, Bernard Roth, Juan G. Santiago, Eric S. G. Shaqfeh, Sheri D. Sheppard, Hai Wang

*Associate Professors:* Wei Cai, Steve Collins, Eric F. Darve, W. Matthias Ihme, Marc E. Levenston, Adrian J. Lew, Xiaolin Zheng

*Assistant Professors:* Ovijit Chaudhuri, Sean Follmer, Wendy Gu, David Lentink, Erin MacDonald, Ali Mani, Sindy K.-Y. Tang

*Professor (Teaching):* David W. Beach

*Courtesy Professors:* Fu-Kuo Chang, Reinhold Dauskardt, Oussama Khatib, Paul Yock

*Courtesy Associate Professor:* Margot G. Gerritsen, Nicholas Giori

*Courtesy Professor (Research):* J. Kenneth Salisbury (Emeritus)

*Courtesy Professor (Teaching):* Shelley V. Goldman

*Senior Lecturers:* Vadim Khayms, J. Craig Milroy

*Adjunct Professors:* Mehdi Asheghi, Michael R. Barry, William R. Burnett, J. Edward Carryer, Rainer J. Fasching, Shannon Gilmartin, John A. Howard, Barry M. Katz, Paul Mitiguy, Gary O'Brien, Dev Patnaik, Paul Saffo III, George Toye

\* Recalled to active duty.

## Cognate Courses

		Units
CS 106A	Programming Methodology	3-5
CS 223A	Introduction to Robotics	3
ENGR 14	Intro to Solid Mechanics	3
ENGR 15	Dynamics	3
ENGR 40	Introductory Electronics	5
ENGR 70A	Programming Methodology	3-5
ENGR 105	Feedback Control Design	3
ENGR 205	Introduction to Control Design Techniques	3
ENGR 209A	Analysis and Control of Nonlinear Systems	3
ENGR 240	Introduction to Micro and Nano Electromechanical Systems	3
ENGR 341	Micro/Nano Systems Design and Fabrication	3-5

## Overseas Studies Courses in Mechanical Engineering

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.



The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

**Units**

explorecourses:OSI#e

# SCHOOL OF HUMANITIES AND SCIENCES

The largest of Stanford's seven schools, the School of Humanities and Sciences is the center of the University's liberal arts education. Through exposure to the humanities and arts, undergraduate and graduate students consider the ethical, aesthetic, and intellectual dimensions of the human experience, past and present, and are thereby prepared to make thoughtful and imaginative contributions to the culture of the future. Through the study of social, political, and economic events, they acquire theories and techniques for the analysis of specific societal issues, as well as general cross-cultural perspectives on the human condition. And through exposure to the methods and discoveries of mathematics and the sciences, they become well-informed participants and leaders in today's increasingly technological societies.

The School of Humanities and Sciences is comprised of academic departments, which are organized into three clusters, each with its own distinct character.

- Humanities and Arts
  - Art and Art History
  - Classics
  - Division of Literatures, Cultures, and Languages
    - Comparative Literature
    - French and Italian
    - German Studies
    - Iberian and Latin American Cultures
    - Slavic Languages and Literatures
  - East Asian Languages and Cultures
  - English
  - History
  - Linguistics
  - Music
  - Philosophy
  - Religious Studies
  - Theater and Performance Studies
- Social Sciences
  - Anthropology
  - Communication
  - Economics
  - Political Science
  - Psychology
  - Sociology
- Natural Sciences
  - Applied Physics
  - Biology (including Hopkins Marine Station)
  - Chemistry
  - Mathematics
  - Physics
  - Statistics

The school also includes interdisciplinary degree programs that bridge traditionally disparate fields in the humanities and sciences: African and African American Studies; African Studies; American Studies; Archaeology; Arts; Biophysics; Comparative Studies in Race and Ethnicity; East Asian Studies; Ethics in Society; Feminist, Gender, and Sexuality Studies; Global Studies; Human Biology; Human Rights; Humanities; International Policy Studies; International Relations; Latin American Studies; Mathematical and Computational Science; Modern

Thought and Literature; Public Policy; Russian, East European and Eurasian Studies; Science, Technology, and Society; Symbolic Systems; and Urban Studies.

In addition, the school has diverse programs and research centers that do not currently grant degrees such as the Bill Lane Center for the American West; the Center for Computer Research in Music and Acoustics; the Center for Molecular Analysis; the Confucius Institute; the Center for Medieval and Early Modern Studies; the Michelle R. Clayman Center for Gender Research; the Jasper Ridge Biological Preserve; and the Institute for Research in the Social Sciences. For more information about the School of Humanities and Sciences and a complete listing of research centers and programs, see the School's web site (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/%20http://humsci.stanford.edu/about>).

Prospective applicants and candidates for the degree of Bachelor of Arts, Bachelor of Science, Bachelor of Arts and Sciences, Master of Arts, Master of Fine Arts, Master of Public Policy, Master of Science, Doctor of Musical Arts, or Doctor of Philosophy should consult the relevant department or program for detailed information about application procedures and degree requirements.

## Faculty

*Dean:* Richard P. Saller

*Senior Associate Deans:* R. Lanier Anderson, Ellen M. Markman, Kathryn A. Moler

*Senior Associate Dean for Finance and Administration:* Stephen Olson

*Associate Dean for Faculty Affairs:* Tina Kass

*Associate Dean for Graduate and Undergraduate Studies:* Susan J. Weersing

*Assistant Dean for Diversity Programs, Data and Technology:* Ayodele Thomas

*Assistant Dean for Curricular and Academic Support:* Beth McKeown

*Graduate Diversity Recruitment Officer:* Joseph L. Brown

*Department Chairs:* B. Douglas Bernheim (Economics), Emmanuel Candes (Statistics), Mark Crimmins (Philosophy), Mark W. Denny (Hopkins Marine Station), Dan Edelstein (Division of Literatures, Cultures, and Languages), Ronald Egan (East Asian Languages and Cultures), Martin Fejer (Applied Physics), Judith L. Goldstein (Political Science), Ian H. Gotlib (Psychology), Keith O. Hodgson (Chemistry), Eleny Ionel (Mathematics), Branislav Jakovljevic (Theater and Performance Studies), Dan Jurafsky (Linguistics), Jarek Kapuscinski (Music), John Kieschnick (Religious Studies), Peter F. Michelson (Physics), Alexander Nemerov (Art and Art History), Grant Parker (Classics), Tim Stearns (Biology), Matthew H. Sommer (History), Fred Turner (Communication), Alex Woloch (English), Sylvia Yanagisako (Anthropology), Xueguang Zhou (Sociology)

*Lecturer:* Ayodele Thomas

# AFRICAN AND AFRICAN AMERICAN STUDIES

## Undergraduate Program in African and African American Studies

The Program in African and African American Studies (AAAS), established in 1969, was the first ethnic studies program developed at Stanford University and the first African and African American Studies program at a private institution in the U.S. The AAAS program provides an interdisciplinary introduction to the study of peoples of African descent as a central component of American culture, offering a course of study that promotes research across disciplinary and departmental boundaries as well as providing research training and community service learning opportunities for undergraduates. It has developed an extensive network of Stanford scholars who work in race studies specific to AAAS and in concert with the Center for Comparative Studies in Race and Ethnicity.

AAAS encourages an interdisciplinary program of study drawn from fields including anthropology, art, art history, economics, education, drama, history, languages, linguistics, literature, music, philosophy, political science, psychology, religion, and sociology. The program emphasizes rigorous and creative scholarship and research, and fosters close academic advising with a faculty adviser, the AAAS Associate Director, and the Director.

AAAS is an interdisciplinary program (IDP) affiliated with the Center for Comparative Studies in Race and Ethnicity (p. 459) (CCSRE) and offers a major independent of it. CCSRE offers additional majors in Asian American Studies, Chicana/o Studies, Comparative Studies in Race and Ethnicity, and Native American Studies.

The Interdisciplinary Program in African and African American Studies (AAAS) provides students the opportunity to structure a major or minor with a core curriculum designed to develop a comparative and multidisciplinary understanding of the experiences and communities on the continent of Africa and African Americans within a broader global, diasporic dialogue. Additionally, majors or minors can focus their course work in one of eleven thematic concentrations.

The directors of the program and the advisory board constitute the AAAS curriculum committee, the policy making body for the interdisciplinary program.

## Mission Statement for the Undergraduate Program in African and African American Studies

The mission of the undergraduate program in African and African American Studies is to provide students with an interdisciplinary introduction to the study of people of African descent as a central component of American culture. Courses in the major promote research across disciplinary and departmental boundaries as well as provide students with research training and community service learning opportunities. Courses of study are drawn from anthropology, art, art history, economics, education, drama, history, languages, linguistics, literature, music, philosophy, political science, psychology, religion, and sociology among others. The program provides an intellectual background for students considering graduate school or professional careers.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These

learning outcomes are used in evaluating students and the program's undergraduate program. Students are expected to demonstrate:

1. an interdisciplinary understanding of scholarship related to the African diaspora and Africa, drawing on interdisciplinary course work and each student's individualized concentration.
2. the ability to identify and critically assess different disciplinary, methodological, and interpretive approaches to the study of African Americans, Africans, and/or people of the African diaspora.
3. an understanding of comparative approaches to race.
4. skills in disciplinary methods necessary for their study.
5. the ability to express their interpretive and analytical arguments in clear, effective prose.

## Bachelor of Arts in African and African American Studies

### Core Curriculum

All core courses taken for the major must be taken for a letter grade.

### Requirements

Majors must complete a total of 60 units, consisting of the following:

1. One of two required courses:
  - a. AFRICAAM 43 Introduction to English III: Introduction to African American Literature (5 units), or
  - b. AFRICAAM 105 Introduction to African and African American Studies (5 units)
2. One Social Science course from AAAS approved core course list. (<https://explorecourses.stanford.edu/search?page=0&catalog=&q=AAAS%3a%3ass&filter-coursestatus-Active=on&view=catalog&academicYear=&collapse=>) (5 units)
3. One Humanities course from AAAS approved core course list. (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=AAAS%3A%3Ah&collapse=>) (5 units)
4. One course in African Studies (<http://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=AAAS%3A%3Aafrica&collapse=>). (5 units)
5. AFRICAAM 200X Honors Thesis and Senior Thesis Seminar - WIM. (5 units)
6. 35 units of AAAS core (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=AAAS%3A%3Acore&collapse=>) and related (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=AAAS%3A%3Arelated&collapse=>) courses
  - At least 10 of the 35 units must be core courses (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=AAAS%3A%3Acore&collapse=>), which are defined as courses that are primarily focused on Africa (<https://explorecourses.stanford.edu/search?q=AAAS%3A%3Aafrica&view=catalog&page=0&academicYear=&collapse=&filter-coursestatus-Active=on>), African American Studies, the Caribbean (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3acaribbean+&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=>), or the African Diaspora (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3adiaspora&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=>).

Students also work closely with a faculty adviser, the AAAS associate director, and the AAAS director in developing a coherent thematic emphasis within their major that reflects their scholarly interests in the field.

## Thematic Emphasis

AAAS majors select a thematic emphasis. Selecting an emphasis allows students to customize their curriculum and synthesize coursework taken across various departments and programs into a coherent focus. Emphases offered include (but are not limited to):

- Africa (<https://explorecourses.stanford.edu/search?q=AAAS%3A%3Aafrica&view=catalog&page=0&academicYear=&collapse=&filter-coursestatus-Active=on>)
- African Americans
- Class
- Diaspora (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3adiaspora&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=>)
- Education (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3aeducation&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=>)
- Gender (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3agender&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=>)
- Historical Period ([https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3ahistorical\\_period&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=](https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3ahistorical_period&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=))
- Identities, Diversity, and Aesthetics (IDA) (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3aaida&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=>)
- Linguistics (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3alanguage+&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=>)
- Mixed Race ([https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3amixed\\_race&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=](https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3amixed_race&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=))
- Theory (<https://explorecourses.stanford.edu/search?page=0&q=AAAS%3a%3atheory&filter-coursestatus-Active=on&view=catalog&collapse=&academicYear=>)

## Core Courses

		Units			
AFRICAAM 19	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	3-4	AFRICAAM 116	Education, Race, and Inequality in African American History, 1880-1990	3-5
AFRICAAM 21	African American Vernacular English	3-5	AFRICAAM 147	History of South Africa	5
AFRICAAM 30	The Egyptians	3-5	AFRICAAM 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1	AFRICAAM 159	James Baldwin & Twentieth Century Literature	5
AFRICAAM 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5	AFRICAAM 181Q	Alternative Viewpoints: Black Independent Film	4
AFRICAAM 43	Introduction to English III: Introduction to African American Literature	5	AFRICAAM 189	Black Life and Death in the Neoliberal Era	5
AFRICAAM 47	History of South Africa	3	AFRICAAM 195	Independent Study	3-5
AFRICAAM 48Q	South Africa: Contested Transitions	4	AFRICAAM 199	Honors Project	1-5
AFRICAAM 50B	Nineteenth Century America	3	AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 54N	African American Women's Lives	3	AFRICAAM 200Y	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 64C	From Freedom to Freedom Now!: African American History, 1865-1965	3	AFRICAAM 200Z	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 75E	Black Cinema	2	AFRICAAM 226	Mixed-Race Politics and Culture	5
AFRICAAM 105	Introduction to African and African American Studies	5	AFRICAAM 245	Understanding Racial and Ethnic Identity Development	3-5
			AFRICAAM 262D	African American Poetics	5
			AFRICAAM 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
			AFRICAST 109	Running While Others Walk: African Perspectives on Development	5
			AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	3-5
			AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
			AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
			AFRICAST 138	Conflict and Reconciliation in Africa: International Intervention	3-5
			AFRICAST 141A	Science, Technology, and Medicine in Africa	4
			AFRICAST 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
			AFRICAST 151	AIDS in Africa	3
			AFRICAST 195	Shifting Frames	1-2
			AFRICAST 199	Independent Study or Directed Reading	1-5
			AFRICAST 209	Running While Others Walk: African Perspectives on Development	5
			AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	3-5
			AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
			AFRICAST 224	Memory and Heritage In South Africa Syllabus	1
			AFRICAST 235	Designing Research-Based Interventions to Solve Global Health Problems	3-4
			AFRICAST 299	Independent Study or Directed Reading	1-10
			AFRICAST 301A	The Dynamics of Change in Africa	4-5
			AMSTUD 261E	Mixed Race Literature in the U.S. and South Africa	5
			AMSTUD 262C	African American Literature and the Retreat of Jim Crow	5
			AMSTUD 262D	African American Poetics	5
			ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4
			COMPLIT 145B	The African Atlantic	3-5
			HISTORY 45B	Africa in the Twentieth Century	3
			HISTORY 47	History of South Africa	3
			HISTORY 48Q	South Africa: Contested Transitions	4
			HISTORY 54N	African American Women's Lives	3
			HISTORY 145B	Africa in the 20th Century	5
			HISTORY 164C	From Freedom to Freedom Now: African American History, 1865-1965	5

HISTORY 245G	Law and Colonialism in Africa	4-5
HISTORY 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
LINGUIST 152	Sociolinguistics and Pidgin Creole Studies	2-4
LINGUIST 252	Sociolinguistics and Pidgin Creole Studies	2-4
MUSIC 147J	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	3-4
POLISCI 146A	African Politics	4-5
POLISCI 246P	The Dynamics of Change in Africa	4-5
SOC 149	The Urban Underclass	4
TAPS 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5

## Directed Reading and Research

Directed reading and research allows students to focus on a special topic of interest. In organizing a reading or research plan, the student consults with the director of the major and one or more faculty members specializing in the area or discipline.

Courses that fulfill directed reading and research requirements:

		Units
AFRICAAM 190		1-5
AFRICAAM 195	Independent Study	5
AFRICAAM 199	Honors Project	1-5

## Senior Seminar

Research and writing of the senior honors thesis or senior paper is under the supervision of a faculty project adviser. All majors in the IDP in AAAS, even those who opt to write honors theses in other departments and programs, must enroll in AFRICAAM 200X Honors Thesis and Senior Thesis Seminar, offered in Autumn Quarter. The course takes students through the process of researching an honors thesis, including conceptualization, development of prospectus, development of theses, research, analysis, and finally the process of drafting and writing. This course meets the Writing in the Major requirement (WIM).

## Honors Program for Majors in African and African American Studies

The honors program offers an opportunity to do independent research for a senior thesis. It is open to majors who have maintained a grade point average (GPA) of at least 3.5 in the major and 3.3 overall. The honors thesis is intended to enable students to synthesize skills to produce a document or project demonstrating a measure of competence in their specialty.

The honors program begins with a proposal describing the project that is approved by the faculty adviser and AAAS directors. Students are required to identify both a faculty adviser and a second reader for the thesis project. The faculty adviser for the honors thesis must be an academic council faculty member and affiliated faculty of the student's major.

Honors students must enroll in AFRICAAM 200X Honors Thesis and Senior Thesis Seminar which fulfills the program's WIM requirement, during Autumn Quarter of the senior year and may take up to an additional 10 units of honors work (AFRICAAM 200Y Honors Thesis and Senior Thesis Research and AFRICAAM 200Z Honors Thesis and Senior Thesis Research) to be distributed across Winter and Spring quarters of senior year to continue their access to peer and faculty support as they write their theses. Students must complete their theses with a grade of 'B+' to receive honors in AAAS.

In May of the senior year, honors students are afforded an opportunity to present their research formally. Prizes for best undergraduate honors

theses are awarded annually by the Program in African and African American Studies.

## Thematic Emphasis

AAAS majors select a thematic emphasis. Selecting an emphasis allows students to customize their curriculum and synthesize course work taken across various departments and programs into a coherent focus. Emphases offered include; for faster navigation click on the links to the right:

### Thematic Emphasis in Africa

Students in the African and African American Studies major can choose a concentration in Africa. The Thematic Emphasis in Africa concentration is designed to investigate how individual African states' domestic and foreign policy, law, history, culture, and society are formed within conversations, debates, policies and studies. Issues of immigration, citizenship, empire and expansion, defense, diplomacy, human rights, public welfare, social justice and law, educational rights and other topics are explored.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in this concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Africa concentration.

		Units
AFRICAAM 30	The Egyptians	3-5
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 47	History of South Africa	3
AFRICAAM 48Q	South Africa: Contested Transitions	4
AFRICAAM 111	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAAM 133	Literature and Society in Africa and the Caribbean	4
AFRICAAM 145B	Africa in the 20th Century	5
AFRICAAM 146A	African Politics	4-5
AFRICAAM 147	History of South Africa	5
AFRICAAM 148	The African Atlantic	3-5
AFRICAAM 195	Independent Study	3-5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 200Y	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 200Z	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 261E	Mixed Race Literature in the U.S. and South Africa	5
AFRICAST 109	Running While Others Walk: African Perspectives on Development	5
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	3-5
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 138	Conflict and Reconciliation in Africa: International Intervention	3-5
AFRICAST 141A	Science, Technology, and Medicine in Africa	4
AFRICAST 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AFRICAST 151	AIDS in Africa	3
AFRICAST 195	Shifting Frames	1-2
AFRICAST 199	Independent Study or Directed Reading	1-5

AFRICAST 209	Running While Others Walk: African Perspectives on Development	5	AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	3-5	AFRICAAM 43	Introduction to English III: Introduction to African American Literature	5
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5	AFRICAAM 50B	Nineteenth Century America	3
AFRICAST 224	Memory and Heritage In South Africa Syllabus	1	AFRICAAM 54N	African American Women's Lives	3
AFRICAST 235	Designing Research-Based Interventions to Solve Global Health Problems	3-4	AFRICAAM 64C	From Freedom to Freedom Now!: African American History, 1865-1965	3
AFRICAST 299	Independent Study or Directed Reading	1-10	AFRICAAM 75E	Black Cinema	2
AFRICAST 301A	The Dynamics of Change in Africa	4-5	AFRICAAM 105	Introduction to African and African American Studies	5
AMSTUD 261E	Mixed Race Literature in the U.S. and South Africa	5	AFRICAAM 116	Education, Race, and Inequality in African American History, 1880-1990	3-5
ANTHRO 27N	Ethnicity and Violence: Anthropological Perspectives	3-5	AFRICAAM 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
ANTHRO 139	Ethnography of Africa	5	AFRICAAM 125V	The Voting Rights Act	5
ANTHRO 140	Ethnography of Africa	3	AFRICAAM 150B	Nineteenth Century America	5
ANTHRO 141A	Science, Technology, and Medicine in Africa	4	AFRICAAM 154	Black Feminist Theory	5
ANTHRO 185	Medical Anthropology of Contemporary Africa	5	AFRICAAM 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
ANTHRO 187A	The Anthropology of Race, Nature, and Animality	5	AFRICAAM 158	Black Queer Theory	5
ANTHRO 239	Ethnography of Africa	5	AFRICAAM 181Q	Alternative Viewpoints: Black Independent Film	4
ANTHRO 285	Medical Anthropology of Contemporary Africa	5	AFRICAAM 195	Independent Study	3-5
ARTHIST 192B	Art of the African Diaspora	4	AFRICAAM 199	Honors Project	1-5
COMPLIT 145B	The African Atlantic	3-5	AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
HISTORY 45B	Africa in the Twentieth Century	3	AFRICAAM 200Y	Honors Thesis and Senior Thesis Research	3-5
HISTORY 47	History of South Africa	3	AFRICAAM 200Z	Honors Thesis and Senior Thesis Research	3-5
HISTORY 48Q	South Africa: Contested Transitions	4	AFRICAAM 226	Mixed-Race Politics and Culture	5
HISTORY 50A	Colonial and Revolutionary America	3	AFRICAAM 245	Understanding Racial and Ethnic Identity Development	3-5
HISTORY 106A	Global Human Geography: Asia and Africa	5	AFRICAAM 262D	African American Poetics	5
HISTORY 145B	Africa in the 20th Century	5	AFRICAAM 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	4-5	AFRICAST 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
HISTORY 147	History of South Africa	5	AMSTUD 15	Global Flows: The Globalization of Hip Hop Art, Culture, and Politics	1-2
HISTORY 245G	Law and Colonialism in Africa	4-5	AMSTUD 50N	The Literature of Inequality: Have and Have-Nots from the Gilded Age to the Occupy Era	3
LINGUIST 252	Sociolinguistics and Pidgin Creole Studies	2-4	AMSTUD 51Q	Comparative Fictions of Ethnicity	4
POLISCI 11N	The Rwandan Genocide	3	AMSTUD 101	Black & White Race Relations in American Fiction & Film	3-5
POLISCI 146A	African Politics	4-5	AMSTUD 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
POLISCI 242A	Why is Africa Poor?	5	AMSTUD 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
POLISCI 246P	The Dynamics of Change in Africa	4-5	AMSTUD 201	History of Education in the United States	3-5

## Thematic Concentration in African Americans

Students in the African and African American Studies major can choose a concentration in African Americans. The Thematic Concentration in African Americans concentration is designed to explore the historical and contemporary experiences of African Americans. Attention is paid to the interactions between the social, economic, cultural, historical, linguistic, genetic, geopolitical, ecological, and biomedical factors that shape and have shaped African American society.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in this concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the African American concentration.

		Units			
AFRICAAM 18A	Jazz History: Ragtime to Bebop, 1900-1940	3	AMSTUD 262D	African American Poetics	5
AFRICAAM 18B	Jazz History: Bebop to Present, 1940-Present	3	ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
AFRICAAM 19	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	3-4	ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4
AFRICAAM 20A	Jazz Theory	3	DANCE 45	Dance Improv StratLab: Freestyle Improvisation from Contemporary to Hip Hop & Beyond	1-2
AFRICAAM 21	African American Vernacular English	3-5			

EDUC 193C	Psychological Well-Being On Campus: Perspectives Of The Black Diaspora	1
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
ENGLISH 68N	Mark Twain and American Culture	4
HISTORY 11W	Service-Learning Workshop on Issues of Education Equity	1
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 50B	Nineteenth Century America	3
HISTORY 50C	The United States in the Twentieth Century	3
HISTORY 54N	African American Women's Lives	3
HISTORY 74S	Sounds of the Century: Popular Music and the United States in the 20th Century	5
HISTORY 150B	Nineteenth Century America	5
HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
HISTORY 167A	Martin Luther King, Jr. and the Global Freedom Struggle	3-5
HISTORY 255E	Education, Race, and Inequality in African American History, 1880-1990	3-5
HISTORY 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
HUMBIO 121E	Ethnicity and Medicine	1-3
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
LINGUIST 65	African American Vernacular English	3-5
LINGUIST 152	Sociolinguistics and Pidgin Creole Studies	2-4
LINGUIST 252	Sociolinguistics and Pidgin Creole Studies	2-4
LINGUIST 265	African American Vernacular English	3-5
MUSIC 20A	Jazz Theory	3
MUSIC 147J	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	3-4
POLISCI 121L	Racial-Ethnic Politics in US	5
POLISCI 125V	The Voting Rights Act	5
POLISCI 226	Race and Racism in American Politics	5
PSYCH 29N	Growing Up in America	3
PSYCH 183	SPARQ Lab	2-3
PSYCH 215	Mind, Culture, and Society	3
PUBLPOL 121L	Racial-Ethnic Politics in US	5
SOC 45Q	Understanding Race and Ethnicity in American Society	4
SOC 145	Race and Ethnic Relations in the USA	4
SOC 149	The Urban Underclass	4
TAPS 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5
TAPS 176S	Finding Meaning in Life's Struggles: Narrative Ways of Healing	5
URBANST 112	The Urban Underclass	4

### Thematic Concentration in Class

Students in the African and African American Studies major can choose a concentration in Class. The Thematic Concentration in Class concentration is designed to explore the cultural, social, legal, and political construction of racial and ethnic differences in African and/or African American history, while examining the historical specificity of markets, money, property, and labor relations and explores the interdependence between the economy and politics, society, and culture.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in this concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Class concentration.

		Units
AFRICAAM 54N	African American Women's Lives	3
AFRICAAM 64C	From Freedom to Freedom Now!: African American History, 1865-1965	3
AFRICAAM 154	Black Feminist Theory	5
AFRICAAM 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
AFRICAAM 195	Independent Study	3-5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 226	Mixed-Race Politics and Culture	5
AFRICAAM 245	Understanding Racial and Ethnic Identity Development	3-5
AFRICAAM 255	Racial Identity in the American Imagination	4-5
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	3-5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	3-5
ANTHRO 145	Race and Power	5
ANTHRO 245	Race and Power	5
ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4
EDUC 232	Culture, Learning, and Poverty	2-3
EDUC 245	Understanding Racial and Ethnic Identity Development	3-5
HISTORY 47	History of South Africa	3
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
POLISCI 242A	Why is Africa Poor?	5
POLISCI 246P	The Dynamics of Change in Africa	4-5
PSYCH 29N	Growing Up in America	3
PSYCH 183	SPARQ Lab	2-3
SOC 45Q	Understanding Race and Ethnicity in American Society	4
SOC 135	Poverty, Inequality, and Social Policy in the United States	4
SOC 140	Introduction to Social Stratification	3
SOC 148	Comparative Ethnic Conflict	4
SOC 149	The Urban Underclass	4
URBANST 112	The Urban Underclass	4

### Thematic Concentration in Diaspora

Students in the African and African American Studies major can choose a concentration in the Diaspora. The Thematic Concentration in Diaspora concentration is designed to explore the exchanges among peoples and cultures from the continent of Africa and their global impact through symbolic, aesthetic and empirical exchanges (i.e. trade, travel, exploration, and migration). This concentration will also examine comparisons, connections and genealogical relations among geographically dispersed cases in order to consider past and present African identities in their global contexts.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in this concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Diaspora concentration.

		Units
AFRICAAM 21	African American Vernacular English	3-5
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 126B	Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population	3-4
AFRICAAM 133	Literature and Society in Africa and the Caribbean	4
AFRICAAM 195	Independent Study	3-5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAST 138	Conflict and Reconciliation in Africa: International Intervention	3-5
AMSTUD 261E	Mixed Race Literature in the U.S. and South Africa	5
ANTHRO 27N	Ethnicity and Violence: Anthropological Perspectives	3-5
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ANTHRO 121A	Hip Hop, Youth Identities, and the Politics of Language	3-4
ANTHRO 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5
ANTHRO 139	Ethnography of Africa	5
ANTHRO 141A	Science, Technology, and Medicine in Africa	4
ANTHRO 239	Ethnography of Africa	5
ARTHIST 192B	Art of the African Diaspora	4
COMPLIT 145B	The African Atlantic	3-5
COMPLIT 149	The Laboring of Diaspora & Border Literary Cultures	3-5
DANCE 106	Choreography Project: Dancing, Recollected	1
HISTORY 48Q	South Africa: Contested Transitions	4
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 106A	Global Human Geography: Asia and Africa	5
LINGUIST 152	Sociolinguistics and Pidgin Creole Studies	2-4

## Thematic Concentration in Education

Students in the African and African American Studies major can choose a concentration in Education. The Thematic Concentration in Education concentration is designed to explore the history, policy, and practice in education to understand how issues of race, ethnicity, socioeconomic status, culture, and language shape educational opportunity. The goal of the concentration is to develop an understanding of the core issues facing educators and policy makers so that students may learn how they can contribute to the social and political discourse surrounding issues of education and opportunity policy.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in this concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Diaspora concentration.

		Units
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5
AFRICAAM 106	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5

AFRICAAM 112	Urban Education	3-5
AFRICAAM 116	Education, Race, and Inequality in African American History, 1880-1990	3-5
AFRICAAM 130	Community-based Research As Tool for Social Change:Discourses of Equity in Communities & Classrooms	3-5
AFRICAAM 165	Identity and Academic Achievement	3
AFRICAAM 195	Independent Study	3-5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 200Y	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 200Z	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 233A	Counseling Theories and Interventions from a Multicultural Perspective	3-5
AFRICAAM 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	3-5
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 141A	Science, Technology, and Medicine in Africa	4
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	3-5
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AMSTUD 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
AMSTUD 201	History of Education in the United States	3-5
AMSTUD 226	Race and Racism in American Politics	5
ANTHRO 121A	Hip Hop, Youth Identities, and the Politics of Language	3-4
EDUC 12SC	Hip Hop as a Universal Language	2
EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
EDUC 110	Sociology of Education: The Social Organization of Schools	4
EDUC 165	History of Higher Education in the U.S.	3-5
EDUC 193C	Psychological Well-Being On Campus: Perspectives Of The Black Diaspora	1
EDUC 201	History of Education in the United States	3-5
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
EDUC 232	Culture, Learning, and Poverty	2-3
EDUC 243	Writing Across Languages and Cultures: Research in Writing and Writing Instruction	3-5
EDUC 245	Understanding Racial and Ethnic Identity Development	3-5
EDUC 322	Community-based Research As Tool for Social Change:Discourses of Equity in Communities & Classrooms	3-5
HISTORY 11W	Service-Learning Workshop on Issues of Education Equity	1
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
HISTORY 255E	Education, Race, and Inequality in African American History, 1880-1990	3-5
LINGUIST 65	African American Vernacular English	3-5
LINGUIST 152	Sociolinguistics and Pidgin Creole Studies	2-4
LINGUIST 252	Sociolinguistics and Pidgin Creole Studies	2-4
LINGUIST 265	African American Vernacular English	3-5



SOC 132	Sociology of Education: The Social Organization of Schools	4
SOC 135	Poverty, Inequality, and Social Policy in the United States	4
TAPS 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5

### Thematic Concentration in Gender

Students in the African and African American Studies major can choose a concentration in Gender. The Thematic Concentration in Gender concentration is designed to explore the historical and contemporary experiences and histories of women or men among the cultures from the continent of Africa and the diaspora. Students also explore how these societies organize gender roles, relations, and identities, and how these intersect with other hierarchies of power, such as class, race, nationality, ethnicity, sexuality, disability and age.

The concentration is not declared on Axes; it does not appear on the transcript or diploma. Students interested in this concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Gender concentration.

		Units
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 43	Introduction to English III: Introduction to African American Literature	5
AFRICAAM 54N	African American Women's Lives	3
AFRICAAM 145A	Poetics and Politics of Caribbean Women's Literature	5
AFRICAAM 154	Black Feminist Theory	5
AFRICAAM 158	Black Queer Theory	5
AFRICAAM 195	Independent Study	3-5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 245	Understanding Racial and Ethnic Identity Development	3-5
AFRICAAM 255	Racial Identity in the American Imagination	4-5
AMSTUD 178	Ethnicity and Dissent in United States Art and Literature	4
AMSTUD 201	History of Education in the United States	3-5
ANTHRO 135H	Conversations in CSRE: Case Studies in the Stanford Community	1-2
ANTHRO 135I	CSRE House Seminar: Race and Ethnicity at Stanford	1-2
ANTHRO 187A	The Anthropology of Race, Nature, and Animality	5
ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4
CSRE 144	Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class	5
EDUC 245	Understanding Racial and Ethnic Identity Development	3-5
FEMGEN 154	Black Feminist Theory	5
HISTORY 54N	African American Women's Lives	3
HISTORY 74S	Sounds of the Century: Popular Music and the United States in the 20th Century	5
HISTORY 145B	Africa in the 20th Century	5
HISTORY 255D	Racial Identity in the American Imagination	4-5
LINGUIST 156	Language and Gender	3-5
LINGUIST 256	Language, Gender and Sexuality	1-4

PSYCH 183	SPARQ Lab	2-3
SOC 140	Introduction to Social Stratification	3
SOC 142	Sociology of Gender	3

### Thematic Concentration in Historical Period

Students in the African and African American Studies major can choose a concentration in Historical Period. The Thematic Concentration in Historical Period concentration is designed to explore African and/or African American history and politics from a multidisciplinary perspective.

The concentration is not declared on Axes; it does not appear on the transcript or diploma. Students interested in this concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Historical Period concentration.

		Units
AFRICAAM 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
AFRICAAM 18B	Jazz History: Bebop to Present, 1940-Present	3
AFRICAAM 30	The Egyptians	3-5
AFRICAAM 50B	Nineteenth Century America	3
AFRICAAM 64C	From Freedom to Freedom Now!: African American History, 1865-1965	3
AFRICAAM 102	From Confederate Monuments to Wikipedia: The Politics of Remembering the Past	5
AFRICAAM 105	Introduction to African and African American Studies	5
AFRICAAM 107C	The Black Mediterranean: Greece, Rome and Antiquity	4-5
AFRICAAM 116	Education, Race, and Inequality in African American History, 1880-1990	3-5
AFRICAAM 145B	Africa in the 20th Century	5
AFRICAAM 150B	Nineteenth Century America	5
AFRICAAM 195	Independent Study	3-5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 262D	African American Poetics	5
AFRICAAM 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
AMSTUD 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
AMSTUD 255D	Racial Identity in the American Imagination	4-5
AMSTUD 261E	Mixed Race Literature in the U.S. and South Africa	5
AMSTUD 262C	African American Literature and the Retreat of Jim Crow	5
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
ENGLISH 68N	Mark Twain and American Culture	4
HISTORY 45B	Africa in the Twentieth Century	3
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 50B	Nineteenth Century America	3
HISTORY 50C	The United States in the Twentieth Century	3
HISTORY 54N	African American Women's Lives	3
HISTORY 145B	Africa in the 20th Century	5
HISTORY 147	History of South Africa	5
HISTORY 150B	Nineteenth Century America	5
HISTORY 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
HISTORY 167A	Martin Luther King, Jr. and the Global Freedom Struggle	3-5

HISTORY 245G	Law and Colonialism in Africa	4-5
HISTORY 255E	Education, Race, and Inequality in African American History, 1880-1990	3-5
HISTORY 267E	Martin Luther King, Jr. - His Life, Ideas, and Legacy	4-5
MUSIC 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
MUSIC 18B	Jazz History: Bebop to Present, 1940-Present	3
SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5

## Thematic Concentration in Identity, Diversity and Aesthetics (IDA)

The Identity, Diversity, and Aesthetics concentration is designed to be attainable and flexible within the AAAS major. Each quarter IDA offers a range of courses taught by IDA-affiliated faculty or Artists. A concentration typically requires 15 units in IDA-approved courses, which may include the senior honors thesis.

IDA Concentration students must also complete a senior creative project. Possible senior projects could include: a stage production, an album of music, a fiction or creative non-fiction piece, or an arts workshop curriculum for a community setting. Students who elect to write an honors thesis may incorporate their project as the basis for their thesis.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in this concentration should contact the AAAS undergraduate program office and/or The Institute for Diversity in the Arts. (<https://diversityarts.stanford.edu/about/contact>)

Students may find the following courses useful in fulfilling requirements in the Identity, Diversity and Aesthetics (IDA) concentration.

		Units
AFRICAAM 3E	Michelle Obama in American Culture	1
AFRICAAM 5I	Hamilton: An American Musical	1
AFRICAAM 10A	Introduction to Identity, Diversity, and Aesthetics: Arts, Culture, and Pedagogy	1
AFRICAAM 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
AFRICAAM 18B	Jazz History: Bebop to Present, 1940-Present	3
AFRICAAM 19	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	3-4
AFRICAAM 20A	Jazz Theory	3
AFRICAAM 21	African American Vernacular English	3-5
AFRICAAM 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5
AFRICAAM 36	REPRESENT! Covering Race, Culture, and Identity In The Arts through Writing, Media, and Transmedia.	5
AFRICAAM 37	Chocolate Heads Performance Project: Dance & Intercultural Performance Creation	2
AFRICAAM 40	Liquid Flow: Introduction to Contemporary Dance and Dance-making	1
AFRICAAM 45	Dance Improv StratLab: Freestyle Improvisation from Contemporary to Hip Hop & Beyond	1-2
AFRICAAM 52	Introduction to Improvisation in Dance: From Salsa to Vodun to Tap Dance	3-4
AFRICAAM 71	Introduction to Capoeira: An African Brazilian Art Form	1
AFRICAAM 75E	Black Cinema	2
AFRICAAM 94	Public Space in Iran: Murals, Graffiti, Performance	3-4
AFRICAAM 101	Black & White Race Relations in American Fiction & Film	3-5
AFRICAAM 102B	Art and Social Criticism	5
AFRICAAM 120F	Buying Black: Economic Sovereignty, Race, and Entrepreneurship in the USA	4-5
AFRICAAM 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
AFRICAAM 122E	Art in the Streets: Identity in Murals, Site-specific works, and Interventions in Public Spaces	4
AFRICAAM 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	2-4
AFRICAAM 128	Roots Modern Experience - Mixed Level	1
AFRICAAM 133	Literature and Society in Africa and the Caribbean	4
AFRICAAM 146L	Studies in Ethnomusicology: Musics of Africa and the African Diaspora	3-5
AFRICAAM 148	The African Atlantic	3-5
AFRICAAM 154G	Black Magic: Ethnicity, Race, and Identity in Performance Cultures	3-4
AFRICAAM 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
AFRICAAM 159	James Baldwin & Twentieth Century Literature	5
AFRICAAM 160J	Conjure Art 101: Performances of Ritual, Spirituality and Decolonial Black Feminist Magic	2
AFRICAAM 165G	Afro-German Art Forms	3-5
AFRICAAM 176B	Documentary Fictions	4
AFRICAAM 181Q	Alternative Viewpoints: Black Independent Film	4
AFRICAAM 189	Black Life and Death in the Neoliberal Era	5
AFRICAAM 194	Topics in Writing & Rhetoric: Contemporary Black Rhetorics: Black Twitter and Black Digital Cultures	4
AFRICAAM 194A	Topics in Writing & Rhetoric: Freedom's Mixtape: DJing Contemporary African American Rhetorics	4
AFRICAAM 195	Independent Study	3-5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200N	Funkentelechy: Technologies, Social Justice and Black Vernacular Cultures	4
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 223	Literature and Human Experimentation	3-5
AFRICAAM 226	Mixed-Race Politics and Culture	5
AFRICAAM 229	Literature and Global Health	3-5
AFRICAAM 255	Racial Identity in the American Imagination	4-5
AFRICAAM 258	Black Feminist Theater and Theory	4
AFRICAAM 262D	African American Poetics	5
AFRICAAM 265G	African-American Independent Film- On Both Sides of the Camera	4-5
AFRICAAM 352	The Novel in Africa	3-5
AFRICAST 132	Literature and Society in Africa and the Caribbean	4
AFRICAST 145B	The African Atlantic	3-5
AFRICAST 229	Literature and Global Health	3-5
AFRICAST 246L	Studies in Ethnomusicology: Musics of Africa and the African Diaspora	3-5
AMSTUD 3E	Michelle Obama in American Culture	1
AMSTUD 5I	Hamilton: An American Musical	1
AMSTUD 12A	Introduction to English III: Introduction to African American Literature	5
AMSTUD 15	Global Flows: The Globalization of Hip Hop Art, Culture, and Politics	1-2
AMSTUD 51Q	Comparative Fictions of Ethnicity	4
AMSTUD 101	Black & White Race Relations in American Fiction & Film	3-5
AMSTUD 102	Art and Social Criticism	5
AMSTUD 134	Museum Cultures: Material Representation in the Past and Present	3-5

AMSTUD 143M	American Indian Mythology, Legend, and Lore	3-5	COMPLIT 110	Introduction to Comparative Queer Literary Studies	3-5
AMSTUD 151	Migration and Diaspora in American Art, 1800-Present	4	COMPLIT 113	Feminist Poetry in the U.S., 1973-2017	3-5
AMSTUD 152K	Mixed-Race Politics and Culture	5	COMPLIT 145B	The African Atlantic	3-5
AMSTUD 178	Ethnicity and Dissent in United States Art and Literature	4	COMPLIT 149	The Laboring of Diaspora & Border Literary Cultures	3-5
AMSTUD 186D	Asian American Art: 1850-Present	4	COMPLIT 182	Making Palestine Visible	3-5
AMSTUD 255D	Racial Identity in the American Imagination	4-5	COMPLIT 204	Indigenous Poetics and the Politics of Resistance	3
AMSTUD 261	Personal Narratives in Feminist, Gender, and Sexuality Studies	4-5	COMPLIT 223	Literature and Human Experimentation	3-5
AMSTUD 262D	African American Poetics	5	COMPLIT 229	Literature and Global Health	3-5
ANTHRO 120F	Buying Black: Economic Sovereignty, Race, and Entrepreneurship in the USA	4-5	COMPLIT 247	Bollywood and Beyond: An Introduction to Indian Film	3-5
ANTHRO 121A	Hip Hop, Youth Identities, and the Politics of Language	3-4	COMPLIT 310	Introduction to Comparative Queer Literary Studies	3-5
ANTHRO 320A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5	COMPLIT 345B	The African Atlantic	3-5
ARCHLGY 134	Museum Cultures: Material Representation in the Past and Present	3-5	COMPLIT 348	US-Mexico Border Fictions: Writing La Frontera, Tearing Down the Wall	3-5
ARCHLGY 234	Museum Cultures: Material Representation in the Past and Present	3-5	COMPLIT 352A	The Novel in Africa	3-5
ARTHIST 118A	Public Space in Iran: Murals, Graffiti, Performance	3-4	CSRE 3E	Michelle Obama in American Culture	1
ARTHIST 151	Migration and Diaspora in American Art, 1800-Present	4	CSRE 5I	Hamilton: An American Musical	1
ARTHIST 162B	Art and Social Criticism	5	CSRE 10A	Introduction to Identity, Diversity, and Aesthetics: Arts, Culture, and Pedagogy	1
ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4	CSRE 10AY	Pacific Standard Time LA/LA creative projects in a Celebration Beyond Borders	1-2
ARTHIST 186B	Asian American Art: 1850-Present	4	CSRE 21	African American Vernacular English	3-5
ARTHIST 192B	Art of the African Diaspora	4	CSRE 41	Black & White Race Relations in American Fiction & Film	3-5
ARTHIST 193	Jacob Lawrence's Twentieth Century: African American Art and Culture	5	CSRE 44	Living Free: Embodying Healing and Creativity in The Era of Racial Justice Movements	1-4
ARTHIST 211	The California Missions: Art History and Reconciliation	5	CSRE 47Q	Heartfulness: Mindfulness, Compassion, and Responsibility	3
ARTHIST 221E	Peripheral Dreams: The Art and Literature of Miró, Dalí, and other Surrealists in Catalonia	3-5	CSRE 51Q	Comparative Fictions of Ethnicity	4
ARTHIST 284B	Museum Cultures: Material Representation in the Past and Present	3-5	CSRE 55N	Batman, Hamilton, Díaz, and Other Wondrous Lives	3-5
ARTHIST 351	Migration and Diaspora in American Art, 1800-Present	4	CSRE 61	Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders	3-4
ARTHIST 502	Methods: Objecthood	5	CSRE 78	Art + Community: Division, Resilience & Reconciliation	1-5
ARTSINST 50	Arts in Context: The Process of Cultural Production	1-2	CSRE 82G	Making Palestine Visible	3-5
ARTSINST 182	Activating Urban Spaces: Materializing Hidden Narratives in the Urban Environment	3-4	CSRE 95I	Revolutionary Practices: Space and Public Discourse in Iran	4
ARTSTUDI 170	PHOTOGRAPHY I: BLACK AND WHITE	4	CSRE 102A	Art and Social Criticism	5
ARTSTUDI 270	Advanced Photography Seminar	1-5	CSRE 111	The California Missions: Art History and Reconciliation	5
ASNAMST 31N	Perspectives in North American Taiko	3	CSRE 114	Sound Tracks: Music, Memory, and Migration in the Twentieth Century	3-4
ASNAMST 91A	ASIAN-AMERICAN AUTOBIOGRAPHY/W	5	CSRE 120F	Buying Black: Economic Sovereignty, Race, and Entrepreneurship in the USA	4-5
ASNAMST 157	An Introduction to Asian American Literature: The Short Story	3	CSRE 123A	American Indians and the Cinema	5
ASNAMST 174S	When Half is Whole: Developing Synergistic Identities and Mestiza Consciousness	5	CSRE 123B	Literature and Human Experimentation	3-5
ASNAMST 186B	Asian American Art: 1850-Present	4	CSRE 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	2-4
CHILATST 109	GENTE: An incubator for transforming national narratives	5	CSRE 129B	Literature and Global Health	3-5
CLASSICS 16N	Sappho: Erotic Poetess of Lesbos	3	CSRE 134	Museum Cultures: Material Representation in the Past and Present	3-5
COMPLIT 37Q	Zionism and the Novel	3	CSRE 141E	Counterstory and Narrative Inquiry in Literature and Education	3
COMPLIT 51Q	Comparative Fictions of Ethnicity	4	CSRE 145B	The African Atlantic	3-5
COMPLIT 55N	Batman, Hamilton, Díaz, and Other Wondrous Lives	3-5	CSRE 146J	Studies in Ethnomusicology: Listening to the Local: Music Ethnography of the Bay Area	3-5
COMPLIT 82	Making Palestine Visible	3-5	CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
COMPLIT 106	Public Writing for Human Rights	1-3			

CSRE 151D	Migration and Diaspora in American Art, 1800-Present	4	ENGLISH 43A	American Indian Mythology, Legend, and Lore	3-5
CSRE 152	Introduction to Improvisation in Dance: From Salsa to Vodun to Tap Dance	3-4	ENGLISH 91A	ASIAN-AMERICAN AUTOBIOGRAPHY/W	5
CSRE 154D	Black Magic: Ethnicity, Race, and Identity in Performance Cultures	3-4	ENGLISH 143A	American Indian Mythology, Legend, and Lore	3-5
CSRE 156T	Performing History: Race, Politics, and Staging the Plays of August Wilson	4	ENGLISH 152K	Mixed-Race Politics and Culture	5
CSRE 160J	Conjure Art 101: Performances of Ritual, Spirituality and Decolonial Black Feminist Magic	2	ENGLISH 159	James Baldwin & Twentieth Century Literature	5
CSRE 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	3-4	ENGLISH 287G	A Woman's Life: 20th- (and 21st-) Century Memoirs by Women	5
CSRE 165I	Afro-German Art Forms	3-5	FEMGEN 3E	Michelle Obama in American Culture	1
CSRE 174S	When Half is Whole: Developing Synergistic Identities and Mestiza Consciousness	5	FEMGEN 12SI	Beyond the Athlete: Intersection of Diversity, Storytelling, and Athletics	1-2
CSRE 188Q	Imagining Women: Writers in Print and in Person	4-5	FEMGEN 13N	Women Making Music	3
CSRE 194KT	Topics in Writing & Rhetoric: The Last Hopi On Earth: The Rhetoric of Entertainment Inequity	4	FEMGEN 21S	StoryCraft: On Relationships	2
CSRE 201D	Public Art Interventions in Social & Cultural Spaces	4-5	FEMGEN 21T	StoryCraft: On Sexuality	2
CSRE 255D	Racial Identity in the American Imagination	4-5	FEMGEN 24N	Sappho: Erotic Poetess of Lesbos	3
CSRE 258	Black Feminist Theater and Theory	4	FEMGEN 36N	Gay Autobiography	4
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5	FEMGEN 97	Bow Down: Queer Hip-Hop Pedagogy	3
DANCE 1	Introduction to Contemporary Dance & Movement: Liquid Flow	1	FEMGEN 102	Art and Social Criticism	5
DANCE 2	Introduction to Dance & Movement: Afro Flows	1	FEMGEN 110X	Introduction to Comparative Queer Literary Studies	3-5
DANCE 30	Chocolate Heads Performance Project: Dance & Intercultural Performance Creation	2	FEMGEN 113X	Feminist Poetry in the U.S., 1973-2017	3-5
DANCE 45	Dance Improv StratLab: Freestyle Improvisation from Contemporary to Hip Hop & Beyond	1-2	FEMGEN 133	Transgender Performance and Performativity	4
DANCE 58	Beginning Hip Hop	1	FEMGEN 154G	Black Magic: Ethnicity, Race, and Identity in Performance Cultures	3-4
DANCE 59	Intermediate-Advanced Hip-Hop	1	FEMGEN 159	James Baldwin & Twentieth Century Literature	5
DANCE 71	Introduction to Capoeira: An African Brazilian Art Form	1	FEMGEN 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	3-4
DANCE 102	Musical Theater Dance Styles	1	FEMGEN 188Q	Imagining Women: Writers in Print and in Person	4-5
DANCE 106	Choreography Project: Dancing, Recollected	1	FEMGEN 205	Songs of Love and War: Gender, Crusade, Politics	3-5
DANCE 106I	Stanford Dance Community: Inter-Style Choreography Workshop	1-2	FEMGEN 258X	Black Feminist Theater and Theory	4
DANCE 108	Hip Hop Meets Broadway	1	FEMGEN 261	Personal Narratives in Feminist, Gender, and Sexuality Studies	4-5
DANCE 128	Roots Modern Experience - Mixed Level	1	FEMGEN 310X	Introduction to Comparative Queer Literary Studies	3-5
DANCE 160J	Conjure Art 101: Performances of Ritual, Spirituality and Decolonial Black Feminist Magic	2	FEMGEN 314	Performing Identities	4
DANCE 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	3-4	FEMGEN 361	Personal Narratives in Feminist, Gender, and Sexuality Studies	4-5
DANCE 161D	Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders	3-4	FILMSTUD 100C	History of World Cinema III, 1960-Present	4
EARTHSYS 95	Liberation Through Land: Organic Gardening and Racial Justice	2	FILMSTUD 132A	Indian Cinema	5
EDUC 12SC	Hip Hop as a Universal Language	2	FILMSTUD 213	Global Melodrama	5
EDUC 141	Counterstory and Narrative Inquiry in Literature and Education	3	FILMSTUD 300C	History of World Cinema III, 1960-Present	4
EDUC 214	Museum Cultures: Material Representation in the Past and Present	3-5	FILMSTUD 332A	Indian Cinema	5
EDUC 314	Technologies, Social Justice and Black Vernacular Culture	3-5	FILMSTUD 413	Global Melodrama	5
EDUC 341	Counterstory and Narrative Inquiry in Literature and Education	3	FRENCH 133	Literature and Society in Africa and the Caribbean	4
EDUC 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5	FRENCH 145B	The African Atlantic	3-5
ENGLISH 12A	Introduction to English III: Introduction to African American Literature	5	FRENCH 205	Songs of Love and War: Gender, Crusade, Politics	3-5
			FRENCH 229	Literature and Global Health	3-5
			FRENCH 345B	The African Atlantic	3-5
			GERMAN 165	Afro-German Art Forms	3-5
			GLOBAL 145	Revolutionary Practices: Space and Public Discourse in Iran	4
			GLOBAL 250	Bollywood and Beyond: An Introduction to Indian Film	3-5
			HISTORY 3E	Michelle Obama in American Culture	1
			HISTORY 3G	Hamilton: An American Musical	1
			HISTORY 36N	Gay Autobiography	4
			HISTORY 74S	Sounds of the Century: Popular Music and the United States in the 20th Century	5
			HISTORY 82G	Making Palestine Visible	3-5
			HISTORY 182G	Making Palestine Visible	3-5
			HISTORY 255D	Racial Identity in the American Imagination	4-5

HISTORY 265G	African-American Independent Film- On Both Sides of the Camera	4-5	STS 200N	Funkentelechy: Technologies, Social Justice and Black Vernacular Cultures	4
HISTORY 355D	Racial Identity in the American Imagination	4-5	TAPS 20N	Prisons and Performance	3
HISTORY 365G	African-American Independent Film- On Both Sides of the Camera	4-5	TAPS 21S	StoryCraft: On Relationships	2
HUMBIO 175H	Literature and Human Experimentation	3-5	TAPS 21T	StoryCraft: On Sexuality	2
HUMBIO 175L	Literature and Global Health	3-5	TAPS 32	The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice	1-5
ILAC 149	The Laboring of Diaspora & Border Literary Cultures	3-5	TAPS 50	Arts in Context: The Process of Cultural Production	1-2
ILAC 193	The Cinema of Pedro Almodovar	3-5	TAPS 133T	Transgender Performance and Performativity	4
ILAC 281E	Peripheral Dreams: The Art and Literature of Miró, Dalí, and other Surrealists in Catalonia	3-5	TAPS 152	Introduction to Improvisation in Dance: From Salsa to Vodun to Tap Dance	3-4
ILAC 348	US-Mexico Border Fictions: Writing La Frontera, Tearing Down the Wall	3-5	TAPS 154G	Black Magic: Ethnicity, Race, and Identity in Performance Cultures	3-4
JEWISHST 37Q	Zionism and the Novel	3	TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
JEWISHST 143	Literature and Society in Africa and the Caribbean	4	TAPS 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	3-4
LIFE 124	Counterstory and Narrative Inquiry in Literature and Education	3	TAPS 161D	Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders	3-4
LINGUIST 65	African American Vernacular English	3-5	TAPS 176S	Finding Meaning in Life's Struggles: Narrative Ways of Healing	5
LINGUIST 253	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5	TAPS 258	Black Feminist Theater and Theory	4
MED 220	Literature and Human Experimentation	3-5	TAPS 314	Performing Identities	4
MED 234	Literature and Global Health	3-5	TAPS 356	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
MUSIC 4SI	Interactive Introduction to North American Taiko	1	URBANST 182	Activating Urban Spaces: Materializing Hidden Narratives in the Urban Environment	3-4
MUSIC 14N	Women Making Music	3	WELLNESS 180	The Flourishing Activist: Mindfully Being the Revolution	1-2
MUSIC 18A	Jazz History: Ragtime to Bebop, 1900-1940	3			
MUSIC 18B	Jazz History: Bebop to Present, 1940-Present	3			
MUSIC 20A	Jazz Theory	3			
MUSIC 31N	Perspectives in North American Taiko	3			
MUSIC 50	Arts in Context: The Process of Cultural Production	1-2			
MUSIC 114	Sound Tracks: Music, Memory, and Migration in the Twentieth Century	3-4			
MUSIC 146J	Studies in Ethnomusicology: Listening to the Local: Music Ethnography of the Bay Area	3-5			
MUSIC 146K	Studies in Ethnomusicology: Music of South Asia	3-5			
MUSIC 146L	Studies in Ethnomusicology: Musics of Africa and the African Diaspora	3-5			
MUSIC 184E	Musical Theater Dance Styles	1			
MUSIC 246J	Studies in Ethnomusicology: Listening to the Local: Music Ethnography of the Bay Area	3-5			
MUSIC 246K	Studies in Ethnomusicology: Music of South Asia	3-5			
MUSIC 246L	Studies in Ethnomusicology: Musics of Africa and the African Diaspora	3-5			
NATIVEAM 134	Museum Cultures: Material Representation in the Past and Present	3-5			
NATIVEAM 143A	American Indian Mythology, Legend, and Lore	3-5			
NATIVEAM 211	The California Missions: Art History and Reconciliation	5			
PWR 1WI	Writing & Rhetoric 1: By Any Means Necessary: The Rhetoric of Black Radical Movements	4			
PWR 2JC	Writing & Rhetoric 2: Walk(s) of Shame: The Rhetoric of Respectability	4			
PWR 194AB	Topics in Writing & Rhetoric: Freedom's Mixtape: DJing Contemporary African American Rhetorics	4			
PWR 194ABA	Topics in Writing & Rhetoric: Contemporary Black Rhetorics: Prince	2-3			
PWR 194AJ	Topics in Writing & Rhetoric: Contemporary Black Rhetorics: Black Twitter and Black Digital Cultures	4			
PWR 194KT	Topics in Writing & Rhetoric: The Last Hopi On Earth: The Rhetoric of Entertainment Inequity	4			

## Thematic Concentration in Linguistics

Students in the African and African American Studies major can choose a concentration in Linguistics. The Thematic Concentration in Linguistics concentration is designed to explore the relationships between language, race and ethnicity across a wide range of social, cultural and educational contexts.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in this concentration should contact the AAAS undergraduate program office. Students may obtain credit for the study of approved AAAS languages towards their degree. If students take 15 or more units of an approved language relevant to AAAS, they may apply 5 of those units toward their degree.

Students may find the following courses useful in fulfilling requirements in the Linguistics concentration.

		Units
AFRICAAM 21	African American Vernacular English	3-5
AFRICAAM 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
AFRICAAM 195	Independent Study	3-5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AMELANG 100A	Beginning Amharic, First Quarter	4
AMELANG 100B	First-Year Amharic, Second Quarter	4
AMELANG 100C	First-Year Amharic, Third Quarter	4
AMELANG 101A	Second-Year Amharic, First Quarter	4
AMELANG 101B	Second-Year Amharic, Second Quarter	4
AMELANG 101C	Second-Year Amharic, Third Quarter	4
AMELANG 103A	First-Year Hausa, First Quarter	4
AMELANG 103B	First-Year Hausa, Second Quarter	4

AMELANG 103C	First-Year Hausa, Third Quarter	4
AMELANG 106A	First-Year Swahili, First Quarter	5
AMELANG 106B	First-Year Swahili, Second Quarter	5
AMELANG 106C	First-Year Swahili, Third Quarter	5
AMELANG 107A	Second-Year Swahili, First Quarter	4
AMELANG 107B	Second-Year Swahili, Second Quarter	4
AMELANG 107C	Second-Year Swahili, Third Quarter	4
AMELANG 108A	Third-Year Swahili, First Quarter	4
AMELANG 108B	Third-Year Swahili, Second Quarter	4
AMELANG 108C	Third-Year Swahili, Third Quarter	4
AMELANG 110A	First-Year Wolof, First Quarter	3
AMELANG 114A	Beginning Afrikaans, First Quarter	4
AMELANG 114B	Beginning Afrikaans, Second Quarter	4
AMELANG 115A	Second year - Afrikaans, First Quarter	4
AMELANG 115B	Second - year Afrikaans, Second Quarter	4
AMELANG 115C	Second - Year Afrikaans, Third Quarter	4
AMELANG 134A	First-Year Igbo, First Quarter	4
AMELANG 134B	First-Year Igbo, Second Quarter	4
AMELANG 134C	First-Year Igbo, Third Quarter	4
AMELANG 135A	Second-Year Igbo, First Quarter	4
AMELANG 135B	Second-Year Igbo, Second Quarter	3
AMELANG 135C	Second-Year Igbo, Third Quarter	4
AMELANG 136A	First-Year Xhosa, First Quarter	4
AMELANG 136B	First-Year Xhosa, Second Quarter	4
AMELANG 136C	First-Year Xhosa, Third Quarter	4
AMELANG 137A	Second-Year Xhosa, First Quarter	4
AMELANG 137B	Second-Year Xhosa, Second Quarter	4
AMELANG 137C	Second-Year Xhosa, Third Quarter	4
AMELANG 153	Introduction to Twi	1
AMELANG 153A	First-Year Twi, First Quarter	4
AMELANG 153B	First-Year Twi, Second Quarter	4
AMELANG 153C	First-Year Beginning Twi, Third Quarter	4
AMELANG 154A	Second-Year Twi, First Quarter	4
AMELANG 154B	Second-Year Twi, Second Quarter	4
AMELANG 154C	Second-Year Twi, Third Quarter	4
AMELANG 156A	First-Year Zulu, First Quarter	4
AMELANG 156B	First-Year Zulu, Second Quarter	4
AMELANG 156C	First-Year Zulu, Third Quarter	4
AMELANG 157A	Second-Year Zulu, First Quarter	4
AMELANG 157B	Second-Year Zulu, Second Quarter	4
AMELANG 157C	Second-Year Zulu, Third Quarter	4
AMELANG 180A	First-Year Kinyarwanda, First Quarter	4
AMELANG 180B	First-Year Kinyarwanda, Second Quarter	4
AMELANG 182A	Intermediate Fulani, First Quarter	3
AMELANG 182B	Intermediate Fulani, Second Quarter	3
AMELANG 182C	Intermediate Fulani, Third Quarter	3
AMELANG 187A	First-Year Yoruba, First Quarter	4
AMELANG 187B	First-Year Yoruba, Second Quarter	4
AMELANG 187C	First-Year Yoruba, Third Quarter	4
AMELANG 203A	Beginning Hausa, First Quarter	4
AMELANG 203B	Beginning Hausa, Second Quarter	4
EDUC 12SC	Hip Hop as a Universal Language	2
LINGUIST 65	African American Vernacular English	3-5
LINGUIST 152	Sociolinguistics and Pidgin Creole Studies	2-4
LINGUIST 251	Sociolinguistic Field Methods	3-5
LINGUIST 252	Sociolinguistics and Pidgin Creole Studies	2-4
LINGUIST 256	Language, Gender and Sexuality	1-4

LINGUIST 265 African American Vernacular English 3-5

## Thematic Concentration in Mixed Race

Students in the African & African American Studies major can choose a concentration in Mixed Race. The Thematic Concentration in Mixed Race concentration is designed to explore how African and/or African American identities were and are constituted in relation to issues of race and ethnicity. The concentration investigates how conversations, debates, and policies on mixed race identities effect domestic and foreign policy, law, history, culture, society and studies on race and ethnicity. In this concentration a number of topics (Issues of immigration, citizenship, empire and expansion, defense, diplomacy, human rights, public welfare, social justice and law, educational rights, etc) are explored from the angle of how racial and ethnic difference impacts debate and policy.

The concentration is not declared on Axes; it does not appear on the transcript or diploma. Students interested in this concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Mixed Race concentration.

		Units
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 41	Genes and Identity	3
AFRICAAM 126B	Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population	3-4
AFRICAAM 131	Genes and Identity	5
AFRICAAM 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
AFRICAAM 158	Black Queer Theory	5
AFRICAAM 195	Independent Study	3-5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 200Y	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 200Z	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 226	Mixed-Race Politics and Culture	5
AFRICAAM 233A	Counseling Theories and Interventions from a Multicultural Perspective	3-5
AFRICAAM 255	Racial Identity in the American Imagination	4-5
AFRICAAM 261E	Mixed Race Literature in the U.S. and South Africa	5
AMSTUD 51Q	Comparative Fictions of Ethnicity	4
AMSTUD 101	Black & White Race Relations in American Fiction & Film	3-5
AMSTUD 178	Ethnicity and Dissent in United States Art and Literature	4
AMSTUD 226	Race and Racism in American Politics	5
AMSTUD 255D	Racial Identity in the American Imagination	4-5
ANTHRO 27N	Ethnicity and Violence: Anthropological Perspectives	3-5
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ANTHRO 135H	Conversations in CSRE: Case Studies in the Stanford Community	1-2
ANTHRO 135I	CSRE House Seminar: Race and Ethnicity at Stanford	1-2
ANTHRO 145	Race and Power	5
ANTHRO 187A	The Anthropology of Race, Nature, and Animality	5
ANTHRO 245	Race and Power	5
ARTHIST 178	Ethnicity and Dissent in United States Art and Literature	4

COMPLIT 51Q	Comparative Fictions of Ethnicity	4	LINGUIST 251	Sociolinguistic Field Methods	3-5
CSRE 144	Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class	5	LINGUIST 255B	Sociolinguistics Classics and Community Studies	3-5
EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5	POLISCI 146A	African Politics	4-5
ENGLISH 15SC	A New Millennial Mix: The Art & Politics of the "Mixed Race Experience"	2	POLISCI 226	Race and Racism in American Politics	5
HISTORY 255D	Racial Identity in the American Imagination	4-5	POLISCI 242A	Why is Africa Poor?	5
POLISCI 11N	The Rwandan Genocide	3	PSYCH 75	Introduction to Cultural Psychology	5
POLISCI 28N	The Changing Nature of Racial Identity in American Politics	3	RELIGST 246	Constructing Race and Religion in America	4-5
POLISCI 121L	Racial-Ethnic Politics in US	5	SOC 14N	Inequality in American Society	4
PSYCH 29N	Growing Up in America	3	SOC 15N	The Transformation of Socialist Societies	3
PSYCH 215	Mind, Culture, and Society	3	SOC 46N	Race, Ethnic, and National Identities: Imagined Communities	3
PUBLPOL 121L	Racial-Ethnic Politics in US	5	SOC 118	Social Movements and Collective Action	4
SOC 145	Race and Ethnic Relations in the USA	4	SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5
SOC 155	The Changing American Family	4	URBANST 123	Approaching Research and the Community	2-3
TAPS 176S	Finding Meaning in Life's Struggles: Narrative Ways of Healing	5			

### Thematic Concentration in Theory

Students in the African and African American Studies major can choose a concentration in Theory. The Thematic Concentration in Theory concentration is a program designed to explore the meta-narratives and theoretical frameworks for analyzing enduring issues of cultural, religious, and political life both within African and/or African American societies and between political communities. Students will also explore the role of identities, values and prejudices that are the product of historical processes and the interaction of different peoples.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in this concentration should contact the AAAS undergraduate program office.

Students may find the following courses useful in fulfilling requirements in the Theory concentration.

AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1
AFRICAAM 107C	The Black Mediterranean: Greece, Rome and Antiquity	4-5
AFRICAAM 125V	The Voting Rights Act	5
AFRICAAM 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	2-4
AFRICAAM 154	Black Feminist Theory	5
AFRICAAM 158	Black Queer Theory	5
AFRICAAM 195	Independent Study	3-5
AFRICAAM 199	Honors Project	1-5
AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 200Y	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 200Z	Honors Thesis and Senior Thesis Research	3-5
AFRICAAM 233A	Counseling Theories and Interventions from a Multicultural Perspective	3-5
AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AFRICAST 195	Shifting Frames	1-2
HUMBIO 170	Facts, Science & Making Policy	5
LAWGEN 112N	Law and Inequality	3
LINGUIST 156	Language and Gender	3-5

### Minor in African and African American Studies

Students who minor in AAAS complete a minimum of 30 units of approved courses. 15 of the required units must include:

- One of two required courses:
  - AFRICAAM 43 Introduction to English III: Introduction to African American Literature (5 units) or
  - AFRICAAM 105 Introduction to African and African American Studies (5 units)
- One Social Science course from AAAS approved core course list. (<https://explorecourses.stanford.edu/search?page=0&catalog=&q=AAAS%3a%3ass&filter-coursestatus-Active=on&view=catalog&academicYear=&collapse=>) (5 units)
- One Humanities course from AAAS approved core course list. (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=AAAS%3A%3Ah&collapse=>) (5 units)

**Units** Director: Dr. H. Samy Alim (Education)

Associate Director: Dr. Cheryl A. Brown

**Advisory Committee:** H. Samy Alim (Education), Ralph Richard Banks (Law), Jan Barker-Alexander (Director, Black Community Services Center), Jennifer Brody (Drama), Bryan Anthony Brown (Education), Cheryl Brown (Program in African and African American Studies), James Campbell (History), Clayborne Carson (History), Jennifer Eberhardt (Psychology), Harry Elam (Drama), Michele Elam (English), James Ferguson (Anthropology), Corey Fields (Sociology), Shelley Fisher Fishkin (English), Allyson Hobbs (History), Vaughn Rasberry (English), John R. Rickford (Linguistics), Joel Samoff (African Studies), Grant Parker (Classics), Adam Banks (Education), Jonathan Calm (Art & Art History)

**Affiliated Faculty:** David Abernethy (Political Science, emeritus), H. Samy Alim (Education), R. Lanier Anderson (Philosophy), Arnetha Ball (Education), Ralph Richard Banks (Law), Lucius Barker (Political Science, emeritus), Don Barr (Sociology), Shasad Bashir (Religious Studies), Carl Bielefeldt (Religious Studies), Jennifer Brody (Drama), Bryan Anthony Brown (Education), Cheryl Brown (Associate Director, Program in African and African American Studies), Albert Camarillo (History), James Campbell (History), Clayborne Carson (History), Gordon Chang (History), Wanda Corn (Art and Art History, emerita), David Degusta (Anthropology), Sandra Drake (English, emerita), Jennifer Eberhardt (Psychology), Paulla Ebron (Anthropology), Harry Elam (Vice Provost), Michele Elam (English), James Ferguson (Anthropology), Shelley Fisher Fishkin (English), Charlotte Fonrobert (Religious Studies), Aleta Hayes (Drama), Jeff Chang (Director, Identity Diversity, and Aesthetics), Allyson

Hobbs (History), Gavin Jones (English), Terry Karl (Political Science), Anthony Kramer (Drama), Teresa LaFromboise (Education), Brian Lowery (Graduate School of Business), Lisa Malkki (Anthropology), Hazel Markus (Psychology), Barbaro Martinez-Ruiz (Art and Art History), Daniel Murray (Director, Service Learning in Comparative Studies in Race and Ethnicity), Paula Moya (English), Elisabeth Mudimbe-Boyi (French and Comparative Literature), Susan Olzak (Sociology), David Palumbo-Liu (Comparative Literature), Arnold Rampersad (English), Vaughn Rasberry (English), John R. Rickford (Linguistics), Richard Roberts (History), Sonia Rocha (Sociology), Michael Rosenfeld (Sociology), José David Saldívar (English), Ramón Saldívar (English), Joel Samoff (African Studies), Gary Segura (Political Science), Paul Sniderman (Political Science), C. Matthew Snipp (Sociology), Ewart Thomas (Psychology), Jeane Tsai (Psychology), Jeremy Weinstein (Political Science), Bryan Wolf (American Art and Culture), Yvonne Yarbo-Bejarno (Spanish and Portuguese), Grant Parker (Classics), Alvan Ikoku (Comparative Literature and Medicine), Lauren Davenport (Political Science), Adam Banks (Education), Jonathan Calm (Art & Art History)

## Related Courses

		Units			
AFRICAAM 18A	Jazz History: Ragtime to Bebop, 1900-1940	3	AFRICAAM 131	Genes and Identity	5
AFRICAAM 18B	Jazz History: Bebop to Present, 1940-Present	3	AFRICAAM 132	Social Class, Race, Ethnicity, and Health	4
AFRICAAM 20A	Jazz Theory	3	AFRICAAM 133	Literature and Society in Africa and the Caribbean	4
AFRICAAM 28	Health Impact of Sexual Assault and Relationship Abuse across the Lifecourse	1-3	AFRICAAM 145A	Poetics and Politics of Caribbean Women's Literature	5
AFRICAAM 31	RealTalk: Intimate Discussions about the African Diaspora	1	AFRICAAM 145B	Africa in the 20th Century	5
AFRICAAM 36	REPRESENT! Covering Race, Culture, and Identity In The Arts through Writing, Media, and Transmedia.	5	AFRICAAM 146A	African Politics	4-5
AFRICAAM 37	Chocolate Heads Performance Project: Dance & Intercultural Performance Creation	2	AFRICAAM 148	The African Atlantic	3-5
AFRICAAM 40	Liquid Flow: Introduction to Contemporary Dance and Dance-making	1	AFRICAAM 150B	Nineteenth Century America	5
AFRICAAM 41	Genes and Identity	3	AFRICAAM 154	Black Feminist Theory	5
AFRICAAM 45	Dance Improv StratLab: Freestyle Improvisation from Contemporary to Hip Hop & Beyond	1-2	AFRICAAM 157P	Solidarity and Racial Justice	4-5
AFRICAAM 52N	Mixed-Race Politics and Culture	3	AFRICAAM 158	Black Queer Theory	5
AFRICAAM 100	Grassroots Community Organizing: Building Power for Collective Liberation	3-5	AFRICAAM 159	James Baldwin & Twentieth Century Literature	5
AFRICAAM 101F	Race & Technology	1-2	AFRICAAM 165	Identity and Academic Achievement	3
AFRICAAM 102	From Confederate Monuments to Wikipedia: The Politics of Remembering the Past	5	AFRICAAM 176B	Documentary Fictions	4
AFRICAAM 106	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5	AFRICAAM 189	Black Life and Death in the Neoliberal Era	5
AFRICAAM 107C	The Black Mediterranean: Greece, Rome and Antiquity	4-5	AFRICAAM 194	Topics in Writing & Rhetoric: Contemporary Black Rhetorics: Black Twitter and Black Digital Cultures	4
AFRICAAM 111	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5	AFRICAAM 200X	Honors Thesis and Senior Thesis Seminar	5
AFRICAAM 112	Urban Education	3-5	AFRICAAM 223	Literature and Human Experimentation	3-5
AFRICAAM 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4	AFRICAAM 229	Literature and Global Health	3-5
AFRICAAM 122E	Art in the Streets: Identity in Murals, Site-specific works, and Interventions in Public Spaces	4	AFRICAAM 233A	Counseling Theories and Interventions from a Multicultural Perspective	3-5
AFRICAAM 125V	The Voting Rights Act	5	AFRICAAM 255	Racial Identity in the American Imagination	4-5
AFRICAAM 126B	Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population	3-4	AFRICAAM 261E	Mixed Race Literature in the U.S. and South Africa	5
AFRICAAM 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	2-4	AMELANG 108A	Third-Year Swahili, First Quarter	4
AFRICAAM 130	Community-based Research As Tool for Social Change:Discourses of Equity in Communities & Classrooms	3-5	AMSTUD 15	Global Flows: The Globalization of Hip Hop Art, Culture, and Politics	1-2
			AMSTUD 50N	The Literature of Inequality: Have and Have-Nots from the Gilded Age to the Occupy Era	3
			AMSTUD 51Q	Comparative Fictions of Ethnicity	4
			AMSTUD 101	Black & White Race Relations in American Fiction & Film	3-5
			AMSTUD 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
			AMSTUD 121Z	Political Power in American Cities	5
			AMSTUD 150B	Nineteenth Century America	5
			AMSTUD 164C	From Freedom to Freedom Now: African American History, 1865-1965	5
			AMSTUD 178	Ethnicity and Dissent in United States Art and Literature	4
			AMSTUD 201	History of Education in the United States	3-5
			AMSTUD 214	The American 1960s: Thought, Protest, and Culture	5
			AMSTUD 226	Race and Racism in American Politics	5
			AMSTUD 255D	Racial Identity in the American Imagination	4-5
			ANTHRO 27N	Ethnicity and Violence: Anthropological Perspectives	3-5
			ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
			ANTHRO 121A	Hip Hop, Youth Identities, and the Politics of Language	3-4
			ANTHRO 135H	Conversations in CSRE: Case Studies in the Stanford Community	1-2
			ANTHRO 135I	CSRE House Seminar: Race and Ethnicity at Stanford	1-2
			ANTHRO 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5
			ANTHRO 139	Ethnography of Africa	5
			ANTHRO 140	Ethnography of Africa	3



ANTHRO 141A	Science, Technology, and Medicine in Africa	4	HISTORY 150C	The United States in the Twentieth Century	5
ANTHRO 145	Race and Power	5	HISTORY 167A	Martin Luther King, Jr. and the Global Freedom Struggle	3-5
ANTHRO 185	Medical Anthropology of Contemporary Africa	5	HISTORY 255D	Racial Identity in the American Imagination	4-5
ANTHRO 187A	The Anthropology of Race, Nature, and Animality	5	HISTORY 255E	Education, Race, and Inequality in African American History, 1880-1990	3-5
ANTHRO 238	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5	HISTORY 260	California's Minority-Majority Cities	4-5
ANTHRO 239	Ethnography of Africa	5	HUMBIO 121E	Ethnicity and Medicine	1-3
ANTHRO 245	Race and Power	5	HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
ANTHRO 285	Medical Anthropology of Contemporary Africa	5	HUMBIO 170	Facts, Science & Making Policy	5
ARTHIST 192B	Art of the African Diaspora	4	LAWGEN 112N	Law and Inequality	3
COMPLIT 51Q	Comparative Fictions of Ethnicity	4	LINGUIST 65	African American Vernacular English	3-5
COMPLIT 149	The Laboring of Diaspora & Border Literary Cultures	3-5	LINGUIST 156	Language and Gender	3-5
CSRE 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	2-4	LINGUIST 251	Sociolinguistic Field Methods	3-5
CSRE 144	Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class	5	LINGUIST 255B	Sociolinguistics Classics and Community Studies	3-5
DANCE 30	Chocolate Heads Performance Project: Dance & Intercultural Performance Creation	2	LINGUIST 256	Language, Gender and Sexuality	1-4
DANCE 45	Dance Improv StratLab: Freestyle Improvisation from Contemporary to Hip Hop & Beyond	1-2	LINGUIST 265	African American Vernacular English	3-5
DANCE 58	Beginning Hip Hop	1	MUSIC 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
DANCE 106	Choreography Project: Dancing, Recollected	1	MUSIC 18B	Jazz History: Bebop to Present, 1940-Present	3
DANCE 108	Hip Hop Meets Broadway	1	MUSIC 20A	Jazz Theory	3
EDUC 12SC	Hip Hop as a Universal Language	2	POLISCI 11N	The Rwandan Genocide	3
EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5	POLISCI 28N	The Changing Nature of Racial Identity in American Politics	3
EDUC 110	Sociology of Education: The Social Organization of Schools	4	POLISCI 121L	Racial-Ethnic Politics in US	5
EDUC 165	History of Higher Education in the U.S.	3-5	POLISCI 125V	The Voting Rights Act	5
EDUC 193C	Psychological Well-Being On Campus: Perspectives Of The Black Diaspora	1	POLISCI 226	Race and Racism in American Politics	5
EDUC 201	History of Education in the United States	3-5	POLISCI 242A	Why is Africa Poor?	5
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5	PSYCH 29N	Growing Up in America	3
EDUC 232	Culture, Learning, and Poverty	2-3	PSYCH 75	Introduction to Cultural Psychology	5
EDUC 243	Writing Across Languages and Cultures: Research in Writing and Writing Instruction	3-5	PSYCH 150	Race and Crime	3
EDUC 245	Understanding Racial and Ethnic Identity Development	3-5	PSYCH 150B	RACE AND CRIME PRACTICUM	2-4
EDUC 322	Community-based Research As Tool for Social Change:Discourses of Equity in Communities & Classrooms	3-5	PSYCH 183	SPARQ Lab	2-3
ENGLISH 15SC	A New Millennial Mix: The Art & Politics of the "Mixed Race Experience"	2	PSYCH 215	Mind, Culture, and Society	3
ENGLISH 68N	Mark Twain and American Culture	4	PUBLPOL 121L	Racial-Ethnic Politics in US	5
FEMGEN 154	Black Feminist Theory	5	RELIGST 246	Constructing Race and Religion in America	4-5
HISTORY 11W	Service-Learning Workshop on Issues of Education Equity	1	SOC 14N	Inequality in American Society	4
HISTORY 50A	Colonial and Revolutionary America	3	SOC 15N	The Transformation of Socialist Societies	3
HISTORY 50B	Nineteenth Century America	3	SOC 45Q	Understanding Race and Ethnicity in American Society	4
HISTORY 50C	The United States in the Twentieth Century	3	SOC 46N	Race, Ethnic, and National Identities: Imagined Communities	3
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5	SOC 118	Social Movements and Collective Action	4
HISTORY 74S	Sounds of the Century: Popular Music and the United States in the 20th Century	5	SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5
HISTORY 106A	Global Human Geography: Asia and Africa	5	SOC 132	Sociology of Education: The Social Organization of Schools	4
HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	4-5	SOC 135	Poverty, Inequality, and Social Policy in the United States	4
HISTORY 147	History of South Africa	5	SOC 140	Introduction to Social Stratification	3
HISTORY 150B	Nineteenth Century America	5	SOC 142	Sociology of Gender	3
			SOC 145	Race and Ethnic Relations in the USA	4
			SOC 148	Comparative Ethnic Conflict	4
			SOC 155	The Changing American Family	4
			TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
			TAPS 176S	Finding Meaning in Life's Struggles: Narrative Ways of Healing	5
			URBANST 112	The Urban Underclass	4

URBANST 123 Approaching Research and the Community 2-3

## Overseas Studies Courses in African and African American Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPCPTWN 18	Xhosa Language and Culture	2
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 45	Transitional Justice and Transformation Debates in South Africa	3
OSPCPTWN 55	Arts of Change	2-4
OSPCPTWN 75	Giving Voice to the Now: Studies in the South African Present	3
OSPPARIS 186F	Contemporary African Literature in French	4

# AFRICAN STUDIES

Courses offered by the Center for African Studies (CAS) are listed under the subject code AFRICAST on the Stanford Bulletin's ExploreCourses web site.

The Center for African Studies coordinates an interdisciplinary program in African Studies for undergraduates and graduate students. The program seeks to enrich understanding of the interactions among the social, economic, cultural, historical, linguistic, genetic, geopolitical, ecological, and biomedical factors that shape and have shaped African societies.

Courses in African Studies are offered by departments and programs throughout the University. Each year CAS sponsors a range of seminars and workshops to demonstrate to advanced undergraduates and graduate students how topics of current interest in African Studies are approached from different disciplinary perspectives.

Course offerings in African languages are also coordinated by the Center for African Studies. Along with regular courses in several levels of Arabic and Swahili, the center arranges with the African and Middle Eastern Languages and Literatures Program in the Stanford Language Center to offer instruction in other African languages; in recent years, it has offered courses in Afrikaans, Amharic, Igbo, Kinyarwanda, Twi, and Yoruba.

The Center for African Studies offers a master of arts degree for graduate students. Undergraduates and graduate students not pursuing the master's degree can specialize in African Studies under the arrangements described under the Undergraduate (p. 362) and Master's (p. 363) tabs.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in African Studies and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

## Undergraduate Programs in African Studies

Undergraduates may choose an African Studies focus in the form of a minor or concentration:

1. A minor in Global Studies with African Studies Specialization offers students the ability to combine a focus on Africa with their major in any other discipline. This offers the students a strong regional specialization. For requirements see the "Minor" tab on this page.
2. A major in a traditionally defined academic department such as Anthropology (p. 371), History (p. 579), or Political Science (p. 690) affords ample opportunity to enroll in courses outside the major, leaving the student free to pursue the interdisciplinary study of Africa.
3. Interdepartmental majors, such as African and African American Studies (p. 346) or International Relations (p. 619), offer coordinated and comprehensive interdisciplinary course sequences, which permit a concentration in African Studies.

## Certificate in African Studies

Students may apply for a certificate in African Studies. Requirements for the certificate are the same as for the minor in Global Studies with African Studies Specialization; however, students may double-count courses applied to their major or graduate studies in fulfillment of the certificate requirements. The certificate in African Studies is issued by the Center for African Studies and does not appear on any University

record, including the student's transcript. For more information and an application, contact the center (<http://africanstudies.stanford.edu>).

## Minor in Global Studies with African Studies Specialization

The minor in Global Studies, African Studies specialization, offers students the opportunity to complement their major course of study with an in-depth, interdisciplinary exploration of the cultures, histories, politics, religions, and societies of Africa.

Students from any major interested in applying for admission to this minor program should consult the minor adviser at the Center for African Studies. Students declare the minor and the African Studies specialization in Axess (<http://axess.stanford.edu>) (see below for detailed instructions).

Students consult with their minor adviser to develop individual programs. The minor is especially well-suited for undergraduates who plan to make service, research, or study abroad in Africa as part of their Stanford experience.

## Declaring the Global Studies Minor with African Studies Specialization

To declare the Global Studies minor with African Studies specialization, students must:

1. Set up an appointment with Laura Hubbard, <lhubbard@stanford.edu>, Associate Director for the Center for African Studies.
2. Declare the Global Studies minor in Axess (<http://axess.stanford.edu>).
3. Complete the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program ([https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change\\_UG\\_program.pdf](https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf)) form in order to declare the African Studies specialization. Submit the form to the minor adviser, Laura Hubbard, in the Center for African Studies office (Encina Hall West, Room 219, 417 Galvez Mall).

## Learning Outcomes

The SGS minor specialization in African Studies enables students to:

1. develop critical knowledge and skills in African Studies
2. organize their interest in Africa into a coherent course of study through directed mentorship and participation in intellectual community.
3. prepare for research, study, or service in Africa

Upon completion of requirements, final certification of the minor is made by the Center for African Studies. The minor and the specialization appear on the transcript but they do not appear on the diploma.

## Requirements

A total of 28 units which include the following:

1. GLOBAL 101 Critical Issues in Global Affairs (3 units)
2. A minimum of 25 units of Africa-related courses. Students may not double-count courses for completing major and minor requirements.
3. At least one quarter's exposure to a sub-Saharan African language. The Center for African Studies (p. 362) and the Special Languages Program of the Language Center (p. 632) can arrange instruction in any of several languages spoken in West, East, Central, and Southern Africa.
4. One entry level course that covers more than one region of Africa.
5. A designated focus of study, either disciplinary or regional, through a three course concentration developed with the minor adviser.

6. A minimum 25-page research paper, with a focus on Africa. This paper may be an extension of a previous paper written for an African Studies course. Other approaches to fulfilling the capstone requirement may be accepted with the approval of the Director of African Studies.

- Students present their work in an end-of-year capstone seminar with other SGS minors and led by SGS faculty.

## Course List

For a representative, rather than comprehensive, list of courses that count towards the minor, see the Related Courses tab in this section of the Bulletin. Other courses may also fulfill the requirements; students should consult their African Studies minor adviser concerning which courses might fulfill minor requirements.

## Related Courses

Below is a sample of AFRICAST and related courses that may be counted toward the minor. Other courses may also fulfill the requirements; consult your African Studies minor adviser concerning the applicability of other courses to the minor.

### African Studies Courses

		Units
AFRICAST 109	Running While Others Walk: African Perspectives on Development	5
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	3-5
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 113V	Freedom in Chains: Black Slavery in the Atlantic, 1400s-1800s	5
AFRICAST 132	Literature and Society in Africa and the Caribbean	4
AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 138	Conflict and Reconciliation in Africa: International Intervention	3-5
AFRICAST 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AFRICAST 181	Media Representations of Africa	3-5
AFRICAST 195	Shifting Frames	1-2
AFRICAST 300	Contemporary Issues in African Studies	1

### Related Courses

AFRICAST 114N	Desert Biogeography of Namibia Prefield Seminar	3
AFRICAST 119	Novel Perspectives on South Africa	2-3
AFRICAST 122F	Histories of Race in Science and Medicine at Home and Abroad	4
AFRICAST 141A	Science, Technology, and Medicine in Africa	4
AFRICAST 145B	The African Atlantic	3-5
AFRICAST 199	Independent Study or Directed Reading	1-5
AFRICAST 229	Literature and Global Health	3-5
AFRICAST 235	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 249	Bodies, Technologies, and Natures in Africa	4-5
ANTHRO 1	Introduction to Cultural and Social Anthropology	3-5
ANTHRO 13A	Islamic Routes: Archaeology and Heritage of Muslim Societies	3-5
ANTHRO 41	Genes and Identity	3
ANTHRO 140	Ethnography of Africa	3
ANTHRO 141B	The Anthropology of Bits and Bytes: Digital Media in the Developing World	5
ANTHRO 147	Nature, Culture, Heritage	5

ANTHRO 185	Medical Anthropology of Contemporary Africa	5
COMPLIT 121	Poems, Poetry, Worlds	5
ECON 118	Development Economics	5
HISTORY 47	History of South Africa	3
HISTORY 48	The Egyptians	3-5
HISTORY 48Q	South Africa: Contested Transitions	4
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 145B	Africa in the 20th Century	5
HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	4-5
HISTORY 238J	The European Scramble for Africa: Origins and Debates	5
HISTORY 283	Middle East Oil and Global Economy	4-5
HUMBIO 129	Critical Issues in International Women's Health	4
OSPCPTWN 16	Sites of Memory	3
OSPCPTWN 18	Xhosa Language and Culture	2
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3
OSPCPTWN 30	Engaging Cape Town	2
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	3
OSPCPTWN 50	[Independent Study] Conservation & Resources in Sub-Saharan Africa	2-3
OSPCPTWN 55	Arts of Change	2-4
OSPCPTWN 57	Directed Study in Health Systems and Policy	1-3
OSPCPTWN 63	Socio-Ecological Systems	3
OSPCPTWN 67	ICT4D: An Introduction to the Use of ICTs for Development	3
OSPCPTWN 69	Comparatively Assessing South Africa's Transition to Democracy: Past, Present and Future	3
OSPCPTWN 70	Youth Citizenship and Community Engagement	3
OSPCPTWN 75	Giving Voice to the Now: Studies in the South African Present	3
OSPCPTWN 78	Postcolonial Modernist Art Movements in Africa	3
OSPCPTWN 79	Creative Cityness in the Global South	3
POLISCI 11N	The Rwandan Genocide	3
POLISCI 114D	Democracy, Development, and the Rule of Law	5
POLISCI 146A	African Politics	4-5
POLISCI 242A	Why is Africa Poor?	5
SURG 150	Principles and Practice of International Humanitarian Surgery	4
THINK 42	Thinking Through Africa: Perspectives on Health, Wealth, and Well-Being	4

## Graduate Study in African Studies

For those who wish to specialize in Africa at the graduate level, African Studies can be designated a field of concentration within the master's and doctoral programs of some academic departments. Students in such departments as Anthropology (p. 371), History (p. 579), Political Science (p. 690), and Sociology (p. 744), and in the School of Education (p. 193), may declare African Studies as the area of specialization for their master's and Ph.D. thesis work. Some other departments, programs, and institutes such as the International Comparative Education Program (p. 195) also permit students to specialize in African Studies.

## Financial Aid

The Center for African Studies (CAS) does not offer financial aid. However, CAS offers a variety of fellowship opportunities to Stanford graduate students of different levels and disciplines. The following is a partial list:

### 1. M.A. Fellowship

Partial funding for two incoming M.A. students in African Studies.

### 2. Susan Ford Dorsey Fellowship for Field Research in Africa

9-12 month dissertation field research fellowship for Ph.D. candidates in the School of Humanities and Sciences.

### 3. Summer Research and Language Fellowship

Graduate research fellowship, an intensive African language fellowship for graduate students and undergraduates.

## Master of Arts in African Studies

The one-year master's program in African Studies is designed for students who have experience working, living, or studying in Africa, and little prior course work on the region.

## Coterminal Master of Arts in African Studies

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Admission to the Master's Program in African Studies

The annual deadline for all applications for the master's program, including coterminal students, is December 8. All applicants must submit:

- External applicants submit an online application, including a 500-word statement of purpose. Coterminal applicants submit the Coterminal Online Application (<https://applyweb.com/stanterm>)
- Resume
- 15-20 page double-spaced academic writing sample
- Three letters of recommendation
- Two official transcripts
- Graduate Record Examination scores

- TOEFL scores are required of applicants for whom English is not their first language or who did not attend an undergraduate institution where English is the language of instruction

To apply online and for further information on graduate admissions, see the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

## Degree Requirements

University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The program requires completion of a minimum of 45 graduate units. Upon entering, each student is assigned a faculty adviser who works with the student to develop a customized program of study.

To receive the M.A. degree in African Studies, students must complete:

### 1. Core Courses (15 units)

Students must complete the core African Studies M.A. course, AFRICAST 301A The Dynamics of Change in Africa, in Autumn Quarter. Students elect two additional graduate courses taught by African Studies academic council members and drawn from a list of approved courses. Students must also complete, AFRICAST 302 Research Workshop, in Spring Quarter, in which they present and discuss their research and research interests.

### 2. Concentration Field (15 units)

Students choose one area of specialization and take at least three related courses for graduate credit within their area of specialization:

- a. Culture and society
- b. Health, well-being, and the environment
- c. Political economy and security

### 3. Cognate Courses and Electives (10 units)

A minimum of 10 units of graduate-level credit in two cognate courses from the following thematic clusters not chosen as the student's concentration field:

- a. Culture and society
- b. Health, well-being, and the environment
- c. Political economy and security
- d. Two additional electives in any concentration

### 4. Language Requirement

Students take one year of training in an African language, usually at least 3 units per quarter, resulting in intermediate-level proficiency as measured by the American Council on the Teaching of Foreign Languages (ACTFL) or comparable language acquisition standards. Students who have advanced proficiency in several African languages may fulfill this requirement by taking another European language spoken in Africa, such as French or Portuguese, or by taking a year-long sequence in Arabic.

### 5. Seminar Requirement

Students enroll each quarter in AFRICAST 300 Contemporary Issues in African Studies, 1 unit, in which guest scholars present lectures on African themes and topics.

### 6. Thesis Option

Students may elect to write a master's thesis; they may register for up to 10 units of thesis research under the guidance of an Academic Council member. Thesis units may be counted toward the electives within the concentration field unit requirements.

### 7. Grade Requirements

Courses to be counted toward the degree, except for AFRICAST 300 Contemporary Issues in African Studies, must be taken for a letter grade and receive a grade of 'B' or higher.

In addition to AFRICAST courses, master's students take Africa-related courses across departments and schools due to the interdisciplinary nature of the degree. The following list represents a small sample of

courses that may be taken to fulfill the requirements of the master's degree. To count toward the completion of the master's degree, courses should be taken at the graduate level and approved by the African Studies graduate adviser.

#### African Studies Courses

AFRICAST 195	Shifting Frames	1-2
AFRICAST 209	Running While Others Walk: African Perspectives on Development	5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	3-5
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 235	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 238	Conflict and Reconciliation in Africa: International Intervention	3-5
AFRICAST 300	Contemporary Issues in African Studies	1
AFRICAST 301A	The Dynamics of Change in Africa	4-5
AFRICAST 302	Research Workshop	1
<b>Related Courses</b>		
AFRICAST 229	Literature and Global Health	3-5
AFRICAST 242	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AFRICAST 249	Bodies, Technologies, and Natures in Africa	4-5
AFRICAST 299	Independent Study or Directed Reading	1-10
ANTHRO 201	Introduction to Cultural and Social Anthropology	3-5
ANTHRO 239	Ethnography of Africa	5
ANTHRO 247	Nature, Culture, Heritage	5
ANTHRO 285	Medical Anthropology of Contemporary Africa	5
ANTHRO 324	Political Anthropology	5
ANTHRO 345A	Race and Power: The Making of Human Difference in History, Biology and Capital	5
ANTHRO 346	The Social Imagination	5
ANTHRO 353	Landscape	5
ANTHRO 372	Urban Ecologies	5
CEE 265D	Water and Sanitation in Developing Countries	1-3
COMPLIT 352A	The Novel in Africa	3-5
ECON 214	Development Economics I	2-5
ECON 215	Development Economics II	2-5
ECON 315	Development Workshop	1-10
EDUC 202	Introduction to Comparative and International Education	4
EDUC 377C	Philanthropy: Strategy, Innovation and Social Change	3
HISTORY 383	Middle East Oil and Global Economy	4-5
IPS 213	International Mediation and Civil Wars	3-5
MED 232	Discussions in Global Health	2
POLISCI 314D	Democracy, Development, and the Rule of Law	5
SURG 250	Principles and Practice of International Humanitarian Surgery	4

## Joint Degree Program in African Studies and Law

This joint degree program grants an M.A. degree in African Studies and a Doctor of Jurisprudence (J.D.) degree. It is designed to train students interested in a career in teaching, research, or the practice of law related to African legal affairs. Students must apply separately

to the African Studies M.A. program and to the Stanford School of Law and be accepted by both. Completing this combined course of study requires approximately four academic years, depending on the student's background and level of training in African languages. A number of approved courses may be counted towards both degrees. For more information, see the "Joint Degree Programs (p. 54)" section of this bulletin and the Stanford Law School's web site (<http://www.law.stanford.edu/degrees/joint>). Students who have been accepted by both programs should consult with the departments to determine which courses can be double-counted.

*Emeriti:* David B. Abernethy, Ellen Jo Baron, John Baugh, Joan Bresnan, Susan Cashion, Sandra E. Drake, Peter Egbert, James. L. Gibbs, Jr., William B. Gould, Bruce F. Johnston, William R. Leben, Bruce Lusignan, Elisabeth Mudimbe-Boyi, Mary Polan, Hans N. Weiler, Sylvia Wynter

*Director:* Richard Roberts

*Professors:* H. Samy Alim (Education), Jean-Marie Apostolidès (French), Michele Barry (Medicine), Joel Beinin (History), John Boothroyd (Microbiology and Immunology), James T. Campbell (History), Martin Carnoy (Education), Prudence L. Carter (Education), William H. Durham (Anthropology), Harry Elam (Drama), James Fearon (Political Science), James Ferguson (Anthropology), Shelley Goldman (Education), Terry Lynn Karl (Latin American Studies and Political Science), Richard Klein (Anthropology), David Laitin (Political Science), Yvonne Maldonado (Pediatrics), Lynn Meskell (Anthropology), Julie Parsonnet (Medicine and Health Research and Policy), John Rickford (Linguistics), Richard Roberts (History)

*Associate Professors:* Vincent Barletta (Comparative Literature and Iberian and Latin American Cultures), Alexandria B. Boehm (Civil and Environmental Engineering), Jenna Davis (Civil and Environmental Engineering), Paula A. Ebron (Anthropology), Oliver Fringer (Civil and Environmental Engineering), Duana Fullwiley (Anthropology), Liisa Malkki (Anthropology), Grant Parker (Classics), Jeremy Weinstein (Political Science)

*Assistant Professors:* Eran Bendavid (General Internal Medicine), Katherine Casey (Political Economy), Pascaline Dupas (Economics), Alvan Ikoku (Comparative Literature), Steven Press (History), Vaughn Rasberry (English), Krish Seetah (Anthropology)

*Professor (Research):* David Katzenstein (School of Medicine), Cheryl Koopman (Psychiatry and Behavioral Sciences)

*Professor (Teaching):* Robert Siegel (Microbiology and Immunology)

*Associate Professor (Clinical):* Brian Blackburn (Infectious Diseases), Daryn Reicherter (Psychiatry and Behavioral Sciences), Hugh Brent Solvason (Psychiatry and Behavioral Sciences)

*Senior Lecturers:* Khalil Barhoum (African and Middle Eastern Languages)

*Lecturers:* Kwame Assenyoh (African and Middle Eastern Languages), Byron Bland (Law), Jonathan Greenberg (Law), Sarah Mkhonza (African and Middle Eastern Languages), Samuel Mukoma (African and Middle Eastern Languages), Toussaint Nothias (African Studies), Jill Rosenthal (History), Ramzi Salti (African and Middle Eastern Languages), Timothy Stanton (Bing Overseas Studies)

*Consulting Professors:* Anne Firth-Murray (Human Biology), Joel Samoff (Center for African Studies)

*Curators:* Karen Fung (African Collection Curator, Green Library), Catherine Hale (Curator, Arts of Africa and the Americas, Cantor Arts Center), Regina Roberts (Bibliographer, Green Library)

*Senior Research Fellows:* Coit Blacker (Freeman Spogli Institute), Larry Diamond (Freeman Spogli Institute, Hoover Institution), Marcel

Fafchamps (Freeman Spogli Institute), Stephen Stedman (Freeman Spogli Institute, Center for International Security and Cooperation)

#### Overseas Studies Courses in African Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPCPTWN 18	Xhosa Language and Culture	2
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 55	Arts of Change	2-4
OSPCPTWN 67	ICT4D: An Introduction to the Use of ICTs for Development	3
OSPCPTWN 69	Comparatively Assessing South Africa's Transition to Democracy: Past, Present and Future	3
OSPCPTWN 75	Giving Voice to the Now: Studies in the South African Present	3

# AMERICAN STUDIES

Courses offered by American Studies Program are listed under the subject code AMSTUD on the Stanford Bulletin's ExploreCourses web site.

## Mission of the Undergraduate Program in American Studies

The mission of the undergraduate program in American Studies is to provide students with a broad understanding of American culture and society. Building on a foundation of courses in history and institutions, literature and the arts, and race and ethnicity, students learn to analyze and interpret America's past and present, forging fresh and creative syntheses along the way. The program is an interdisciplinary major and, beyond the core requirements of the major, students may define and pursue their own interests from fields such as history, literature, art, communication, theater, African American studies, feminist studies, economics, anthropology, religious studies, Chicana/o studies, law, sociology, education, Native American studies, music, and film. The program is designed to provide students majoring in American Studies with excellent preparation for further study in graduate or professional schools as well as careers in government, business, journalism, entertainment, public service, the arts, and other fields.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. higher order, interdisciplinary, historically informed understanding of how to think about American culture and society, drawing on course work in: history and institutions; literature, art, and culture; comparative race and ethnicity; and each student's individualized thematic focus.
2. ability to identify and critically to assess different disciplinary, methodological, and interpretive approaches to the study of Americans and their past.
3. ability to produce their own persuasive, nuanced, fact-based interpretations reflecting a close critical reading and analysis of relevant primary or secondary sources.
4. ability to express their interpretive and analytical arguments in clear, effective prose.
5. ability to listen actively and to contribute to productive intellectual discussion in class.

## Bachelor of Arts in American Studies

The core requirements illustrate how different disciplines approach the study and interpretation of American life and include three courses in each of two main areas: history and institutions; and literature, culture, and the arts. One additional course in comparative race and ethnicity is also required. The required gateway seminar, AMSTUD 160 Perspectives on American Identity, explores the tensions between commonality and difference from a variety of disciplinary perspectives.

Beyond the core requirements of the major, American Studies expects students to define and pursue their own interests in interpreting important dimensions of American life. Accordingly, each student designs a thematic concentration of at least five courses drawn from fields such as history, literature, art, communication, theater, political science, African American studies, feminist studies, economics, anthropology, religious studies, Chicana/o studies, law, sociology, education, Native American studies, music, and film. At least one of the five courses in a student's thematic concentration should be a small

group seminar or a colloquium. With program approval, students may conclude the major with an honors research project during their senior year.

Whether defined broadly or narrowly, the thematic focus or concentration should examine its subject from the vantage of multiple disciplines. Examples of concentrations include: race and the law in America; gender in American culture and society; technology in American life and thought; health policy in America; art and culture in 19th-century America; education in America; nature and the environment in American culture; politics and the media; religion in American life; borders and boundaries in American culture; the artist in American society; and civil rights in America.

Completion of the major thus normally requires 13 courses (totaling at least 60 units), all of which must be taken for a letter grade. Not all courses are offered each year; students should consult ExploreCourses (<http://explorecourses.stanford.edu>) for scheduling information for the current academic year.

## Degree Requirements

### 1. Gateway Seminar

		Units
AMSTUD 160	Perspectives on American Identity (WIM course for American Studies)	5

### 2. History and Institutions

Majors are required to complete three courses in American History and Institutions. Specific requirements are:

		Units
AMSTUD/ HISTORY 150A	Colonial and Revolutionary America	5
AMSTUD/ HISTORY 150B	Nineteenth Century America	5
	Select one of the following:	3-5
AMSTUD 41Q	Madwomen: The History of Women and Mental Illness in the U.S.	3
AMSTUD 54N	African American Women's Lives	3
AMSTUD 91	Exploring American Religious History	4
AMSTUD 104	AMERICA AT PLAY: A HISTORY OF LEISURE IN THE UNITED STATES	5
AMSTUD 107	Introduction to Feminist, Gender, and Sexuality Studies	5
AMSTUD 117N	Losing My Religion: Secularism and Spirituality in American Lives	3
AMSTUD 121Z	Political Power in American Cities	5
AMSTUD 123X	Politics and Public Policy	4-5
AMSTUD 124A	The American West	5
AMSTUD 125	Perspectives on American Journalism	4-5
AMSTUD 130A	In Sickness and In Health: Medicine and Society in the United States: 1800-Present	3-5
AMSTUD 135	Deliberative Democracy and its Critics	3-5
AMSTUD 137	The Dialogue of Democracy	4-5
AMSTUD/ HISTORY 150C	The United States in the Twentieth Century	5
AMSTUD 155	American Constitutional History from the Civil War to the War on Poverty	5
AMSTUD 156H	Women and Medicine in US History: Women as Patients, Healers and Doctors	5
AMSTUD/ HISTORY 161	The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History	4-5



AMSTUD 179/ POLISCI 122	Introduction to American Law	3-5
AMSTUD 255D	Racial Identity in the American Imagination	4-5
AMSTUD 293	Church, State, & Schools: Issues in Education & Religion	4

### 3. Literature, Culture, and the Arts

Majors are required to take a minimum of three courses in literature, culture, and the arts, broadly understood. Specific requirements are:

At least one course focusing on the period before the Civil War, normally:

AMSTUD 150/ ENGLISH 11B	Introduction to English II: American Literature and Culture to 1855	5
Select two of the following: <sup>1</sup>		
AMSTUD 1B	Media, Culture, and Society	5
AMSTUD 48N	The American Songbook and Love Poetry	3
AMSTUD 53N		3
AMSTUD 57Q	10 American Photographs	3
AMSTUD/ ENGLISH 68N	Mark Twain and American Culture	4
AMSTUD 75N	American Short Stories	3
AMSTUD 101	Black & White Race Relations in American Fiction & Film	3-5
AMSTUD 102	Art and Social Criticism	5
AMSTUD 105Q	Law and Popular Culture	3
AMSTUD 120/ COMM 120W	Digital Media in Society	5
AMSTUD 12A	Introduction to English III: Introduction to African American Literature	5
AMSTUD 124A	The American West	5
AMSTUD 125C	The Lost Generation: American literature between the World Wars	5
AMSTUD 127	American Style and the Rhetoric of Fashion	5
AMSTUD 128	Representing Fashion	4
AMSTUD 129	Animation and the Animated Film	4
AMSTUD 133	Technology and American Visual Culture	4
AMSTUD 143A	American Architecture	4
AMSTUD 143M	American Indian Mythology, Legend, and Lore	3-5
AMSTUD 143X	Starstuff: Space and the American Imagination	5
AMSTUD 145D	Jewish American Literature	5
AMSTUD 145H		5
AMSTUD 146A	Steinbeck	3-5
AMSTUD 151	Migration and Diaspora in American Art, 1800-Present	4
AMSTUD 152C	The JFK Era and American Literature	5
AMSTUD 163	Queer America	4
AMSTUD 183	Re- Imagining American Borders	5
AMSTUD 226X/ EDUC 226	Curating Experience: Representation in and beyond Museums	4
AMSTUD 250J		4
AMSTUD 262C	African American Literature and the Retreat of Jim Crow	5
THINK 31	Race and American Memory	4

### 4. Comparative Race and Ethnicity

Majors are required to take one course that focuses on the comparative study of race and ethnicity rather than a single racial or ethnic group.

Choose one from the following list:

AMSTUD 51Q	Comparative Fictions of Ethnicity	4
AMSTUD 53N		3
AMSTUD 54N	African American Women's Lives	3
AMSTUD 58Q	American Landscapes of Segregation	3-4
AMSTUD 101	Black & White Race Relations in American Fiction & Film	3-5
AMSTUD 152K	Mixed-Race Politics and Culture	5
AMSTUD 155D	The Asian American Movement: A History of Activism	3-5
AMSTUD/CSRE 183	Re- Imagining American Borders	5
AMSTUD 246	Constructing Race and Religion in America	4-5
AMSTUD 255D	Racial Identity in the American Imagination	4-5
AMSTUD 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
AMSTUD 262C	African American Literature and the Retreat of Jim Crow	5
SOC 149	The Urban Underclass	4
THINK 31	Race and American Memory	4

### 5. Concentration and Capstone Seminar

Students must design a thematic concentration of at least five courses, with the help of faculty advisers. The courses, taken together, must give the student in-depth knowledge and understanding of a coherent topic in American cultures, history, and institutions. Thematic concentrations should be approved by the end of the registration period of the Autumn Quarter of the junior year, if at all possible. Sample thematic concentrations and courses that allow a student to explore them are available in the American Studies Office in Building 460.

At least one of the courses in the concentration must be an upper division seminar designated as the capstone seminar and must require a substantial research paper on a topic related to the thematic concentration. This paper must be filed in the program office prior to degree conferral. An honors project, or an independent study course with a faculty member culminating in a research paper, may also fulfill this requirement with the Director's approval.

Students may choose, but are not limited to, selections for their thematic concentrations from the following list of suggested courses:

AFRICAAM 105	Introduction to African and African American Studies	5
ANTHRO 82	Medical Anthropology	4
ARTHIST 176	Feminism and Contemporary Art	4
CHILATST 14N	Growing Up Bilingual	3
CHILATST 125S	Chicano/Latino Politics	5
CHILATST 201B	Making Meaning: Art, Culture & Social Change	3
COMM 116	Journalism Law	5
COMM 125	Perspectives on American Journalism	5
COMM 162	Campaigns, Voting, Media, and Elections	5
CSRE 45Q	Understanding Race and Ethnicity in American Society	4
CSRE 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
ECON 155	Environmental Economics and Policy	5
ECON 157	Imperfect Competition	5
EDUC 102	Examining Social Structures, Power, and Educational Access	2-4

EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
EDUC 277	Education of Immigrant Students: Psychological Perspectives	4
HISTORY 60N	Revolutionaries and Founders	3
HISTORY 64	Racial and Ethnic Diversity in Modern America	5
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 201	From Confederate Monuments to Wikipedia: The Politics of Remembering the Past	5
HISTORY 260	California's Minority-Majority Cities	4-5
HUMBIO 120	Health Care in America: An Introduction to U.S. Health Policy	4
HUMBIO 120A	American Health Policy	3
HUMBIO 121E	Ethnicity and Medicine	1-3
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
HUMBIO 123	Obesity in America: Clinical and Public Health Implications	3-4
HUMBIO 125	Current Topics and Controversies in Women's Health	2-3
HUMBIO 166	Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context	4
INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War	5
MUSIC 8A	Rock, Sex, and Rebellion	3
MUSIC 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
MUSIC 18B	Jazz History: Bebop to Present, 1940-Present	3
MUSIC 34N	Performing America: The Broadway Musical	3
MUSIC 147K	Studies in Music, Media, and Popular Culture: Music and Urban Film	3-4
MUSIC 147L	Studies in Music, Media, and Popular Culture: Latin American Music and Globalization	3-4
NATIVEAM 103S	Gender in Native American Societies	5
NATIVEAM 115	Introduction to Native American History	5
NATIVEAM 240	Psychology and American Indian Mental Health	3-5
POLISCI 110X	America and the World Economy	5
POLISCI 118P	U.S. Relations in Iran	5
POLISCI 120B	Campaigns, Voting, Media, and Elections	5
POLISCI 120C	American Political Institutions in Uncertain Times	5
POLISCI 121	Political Power in American Cities	5
POLISCI 213S	A Post American Century? American Foreign Policy in a Uni-Multi-unipolar World	5
POLISCI 225C	Fixing US Politics: Political Reform in Principle and Practice	5
PUBLPOL 101	Politics and Public Policy	5
PUBLPOL 125		5
PUBLPOL 132	The Politics of Policy Making	3
PUBLPOL 135	Regional Politics and Decision Making in Silicon Valley and the Greater Bay Area	4
PUBLPOL 154	Politics and Policy in California	5
PUBLPOL 156	Health Care Policy and Reform	5
SOC 135	Poverty, Inequality, and Social Policy in the United States	4
SOC 118	Social Movements and Collective Action	4
SOC 142	Sociology of Gender	3
URBANST 161	U.S. Urban History since 1920	5

<sup>1</sup> Including at least one course outside of literature that emphasizes art, drama, film, music, translation studies, or culture from a different disciplinary or interpretive perspective.

## Honors Program

To graduate with honors, American Studies majors must complete a senior thesis and have an overall grade point average of at least 3.5 in the major, or demonstrated academic competence. Students applying must secure a thesis adviser, a Stanford faculty member who is willing and available to direct the thesis project through the ensuing year. Having a confirmed thesis adviser is required for final approval to pursue an honors project. Students also need to secure a second reader for the honors thesis no later than the start of Spring Quarter of senior year. Along with the application form signed by the thesis adviser, a 3-5 page proposal describing the thesis project and including a preliminary bibliography is due to the program office by October 1 of senior year at the latest (though students are strongly encouraged to submit at least preliminary thesis proposals in Spring of their junior year). The program may approve the application and proposal or request that the student resubmit with revisions. Students pursuing honors must enroll in 10-15 units of AMSTUD 250 Senior Research during the senior year. These units are in addition to the 60 units required for the major and must be taken for a letter grade. The finished essay is due in mid-May (typically May 15) of the senior year.

Students are encouraged to choose an honors topic and adviser during the junior year. The honors coordinator is available to meet with students to discuss possible honors topics and strategies. Students are strongly encouraged to enroll in the American Studies Honors College during September before the senior year. American Studies also provides students the opportunity to work as paid research assistants for faculty members during the summer between their junior and senior years. More information about American Studies honors is available from the program office.

## Minor in American Studies

To earn a minor in American Studies, students must complete at least 28 units of course work in the program. Because students may not count courses for both a major and a minor, the specific courses that are used for an American Studies minor depend on the courses that are used to satisfy the major requirement.

A student must take the following:

	<b>Units</b>
AMSTUD 160 Perspectives on American Identity (The gateway seminar)	5
at least 2 courses from category 2 (History and Institutions)	6-10
at least 2 courses from category 3 (Literature, Culture and the Arts)	6-10
at least 1 course from category 4 (Comparative Race and Ethnicity)	3-5

If the units for these requirements do not total 28, the student must take additional coursework, appropriate to American Studies and approved by the Director or one of the Program Coordinators, to meet the minimum unit requirement. Courses used to satisfy all units taken for the minor must be taken for a letter grade.

*Director:* Shelley Fisher Fishkin

*Program Coordinators:* Elizabeth Kessler, Judith Richardson

*Committee in Charge:* Shelley Fisher Fishkin (English, Chair), Jennifer DeVere Brody (Drama), Scott Bukatman (Art and Art History), Bruce Cain (Political Science), James T. Campbell (History), Gordon H. Chang (History), Michele B. Elam (English), James Fishkin (Communication, and by courtesy, Political Science), Estelle Freedman (History), Leah Gordon (Education), Allyson Hobbs (History), Ari Kelman (Education), Gavin Jones (English), Charles Kronengold (Music), Marci Kwon (Art and Art History), Kathryn Gin Lum (Religious Studies), Doug McAdam (Sociology), Richard Meyer (Art and Art History), Ana Minian (History), Paula Moya (English), Clayton Nall (Political Science), Alexander Nemerov (Art and Art History),

Jack Rakove (History, Political Science), Vaughn Rasberry (English), Judith Richardson (English), Ramón Saldivar (English, Comparative Literature), Fred Turner (Communication), Sam Wineburg (Education), Caroline Winterer (History), Gavin Wright (Economics), Amy Beth Zegart (Hoover Senior Fellow)

# ANTHROPOLOGY

Courses offered by the Department of Anthropology are listed under the subject code ANTHRO on the *Stanford Bulletin's* ExploreCourses web site.

## Mission of the Department of Anthropology

The courses offered by the Department of Anthropology are designed to: provide undergraduates with instruction in anthropology; provide undergraduate majors in Anthropology with a program of work leading to the bachelor's degree; and prepare graduate candidates for advanced degrees in Anthropology. Anthropology is devoted to the study of human beings and human societies as they exist across time and space. It is distinct from other social sciences in that it gives central attention to the full time span of human history, and to the full range of human societies and cultures, including those located in historically marginalized parts of the world. It is therefore especially attuned to questions of social, cultural, and biological diversity, to issues of power, identity, and inequality, and to understanding the dynamic processes of social, historical, ecological, and biological change over time. Education in Anthropology provides excellent preparation for living in a multicultural and globally-interconnected world, and helps to equip students for careers in fields including law, medicine, business, public service, research, ecological sustainability, and resource management. Students may pursue degrees in Anthropology at the bachelor's, master's, and doctoral levels.

The Department of Anthropology offers a wide range of approaches to the topics and area studies within the field, including archaeology, ecology, environmental anthropology, evolution, linguistics, medical anthropology, political economy, science and technology studies, and sociocultural anthropology. Methodologies for the study of micro- and macro-social processes are taught through the use of qualitative and quantitative approaches. The department provides students with excellent training in theory and methods to enable them to pursue graduate study in any of the above mentioned subfields of Anthropology.

## Undergraduate Programs in Anthropology

- Bachelor of Arts (B.A.)
- Anthropology Minor

In addition to gaining an excellent foundation for graduate research and study, students majoring in Anthropology can pursue careers in government, international business, international development agencies, international education, law, mass media, nonprofit organizations, and public policy.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the degree program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the Anthropology discipline.
2. the ability to communicate ideas clearly and persuasively in writing.
3. identify analytical problems and make appropriate inferences and analytical arguments.
4. critically evaluate anthropological theory and ethnographic research.

## Graduate Programs in Anthropology

Graduate training in Anthropology at Stanford is designed for students who seek the Doctoral (Ph.D.) degree, and for students who seek the Masters of Arts (M.A.) degree only.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Anthropology and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses in the primary field, as well as related areas, and through experience with independent work, area specialization and field research.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Anthropology. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Anthropology and to interpret and present the results of such research.

## Field School and Research Opportunities in Anthropology

Students majoring in Anthropology are encouraged to develop field research projects under the supervision of a department faculty member. The department offers research grants to support individually-designed and other summer field research in Anthropology. The department research grants may be used to support field research as a supplement to other field research grants such as the UAR research grants. The department also offers opportunities to participate in faculty-led research projects.

The department's summer research opportunities, include: Franz Boas summer scholars programs and Michelle Z. Rosaldo Summer Field Research Grant program. Other field school opportunities include the following: Catalhoyuk and Chavin Huantar. *Note:* Required courses for the Franz Boas summer scholars program and the Michelle Z. Rosaldo grant program include:

		Units
ANTHRO 93	Prefield Research Seminar	5
or ANTHRO 93B	Prefield Research Seminar: Non-Majors	
ANTHRO 94	Postfield Research Seminar	5

For more information about research opportunities and deadlines, see the department's web site.

## Bachelor of Arts in Anthropology

Undergraduate training in the Department of Anthropology is designed for students who seek the Bachelor of Arts (B.A.) degree, only. Students may declare a major in Anthropology and earn the B.A. degree by completing the requirements below. The Department also offers a minor in Anthropology. The Anthropology B.A. degree program usually requires at least five quarters of enrollment. Students interested in majoring in Anthropology are encouraged to declare by the beginning of their junior year and to work closely with a faculty adviser to develop a coherent plan of study.

To declare a major in Anthropology, apply in Axess for the B.A. in Anthropology, contact the department's student peer adviser(s) or the undergraduate student services officer to prepare the department major checklist and planning form; submit the required forms to the undergraduate student services officer; request a faculty adviser assignment and meet with the assigned faculty adviser for approval of the department major checklist and planning form. Students should

apply in Axxess for the major in Anthropology by the time junior status is achieved at 85 units.

## Degree Requirements

The B.A. degree in Anthropology may be earned by fulfilling the following requirements:

1. A faculty adviser appointed in the Department of Anthropology. A faculty adviser will be assigned based on the students chosen emphasis. Undergraduate Anthropology (ANTHRO) majors should plan to meet with their faculty adviser at least once each quarter.
2. A program of 65 units, passed with an overall minimum grade point average of 'C':
  - of the 65 units, 50 units must be in courses with the ANTHRO subject code. 15 may be approved from related areas of study, overseas studies, and/or transfer units.
    - any related, overseas studies, or transfer units must be approved by the faculty adviser and by petition to the undergraduate committee.
  - of the 65 units, at least 20 units with a minimum grade of 'C' must be in courses with the ANTHRO subject code numbered 100 or above and taught by Anthropology faculty.
  - no more than 10 units of directed reading-style course work may be counted towards the 50 units required for the major in the ANTHRO subject code.
  - no more than 10 units may be taken for a satisfactory/no credit grade: 5 units in ANTHRO courses, and 5 in related or transfer units.
3. A minimum grade of 'B' in the ANTHRO Writing in the Major (WIM) course from the chosen emphasis. This can be fulfilled by completing the ANTHRO Theory course, ANTHRO 90B or ANTHRO 90C, and should be taken within a year of declaring the Major or before the end of the junior year.
4. A minimum grade of 'B' in the ANTHRO Theory course from the chosen emphasis. This should be taken within a year of declaring the major or before the end of the junior year.
5. A minimum grade of 'B' in the ANTHRO Methods course (ANTHRO 91 Method and Evidence in Anthropology). This should be taken within a year of declaring the major or before the end of the junior year.
6. Students must enroll in the senior Capstone course, (ANTHRO 193 Anthropology Capstone: Contemporary Debates in Anthropology) during their senior year.
7. An approved plan of study which includes an emphasis chosen from the list below. Students must complete a minimum of 20 units in their chosen emphasis of which 10 units must be numbered 100 or above.
  - Culture and Society
  - Ecology, Environment, and Evolution
  - Medical Anthropology
  - Self-Designed Emphasis (with faculty adviser and undergraduate committee approval, only)
8. Competence in a foreign language beyond the first-year level. Such competence is usually demonstrated by completing a 5 unit course at the second-year level with a minimum grade of 'B-'. The requirement may also be met by special examination administered through the Language Center.
  - Up to 5 units from a second-year language course can count towards the "Related to Anthro" category of the major requirements.
9. At least five quarters of enrollment in the major. Each candidate for the B.A. in Anthropology should declare a major by the first day of the first quarter of the third year of study.

Advising is an important component of the Anthropology major. Students are encouraged to work closely with their major adviser throughout their

pursuit of the B.A. degree. Advising milestones for the major include the following:

1. In the quarter in which the major is declared, students meet with their assigned faculty adviser, create a rigorous plan of study based on topical breadth, obtain adviser approval of an Anthropology emphasis as part of the plan of study, and obtain the major adviser's signature on the Major Checklist form.
2. Undergraduate Anthropology majors should plan to meet with their major faculty adviser at least once each quarter before the final study list deadline. Any revisions to the initial checklist must be approved by the faculty adviser.
3. Undergraduate Anthropology majors must submit an updated major checklist and planning form to the undergraduate student services officer in the quarter before graduating.

## Required Courses

### 1. Writing in the Major courses

Undergraduate majors can fulfill the Writing in the major course requirement for the B.A. in Anthropology by taking the ANTHRO theory course designated from a chosen emphasis.

### 2. Theory courses

Enroll in one of the following theory courses according to the student's chosen emphasis:

		Units
<b>Culture and Society/Medical Anthropology:</b>		
ANTHRO 90B	Theory of Cultural and Social Anthropology	5
<b>Ecology, Environment, and Evolution:</b>		
ANTHRO 90C	Theory of Ecological and Environmental Anthropology	5

### 3. Methods courses

The following course fulfills the ANTHRO undergraduate major methods course requirement for all emphases:

		Units
ANTHRO 91	Method and Evidence in Anthropology	5

### 4. Capstone Course

The following course fulfills the ANTHRO undergraduate major capstone course requirement for all emphases:

		Units
ANTHRO 193	Anthropology Capstone: Contemporary Debates in Anthropology	5

## Department Courses

Students should complete a minimum of 20 units from the courses listed below within their chosen emphases; 10 of these units must be numbered 100, or above. Departmental courses may fulfill the requirements for more than one emphasis. For example: with approval, an Archaeology course may fulfill a course needed to meet a course requirement in the Medical Anthropology emphasis. Undergraduates may also petition to the undergraduate committee for a self-designed emphasis in the Anthropology major.

		Units
<b>Cultural &amp; Society Anthropology Courses</b>		
ANTHRO 1	Introduction to Cultural and Social Anthropology	5
ANTHRO 30Q	The Big Shift	4
ANTHRO 39	Sense of Place	3
ANTHRO 34	Animals and Us	5
ANTHRO 42	Megacities	5

ANTHRO 49	Violence and Belonging in the Middle East (not given this year)	5
ANTHRO 90B	Theory of Cultural and Social Anthropology	5
ANTHRO 91	Method and Evidence in Anthropology	5
ANTHRO 106	Incas and their Ancestors: Peruvian Archaeology	3-5
ANTHRO 126	Urban Culture in Global Perspective	5
ANTHRO 136	The Anthropology of Global Supply Chains	5
ANTHRO 140	Ethnography of Africa	3
ANTHRO 149	South Asia: History, People, Politics	5
ANTHRO 152	Ritual, Politics, Power	5
ANTHRO 187	Nuclear Cultures	5

**Medical Anthropology Courses**

ANTHRO 82	Medical Anthropology	4
ANTHRO 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5
ANTHRO 154	Anthropology of Drugs: Experience, Capitalism, Modernity	5
ANTHRO 175	Human Skeletal Anatomy	5
ANTHRO 176	Cultures, Minds, and Medicine	1
ANTHRO 182N	Smoke and Mirrors in Global Health	3
ANTHRO 186	Culture and Madness: Anthropological and Psychiatric Approaches to Mental Illness	5

**Ecology, Environment & Evolution Anthropology Courses**

ANTHRO 90C	Theory of Ecological and Environmental Anthropology	5
ANTHRO 160	Social and Environmental Sustainability: The Costa Rican Case	3-5
ANTHRO 162	Indigenous Peoples and Environmental Problems	3-5
ANTHRO 166	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness	3-5

**Senior Courses**

ANTHRO 95B	Directed Study in Honors and Senior Papers	1-10
ANTHRO 193	Anthropology Capstone: Contemporary Debates in Anthropology	5

**Senior Paper/Honors & Research Courses**

ANTHRO 92A	Undergraduate Research Proposal Writing Workshop	2-3
ANTHRO 92B	Undergraduate Research Proposal Writing Workshop	2-3
ANTHRO 93	Prefield Research Seminar	5
ANTHRO 93B	Prefield Research Seminar: Non-Majors	5
ANTHRO 94	Postfield Research Seminar	5
ANTHRO 95	Research in Anthropology	1-10
ANTHRO 96	Directed Individual Study	1-10
ANTHRO 97	Internship in Anthropology	1-10

**Emphasis Courses**

The following course listing includes courses taught by the Anthropology faculty in Archaeology. These courses may be considered towards the published emphasis requirements in the Anthropology bachelors degree with the culture and society, ecology, environment and evolution, medical, and self-designed emphases in the Anthropology undergraduate major.

**Archaeology Courses**

ANTHRO 3	Introduction to Archaeology	3-5
ANTHRO 34	Animals and Us	5
ANTHRO 91A	Archaeological Methods	5
ANTHRO 98B	Digital Methods in Archaeology	3-5

ANTHRO 106	Incas and their Ancestors: Peruvian Archaeology	3-5
ANTHRO 108E	Catalhoyuk and Neolithic Archaeology	3
ANTHRO 113B	Religious Practices in Archaeological Cultures	5
ANTHRO 115	The Social life of Human Bones	3-5
ANTHRO 118	Heritage, Environment, and Sovereignty in Hawaii	4
ANTHRO 119	Zooarchaeology: An Introduction to Faunal Remains	5
ANTHRO 134	Object Lessons	5

**Plan of Study (example)**

Please see the example Plan of Study grid below designed for an ANTHRO major beginning junior year (from 85 units). This sample course schedule details the courses needed to satisfy the requirements for the Culture & Society emphasis.

Junior	Units		
	Autumn	Winter	Spring
Method and Evidence in Anthropology (ANTHRO 91)		5	
Undergraduate Research Proposal Writing Workshop (ANTHRO 92A)		2-3	
Culture, Narrative, and Medicine (ANTHRO 178A)		5	
Megacities (ANTHRO 42)		5	
Undergraduate Research Proposal Writing Workshop (ANTHRO 92B)			2-3
Introduction to Cultural and Social Anthropology (ANTHRO 1)			5
Theory of Cultural and Social Anthropology (ANTHRO 90B)			5
Sex and Gender (ANTHRO 15)			3
Prefield Research Seminar (ANTHRO 93)			5
Field School Training Workshop (ANTHRO 98F)			1-3
The Anthropology of Global Supply Chains (ANTHRO 136)			5
Medical Anthropology (ANTHRO 82)			4
Year Total:		17-18	15-16 15-17

Senior	Units		
	Autumn	Winter	Spring
Urban Culture in Global Perspective (ANTHRO 126)		5	
Senior and Master's Paper Writing Workshop (ANTHRO 199)		1-2	
Postfield Research Seminar (ANTHRO 94)		5	
Anthropology Capstone: Contemporary Debates in Anthropology (ANTHRO 193)		5	
Ritual, Politics, Power (ANTHRO 152)			5
Ethnography of Africa (ANTHRO 139)			5
Senior and Master's Paper Writing Workshop (ANTHRO 199)			1-2
Directed Study in Honors and Senior Papers (ANTHRO 95B)			1-10
South Asia: History, People, Politics (ANTHRO 149)			5
Year Total:		16-17	11-12 6-15
Total Units in Sequence:			80-95

Course selections may vary depending on the students chosen emphasis. The number of units needed to satisfy the ANTHRO major requirements may also vary depending on the student's current undergraduate status and units accomplished previously before declaration of the ANTHRO major.

**Research Courses**

Courses listed are recommended for students writing a research paper in the major:

ANTHRO 92A	Undergraduate Research Proposal Writing Workshop	2-3
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ANTHRO 93B	Prefield Research Seminar: Non-Majors	5
ANTHRO 93	Prefield Research Seminar	5
ANTHRO 94	Postfield Research Seminar	5
ANTHRO 95	Research in Anthropology	1-10
ANTHRO 199	Senior and Master's Paper Writing Workshop	1-2
Total Units		19-30

### Senior Courses

		Units
ANTHRO 95B	Directed Study in Honors and Senior Papers	1-10
ANTHRO 193	Anthropology Capstone: Contemporary Debates in Anthropology	5

### Senior Paper

The senior paper program in Anthropology provides majors with the opportunity to conduct original research under the guidance of an Anthropology faculty member. All Anthropology majors are encouraged to write a senior paper. Interested Anthropology majors of junior standing may apply to the senior paper program by submitting a senior paper application form, including a research topic/title of the proposed senior paper project, a two page abstract/proposal, and a letter of reference from their faculty adviser to the undergraduate student services officer on or by February 15 in the junior year. Enrollment in ANTHRO 95 Research in Anthropology is recommended during Autumn and Winter quarters of the senior year. Students must enroll in ANTHRO 95B Directed Study in Honors and Senior Papers in the final quarter of the undergraduate degree program before graduating. The senior paper is submitted in the final quarter before graduation. For more information, see the undergraduate student services officer.

### Honors Program

The honors program in Anthropology provides eligible Anthropology majors with an opportunity to conduct original ethnographic, field, laboratory, or library-based research under the guidance of an Anthropology faculty member. All Anthropology majors are urged to consider applying to the Departmental Honors Program in Anthropology. Interested Anthropology majors of junior standing may apply for admission to the honors program by applying first in Axess, submitting an honors program application form, including a research topic/title of the proposed honors project, a two page abstract/proposal, a transcript, and a letter of reference from the faculty or honors adviser, to the undergraduate student services officer on or by February 15 in the junior year.

Department majors are eligible to apply for honors candidacy with a 3.4 GPA in the major, a 3.0 GPA in overall course work, and with no more than one incomplete listed on the transcript at the time of application. Students interested in the honors program are encouraged to apply for Summer Quarter research funding through the Department of Anthropology, Undergraduate Advising and Research, and area studies centers. In most cases, honors students apply for such funding early in the junior year. This process requires advanced planning as the Spring Quarter research deadline falls before the honors application due date.

Students must enroll in ANTHRO 95B Directed Study in Honors and Senior Papers in the final quarter of the undergraduate degree program and earn a grade of 'A-' or better to graduate with honors. Students must submit the final draft of their honors thesis to their honors adviser (first reader) and second reader, electronically or printed, no later than May 13, 2018. Honors advisers and second readers must review the final draft submission and sign off on the Honors Signature Cover Sheet to confirm satisfactory completion of the honors paper and approved honors status. The Honors Signature Cover Sheet and final copy of the honors paper must be submitted to the undergraduate student services officer no later than May 20, 2018. If ineligible for honors status, students must withdraw

their request to graduate with honors via Axess. For more information, see the undergraduate student services officer.

## Minor in Anthropology

To declare a minor in Anthropology, apply in Axess; contact the department's student peer adviser(s) or the undergraduate student services officer to prepare the minor checklist and the minor planning form; submit the required forms to the undergraduate student services officer; request a faculty adviser assignment; and meet with the assigned faculty adviser for approval of the minor checklist and planning form. These forms are available at <http://anthropology.stanford.edu>. Students must apply in Axess for the undergraduate minor in Anthropology by the last day of the quarter at least two quarters before degree conferral.

Requirements for the minor in Anthropology include the following:

1. A faculty adviser appointed in the Department of Anthropology.
2. A program of 30 units, with a minimum grade of 'C':
  - Of the 30 units, a minimum of 10 units must be taken from the chosen ANTHRO emphasis.
  - Of the 30 units, a minimum of 15 units must be ANTHRO courses numbered 100 or above.
  - Of the 30 units, 10 units may be approved from related areas of study, overseas studies, and transfer units.
    - *Note:* Any related, overseas studies, or transfer units must be approved by the faculty adviser and by petition to the Undergraduate Committee
  - No more than 5 units of directed reading-style course work may be counted towards the minor and may only be included among the 10 related units permitted for the minor.
  - No more than 5 units may be taken for a satisfactory/no credit grade.
3. A self-designed course of study chosen from an Anthropology emphasis listed below and approved by the faculty adviser:
  - Culture and Society
  - Ecology, Environment and Evolution
  - Medical Anthropology
4. At least two quarters of enrollment in the minor. Each candidate for the minor in Anthropology should declare by the last day of the quarter at least two quarters before the quarter of degree conferral.

Advising milestones for the minor include the following:

1. In the quarter in which the minor is declared, the student must meet with his or her assigned adviser, create a rigorous course of study based on topical breadth, and obtain adviser approval for the checklist.
2. Any revisions to the initial checklist must be approved by the faculty adviser.
3. Undergraduate Anthropology minors must submit an updated minor checklist and planning form to the undergraduate student services officer in the quarter before graduating.

## Coterminal Master's Degrees in Anthropology

Graduate enrollment at Stanford University for three consecutive quarters of full tuition for at least 45 units is usually required of all candidates for the coterminal M.A. degree. Coterminal M.A. students must matriculate in the M.A. graduate program for a minimum of two quarters (excluding the Summer Quarter) with Anthropology faculty advising and supervision.

M.A. students in Anthropology must take a minimum of 45 units of Anthropology course work beyond the undergraduate degree with an overall minimum grade point average of 3.0. Coterminal M.A. students

may transfer units from the two quarters previous to the graduate admit quarter. For the master's degree, all courses must be at or above the 100 level, and at least 23 of the required 45 units must be taken at either the ANTHRO 200- or 300-level.

The M.A. program usually requires more than one year of study. However, full-time students entering the program with appropriate background should complete the M.A. degree program within three consecutive quarters after the student's first quarter of master's-level enrollment.

The University allows no transfer units into the master's program. To provide a meaningful master's program within one year, advance planning of course work with a faculty adviser is required. Requirements for the coterminal M.A. program must be completed within three years.

It is recommended by this department that a student who accepts an offer of admission to the Anthropology coterminal master's program, defer their undergraduate bachelor's conferral until the graduate M.A. degree requirements have been completed. The student can then request to graduate in both the bachelor's and master's degrees simultaneously. Students are advised to consult the undergraduate student services officer.

### Admission to the Coterminal Master's Degree Program

The deadline for graduate applications to the coterminal M.A. degree program in Anthropology is December 5, 2017. Stanford University undergraduate majors are eligible to apply for the coterminal M.A. degree program if they have a 3.4 GPA in their department major, a 3.0 GPA in overall course work, and have no more than one incomplete listed on the transcript at the time of application. Successful applicants to the M.A. program may enter only in the following Autumn Quarter. However, the department may consider a request for early deferral of admission in the Spring Quarter by petition. Coterminal M.A. degree applicants are not required to submit their Graduate Record Examination scores.

Applicants must submit the following:

1. Online Application for Admission to Coterminal Master's Program
2. Preliminary Program Proposal, Coterminal Degree Program
3. Coterminal Course Approval Form
4. Two Letters of Recommendation. Letters of recommendation must be accompanied by signed Recommendation Form.
5. All relevant transcripts
6. A 2-3 page, singled-spaced Statement of Purpose
  - a. For further information on how to write a personal statement please contact your faculty recommenders. You may also contact current graduate students in Anthropology.
  - b. For tips on writing Statement of Purpose and Personal Statement Essays, see available resources at the Hume Center for Writing and Speaking (<https://undergrad.stanford.edu/tutoring-support/hume-center>).
7. Writing Sample in English: A 10-12 page paper giving evidence of both writing ability and the capacity for research, analysis, and original thought at the graduate level, and demonstrating the ability to use theory in relation to evidence. If your writing sample is longer than 10-12 pages, please indicate which 10-12 pages should be reviewed by the admissions committee.

See the department's web site (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/anthropology/%20https://web.stanford.edu/dept/anthropology/cgi-bin/web/?q=node/35>) for additional information.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements

for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken two quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

### Degree Options

Students may pursue one of two possible department tracks in the coterminal Anthropology M.A. degree program. The tracks are:

- Archaeology
- Culture and Society

The tracks are not declarable in Axess.

## Master of Arts in Anthropology

University requirements for the terminal M.A. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The Department of Anthropology offers the terminal M.A. degree to the following:

1. Graduate applicants who apply from outside the University for admission to the terminal M.A. program in Anthropology.
2. Stanford graduate students, taking advanced degrees in other departments or schools at Stanford, who are admitted to the terminal M.A. program in Anthropology.
3. Anthropology Ph.D. students at Stanford University who fulfill the M.A. degree requirements on the way to the Ph.D. degree.

Graduate applicants who apply from outside the University and whose ultimate goal is the Ph.D. degree should apply directly to the Ph.D. degree program. Applicants who are offered admission to the terminal Masters degree program may not transfer to the Ph.D. degree program; they must reapply on the same basis as other Ph.D. applicants and in competition with the Ph.D. applicants.

Graduate applicants, taking an advanced degree in other departments or schools at Stanford, applying for admission to the M.A. in Anthropology should apply via the Department terminal M.A. degree application for current Stanford University graduate students form and via the Registrar electronic graduate authorization petition by December 5, 2017 in consideration of beginning degree matriculation in either the following Spring Quarter or the following Autumn Quarter.

Anthropology Ph.D. students choosing to take the M.A. in Anthropology on the way to the Ph.D. are governed by separate requirements described in the Anthropology Ph.D. Degree Program and Ph.D. Handbook.

Graduate enrollment at Stanford University for three consecutive quarters of full tuition for at least 45 units is required of all candidates for the terminal master's degree. M.A. students in Anthropology must take a



minimum of 45 units of course work with an overall minimum grade point average of 3.0. For the Masters degree, all courses must be at or above the 100 level, and, at least 23 of the required 45 units must be taken at either the ANTHRO 200 or 300-level.

The M.A. program may require more than one year of study. However, full-time students entering the program with appropriate background should complete the M.A. degree program within three consecutive calendar quarters after the student's first quarter of master's-level enrollment. The University allows no transfer units into the master's program. To provide a meaningful master's program within one year, advance planning of course work with an adviser is required. Requirements for the terminal master's program must be completed within three years.

For further information about the Department's M.A. degree program requirements, please consult the Department webpages.

### Admission to the Master's Degree Program

The deadline for graduate applications to the M.A. degree program in Anthropology is December 5, 2017. Successful applicants to the M.A. program may enter only in the following Autumn Quarter. M.A. degree applicants must file a report of their Graduate Record Examination score electronically. Additional terminal M.A. degree program application procedures are required by the Department. Please consult the Department webpages.

No financial support is available to students enrolled for the M.A. degree.

### Degree Requirements

Requirements for the coterminal and terminal master's degree program include the following:

1. A faculty adviser appointed in the Department of Anthropology.
2. A program of 45 units, taken at the 100 level or higher with a minimum grade of 'B'. *Note:* At least 23 of the 45 units must be taken at the 200/300 level.
  - of the 45 units, no more than 15 units may be approved from related areas of study or overseas studies.
  - of the 45 units, no more than 10 units of directed reading-style course work may be counted towards the degree.
  - of the 45 units, no more than 5 units may be taken for a satisfactory/no credit grade.
3. A minimum grade of 'B' in one graduate-level ANTHRO Theory course from the chosen track. Please note that ANTHRO theory courses are usually considered as department review courses.
4. A minimum grade of 'B' in one graduate-level ANTHRO Methods course from the chosen track. Please note that ANTHRO methods courses are not considered as department review courses. [Student's seeking to fulfill the Department's requirement for methods training may petition the graduate committee for an alternate way (i.e. other course or training) to fulfill the Department methods requirement].
5. A minimum grade of 'B' in four ANTHRO Review courses from the chosen track, listed at the 200-level or higher, taught by Anthropology faculty, and taken as a five unit course.
6. A self-designed plan of study chosen from one of the following Anthropology tracks; the tracks are not declarable in Axxess.:
  - Archaeology
  - Culture and Society
7. Submission of an approved plan of study form and an approved department graduate report of degree progress form, inclusive of a field research, laboratory research or library-based paper proposal, by the last day of the first quarter of the Master's degree program.
8. Submission of an approved Master's degree program proposal form by the last day of the first quarter of the Master's degree program.

9. Presentation of the Master's research project at the Department's Master's (Honors) paper presentation event in Spring Quarter, optional.
10. Submission of the Master's paper reviewed by two faculty members (advisor and reader). For the Culture and Society track, the paper can be a field research or library-based research paper. For the Archaeology track, the paper can also be a laboratory research paper.

### Required Courses

		Units
<b>Archaeology Track, Required Theory (Review) Course</b>		
ANTHRO 303	Introduction to Archaeological Theory	5
<b>Culture and Society Track, Required Theory (Review) Courses</b>		
ANTHRO 301	History of Anthropological Theory, Culture and Society	5
-or-		
ANTHRO 301A	Foundations of Social Theory	5
-or-		
ANTHRO 300	Reading Theory Through Ethnography	5

		Units
<b>Archaeology Track, Required Methods Course</b>		
ANTHRO 307	Archaeological Methods	5
<b>Culture and Society Track, Required Methods Course</b>		
ANTHRO 306	Anthropological Research Methods	5
or comparable approved course at the 200 level or greater		

### Recommended Courses

For both tracks, attendance at the Departmental colloquium each quarter is recommended for all Master's students. Students may enroll in the following course for additional units.

		Units
ANTHRO 444	Anthropology Colloquium	1
ANTHRO 445	Anthropology Brown Bag Series	1

## Doctor of Philosophy in Anthropology

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

### Admission

The deadline for graduate application to the Ph.D. degree program is December 5, 2017. Successful applicants for the Ph.D. program may enter only in Autumn Quarter. It is the Department of Anthropology's policy not to defer graduate admission. Additional Ph.D. application procedures are required by the department. Please consult the department website.

### Financial Support

The department endeavors to provide needed financial support (through fellowships, teaching and research assistantships, and tuition grants) to all students admitted to the program who maintain satisfactory degree progress in years one through five of the Ph.D. program. San Francisco Bay Area residency during the Autumn, Winter, and Spring Quarters in academic cohort years one through five is required for eligibility to receive department funding.

First-year students who have not obtained a graduate degree previous to entering the Ph.D. program, and who have not obtained extramural funding previously before entering the Ph.D. program, are required to submit one extramural funding application to the faculty adviser in support of graduate doctoral training (for example, funding support for training during the first three years of the Ph.D. program) by the first

day of finals week in the Autumn Quarter of the first year. In order to be eligible to apply for the departments exceptional (pre)dissertation research-related Summer Quarter funding support, first-year students must submit at least two intramural or extramural Summer Quarter research funding proposals (deadlines are usually early Winter Quarter and advanced planning is required) as well as the department graduate report of degree progress form inclusive of a research proposal on or by May 15 in the Spring Quarter of the first year of the Ph.D. program.

Note that two instances of predissertation field research Summer Quarter funding support are given to qualified Ph.D. students in Anthropology. The first of two summers of predissertation field research funding support, is given in the Summer Quarter of the second year in the Ph.D. program and provided by way of a predoctoral research affiliateship. The second of two summers of predissertation field research funding support may be taken in either the first or third year Summer Quarter in the Ph.D. and is provided by way of a department fellowship with no tuition. Careful consideration should be given when choosing to take Summer Quarter funding support, either in the first year for a pilot study, survey work, or approved predissertation research, or, in the third year as a bridge to the field to conduct approved dissertation research.

Second-year students are required to complete one or more full time quarterly teaching assistant assignments and be advanced to candidacy. In order to qualify for a predoctoral research affiliateship given in the Summer Quarter of the second year, Ph.D. students are required to submit at least two predissertation research funding proposals for second year Summer Quarter funding support.

Third-year students must pass the department qualifying examinations, inclusive of an oral component, to receive department approval by the dissertation reading committee for the dissertation proposal. Third-year students who have not secured fourth-year field research funding support are required to make at least three extramural funding applications to support dissertation research usually by the end of Autumn Quarter of the third year. Advanced planning is required in order to meet approved dissertation research funding application deadlines. If receiving department funding for fourth-year field research, third-year students must review the department Ph.D. funding agreement form before leaving to conduct field research. Finally, the second of two Summer Quarters of (pre)dissertation field research funding support may be taken as a bridge to the field in the third-year Summer Quarter if this support was not taken, previously, in the first year Summer Quarter. If this support is taken in the third-year Summer Quarter, Ph.D. students may qualify to receive these funds by way of the following: successful completion of the department qualifying examinations, inclusive of an oral component; receiving approval for the dissertation proposal by the dissertation reading committee by the Summer Quarter final study list deadline; and, departing for approved dissertation field research on or by the final study list deadline in the Summer Quarter of the third year.

While in the field, fourth-year students are required to make quarterly reports of their dissertation research progress to the dissertation reading committee via email. Fourth-year students returning from the field must submit the department's graduate report of degree progress form to establish eligibility for fifth year funding for degree progress and dissertation writing support, on or by May 15th in the Spring Quarter of the fourth year.

Fifth-year students are required to complete one or more full time quarterly teaching assistantship assignments. Fifth-year students who have not secured extramural funding for the sixth year are required to make at least two dissertation write-up funding applications to secure extramural or intramural funding for dissertation write-up in order to be eligible for consideration of a department teaching affiliateship in the sixth year. A department offer of teaching affiliateship is always dependent on the availability of funds and is given at the discretion of the department curriculum committee. During the fifth year and after returning from field research, students confirm Bay Area residency to be

eligible for department fifth-year dissertation writing funds. Eligibility for department support is based on dissertation writing seminar attendance and dissertation chapter production, as well as on Bay Area residency (the Bay Area is defined as Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, or Sonoma counties)

## Program

The Ph.D. in Anthropology allows the student to develop a flexible program reflecting special research interests, under the supervision of a faculty committee, chosen by the student. Students are encouraged to plan for completion of all work for the Ph.D. in five years. Matriculation in the Ph.D. is full-time only. In order to be eligible for department and intramural support, students must reside locally through the Autumn, Winter and Spring Quarters of academic years one through five. The University oral examination may be scheduled in the fifth year or beyond depending upon a student's time to degree completion. Ph.D. students in Anthropology must complete a minimum of 135 quarter units with a minimum grade point average (GPA) of 3.0 (B). The maximum allowable number of transfer units is 45.

## Degree Options

Students may pursue one of two different tracks in the Anthropology Ph.D. program. The tracks are not declarable in Axess and do not appear on the transcript or the diploma. The tracks are:

- Archaeology
- Culture and Society

## Degree Requirements

For students who matriculate beginning 2017-18, the requirements for the doctoral degree program include the following:

1. Students must submit a department (first year) plan of study form detailing intended courses enrollment and milestone accomplishment to be completed in the first year of the Ph.D. program. The plan of study form should be submitted by the first day of Autumn Quarter. In addition, the plan of study form also confirms the department track: Archaeology or Culture and Society.
2. Students must pass six graduate level ANTHRO subject code department review courses, with a minimum grade of 'B+', appropriate to the student's chosen track, within the first two years of the degree program. Department review courses are usually those seminar-style courses, taught by tenure-line ANTHRO faculty appointed in the department, at the 300-level.
3. In the first year of the program:
  - a. pass with a minimum grade of 'B+' the theory course(s) as required for the chosen track in Archaeology or Culture and Society:

### Archaeology Track, Required Theory (Review) Course

ANTHRO 303	Introduction to Archaeological Theory	5
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### Culture and Society Track, Required Theory (Review) Courses

ANTHRO 300	Reading Theory Through Ethnography	5
ANTHRO 301	History of Anthropological Theory, Culture and Society	5
ANTHRO 301A	Foundations of Social Theory	5

- a. pass with a minimum grade of 'B+' one or more methods courses as required for the chosen track in Archaeology:

### Archaeology Track, Required Methods Course

ANTHRO 307	Archaeological Methods	5
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(may be taken in either the first or second year of the PhD program)

- c. complete at least 45 units by the end of Spring Quarter in the first year.
  - d. as scheduled by the department, attend the department ethics workshop for review of ethics in Anthropology. Submit the department review of ethics in anthropology form on or by May 15th in Spring Quarter.
  - e. enroll in ANTHRO 310G Introduction to Graduate Studies during Autumn Quarter (all tracks).
  - f. Culture and Society track students, only, enroll in ANTHRO 311G Introduction to Culture and Society Graduate Studies in Anthropology during Winter and Spring quarters for 1-2 units (no more than 5 units total over two quarters).
  - g. attend the department colloquial series each quarter. Enrollment in ANTHRO 444 Anthropology Colloquium is optional.
  - h. attend the department brown bag series each quarter. Enrollment in ANTHRO 445 Anthropology Brown Bag Series is optional.
  - i. submit the department graduate report of degree progress form inclusive of the research proposal to the faculty adviser and the graduate program committee on or by May 15th in Spring Quarter of the first year. Receive final approval for the predissertation research proposal from the adviser and the graduate program committee by the first day of finals week in Spring Quarter.
  - j. submit at least one extramural funding application within the first year (deadlines are usually early Autumn Quarter and advanced planning is required). If ineligible to submit an extramural funding proposal due to previous graduate work, nationality, or other, submit a draft proposal in the style of a National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP) to the faculty adviser.
  - k. to be eligible for exceptional funding support in the Summer Quarter of the first year, submit at least two intramural or extramural funding proposals for Summer Quarter funding support (deadlines are usually early Winter Quarter and advanced planning is required). If exceptional Summer Quarter funding support is needed, submit a petition for predissertation funding support for the Summer Quarter of the first year using a department graduate petition form on or by May 15th in the Spring Quarter. The second of two summers of predissertation field research funding support may be taken in the Summer Quarter of either the first or third year in the Ph.D. program and is provided by way of a department fellowship. Careful consideration should be given when choosing to use the Summer Quarter funding support in either the first year for a pilot study, survey work, or approved field research or, in the third year as a 'bridge to the field' to conduct approved dissertation field research.
  - l. complete the appropriate CITI tutorial for non-medical human subjects, and, either submit a non-medical human subjects protocol, based on the predissertation research proposal, to the Institutional Review Board before departing for Summer Quarter field research in the first year, or confirm approval for exempt status. Alternately, a notice of determination may be confirmed with the Institutional Review Board for a pilot study proposal that does not require protocol submission.
  - m. complete the appropriate CITI tutorial for Responsible Conduct of Research on or by May 15 in Spring Quarter.
  - n. upon completion of the above requirements, and with recommendation from the faculty adviser and department chair, request the master's degree 'on the way to the Ph.D.' by the first day of finals week in Spring Quarter, or during any other registered quarter following this time, if desired.
4. In the second year:
- a. pass with a minimum grade of 'B+' the methods course(s) appropriate for the chosen track in Archaeology or Culture and Society:

**Archaeology Track, Required Methods Course**

ANTHRO 307	Archaeological Methods	5
ANTHRO 370	Advanced Theory and Method in Historical Archaeology	5

**Culture and Society Track, Required Methods Course**

ANTHRO 306	Anthropological Research Methods	5
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- b. pass with a minimum grade of 'B+' the proposal writing course appropriate for the chosen track in Archaeology or Culture and Society:

**Archaeology Track, Required Proposal Writing Course**

ANTHRO 308A	Proposal Writing Seminar in Archaeology	5
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**Culture and Society Track, Required Proposal Writing Course**

ANTHRO 308	Proposal Writing Seminar in Cultural and Social Anthropology	5
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- c. for both tracks, submit the pre-dissertation proposal to the assigned faculty adviser and the graduate program committee by the first day of finals week in Spring Quarter. Receive approval for the draft proposal of the second year summer pre-dissertation research before departing for field research.
- d. complete at least 40 units of course work in the second year and a total of at least 50 units overall including the Summer Quarter enrollment in ANTHRO 450 Research Apprenticeship (10 units). Students must have completed a total of 95 units overall by the end of the second year.
- e. pass with a minimum grade of 'B+' any remaining ANTHRO subject code review courses to complete the six review course requirement.
- f. as scheduled by the department, attend the teaching assistant training workshop (to be scheduled during or after the week before the first day of Autumn Quarter).
- g. complete one or more full time quarterly teaching assistant assignments in the second year.
- h. submit a second year graduate report of degree progress form inclusive of a draft of the research proposal on or by May 15th in Spring Quarter. Receive approvals from the assigned faculty adviser and the graduate program committee by the first day of finals week in Spring Quarter.
- i. by the first day of finals week in Winter Quarter, confirm the qualifying examination committee adviser for each examination committee (i.e. one committee for AREA and one committee for TOPIC) by submitting the department report of qualifying examination form to the department graduate program committee.
- j. by the first day of finals week in Winter Quarter (for those whose native language is English), either pass a foreign research or field language exam, or petition the department's language committee for exemption from a foreign research or field language examination (based on a description of previous field or research language training). For those whose native language is not English, demonstrate satisfactory command of the English language, as evidenced by completion of the first two years of graduate study and a petition to the language committee.
- k. upon completion of the above requirements and at the recommendation of the Anthropology faculty, petition the University for candidacy by submitting the University application for candidacy for doctoral degree form by the first day of finals week in Winter Quarter. Advancement to candidacy is based on faculty review and approval of the predissertation research proposal demonstrating the ability to conduct independent research, analysis and interpretation. The candidacy form should be submitted no later than May 15th in Spring Quarter of the

second year. The final draft of the proposal should be submitted for review by the department faculty on or by the first day of end quarter period in the Spring quarter of the second year. Failure to advance to candidacy may result in the dismissal of the student from the program.

- i. In order to qualify for a predoctoral research affiliateship given in the Summer Quarter of the second year, Ph.D. students are required to submit at least two predissertation research funding proposals for second year Summer Quarter funding support.
5. In the third year, complete the following:
- a. by the last day of the third week of Autumn Quarter, confirm the committee reader for each of the qualifying examination committees (i.e. one committee for AREA and one committee for TOPIC) by submitting the report of qualifying examination form to the department graduate program committee.
  - b. In order to be eligible for fourth year field research funding support, submit three dissertation research grant proposals to the faculty adviser for approval by the first day of finals week in the Autumn quarter. Submit an approved extramural funding proposal to three funding agencies by the end of the Summer Quarter in the third year.
  - c. by the first day of finals week in Autumn Quarter, confirm the dissertation reading committee by submitting the University dissertation reading committee form to the graduate program committee.
  - d. During Winter Quarter in the third year, enroll in and pass the following directed reading-style courses: ANTHRO 401A Qualifying Examination: Topic and ANTHRO 401B Qualifying Examination: Area, under the section of the ANTHRO faculty adviser for each.

ANTHRO 401A	Qualifying Examination: Topic	2-5
ANTHRO 401B	Qualifying Examination: Area	2-5

1.
  - a. by the last day of third week in Winter Quarter, submit the third year department report of qualifying examination status form to the graduate program committee reaffirming committee formulation, and confirming the exam dates, preliminary qualifying bibliographies, and the proposed question set for each examination.
  - b. by the last day of finals week in Winter Quarter, complete the qualifying examinations for area and for topic (two separate examinations to be scheduled one week apart), inclusive of the final bibliographies.
  - c. by the last day of the second week in Spring Quarter, submit a draft of the dissertation proposal to the dissertation reading committee.
  - d. by the last day of the second week in Spring Quarter, confirm a scheduled meeting with the qualifying examination committee/ dissertation reading committee members for the oral component of the qualifying examinations and for review and approval of the dissertation proposal.
  - e. meet with the qualifying examination/dissertation reading committee members to review the dissertation proposal, inclusive of the oral component of the qualifying examinations, on or by May 15th in Spring Quarter.
  - f. the second of two summers of (pre)dissertation field research funding support, provided by way of a fellowship stipend, may be taken in either the first or third year Summer Quarters in the Ph.D. program. If not taken in Summer Quarter of the first year, submit the third-year Summer Quarter dissertation bridge to the field funding request via a graduate petition form on or by May 15th in Spring Quarter.

- g. by the first day of finals week in Spring Quarter, submit the approved dissertation proposal to the graduate program committee.
  - h. before departing for field research, receive approval for the non-medical human subjects protocol from the Institutional Review Board.
    - i. meet with faculty adviser to review comments for the dissertation proposal, all tracks.
    - j. full-time research, based on the approved dissertation research proposal, should start no later than the final study list deadline in the Summer Quarter of the third year.
2. In the fourth year, complete the following requirements:
- a. If necessary, successfully complete a third of three possible attempts to re-write/re-take the qualifying examinations for area and topic no later than the last day of Autumn quarter in fourth year, following the Spring quarter of the third year.
  - b. by the first day of finals week in the Autumn, Winter and Spring Quarters, submit a quarterly report of dissertation field research via email to the dissertation reading committee.
  - c. to establish eligibility for funding and to confirm Bay Area residency, submit a fourth-year department graduate report of degree progress form to the department graduate program committee on or by May 15th in the Spring Quarter of the fourth year.
  - d. submit one or more funding proposals to support the Summer Quarter of the fourth year.

3. In the fifth year, complete the following requirements:
- a. during the fifth year and after returning from field research, confirm Bay Area residency to be eligible for department fifth year dissertation writing funds. Eligibility for department support is based on dissertation writing seminar attendance as well as on Bay Area residency (the Bay Area is defined as Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, or Sonoma counties).
  - b. during the fifth year and after returning from field research, complete one or more full time quarterly teaching assistant assignments in the department.
  - c. Culture and Society Track students, only, and during Autumn, Winter, Spring Quarters in the fifth year, students attend a minimum of four out of five class meetings of ANTHRO 400 Cultural and Social Dissertation Writers Seminar (required of Culture and Society track, only; and, recommended for the Archaeology track). In each quarter and for both tracks, chapter drafts of the dissertation must be handed in to the dissertation reading committee for review.
  - d. submit the fifth year dissertation writers report of degree progress and time to degree completion form by the last day of finals week in the Autumn, Winter and Spring Quarters.
  - e. fifth year students who have not secured funding support from the beginning of the Summer Quarter of the fifth year through the end of Summer Quarter in the sixth year, should submit one or more funding proposals for dissertation writing funding support.
4. In either the fifth year or in the sixth plus year and beyond, complete the following requirements:
- a. submit a penultimate draft of the dissertation by the last day of the first week of the quarter preceding the quarter in which the University oral examination (dissertation defense) has been scheduled; and, in which the dissertation is to be submitted in partial fulfillment of degree requirements. At the time the dissertation reading committee has confirmed the penultimate draft status, obtain approval by the dissertation reading committee using the department checklist form.
  - b. at least four weeks prior to a proposed date for the University oral examination, submit the University oral examination schedule

#### Units

form and a final draft of the dissertation, to the department graduate program committee.

- c. pass the University oral examination, inclusive of an oral presentation held at the beginning of the oral examination period (approximately 30 minutes for the public presentation with a 15 minute public discussion period preceding a closed session with the oral examination committee), prior to the final submission of the dissertation to the University Registrar and the conferral of the doctoral degree in Anthropology.

## Required Courses

### Archaeology Track

	Units
ANTHRO 303 Introduction to Archaeological Theory	5
ANTHRO 307 Archaeological Methods	5
ANTHRO 310G Introduction to Graduate Studies	2
ANTHRO 308A Proposal Writing Seminar in Archaeology	5
<b>Total Units</b>	<b>17</b>

### Culture and Society Track

	Units
ANTHRO 300 Reading Theory Through Ethnography	5
ANTHRO 301 History of Anthropological Theory, Culture and Society	5
ANTHRO 301A Foundations of Social Theory	5
ANTHRO 306 Anthropological Research Methods	5
ANTHRO 308 Proposal Writing Seminar in Cultural and Social Anthropology	5
ANTHRO 310G Introduction to Graduate Studies	2
ANTHRO 311G Introduction to Culture and Society Graduate Studies in Anthropology	2
<b>Total Units</b>	<b>29</b>

## Recommended Courses

For both tracks, quarterly attendance (during the Autumn, Winter, and Spring quarters) in the departmental colloquium is recommended for all doctoral students and required for all current first-year, second-year, and fifth-year cohort Ph.D. students. Students may enroll in the following course for additional units.

	Units
ANTHRO 444 Anthropology Colloquium	1
ANTHRO 445 Anthropology Brown Bag Series	1

## Ph.D. Minor in Anthropology

University requirements for the Ph.D. Minor are described in the Graduate Degrees section of this Bulletin.

To request the Ph.D. Minor in Anthropology, apply to the department graduate program committee at least three quarters before terminal graduate registration status is confirmed with the following materials: the University application for Ph.D. minor form, the department request for Ph.D. minor adviser form, an approved pre-dissertation proposal, confirmation of qualifying status in the Ph.D. (home) department, confirmation of Doctoral candidacy in the Ph.D. degree (home) department, proposed dates for the University oral examination and the dissertation defense, and a recommendation for consideration of the Ph.D. minor made by the Ph.D. (Minor) department adviser. Once approved, a HelpSU request to the University Registrar requesting the addition of the Ph.D. minor to the student's academic career will be submitted by the Anthropology student services officer on behalf of the Ph.D. minor applicant.

The requirements for a Ph.D. Minor in Anthropology include the following:

1. Complete 30 units of ANTHRO subject code courses at the 300 level. The courses dedicated to the Ph.D. minor must be successfully completed with a minimum (GPA) of 3.0 (B). Directed Individual Study units are not approved for the Ph.D. minor in Anthropology.
2. Request a faculty member within the Department of Anthropology who provides written consent to serve as the adviser for the Ph.D. minor and serve on the student's oral examination and dissertation reading committees.
3. With the faculty adviser, determine a coherent plan and submit the plan of study form for the Ph.D. minor.
4. Pass with a minimum grade of 'B+' three ANTHRO theory courses, and one ANTHRO course in geographical or theoretical area, for a total of four department Review courses.

For additional information regarding the Ph.D. Minor in Anthropology, consult the department website.

## Faculty

*Emeriti (Professors)* Harumi Befu, George A. Collier, Jane F. Collier, Carol Delaney, Charles O. Frake, James L. Gibbs, Jr., Renato I. Rosaldo

*Chair:* Sylvia Yanagisako

*Professors:* Lisa Curran, James Ferguson, Thomas Blom Hansen (on leave), Ian Hodder, S. Lochlann Jain, Liisa Malkki, Richard G. Klein, Tanya Luhmann, Lynn Meskell, Sylvia J. Yanagisako

*Associate Professors:* Paulla Ebron, James A. Fox, Duana Fullwiley, Angela Garcia, Miyako Inoue, Matthew Kohrman, John W. Rick, Barbara Voss

*Assistant Professors:* Andrew Bauer, Krish Seetah, Kabir Tambar, Sharika Thiranagama

*Courtesy Professors:* H. Samy Alim, Penelope Eckert, Raymond McDermott

*Emeriti Recalled:* William H. Durham

*Visiting Professors:* Ewa Domanska

*Visiting Assistant Professors:* Felicity Aulino

*Lecturers:* Claudia Engel, Sarah Ives

*Affiliated Faculty:* Li Liu, Richard White, Michael V. Wilcox

*Postdoctoral Fellows:* Joshua Brahinsky, Katherine Dennis, John Dulin, Giacomo Mantovan, Emily Ng, Rachel Smith

*Teaching Affiliates:* E'lana Jordan, Johanna Markkula, John Moran, Kathryn Takabvirwa

## Overseas Studies Courses in Anthropology

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPBER 51	Dance on the Edge in Germany	1-2
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPKYOTO 27	Japanese Popular Culture	4
OSPKYOTO 41	Queer Culture and Life in Japan	4
OSPOXFRD 93	Collecting the World	4-5
OSPPARIS 68	France: Birthplace of Human Rights	5

# APPLIED PHYSICS

Courses offered by the Department of Applied Physics are listed under the subject code APPPHYS on the Stanford Bulletin's ExploreCourses web site.

The Department of Applied Physics offers qualified students with backgrounds in physics or engineering the opportunity to do graduate course work and research in the physics relevant to technical applications and natural phenomena. These areas include accelerator physics, biophysics, condensed matter physics, nanostructured materials, quantum electronics and photonics, quantum optics and quantum information, space science and astrophysics, synchrotron radiation and applications.

Student research is supervised by the faculty members listed above and also by various members of other departments such as Biology, Chemistry, Electrical Engineering, Materials Science and Engineering, Physics, the SLAC National Accelerator Laboratory, and faculty of the Medical School who are engaged in related research fields.

Research activities are carried out in laboratories including the Geballe Laboratory for Advanced Materials, the Edward L. Ginzton Laboratory, the Hansen Experimental Physics Laboratory, the SLAC National Accelerator Laboratory, the Center for Probing the Nanoscale, and the Stanford Institute for Materials and Energy Science.

The number of graduate students admitted to Applied Physics is limited. Applications to the Master of Science and Ph.D. programs should be received by December 12, 2017. M.S. and Ph.D. students normally enter the department only in Autumn Quarter.

## Graduate Programs in Applied Physics

The Department of Applied Physics offers three types of advanced degrees:

- the Doctor of Philosophy
- the coterminal Master of Science in Applied and Engineering Physics
- the Master of Science in Applied Physics, either a terminal degree or an en route degree to the Ph.D. for students enrolled in the Applied Physics Department

Admission requirements for graduate work in the Master of Science and Ph.D. programs in Applied Physics include a bachelor's degree in Physics or an equivalent engineering degree. Students entering the program from an engineering curriculum should expect to spend at least an additional quarter of study acquiring the background to meet the requirements for the M.S. and Ph.D. degrees in Applied Physics.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Applied Physics and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Applied Physics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Applied Physics and to interpret and present the results of such research.

## Coterminal Master of Science in Applied and Engineering Physics

Stanford undergraduates, regardless of undergraduate major, who are interested in a M.S. degree at the intersection of applied physics and engineering may choose to apply for the coterminal Master of Science program in Applied and Engineering Physics. The program is designed to be completed in a fifth year at Stanford. Students with accelerated undergraduate programs may be able to complete their B.S. and coterminal M.S. in four years.

### Application and Admission

Undergraduates must be admitted to the program and enrolled as a graduate student for at least one quarter prior to B.S. conferral. Applications will be due on the last day of class of the Spring Quarter for Autumn matriculation and at least four weeks before the last day of class in the previous quarter for Winter or Spring matriculation. All application materials must be submitted directly to the Applied Physics department office by the deadlines. To apply for admission to the Applied and Engineering Physics coterminal M.S. program, students must submit the coterminal application which consists of the following:

- Application for Admission to Coterminal Master's Program (<https://registrar.stanford.edu/students/coterminal-degree-programs/applying-coterm>)
- Statement of Purpose
- Unofficial Transcript
- Two Letters of Recommendation from members of the Stanford faculty
- Supplemental Form (<http://www.stanford.edu/dept/app-physics/cgi-bin/aep-application-process>)

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

### Program Requirements

Coterminal M.S. students are required to take 45 units of course work during their graduate career. Of these 45 units, the following are required.

#### Four Breadth Courses (required)

APPPHYS 201    Electrons and Photons

Units

4

APPPHYS 203	Atoms, Fields and Photons	4
APPPHYS 204	Quantum Materials	4
APPPHYS 205	Introduction to Biophysics	4
<b>Three Engineering Depth Courses</b>		9
At least one must be at the 300 level and the other courses must be at the 200 level or above to provide depth in one area. To be approved by the Applied Physics academic adviser.		
<b>One Laboratory or Methods Course</b>		3-4
APPPHYS 207	Laboratory Electronics	
APPPHYS 208	Laboratory Electronics	
APPPHYS 215	Numerical Methods for Physicists and Engineers	
APPPHYS 217	Estimation and Control Methods for Applied Physics	
APPPHYS 232	Advanced Imaging Lab in Biophysics	
EE 234	Photonics Laboratory	
EE 251	High-Frequency Circuit Design Laboratory	
EE 312	Integrated Circuit Fabrication Laboratory	
ENGR 341	Micro/Nano Systems Design and Fabrication	
ENGR 342	MEMS Laboratory II	
MATSCI 322	Transmission Electron Microscopy Laboratory	
MATSCI 331	Atom-based computational methods for materials	
<b>Seminar</b> <sup>1</sup>		3
<b>Approved Technical Electives</b> <sup>2</sup>		6-12
6 units minimum that brings up the total units to 45		
<b>Total Units</b>		45

<sup>1</sup> The seminar requirement can be fulfilled by either (i) taking one formal seminar course for credit each term, and/or (ii) enrolling in Applied Physics 290 and attending a minimum of 8 informal talks or formal research seminars during each of the three terms. Students enrolling in Applied Physics 290 must submit with their final M.S. program proposal a list of the 8 talks/seminars with a paragraph describing the content, signed by their academic adviser.

<sup>2</sup> These include APPPHYS, CS, CME, EE, ME, BIOE, MATSCI, PHYSICS courses (see <http://www.stanford.edu/dept/app-physics/cgi-bin/academic-programs/>) as well as those courses that are formally approved by the Applied Physics Graduate Studies Committee through petition.

Any request for a course transfer from the undergraduate career is subject to approval of the undergraduate and graduate departments.

## Master of Science in Applied Physics

The University's basic requirements for the master's degree are discussed in the "Graduate Degrees (p. 50)" section of this bulletin. The minimum requirements for the degree are 45 units, of which at least 39 units must be graduate-level courses in applied physics, engineering, mathematics, and physics. The required program consists of the following:

<b>Advanced Mechanics</b>		3
Select one of the following:		
PHYSICS 210	Advanced Mechanics	
PHYSICS 211	Continuum Mechanics (approved substitute)	
<b>Electrodynamics</b>		3
PHYSICS 220	Classical Electrodynamics	
<b>Quantum Mechanics</b>		6
Select two of the following:		
PHYSICS 230	Graduate Quantum Mechanics I	
PHYSICS 231	Graduate Quantum Mechanics II	

EE 222	Applied Quantum Mechanics I (approved substitute)	
EE 223	Applied Quantum Mechanics II (approved substitute)	
PHYSICS 234	Advanced Topics in Quantum Mechanics (approved substitute)	
PHYSICS 330	Quantum Field Theory I (approved substitute)	
PHYSICS 331	Quantum Field Theory II (approved substitute)	
PHYSICS 332	Quantum Field Theory III (approved substitute)	

### Units

APPPHYS 290	Directed Studies in Applied Physics	
1-unit seminar courses		
Examples of suitable courses include:		
EE 222	Applied Quantum Mechanics I	
EE 223	Applied Quantum Mechanics II	
EE 236A	Modern Optics	
EE 236C	Lasers	
EE 332	Laser Dynamics	
EE 346	Introduction to Nonlinear Optics	
PHYSICS 372	Condensed Matter Theory I	
PHYSICS 373	Condensed Matter Theory II	

1. Courses in Physics and Mathematics to overcome deficiencies, if any, in undergraduate preparation.
2. Basic graduate courses (letter grade required):
  - 33 units of additional advanced courses in science and/or engineering. May be any combination of APPPHYS 290 Directed Studies in Applied Physics, any 1-unit course, and regular courses. At least 18 of these 33 units must be taken for a letter grade. 15 of these 18 units must be at the 200-level or above. Only 6 units below the 200-level are permitted without approval by the Applied Physics Graduate Study Committee.
3. A final overall grade point average (GPA) of 3.0 (B) is required for courses used to fulfill degree requirements.

There are no department nor University examinations. There is no thesis component. If a student is admitted to the M.S. program only, but later wishes to change to the Ph.D. program, the student must apply to the department's admissions committee.

## Doctor of Philosophy in Applied Physics

The University's basic requirements for the Ph.D. including residency, dissertation, and examinations are discussed in the "Graduate Degrees (p. 50)" section of this bulletin. The program leading to a Ph.D. in Applied Physics consists of course work, research, qualifying for Ph.D. candidacy, a research progress report, a University oral examination, and a dissertation as follows:

1. <i>Course Work:</i>		
<b>Statistical Physics</b>		3-4
Select one of the following: <sup>1</sup>		
APPPHYS 217	Estimation and Control Methods for Applied Physics	
APPPHYS 315	Methods in Computational Biology	
PHYSICS 212	Statistical Mechanics	
<b>Electrodynamics</b> <sup>1</sup>		3
PHYSICS 220	Classical Electrodynamics	

### Units



**Quantum Mechanics** 3

Select one of the following:<sup>1</sup>

PHYSICS 230	Graduate Quantum Mechanics I	
PHYSICS 231	Graduate Quantum Mechanics II	
EE 222	Applied Quantum Mechanics I (approved substitute)	
EE 223	Applied Quantum Mechanics II (approved substitute)	
PHYSICS 234	Advanced Topics in Quantum Mechanics (approved substitute)	
PHYSICS 330	Quantum Field Theory I (approved substitute)	
PHYSICS 331	Quantum Field Theory II (approved substitute)	
PHYSICS 332	Quantum Field Theory III (approved substitute)	

**Laboratory** 3-4

Select one of the following:<sup>2</sup>

APPPHYS 207	Laboratory Electronics	
APPPHYS 208	Laboratory Electronics	
APPPHYS 232	Advanced Imaging Lab in Biophysics	
BIOE 370	Microfluidic Device Laboratory	
EE 234	Photonics Laboratory	
EE 312	Integrated Circuit Fabrication Laboratory	
MATSCI 171	Energy Materials Laboratory	
MATSCI 172	X-Ray Diffraction Laboratory	
MATSCI 173	Mechanical Behavior Laboratory	
PHYSICS 301	Astrophysics Laboratory	

<sup>1</sup> Additional courses to fulfill this requirement are being reviewed by the department curriculum committee and will be added here when they have been approved.

<sup>2</sup> Students who took APPPHYS 304 or APPPHYS 305 in previous years may also count these courses towards this requirement.

- Courses in Physics and Mathematics to overcome deficiencies, if any, in undergraduate preparation.
- Basic graduate courses:* These requirements may be totally or partly satisfied with equivalent courses taken elsewhere, pending the approval of the graduate study committee. Letter grades required for all courses:
- 18 units of additional advanced courses in science and/or engineering. At least one course in each of two areas other than those of the student's research specialization is required. Only 3 units at the 300 or above level may be taken on a satisfactory/no credit basis. Units from APPPHYS 290, APPPHYS 390, and any 1-unit courses do not count towards this requirement. Examples of suitable courses include:

EE 222	Applied Quantum Mechanics I	3
EE 223	Applied Quantum Mechanics II	3
EE 236A	Modern Optics	3
EE 236C	Lasers	3
EE 332	Laser Dynamics	3
EE 346	Introduction to Nonlinear Optics	3
PHYSICS 372	Condensed Matter Theory I	3
PHYSICS 373	Condensed Matter Theory II	3

- Additional units of courses as needed to meet the minimum residency requirement of 135. Directed study and research units as well as 1-unit seminar courses can be included.
- A final average overall grade point average (GPA) of 3.0 (B) is required for courses used to fulfill degree requirements.

f. Students are normally expected to complete the specified course requirements by the end of their third year of graduate study.

- Research:* may be conducted in a science/engineering field under the supervision of a member of the Applied Physics faculty or appropriate faculty from other departments.
- Ph.D. Candidacy:* satisfactory progress in academic and research work, together with passing the Ph.D. candidacy qualifying examination, qualifies the student to apply for Ph.D. candidacy, and must be completed before the third year of graduate registration. The examination consists of a seminar on a suitable subject delivered by the student before the faculty academic adviser (or an approved substitute) and two other members of the faculty selected by the department.
- Research Progress Report:* normally before the end of the Winter Quarter of the fourth year of enrollment in graduate study at Stanford, the student arranges to give an oral research progress report of approximately 45 minutes, of which a minimum of 15 minutes should be devoted to questions from the Ph.D. reading committee.
- University Ph.D. Oral Examination:* consists of a public seminar in defense of the dissertation, followed by private questioning of the candidate by the University examining committee.
- Dissertation:* must be approved and signed by the Ph.D. reading committee.

*Emeriti:* (Professors) Malcolm R. Beasley, Arthur Bienenstock, Alexander L. Fetter, Theodore H. Geballe, Stephen E. Harris, Walter A. Harrison, Peter A. Sturrock, Yoshihisa Yamamoto; (Professors, Research) Calvin F. Quate, Helmut Wiedemann, Herman Winick; (Courtesy) Gordon S. Kino, Douglas D. Osheroff

*Chair:* Martin M. Fejer

*Professors:* Steven M. Block, Philip H. Bucksbaum (on leave Autumn), Robert L. Byer, Sebastian Doniach (on leave Spring), Martin M. Fejer, Daniel S. Fisher, Ian R. Fisher, Tony F. Heinz, Harold Y. Hwang, Aharon Kapitulnik, Mark A. Kasevich, Young S. Lee, Hideo Mabuchi, Kathryn A. Moler, Vahé Petrosian, Stephen R. Quake, Zhi-Xun Shen, Yuri Suzuki

*Associate Professors:* Benjamin L. Lev, David A. Reis, Mark J. Schnitzer (on leave Autumn, Winter)

*Assistant Professors:* Surya Ganguli, Amir H. Safavi-Naeini

*Professor (Research):* Michel J-F. Digonnet

*Courtesy Professors:* Mark L. Brongersma, Bruce M. Clemens, Shanhui Fan, David Goldhaber-Gordon, James S. Harris, Lambertus Hesselink, David A. B. Miller, W. E. Moerner, Jelena Vuckovic, Shoucheng Zhang

*Courtesy Associate Professors:* William J. Greenleaf, Zhirong Huang, Andrew J. Spakowitz

*Adjunct Professors:* Thomas M. Baer, Raymond G. Beausoleil, John D. Fox, Richard M. Martin

# ARCHAEOLOGY

Courses offered by the Archaeology Program are listed under the subject code ARCHLGY on the Stanford Bulletin's ExploreCourses web site.

Archaeology is the study of the past through its material remains that survive into the present. Archaeology is a discipline that offers direct access to the experiences of a wide range of people in numerous cultures across the globe. Increasingly, archaeology bridges past and present societies through the study of the human heritage and its role in contemporary societies. Stanford's Archaeology Program provides students with an interdisciplinary approach to the material remains of past societies, drawing in equal parts on the humanities, social sciences, and natural sciences.

The Archaeology curriculum draws on faculty from a wide range of University departments and schools. To complete the requirements for the major, students must take courses from the offerings of the program and from the listings of other University departments. The program culminates in a Bachelor of Arts (B.A.) in Archaeology.

## Mission of the Undergraduate Program in Archaeology

The mission of the undergraduate program in Archaeology is to provide students with a broad and rigorous introduction to the analysis of the material culture of past societies, drawing on the questions and methods of the humanities, social sciences, and natural sciences. Students in the major learn to relate these analyses to the practice of archaeology in the contemporary world. The program seeks to help each student achieve a high level of understanding through concentrated study of a particular research area. Courses in the major complete a comprehensive curriculum that draws on faculty from a wide range of University departments and programs. Archaeology majors are well prepared for advanced training in professional schools such as education, law, and journalism and, depending upon their choice of upper-division course, graduate programs in the humanities, social sciences, and natural sciences.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. demonstrate an understanding of core knowledge of the history of thought and basic theoretical foundations in archaeology.
2. write clearly and persuasively, communicating ideas about archaeology to multiple audiences and different communities, from the scholarly and to the general public in a variety of formats.
3. learn about the development of archaeology as a discipline and the major trends that have influenced thinking and writing about archaeology today.
4. demonstrate their mastery of the broad historical and theoretical trends in the field through critique of research within archaeology.

## Bachelor of Arts in Archaeology

To declare a major in Archaeology, students should apply for the B.A. in Archaeology on AxBSS and contact the student services specialist, who provides an application form, answers initial questions, and helps the student choose a faculty adviser. Students should declare by the beginning of their junior year.

All majors must complete 65 units with an overall minimum grade of 'C', which must form a coherent program of study and be approved by the student's faculty adviser and the program director.

Students who plan to pursue graduate work in Archaeology should be aware of the admission requirements of the particular departments to which they intend to apply. These vary greatly. Early planning is advisable to guarantee completion of major and graduate school requirements.

## Degree Requirements

The B.A. in Archaeology requires a minimum of 65 units in the major, with an overall minimum grade of 'C', and no more than 10 units may be taken for pass/nopass credit. The major requirements are divided among five components. A course may only be used once to fulfill a component.

### 1. Core Courses

	Units
20 units must be taken for a letter grade (minimum passing grade of 'B')	
ARCHLGY 1 Introduction to Archaeology (Gateway)	5
ARCHLGY 102 Archaeological Methods (Intermediate)	5
ARCHLGY 103 History of Archaeological Thought (Intermediate)	5
ARCHLGY 107A Archaeology as a Profession (Capstone)	5
<b>Total Units</b>	<b>20</b>

ARCHLGY 1 Introduction to Archaeology is recommended as a first course. Many upper-level courses in Archaeology require this course as a prerequisite. Students should normally take the capstone course in their final year of course work in the major.

### 2. Analytical Methods and Computing (5 units)

Quantitative skills and computing ability are indispensable to archaeologists. It is recommended that students take one of the following:

	Units
Select one of the following:	5
ANTHRO 98B Digital Methods in Archaeology (recommended)	
PSYCH 10/ INTRODUCTION TO STATISTICAL METHODS: PRECALCULUS STATS 60	
ECON 102A INTRODUCTION TO STATISTICAL METHODS (POSTCALCULUS) FOR SOCIAL SCIENTISTS	

### 3. Archaeological Skills (10 units)

Archaeological skills include archaeological formation processes, botanical analysis, cartography, ceramic analysis, dating methods, faunal analysis, geographic information systems, geology, geophysics, genetics, osteology, remote sensing, soil chemistry, and statistics. With the approval of the instructor and Archaeology director, undergraduates may fulfill part of this requirement from graduate-level courses (typically courses with catalog numbers of 200 or higher).

	Units
ARCHLGY 119 Zooarchaeology: An Introduction to Faunal Remains	5
ARCHLGY 124 Archaeology of Food: production, consumption and ritual	3-5
ANTHRO 103A Human Osteoarchaeology	5
ANTHRO 175 Human Skeletal Anatomy	5

### 4. Theory (at least 10 units)

Topics include archaeological, art-historical, sociocultural, historical, and material culture theory. With the approval of the instructor,

undergraduates may fulfill part of this requirement from graduate-level courses (typically courses with catalog numbers of 200 or higher).

		Units
ARCHLGY 151	Ten Things: An Archaeology of Design	3
ANTHRO 90B	Theory of Cultural and Social Anthropology	5
ANTHRO 117	Thinking Through Animals	5
ANTHRO 125	Language and the Environment	3
ANTHRO 134	Object Lessons	5
ANTHRO 147	Nature, Culture, Heritage	5

### 5. Electives (20 units)

Select from any of the courses listed below. Courses are arranged around a regional or thematic focus, and therefore, may appear more than once. Students have the option of taking courses around a theme or concentration, and are encouraged to do so by consulting with their faculty adviser(s) to design a course plan. Courses other than those on this list can be used to fulfill this requirement with prior approval of the student's faculty adviser and program director. With the approval of instructor, undergraduates may fulfill part of this requirement from graduate-level courses, typically courses numbered 200 or higher.

#### • World Archaeology: Mediterranean

		Units
ARCHLGY 118	Engineering the Roman Empire	4-5
ARCHLGY 145	Sailing the Wine-Dark Sea: Maritime Archaeology of the Ancient Mediterranean	3
CLASSICS 51	Introduction to Greek Archaeology	3-5
CLASSICS 52	Introduction to Roman Archaeology	3-5
CLASSICS 169	Archaeology of Britannia	3-4

#### • World Archaeology: Americas

		Units
ARCHLGY 10		3-5
ARCHLGY 102B	Incas and their Ancestors: Peruvian Archaeology	3-5
ANTHRO 30Q	The Big Shift	4

#### • World Archaeology: Asia

		Units
ARCHLGY 111	Emergence of Chinese Civilization from Caves to Palaces	3-4
ARCHLGY 135	Constructing National History in East Asian Archaeology	3-5

#### • Heritage

		Units
ARCHLGY 13	Islamic Routes: Archaeology and Heritage of Muslim Societies	3-5
ARCHLGY 135	Constructing National History in East Asian Archaeology	3-5
ARCHLGY 143	Classical Archaeology Today: Ethical Issues of Excavation, Ownership, and Display	3
ANTHRO 112	Public Archaeology: Market Street Chinatown Archaeology Project	4-5
ANTHRO 112B	Advanced Study in Public Archaeology	2-5
ANTHRO 147	Nature, Culture, Heritage	5
THINK 22	Who Owns the Past? Archaeology, Heritage and Global Conflicts	4

#### • Urbanism and Cities

		Units
ANTHRO 112	Public Archaeology: Market Street Chinatown Archaeology Project	5
ANTHRO 112B	Advanced Study in Public Archaeology	2-5

### 6. Archaeological Fieldwork

Students must take part in a month-long Stanford Archaeology Center field project directed by a Stanford faculty member, and enroll in any coursework that is required for participation in the field project. Projects are typically offered during summer months and funding may be provided. In summer 2013, field schools were located in: Turkey, Peru, China, Mauritius and Italy.

### 7. Collateral Language Requirement

All Archaeology majors must demonstrate competence in a foreign language beyond the first-year level. Students can meet this requirement by completing a course beyond the first-year level with a grade of 'B' or better, and are encouraged to choose a language that has relevance to their archaeological region or topic of interest. Students may petition to take an introductory-level course in a second language to fulfill this requirement by demonstrating the connection between the language(s) and their research interest(s).

### 8. Research and Independent Study

Students may count up to 5 units of research and independent study toward the Archaeology major:

		Units
including but not limited to:		
ARCHLGY 190	Archaeology Directed Reading/Independent Study	1-5
ARCHLGY 195	Independent Study/Research	1-5
ARCHLGY 199	Honors Independent Study	5

### Honors Program

The honors program in Archaeology gives qualified majors the chance to work closely with faculty on an individual research project culminating in an honors thesis. Students may begin honors research from a number of starting points, including topics introduced in the core or upper-division courses, independent interests, research on artifacts in Stanford's collections, or fieldwork experiences.

Interested Archaeology majors of junior standing may apply for admission by submitting an honors application form, including a 4-5 page statement of the project, a transcript, and a letter of recommendation from the faculty member supervising the honors thesis to the student services specialist, no later than the end of the fourth week of the Spring Quarter. Archaeology majors are eligible to apply for honors candidacy. The thesis is due in early May of the senior year and is read by the candidate's adviser and a second reader appointed by the undergraduate committee.

### Overseas Studies Courses in Archaeology

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site or the Bing Overseas Studies (<http://bossp.stanford.edu>) web site. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

### Minor in Archaeology

A minor in Archaeology provides an introduction to the study of the material cultures of past societies. It can complement many majors, including but not limited to Anthropology, Applied Physics, Art and Art

History, Classics, Earth Systems, Geological and Environmental Sciences, History, and Religious Studies.

Students must complete the declaration process, including the planning form submission and Axxess registration, by the last day of the quarter, two quarters prior to degree conferral; for example, by the last day of Autumn Quarter if Spring graduation is the intended quarter of graduation.

## Requirements

To minor in Archaeology, students must complete at least 27 units of relevant course work, including:

### 1. Core Program (10 units)

ARCHLGY 1	Introduction to Archaeology (Gateway Course, Required)	3-5
ARCHLGY 103	History of Archaeological Thought	5
ARCHLGY 107A	Archaeology as a Profession	5

is recommended as a first course, and many of the upper-level courses in Archaeology require this course as a prerequisite. Students have the option to take ARCHLGY 103 History of Archaeological Thought or ARCHLGY 107A Archaeology as a Profession to fulfill the rest of the 10 unit core requirement for the minor.

### 2. Archaeological Skills (2-5 units)

Archaeological skills include dating methods, faunal analysis, botanical analysis, ceramic analysis, geology, geophysics, soil chemistry, remote sensing, osteology, genetics, statistics, cartography, and geographic information systems. The course(s) must be chosen from the list of courses under Archaeological Skills (requirement 3) in the Bachelor's tab of this section.

### 3. Theory (5 units)

Topics include archaeological, art historical, sociocultural, historical, and material culture theory. The course(s) must be chosen from the list of courses under Theory (requirement 4) in the Bachelor's tab of this section.

### 4. Electives (10 units)

Select courses from the list of courses under Electives (requirement 5) in the Bachelor's tab of this section. Students have the option of taking courses around a theme or concentration, and are encouraged to do so by consulting their faculty advisers to design a course plan.

Archaeology is an interdisciplinary program. Students should meet with their adviser about degree requirements and the applicability of courses from other University departments to the Archaeology major or minor. Applicable courses are commonly found in Anthropology (ANTHRO) and Classics (CLASSICS), but are not limited to these departments. Please check with your adviser and the program director for course approvals.

*Director:* Ian Hodder (Anthropology)

*Department Faculty:*

*Professors:* Ian Hodder (Anthropology), Li Liu (East Asian Languages and Cultures), Gail Mahood (Geological Sciences), Lynn Meskell (Anthropology), Ian Morris (Classics), Michael Shanks (Classics)

*Associate Professors:* Giovanna Ceserani (Classics), Jody Maxmin (Art and Art History, Classics), John Rick (Anthropology), Jennifer Trimble (Classics), Barbara Voss (Anthropology)

*Assistant Professors:* Andrew Bauer (Anthropology), Justin Leidwanger (Classics, on leave), Krish Seetah (Anthropology)

*Associated Faculty:* Christina Hodge (Academic Curator & Collections Manager), Laura Jones (Campus Archaeologist)

*Postdoctoral Fellows:* Maureece Levin (Archaeological Science), Elisabeth Niklasson (Heritage)

*Affiliated Faculty:*

*Professors:* Rob Dunbar (Earth Sciences), Mark Lewis (Chinese Culture, Religious Studies), J. Moldowan (Geological and Environmental Sciences), Amos Nur (Earth Sciences), Peter Vitousek (Earth System Science)

### Units

*Associate Professors:* Paulla Ebron (Anthropology), James A. Fox (Anthropology, Iberian and Latin American Cultures, Linguistics, on leave A), Grant Parker (Classics)

*Staff:* Apurva Mehta (SLAC National Accelerator Laboratory)

## Overseas Studies Courses in Archaeology

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPCPTWN 16	Sites of Memory	2
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPAUSTL 40	Australian Studies	3

# ART AND ART HISTORY

Courses offered by the Department of Art & Art History are listed on the Stanford Bulletin's ExploreCourses web site under the subject codes ARTHIST (Art History), ARTSTUDI (Art Practice), FILMSTUD (Film Studies), and FILMPROD (Film Practice).

## Mission of the Department of Art and Art History

The department offers courses of study in:

1. Art History
2. Art Practice (studio)
3. Design
4. Film and Media Studies
5. Film Production

leading to the following degrees: B.A. degree in Art History; B.A. degree in Art Practice; B.A. degree in Film and Media Studies; M.F.A. degree in Art Practice; M.F.A. degree in Documentary Film and Video; Ph.D. degree in Art History.

The undergraduate program is designed to help students think critically about the visual arts and visual culture. Courses focus on the meaning of images and media, and their historical development, roles in society, and relationships to disciplines such as literature, music, and philosophy. Work performed in the classroom, studio, and screening room is designed to develop a student's powers of perception, capacity for visual analysis, and knowledge of technical processes.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program.

Students in historical studies are expected to demonstrate:

1. knowledge and awareness of art and/or film terminology and concepts;
2. ability to develop effective and nuanced lines of interpretation;
3. improved critical thinking skills using primary and secondary source materials;
4. improvement in analytical writing skills and close reading skills;
5. ability to form and validate their own and others' opinions through knowledge of artistic movements and sociohistorical events.

Students in creative art are expected to demonstrate:

1. enhanced awareness of the role of art in intellectual and cultural life;
2. problem solving skills to organize, analyze and interpret visual information;
3. mastery of techniques and materials of a discipline with awareness of historical and current practices;
4. selection of materials, processes, form, and content to achieve poetic and expressive relationships to artistic media;
5. ability to apply critical analysis to the student's own work and the work of others;
6. effective techniques for the preparation and presentation of work consistent with professional practices in the field.

## Learning Outcomes (Graduate)

The purpose of the master's programs is to further develop knowledge and skills in Art and Art History and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates in Art History (including Film and Media Studies) who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in their respective disciplines. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to knowledge in their fields and to interpret and present the results of their research.

## Iris and B. Gerald Cantor Center For Visual Arts

The Cantor Arts Center at Stanford University is a major resource for the department. The Cantor presents art from around the world in 24 galleries: from Africa to the Americas to Asia, and from ancient to contemporary periods. The Cantor offers changing selections from its 30,000-object collection; the Rodin Sculpture Garden; special exhibitions; and a variety of educational programs. Through collaborations with the teaching program, student internships, and student activities, the Cantor provides a rich resource for Stanford students.

## Art History

### Undergraduate Program in Art History

The discipline of Art History teaches students how to analyze and interpret works of fine art (paintings, drawings, prints, and sculpture), photography and moving image media (film, video, television, and digital art), material culture (ritual objects, fashion, advertisements, and the decorative, applied, and industrial arts), and the built environment (architecture, urbanism, and design). The department takes it as axiomatic that the skills of visual literacy and analysis are not innate but may be acquired through training and practice. Objects of study are drawn from the cultures of Africa, Asia, the Americas, from the Middle East; from Western, Central, and Eastern Europe; and from antiquity to the present.

Art History is a historical discipline that seeks to reintegrate the work of art into the original context of its making and reception, foregrounding its significant status as both historical document and act of social communication. At the same time, Art History seeks to understand the ways in which the work of art transcends the historical moment of its production, taking on different meanings in later historical periods, including the present. As part of their visual training, students of Art History become proficient in cultural analysis and historical interpretation. Art History thus envisions itself as uniquely well positioned to train students from a variety of disciplines in the light of the dramatic visual turn that has gripped the humanities and the sciences over the course of the last decade, with more and more disciplines becoming vitally interested in visual forms and modes of communication.

### Graduate Program in Art History

The doctoral program in Art History at Stanford is relatively small, and affords the graduate student the opportunity to work intensively with individual members of the faculty. The Doctor of Philosophy degree is taken in a particular field, supported by a background in the general history of art. Doctoral candidates also undertake collateral studies in other graduate departments or in one of the University's interdisciplinary programs.

## Art Practice (Studio)

### Undergraduate Program in Art Practice (Studio)

The Art Practice program offers production-based courses founded on the concepts, skills and cultural viewpoints that characterize contemporary art practice. The goal is to educate students, both majors and minors, in the craft, culture, and theory of current fine art practices to prepare them for successful careers as artists. The art practice program is designed to develop in-depth skills in more than one area of the visual arts. It emphasizes the expressive potential of an integration of media, often via a cross-disciplinary, interactive path. Through collaboration and connections with scientists, engineers, and humanities scholars, the program addresses a breadth of topical and artistic concerns central to a vital undergraduate education.

### Graduate Program in Painting, Sculpture, New Genres, and Photography

The program provides a demanding course of study designed to challenge advanced students. Participants are chosen for the program on the basis of work that indicates high artistic individuality, achievement, and promise. Candidates should embody the intellectual curiosity and broad interests appropriate to, and best served by, work and study within the University context.

## Film and Media Studies

### Undergraduate Program in Film and Media Studies

The Bachelor of Arts in Film and Media Studies provides an introduction to film aesthetics, history, national cinematic traditions, modes of production in narrative, documentary, and experimental films, the incorporation of moving image media by contemporary artists, and the proliferation of new forms of digital media. The program is designed to develop the critical vocabulary and intellectual framework for understanding the role of cinema and related media within broad cultural and historical concepts.

### Graduate Program in Documentary Film and Video

The Master of Fine Arts program in documentary production provides a historical, theoretical, and critical framework within which students master the conceptual and practical skills for producing nonfiction film and video. The M.F.A. is a terminal degree program with a two-year, full-time curriculum representing a synthesis of film praxis and film and media history, theory, and criticism. Courses provide an intellectual and theoretical framework within which students' creative work is developed. Students proceed through the program as a cohort. The program does not permit leaves of absence.

The M.F.A. degree is designed to prepare graduate students for professional careers in film, video, and digital media. Graduates are qualified to teach at the university level. The philosophy of the program is predicated on a paradigm of independent media that values artistic expression, social awareness, and an articulated perspective. Students become conversant with the documentary tradition as well as with alternative media and new directions in documentary. Training in documentary production is combined with the development of research skills in film criticism and analysis. Electives in film studies, art history, and studio art provide an intellectual and theoretical framework within which creative work is realized. The parallel focus on production and studies prepares students for an academic position that may require teaching both film studies and production.

## Art and Art History Department Course Catalog Numbering System

The first digit of the ARTHIST and FILMSTUD course number indicates its general level of sophistication.

Digit	Area
001-099	Introductory
100-199	Undergraduate level lectures
200-299	Undergraduate seminars/individual work
300-399	Graduate level lectures
400-599	Graduate seminars/individual work

### Art History

Digit	Area
001-099	Introductory
100-104	Ancient
105-109	Medieval
110-119	Renaissance
120-139	Early Modern
140-159	Modern
160-179	Contemporary
180-189	Asia
190-195	Africa and the Americas
200-299	Seminars and Colloquia
410-499	Historical Studies
500-599	Critical Studies
600-699	Graduate Research

### Art Practice (Studio)

Digit	Area
001-099	Courses for Non-Major (Lower Level)
100-199	Lower Level Undergraduate Courses
200-299	Upper Level Undergraduate Courses
300-399	Graduate Seminars

### Film and Media Studies

Digit	Area
004-103	Introductory
111-118	Genre
130-139	National Cinemas
140-149	Aesthetics
150-159	Other
220-299	Undergraduate Seminars
400-660	Graduate Seminars

### Film Production

Digit	Area
001-199	Undergraduate Courses
300-399	Graduate Courses
400-499	Graduate Courses for MFA Doc Film Students Only

# Bachelor of Arts in Art History

## Suggested Preparation for the Major

Students considering a major in art history should take either ARTHIST 1A Introduction to the Visual Arts: Prehistoric through Medieval or ARTHIST 1B Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present, during their freshman or sophomore year.

## Fields of Study or Degree Options

Students who wish to major in Art History must meet with the undergraduate coordinator. At that time the student selects a faculty adviser and declares the major on Axess. Concentrations within the major are approved by the student's major adviser and are not declared on Axess. Sample concentrations include:

1. Topical concentrations: art and gender; art, politics, race, and ethnicity; art, science, and technology; urban studies
2. Genre concentrations: architecture; painting; sculpture; film studies; prints and media; decorative arts and material culture
3. Historical and national concentrations: ancient and medieval; Renaissance and early modern; modern and contemporary; America; Africa; Asia; the Americas
4. Interdisciplinary concentrations: art and literature; art and history; art and religion; art and economics; art and medicine (with adviser consent a maximum of two concentration courses may be taken outside the department).

## Degree Requirements

All undergraduate majors complete a minimum of 65 units (15 courses that carry 4 or 5 units each). Students are required to complete four core courses, two seminar courses for the major (ARTHIST 294 Writing and the Visual: Photography and Truth and ARTHIST 296 Junior Seminar: Methods & Historiography of Art History), five Art History foundation courses, three concentration courses, one of which must be a seminar, and one Art Practice course (4 units). Courses must be taken for a letter grade. Completing a full year of ITALIC can count as an Art History elective. Majors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the major declaration.

## Required Courses

### 1. Core Courses (20 units)

Select four of the following:

ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval (meets WAY A-II and ED)	5
ARTHIST 1B	Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present (meets WAY A-II)	5
ARTHIST 2	Asian Arts and Cultures (meets WAY A-II)	5
ARTHIST 3	Introduction to World Architecture (meets WAY A-II)	5
FILMSTUD 4	Introduction to Film Study (meets WAY A-II)	5

### 2. Foundation Courses (20 units)

In order that students acquire a broad overview of different historical periods and different geographic regions, majors must take five Art History lecture courses, one from each of the following five categories:

Take one course from each of the following categories:

### Ancient and Medieval

Select one of the following:

ARTHIST 100N	The Artist in Ancient Greek Society (meets WAY A-II)	3
ARTHIST 101	Introduction to Greek Art I: The Archaic Period (meets WAY A-II)	4
ARTHIST 102	Introduction to Greek Art II: The Classical Period (meets WAY A-II)	4
ARTHIST 105B	Medieval Journeys: Introduction through the Art and Architecture	3-5
ARTHIST 106	Byzantine Art and Architecture, 300-1453 C.E.	4
ARTHIST 107B		4

### Renaissance and Early Modern

Select one of the following:

ARTHIST 121	18th-Century Art in Europe, ca 1660-1780	4
ARTHIST 122	The Age of Revolution: Painting in Europe 1780-1830	4
ARTHIST 126	Post-Naturalist Painting	4
ARTHIST 142A	The Architecture of Thought: Artists and Thinkers Design for Themselves	4

### Modern, Contemporary, and the U.S

Select one of the following:

ARTHIST 118A	Public Space in Iran: Murals, Graffiti, Performance	3-4
ARTHIST 143A	American Architecture	4
ARTHIST 144B	Modern Design from the Eiffel Tower to Yves Saint Laurent	4
ARTHIST 147	Modernism and Modernity	4
ARTHIST 151	Migration and Diaspora in American Art, 1800-Present	4
ARTHIST 155C	Abstract Expressionism: Painting/Modern/America	4
ARTHIST 156A	Warhol: Painting, Photography, Performance	4
ARTHIST 159B	American Photography Since 1960	5
ARTHIST 160	Intro to Contemporary Art	4
ARTHIST 160N	The Sisters: Poetry & Painting	3
ARTHIST 163	Queer America	4
ARTHIST 171		4
ARTHIST 176	Feminism and Contemporary Art	4

### Asia, Africa, and the Americas

Select one of the following:

Units		
ARTHIST 182B	Cultures in Competition: Arts of Song-Era China	4
ARTHIST 185	Arts of China in the Early Modern World, 1550-1800	4
ARTHIST 186	Theme and Style in Japanese Art	4
ARTHIST 186B	Asian American Art: 1850-Present	4
ARTHIST 187	Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868	4
ARTHIST 188B	From Shanghai Modern to Global Contemporary: Frontiers of Modern Chinese Art	4

### Film & Media Studies

Select one of the following:

FILMSTUD 4	Introduction to Film Study (meets WAY A-II)	5
FILMSTUD 6	Introduction to Media	5
FILMSTUD 100B	History of World Cinema II, 1930-1959 (meets WAY A-II)	4
FILMSTUD 100C	History of World Cinema III, 1960-Present (meets WAY A-II)	4

FILMSTUD 101	Fundamentals of Cinematic Analysis (meets WAY A-II)	4
FILMSTUD 102	Theories of the Moving Image (meets WAY A-II)	4
FILMSTUD 115	Documentary Issues and Traditions	4

### 3. Seminar Courses for Majors (10 units)

*Writing in the Major (5 units):* This course is designed for Art History majors in their junior year, equipping them with the scholarly tools necessary for writing about art in a variety of contexts as they progress through the major. This course fulfills the requirements of Writing in the Major (WIM).

*Capstone Junior Seminar (5 units):* This course is designed to introduce majors to methods and theories underlying the practice of Art History. The seminar is offered annually, typically during Autumn Quarter.

Take each of the following:

#### Writing in the Major

ARTHIST 294	Writing and the Visual: Photography and Truth (Required: WIM course)	5
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#### Capstone Junior Seminar

ARTHIST 296	Junior Seminar: Methods & Historiography of Art History	5
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### 4. Seminar Requirement (5 units)

The student needs one additional seminar course within his or her area of concentration.

Select one of the following:

ARTHIST 193	Jacob Lawrence's Twentieth Century: African American Art and Culture	5
ARTHIST 203	Artists, Athletes, Courtesans and Crooks (meets WAY A-II)	5
ARTHIST 208	Hagia Sophia	5
ARTHIST 208B	The Art of Medieval Spain: Muslims, Christians, Jews	5
ARTHIST 210	Giotto	5
ARTHIST 211	The California Missions: Art History and Reconciliation	5
ARTHIST 215C	What is Contemporary Art?	5
ARTHIST 217B	The Classical Theory of Architecture from Antiquity to the French Revolution	5
ARTHIST 243B	Photography and Time	5
ARTHIST 245	Art, Business & the Law	5
ARTHIST 278	Introduction to Curating	5
ARTHIST 287	Pictures of the Floating World: Images from Japanese Popular Culture	5
ARTHIST 287A	The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime	5

### 5. Area of Concentration (8-10 units)

The department encourages students to pursue their interests by designing an area of concentration tailored to their own intellectual concerns. This area of concentration provides the student with an in-depth understanding of a coherent topic in Art History and consists of three Art History courses: one must be a seminar, and two of the three courses must be in a single field or concentration constructed by the student in consultation with his or her faculty adviser. Students must submit an area of concentration form, signed by their faculty adviser, during Winter Quarter of the junior year.

### 6. Art Practice Course (4 units)

Majors are required to complete at least one introductory Art Practice course.

\*Consult an academic adviser if a course is not listed above.

## Honors Program in Art History

The purpose of the honors program is to extend and deepen work done in Art History classes. The honors thesis topic typically emerges out of prior course work; it should be focused and have clear parameters. Ordinarily, an honors thesis is not an exploration of an area that the student has never studied before.

### Admission to the Program

The minimum requirement for admission to the honors program is an overall GPA of 3.5, and at least 3.5 in Art History courses. Students must complete at least five Art History courses at Stanford by the end of their junior year, and four must be completed by the end of Winter Quarter; with the adviser's approval, two of these courses may be taken at an overseas campus or Stanford in Washington. Students interested in pursuing honors should consult a potential thesis adviser on the Art History faculty during the Autumn Quarter of junior year. Thesis advisers must be in residence during Autumn Quarter of the student's senior year, and it is recommended that they be in residence throughout the senior year. Students considering honors should contact the Director of the Honors Program in their junior year as soon as they begin to think about writing an honors thesis. Those wishing to do so must announce their intention to write an honors thesis by submitting an intent form signed by their thesis adviser (who need not be the student's academic adviser) by February 1 of their junior year.

Units

### Submission of the Thesis Proposal Package

Candidates for the honors program must submit a five-page (double-spaced) thesis proposal, including bibliography and illustrations, and one completed paper that demonstrates the student's ability to conceptualize and write cogently about art historical issues. The deadline for submitting the complete package to the department's undergraduate coordinator is the third week of Spring Quarter of the candidate's junior year. Upon approval by a majority of the faculty at its regular meeting in early May, the candidate is accepted into the honors program.

### Research and Writing of the Honors Thesis

Once admitted to the honors program, students work with the director of the honors program and their thesis adviser to define the scope of study, establish a research and writing timetable, and enlist one other faculty member, ideally but not necessarily in the Department of Art and Art History, to serve as a second reader. The summer between junior and senior years is usually devoted to refining the topic and pursuing any off-campus research. Students are encouraged to apply for UAR research grants (<https://undergrad.stanford.edu/opportunities/research>) to help finance trips or expenses related to research for their honors thesis.

During their senior year, students must register for 10 units of ARTHIST 297 Honors Thesis Writing, 5 units of which may count towards the student's concentration in Art History. Students are required to register for 2-5 units each quarter during their senior year, for a total of 10 units.

### Submission and Approval of the Honors Thesis

With the guidance of the director of the honors program, students and thesis advisers should plan their work so that a complete, final manuscript is submitted to the thesis adviser and the second reader by the beginning of the seventh week of the student's final quarter at Stanford. The thesis adviser assigns a letter grade; both the adviser and the second reader must approve the honors thesis in order to qualify the student to graduate with honors.



# Bachelor of Arts in Art Practice (Studio)

## Degree Requirements

All undergraduate majors complete a minimum of 65 units including six lower level courses, six upper level courses, and four art history courses, including the WIM course ARTHIST 294 Writing and the Visual: Photography and Truth. All courses must be taken for a letter grade and must pass with a letter grade of 'C' or better. Students are required to take upper level ARTSTUDI 230 Interdisciplinary Art Survey in their junior year and ARTSTUDI 249 Advanced Undergraduate Seminar in their senior year. University units earned by placement tests or advanced placement work in secondary school are not counted within the 65 units. The studio requirements are divided into lower level (introductory, 100 level) and upper level (advanced, 200 level) course work. At the lower level, students focus on a range of subject matter from historical motifs (figure, still life, landscape) to contemporary ideas in art. Upper level courses are designed to stretch the student's understanding of materials, techniques, site, and social relevance. Experimental and challenging in nature, these courses cross area boundaries. Completing a full year of ITALIC can count towards either one Art History elective or one lower level Art Practice course. Independent study supervised by a member of the permanent faculty is also available to the advanced student.

Students are encouraged to move through the requirements for the major in the sequence outlined. Students are exposed to a range of practices early in their development in order to have a good basis of comparison if they choose to focus on a particular medium. This sequence of courses also broadens the students' skills and enables them to combine materials and methods. In all courses, students are expected to pass mid-term and final reviews and critiques of their work.

To declare the major, students must meet with the undergraduate coordinator. At that time the student selects a faculty adviser. Art Practice majors are required to meet with both their adviser and the undergraduate coordinator during the first two weeks of each quarter to have course work approved and make certain they are meeting degree requirements. Majors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the major declaration.

Most art practice courses are studio-based, and there is a fee to support those studios and the class activity. Enrolled students are typically required to purchase their own supplies or materials depending on the medium of the class, and the scale of individual student work.

## Required Courses

### 1. Six lower level courses (24 units)

Select six of the following:

ARTSTUDI 130	Interactive Art: Making it with Arduino	4
ARTSTUDI 131	Sound Art I	4
ARTSTUDI 136	The Portable Studio	4
ARTSTUDI 140	Drawing I	4
ARTSTUDI 141	Plein Air Painting Now	4
ARTSTUDI 143		4
ARTSTUDI 145	Painting I	4
ARTSTUDI 147	Art Book Object	4
ARTSTUDI 148	Monotype	4
ARTSTUDI 148A	Lithography	4
ARTSTUDI 148B	Introduction to Printmaking	4
ARTSTUDI 148P	The Hybrid Print	4
ARTSTUDI 149C	Etching	4

ARTSTUDI 150Q	Queer Sculpture	4
ARTSTUDI 151	Sculpture I	4
ARTSTUDI 155	Social Sculpture	4
ARTSTUDI 156Q	Installation Art in Time and Space	4
ARTSTUDI 157	Art, Invention, Activism in the Public Sphere	4
ARTSTUDI 160	Intro to Digital / Physical Design	3-4
ARTSTUDI 162	Embodied Interfaces	4
ARTSTUDI 163	Drawing with Code	4
ARTSTUDI 164	DESIGN IN PUBLIC SPACES	4
ARTSTUDI 165	Social Media and Performative Practices	4
ARTSTUDI 167	Introduction to Animation	3-4
ARTSTUDI 168	Data as Material	4
ARTSTUDI 170	PHOTOGRAPHY I: BLACK AND WHITE	4
ARTSTUDI 171	PHOTOGRAPHY I: DIGITAL	3-4
ARTSTUDI 173E	Cell Phone Photography	4
ARTSTUDI 174B	Creativity in the Age of Facebook: Making Art for and from Networks	4
ARTSTUDI 176	Time Shifts	4
ARTSTUDI 177	Video Art I	4
ARTSTUDI 178	Art and Electronics	4
ARTSTUDI 179	Digital Art I	4
ARTSTUDI 181	From Dissection to Monster	4
ARTSTUDI 184	Art and Environmental Engagement	4

### 2. Six upper level courses (24 units):

a. ARTSTUDI 230 Interdisciplinary Art Survey is a required course which focuses on direct experiences of multidisciplinary art and art practices. ARTSTUDI 249 Advanced Undergraduate Seminar (8 units)

b. Students select four optional courses from the following list.

		Units
Select four of the following:		
ARTSTUDI 233	Let's Make a Monster: Critical Making	5
ARTSTUDI 236	Future Media, Media Archaeologies	3-4
ARTSTUDI 239	Intermedia Workshop	3-4
ARTSTUDI 240	Drawing II	4
ARTSTUDI 245	Painting II	4
ARTSTUDI 247	Collage	4
ARTSTUDI 252	Sculpture II	4
ARTSTUDI 253	ECOLOGY OF MATERIALS	4
ARTSTUDI 254	Kinetic Sculpture	4
ARTSTUDI 264	Advanced Interaction Design	4
ARTSTUDI 266	Sculptural Screens / Malleable Media	4
ARTSTUDI 267	Emerging Technology Studio	4
ARTSTUDI 270	Advanced Photography Seminar	1-5
ARTSTUDI 271	The View Camera	4
ARTSTUDI 275	PHOTOGRAPHY II: Digital	4
ARTSTUDI 276	The Photographic Book	4
ARTSTUDI 277	Project class: Digital and Analogue Projects in Photography	4
ARTSTUDI 277A	Video Art II	4
ARTSTUDI 278	Photography II: Black and White	4
ARTSTUDI 284	Art and Biology	4
ARTSTUDI 288	Documentary Photography	4

### 3. Four Art History courses (17-20 units)

ARTHIST 294 Writing and the Visual: Photography and Truth  
(Required: WIM course)

Three other art history courses, one must be from the modern art series.

One Film & Media Studies course may satisfy an Art History elective.

\*Consult an academic adviser if a course is not listed above.

### Transfer Credit Evaluation

Upon declaring an Art Practice major, a student transferring from another school must have his or her work evaluated by the Director of Undergraduate Studies (DUS) in Art Practice. A maximum of 13 transfer units are applied toward the 65 total units required for the major. A student wishing to have more than 13 units applied toward the major must submit a petition to the Director of Undergraduate Studies in Art Practice and then have his or her work reviewed by a studio committee.

### Overseas Study or Study Abroad

A minimum of 52 of the 65 units required for the Art Practice major and a minimum of 32 of the 36 units required for the Art Practice minor must be taken at the Stanford campus. A student must meet with his or her adviser and with the undergraduate coordinator before planning an overseas campus program.

### Honors Program in Art Practice

The purpose of the honors program is to extend and deepen work done in Art Practice classes. The honors thesis exhibition topic typically emerges out of prior course work. Ordinarily, an honors thesis exhibition is not an exploration of an area that the student has never studied before. Completion of the program is noted on the diploma and on the transcript

### Admission to the Program

The honors program is open to art practice majors only. The minimum requirement for admission to the honors program is an overall GPA of 3.5, and at least 3.5 in Art Practice courses. Students must complete at least five Art Practice courses at Stanford by the end of their junior year, and four must be completed by the end of Winter Quarter. With adviser approval, two of these courses may be taken at an overseas campus.

Students interested in pursuing honors should consult a potential thesis adviser on the Art Practice faculty during the Autumn Quarter of junior year. Thesis advisers must be in residence during Autumn Quarter of the student's senior year. Students considering honors should contact the Director of the Honors Program in their junior year. Those wishing to do so must announce their intention to write an honors thesis exhibition proposal by submitting an intent form signed by their thesis adviser, who need not be the student's academic adviser, by March 1 of their junior year.

### Submission of the Thesis Proposal Package

The thesis proposal package must include:

1. A two-page Honors Thesis Exhibition Project Proposal description of the artwork/project, including an outline of research and goals signed by the thesis adviser.
2. Artwork Samples: 10 JPEGs of recent work (scaled to 8"x 10", no larger than 1MB each) or 5 minutes of video/audio clips. If video/audio work only is submitted, it may consist of up to 15 minutes of clips. Upload via Slideroom application.
3. Artwork Sample Descriptions: List each artwork and descriptions of submitted artwork (title, date, medium, dimensions, length if applicable, explanation if needed). Upload via Slideroom application.
4. Course plan for senior year and copy of academic transcript.

### Research and Writing of the Honors Thesis

**Units** 5  
12-15

Once admitted to the honors program, students work with the director of the honors program and their thesis adviser to define the scope of study, establish a research and artwork completion timetable, and enlist one other faculty member, ideally but not necessarily on the Art Practice faculty, to serve as a second reader. The summer between junior and senior years is usually devoted to refining the topic and pursuing any off-campus research. Students are encouraged to apply for UAR research grants (<https://undergrad.stanford.edu/opportunities/research/get-funded/apply-uar-student-grants>) to help finance trips or expenses related to research for their honors thesis.

During their senior year, students must register for 10 units of ARTSTUDI 297 Honors Thesis Exhibition, 5 units of which may count towards the student's concentration in Art Practice. Students are required to register for 2-5 units each quarter during their senior year, for a total of 10 units.

### Submission and Approval of the Honors Thesis

With the guidance of the director of the honors program, students and thesis advisers should plan their work so that a complete art exhibition is installed in the first five weeks of Spring Quarter of their senior year with the Exhibitions Manager for the Department of Art and Art History. The student arranges a meeting with the advisers while the exhibition is on display. The thesis adviser assigns a letter grade; both the main adviser and the second adviser must approve the honors thesis in order to qualify the student to graduate with honors.

## Bachelor of Arts in Film and Media Studies

### Suggested Preparation for the Major

Students considering a major in film and media studies should take FILMSTUD 4 Introduction to Film Study, and are encouraged to take either ARTHIST 1A Introduction to the Visual Arts: Prehistoric through Medieval or ARTHIST 1B Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present, during their freshman or sophomore year. These courses anchor the major through exposure to film language, genre, and visual and narrative structures. Majors are required to take one course in the fundamentals of film and video production.

### Suggested or Recommended Courses (all of which meet major requirements)

		<b>Units</b>
ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval (meets WAY A-II and ED)	5
ARTHIST 1B	Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present (meets WAY A-II)	5
FILMSTUD 4	Introduction to Film Study (meets WAY A-II)	5
FILMSTUD 101	Fundamentals of Cinematic Analysis (meets WAY A-II)	4

### Fields of Study or Degree Option

Advanced undergraduate courses are offered in five fields of study. These fields are declared on ACESS; they appear on the transcript but they do not appear on the diploma:

- Film History
- Film and Culture
- Film, Media, and Technology
- Writing, Criticism, and Practice
- Aesthetics and Performance

Working with a faculty adviser, students choose five courses in their field from course offerings in Film and Media Studies and one course from another department in the University.

## Degree Requirements

All undergraduate majors complete a minimum of 64 units (16 courses of 3-5 units each), or 15 courses plus an honors thesis. FILMSTUD 102 Theories of the Moving Image (WIM course) is required for all majors. All courses for the major must be taken for a letter grade. To declare the major, students must meet with the undergraduate coordinator. At that time the student selects a faculty adviser. Majors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the major declaration.

## Required Courses

		Units
FILMSTUD 4	Introduction to Film Study (meets WAY A-II)	5
FILMSTUD 6	Introduction to Media	5
FILMSTUD 100A	History of World Cinema I, 1895-1929	4
FILMSTUD 100B	History of World Cinema II, 1930-1959 (meets WAY A-II)	4
FILMSTUD 100C	History of World Cinema III, 1960-Present (meets WAY A-II)	4
FILMSTUD 101	Fundamentals of Cinematic Analysis (WIM Course, meets WAY A-II)	4
FILMSTUD 102	Theories of the Moving Image (meets WAY A-II)	4
FILMPROD 114	Introduction to Film and Video Production (meets WAY CE)	5
Concentration <sup>1</sup>		
FILMSTUD 290	Movies and Methods: FILMS OF BURT LANCASTER <sup>2</sup>	5
Choose one of the following:		
ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval (meets WAY A-II and ED)	5
ARTHIST 1B	Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present (meets WAY A-II)	5

<sup>1</sup> Concentration: Five courses, four of which must be in a single film and media studies concentration developed by the student in consultation with an adviser. Concentration areas are: film history; film and culture; aesthetics and performance; film, media, and technology; and writing, criticism, and practice. The remaining course must be related, situating the student's concentration in a broader context.

<sup>2</sup> Capstone Experience: FILMSTUD 290 Movies and Methods: FILMS OF BURT LANCASTER, offered once a year. The Senior Seminar represents the culminating intellectual experience for Film Studies majors choosing not to write an honors thesis. Honors thesis writers may also take the senior seminar. Seniors who may not be in residence in the quarter that the senior seminar is offered may enroll in their junior year. Movies and Methods provides majors with an opportunity to synthesize their previous work in Film Studies and work in an advanced setting with a faculty member.

## Electives (20 units)

		Units
Film Studies Concentration Electives		
FILMSTUD 115	Documentary Issues and Traditions	4
FILMSTUD 119	Science Fiction: Cyborgs & Human Simulacra in the Cinema	4

FILMSTUD 125	Horror Films	4
FILMSTUD 127	Monster Movies: Frankenstein & Film	4
FILMSTUD 129	Animation and the Animated Film	4
FILMSTUD 132A	Indian Cinema	4
FILMSTUD 135	Around the World in Ten Films	4
FILMSTUD 232	CHINESE CINEMA	5
FILMSTUD 233	Let's Make a Monster: Critical Making	5
FILMSTUD 256	Horror Comics	5
FILMSTUD 259	Game Studies	5
FILMSTUD 245B	History and Politics in Russian and Eastern European Cinema	5
FILMSTUD 250B		4
FILMPROD 101T	Writing the Television Pilot	5
FILMPROD 103	Adaptation	4
FILMPROD 104	Screenwriting II: Intermediate Screenwriting	5
FILMPROD 105	Script Analysis	4

\*Consult an academic adviser if a course is not listed above.

## Honors Program in Film and Media Studies

The purpose of the honors program is to extend and deepen work done in Film and Media Studies classes. The honors thesis topic typically emerges out of prior coursework; it should be focused and have clear parameters. Ordinarily, an honors thesis is not an exploration of an area that the student has never studied before.

### Admission to the Program

The minimum requirement for admission to the honor program is an overall GPA of 3.5, and at least 3.5 in Film and Media Studies courses. Students must complete at least five Film and Media Studies courses at Stanford by the end of their junior year, and four must be completed by the end of Winter Quarter; with the adviser's approval, two of these courses may be taken at an overseas campus. Students interested in pursuing honors should consult a potential thesis adviser on the Film and Media Studies faculty during the Autumn Quarter of junior year. Thesis advisers must be in residence during Autumn Quarter of the student's senior year, and it is highly recommended that they be in residence throughout the senior year. Students considering honors should contact the director of the honors program in their junior year as soon as they begin to think about writing an honors thesis. Those wishing to do so must announce their intention to write an honors thesis by submitting an intent form signed by their thesis adviser (who need not be the student's academic adviser) by February 1 of their junior year.

### Submission of the Thesis Proposal Package

Candidates for the honors program must submit a five-page (double-spaced) thesis proposal, including bibliography, a tentative schedule for research and writing, and one completed paper that demonstrates the student's ability to conceptualize and write cogently about film. The deadline for submitting the complete package to the department's undergraduate coordinator is the third week of Spring Quarter of the candidate's junior year. Upon approval by a majority of the faculty at its regular meeting in early May, the candidate is accepted into the honors program.

### Research and Writing of the Honors Thesis

Once admitted to the honors program, students work with the director of the honors program and their thesis adviser to define the scope of study, establish a research and writing timetable, and enlist one other faculty member, ideally but not necessarily in the Department of Art and Art History, to serve as a second reader. The summer between junior and senior years is usually devoted to refining the topic and pursuing any off-campus research. Students are encouraged to apply for UAR

research grants to help finance trips or expenses related to research for their honors thesis.

During their senior year, students must register for 10 units of FILMSTUD 297 Honors Thesis Writing, 5 units of which may count towards the student's concentration in Film and Media Studies. Students are required to register for two to five units each quarter during their senior year, for a total of ten units.

### Submission and Approval of the Honors Thesis

With the guidance of the director of the honors program, students and thesis advisers should plan their work so that a complete, final manuscript is submitted to the thesis adviser and the second reader by the beginning of the seventh week of the student's final quarter at Stanford. The thesis adviser assigns a letter grade; both the adviser and the second reader must approve the honors thesis in order to qualify the student to graduate with honors.

### Required Course

	Units
FILMSTUD 297 Honors Thesis Writing	1-5

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

## Joint Major Program in Art Practice and Computer Science

### Art Practice Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Program (p. 278)" section of this bulletin for details on Computer Science requirements.

Students majoring in the Art Practice and Computer Science joint major program must complete five lower level courses and six upper level courses in art practice, and four art history courses, including the WIM course. Students in the JMP are excused from completing one lower level course, reducing the required unit count of the Art Practice major from 65 to 61 units. All courses comprising the major must be taken for a letter grade.

Most art practice courses are studio-based, and there is a fee to support those studios and the class activity. Enrolled students are typically required to purchase their own supplies or materials depending on the medium of the class, and the scale of individual student work.

Students majoring in the joint major program in Art Practice and Computer Science must complete the modified degree requirements for Art Practice by completing the following:

1. Five lower level courses (20 units)

a.		
	ARTSTUDI 130 Interactive Art: Making it with Arduino	4
	ARTSTUDI 131 Sound Art I	4
	ARTSTUDI 136 The Portable Studio	4
	ARTSTUDI 140 Drawing I	4

	ARTSTUDI 141 Plein Air Painting Now	4
	ARTSTUDI 143	4
	ARTSTUDI 145 Painting I	4
	ARTSTUDI 147 Art Book Object	4
	ARTSTUDI 148 Monotype	4
	ARTSTUDI 148A Lithography	4
	ARTSTUDI 148B Introduction to Printmaking	4
	ARTSTUDI 148P The Hybrid Print	4
	ARTSTUDI 149C Etching	4
	ARTSTUDI 150Q Queer Sculpture	4
	ARTSTUDI 151 Sculpture I	4
	ARTSTUDI 155 Social Sculpture	4
	ARTSTUDI 156Q Installation Art in Time and Space	4
	ARTSTUDI 157 Art, Invention, Activism in the Public Sphere	4
	ARTSTUDI 160 Intro to Digital / Physical Design	3-4
	ARTSTUDI 162 Embodied Interfaces	4
	ARTSTUDI 163 Drawing with Code	4
	ARTSTUDI 164 DESIGN IN PUBLIC SPACES	4
	ARTSTUDI 165 Social Media and Performative Practices	4
	ARTSTUDI 167 Introduction to Animation	3-4
	ARTSTUDI 168 Data as Material	4
	ARTSTUDI 170 PHOTOGRAPHY I: BLACK AND WHITE	4
	ARTSTUDI 171 PHOTOGRAPHY I: DIGITAL	3-4
	ARTSTUDI 173E Cell Phone Photography	4
	ARTSTUDI 174B Creativity in the Age of Facebook: Making Art for and from Networks	4
	ARTSTUDI 176 Time Shifts	4
	ARTSTUDI 177 Video Art I	4
	ARTSTUDI 178 Art and Electronics	4
	ARTSTUDI 179 Digital Art I	4
	ARTSTUDI 181 From Dissection to Monster	4
	ARTSTUDI 184 Art and Environmental Engagement	4

2. Six upper level courses (24 units) including:
  - a. ARTSTUDI 230 Interdisciplinary Art Survey (4 units) is a required course which focuses on direct experiences of multidisciplinary art and art practices
  - b. ARTSTUDI 249 Advanced Undergraduate Seminar ; majors must take this course for 4 units.

3. Students select four optional courses from the following list
  - a.

	ARTSTUDI 233 Let's Make a Monster: Critical Making	5
	ARTSTUDI 236 Future Media, Media Archaeologies	3-4
	ARTSTUDI 239 Intermedia Workshop	3-4
	ARTSTUDI 240 Drawing II	4
	ARTSTUDI 245 Painting II	4
	ARTSTUDI 247 Collage	4
	ARTSTUDI 252 Sculpture II	4
	ARTSTUDI 253 ECOLOGY OF MATERIALS	4
	ARTSTUDI 254 Kinetic Sculpture	3-4
	ARTSTUDI 264 Advanced Interaction Design	4
	ARTSTUDI 266 Sculptural Screens / Malleable Media	4
	ARTSTUDI 267 Emerging Technology Studio	4
	ARTSTUDI 270 Advanced Photography Seminar	1-5
	ARTSTUDI 271 The View Camera	4
	ARTSTUDI 275 PHOTOGRAPHY II: Digital	4
	ARTSTUDI 276 The Photographic Book	4

Units

ARTSTUDI 277	Project class: Digital and Analogue Projects in Photography	4
ARTSTUDI 277A	Video Art II	4
ARTSTUDI 278	Photography II: Black and White	4
ARTSTUDI 284	Art and Biology	4
ARTSTUDI 288	Documentary Photography	4

4. Four Art History courses (17-20 units)
  - a. ARTHIST 294 Writing and the Visual: Photography and Truth (5 units)
  - b. Three other Art History courses, one must be from the modern art series. One Film and Media Studies course may satisfy an Art History elective.
5. Senior Capstone Project

\*Consult an academic adviser if a course is not listed above.

The senior seminar (4 units) in conjunction with the computer science capstone course (3-5 units) enables students to produce a creative and in-depth senior capstone project that highlights the integration of the two disciplines. An adviser from each program guides and assesses the project throughout the academic year. The completed project is included in the Senior Exhibit.

Example capstone projects might include an interactive installation that combines various sensors with computer graphic techniques, a screen based artwork that requires sophisticated data visualization, a sculpture involving new forms of projection mapping, or a social media artwork integrating a new type of mobile application. These works would qualify as effective contemporary artworks, and also illustrate unique command of and innovations within the field of computer science.

## Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

## Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>). Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

## Transcript and Diploma

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

## Minor in Art History

A student declaring a minor in Art History must complete 25 units of course work in one of the following four tracks: Open, Modern, Asian, or Architecture. Courses must be taken for a letter grade. Upon declaring the minor, students are assigned a faculty adviser with whom they plan their course of study and electives. A proposed course of study must be approved by the adviser and placed in the student's departmental file. Only one class may be taken for credit outside of the Stanford campus; this includes courses taken in the Overseas Studies Program. Minors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of

research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the minor declaration.

## Degree Requirements

A student with a minor in Art History must complete six Art History courses for a total of 25 units.

Units

### Open Track

choose one of the following:

ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval
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ARTHIST 1B	Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present
------------	---

Plus five Art History lecture courses or seminars in any field.

### Modern Track

choose one of the following:

ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval
------------	---

ARTHIST 1B	Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present
------------	---

Plus five Art History lecture courses or seminars in any aspect of 19th- to 20th-century art.

### Asian Track

ARTHIST 2	Asian Arts and Cultures
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Plus five Art History lecture courses or seminars in Asian Art (ARTHIST 1A OR ARTHIST 1B may be one of the five courses).

### Architecture Track

ARTHIST 3	Introduction to World Architecture
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Plus five Art History lecture courses or seminars in Architectural History (ARTHIST 1A OR ARTHIST 1B may be one of the five courses).

## Minor in Art Practice (Studio)

A student declaring a minor in Art Practice must complete 36 units of Art Practice and Art History course work. Courses must be taken for a letter grade. All minors are required to attend an orientation session presented by the professional staff of the Art and Architecture Library, which introduces the tools of research and reference available on campus or through the internet. Minors are required to meet with both their adviser and the undergraduate coordinator during the first two weeks of each quarter to have course work approved and to make certain they are meeting degree requirements.

Most art practice courses are studio-based, and there is a fee to support those studios and the class activity. Enrolled students are typically required to purchase their own supplies or materials depending on the medium of the class, and the scale of individual student work.

## Degree Requirements

A student with a minor in Art Practice must complete nine courses for a total of 36 units.

1. Three lower level courses (12 units) selected from:
  - a.

Select three of the following:

12

ARTSTUDI 13	Interactive Art: Making it with Arduino (meets WAY CE)
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ARTSTUDI 13	Sound Art I (meets WAY CE)
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ARTSTUDI 13	The Portable Studio
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ARTSTUDI 14	Drawing I (meets WAY CE)
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Units

ARTSTUDI 14	Plein Air Painting Now	
ARTSTUDI 143		
ARTSTUDI 14	Painting I (meets WAY CE)	
ARTSTUDI 14	Art Book Object	
ARTSTUDI 14	Monotype	
ARTSTUDI 14	Photography	
ARTSTUDI 14	Introduction to Printmaking (meets WAY CE)	
ARTSTUDI 14	The Hybrid Print	
ARTSTUDI 14	Etching	
ARTSTUDI 15	Queer Sculpture	
ARTSTUDI 15	Sculpture I (meets WAY CE)	
ARTSTUDI 15	Social Sculpture	
ARTSTUDI 15	Installation Art in Time and Space	
ARTSTUDI 15	Art, Invention, Activism in the Public Sphere	
ARTSTUDI 16	Intro to Digital / Physical Design (meets WAY CE)	
ARTSTUDI 16	Embodied Interfaces	
ARTSTUDI 16	Drawing with Code	
ARTSTUDI 16	DESIGN IN PUBLIC SPACES	
ARTSTUDI 16	Social Media and Performative Practices	
ARTSTUDI 16	Introduction to Animation	
ARTSTUDI 16	Data as Material	
ARTSTUDI 17	PHOTOGRAPHY I: BLACK AND WHITE (meets WAY CE)	
ARTSTUDI 17	PHOTOGRAPHY I: DIGITAL	
ARTSTUDI 17	Cell Phone Photography (meets WAY CE)	
ARTSTUDI 17	Creativity in the Age of Facebook: Making Art for and from Networks (meets WAY CE)	
ARTSTUDI 17	Video Art I (meets WAY CE)	
ARTSTUDI 17	Art and Electronics (meets WAY CE)	
ARTSTUDI 17	Digital Art I (meets WAY CE)	
ARTSTUDI 18	From Dissection to Monster	
ARTSTUDI 18	Art and Environmental Engagement	

2. Three upper level courses (11 units):

a.		
	ARTSTUDI 230 Interdisciplinary Art Survey	4
b.		
	Select two of the following:	8
	ARTSTUDI 23 Intermedia Workshop	
	ARTSTUDI 24 Drawing II	
	ARTSTUDI 24 Painting II	
	ARTSTUDI 25 Sculpture II	
	ARTSTUDI 25 Kinetic Sculpture	
	ARTSTUDI 26 Advanced Interaction Design	
	ARTSTUDI 26 Sculptural Screens / Malleable Media	
	ARTSTUDI 27 Advanced Photography Seminar	
	ARTSTUDI 27 The View Camera	
	ARTSTUDI 27 Alternative Processes	
	ARTSTUDI 27 PHOTOGRAPHY II: Digital	
	ARTSTUDI 27 The Photographic Book	
	ARTSTUDI 27 Project class: Digital and Analogue Projects in Photography	
	ARTSTUDI 27 Video Art II	
	ARTSTUDI 27 Photography II: Black and White	
	ARTSTUDI 27 Digital Art II	

ARTSTUDI 28 Art and Biology

3. Three Art History Courses (13 units):

a.		
	Select one of the following:	5
	ARTHIST 1A Introduction to the Visual Arts: Prehistoric through Medieval (highly recommended)	
	ARTHIST 1B Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present (highly recommended)	
	Two other art history courses, one must be from the modern art series.	8-10

Courses may not be offered every year and are subject to change. Consult an academic adviser if a course is not listed above.

### Minor in Film and Media Studies

A minor in Film Studies requires four core courses and three elective courses for a total of seven courses. Courses must focus on film and use the method of film study towards completion of the minor; courses that use film to illustrate a cultural topic are not eligible. Courses must be taken for a letter grade. Studio Art courses may not be used towards the requirements.

Upon declaring the minor, students are assigned an adviser with whom they plan their course of study and electives. A proposed course of study must be approved by the adviser and placed in the student's departmental file. Only one class may be taken for credit outside the Stanford campus, including Stanford Overseas Studies programs. Minors are required to attend an orientation session presented by the professional staff of the Art & Architecture Library, which introduces the many tools of research and reference available on campus or through the Internet. This requirement should be completed no later than the quarter following the minor declaration.

### Degree Requirements

The minor in Film Studies requires seven courses for a minimum of 29 units.

Required Courses for the Minor

Units		Units
FILMSTUD 4	Introduction to Film Study (meets WAY A-II)	5
FILMSTUD 102	Theories of the Moving Image (meets WAY A-II)	4
	Select one of the following:	4
	FILMSTUD 100 History of World Cinema I, 1895-1929	
	FILMSTUD 100B History of World Cinema II, 1930-1959 (meets WAY A-II)	
	FILMSTUD 100I History of World Cinema III, 1960-Present (meets WAY A-II)	

One course in a national cinema or an additional course in film history 4-5

### Elective Courses for the Minor

Three elective courses. No more than one elective can be chosen from courses in another department, and only if it is approved by the Film Studies coordinator and core faculty for their stress on methods of film analysis. Electives may include courses in national cinemas, film genres, experimental and documentary film, or film theory.

Elective Courses		12-15
FILMSTUD 6	Introduction to Media	5
FILMSTUD 101	Fundamentals of Cinematic Analysis	4
FILMSTUD 115	Documentary Issues and Traditions	4

FILMSTUD 119	Science Fiction: Cyborgs & Human Simulacra in the Cinema	4
FILMSTUD 125	Horror Films	4
FILMSTUD 127	Monster Movies: Frankenstein & Film	4
FILMSTUD 129	Animation and the Animated Film	4
FILMSTUD 132A	Indian Cinema	4
FILMSTUD 135	Around the World in Ten Films	4
FILMSTUD 233	Let's Make a Monster: Critical Making	5
FILMSTUD 245B	History and Politics in Russian and Eastern European Cinema	5
FILMSTUD 250B		4
FILMSTUD 256	Horror Comics	5
FILMSTUD 259	Game Studies	5
FILMPROD 101T	Writing the Television Pilot	5
FILMPROD 103	Adaptation	4
FILMPROD 104	Screenwriting II: Intermediate Screenwriting	5
FILMPROD 105	Script Analysis	4
FILMPROD 114	Introduction to Film and Video Production (meets WAY CE)	5

Courses may not be offered every year and are subject to change. Consult an academic adviser if a course is not listed above.

## Coterminal Master of Arts in Art History

Stanford undergraduates, regardless of undergraduate major, who wish to pursue an M.A. in Art History may apply for the coterminal master's program. University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 46)" section of the Bulletin.

### Admission

Undergraduates must be admitted to the program and enrolled as a graduate student for at least one quarter prior to their B.A. conferral. A cumulative GPA of at least 3.5 in previous undergraduate work is required for admission; GRE test scores are not required. The department accepts applications once a year; the application deadline is January 16 for admission in the Spring Quarter immediately following. There are no exceptions to this deadline. The department does not fund coterminal M.A. students. To apply for admission to the Art History coterminal M.A. program, students must submit the Coterminal Online Application (<https://applyweb.com/stanterm>) and the following:

- Statement of Purpose (up to 1000 words, double-spaced);
- Current unofficial transcript;
- Coterminal Online Application (<https://applyweb.com/stanterm>);
- Preliminary Master's Program Proposal; this is a form in the application packet. Specify at least 45 units of course work relevant to the degree program with at least 40 units in Art History.
- Coterminal Course Approval Form (<https://stanford.box.com/v/Coterm-Course-Approval>): this form is required only if transferring courses from undergraduate to the graduate program at the time of application; students are allowed to transfer courses between their undergraduate and graduate careers for a limited time and are not allowed to transfer courses after the undergraduate degree has been conferred. To be eligible for transfer, courses must have been taken in the three quarters preceding admission to the M.A. program. No courses taken earlier than Autumn Quarter of sophomore year may count toward the M.A.
- Two letters of recommendation from Stanford faculty familiar with the student's academic work, one of which must be from an Art History faculty member.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

### Degree Requirements

Requirements for the coterminal master's degree program include the following:

- Coterminal M.A. students are required to take a minimum of 45 units of course work during their graduate career, of which at least 40 of these units must be in Art History courses (Note: One of these courses must be the art history methods graduate seminar; six of these courses may be Art History or Film Studies courses and must be at the 300-400 level).
- All units for the coterminal M.A. must be taken at or above the 100 level; advanced-level course work is encouraged and a minimum of 23 of the required 45 units must be taken at or above the 200 level.
- M.A. Qualifying paper (this paper can be developed from a seminar paper; it should be 20-25 pages in length inclusive of notes); the paper will be due in the last quarter of the coterm program.
- All courses taken for the Coterminal M.A. must be taken for a letter grade; achievement of an overall grade point average of 3.5 is required for the degree to be conferred.
- A faculty advisor appointed in the Department of Art & Art History in the first quarter of the Master's degree program.
- Students may transfer up to 10 units from their undergraduate career to count toward the M.A.; to be eligible for transfer, courses must have been taken in the three quarters prior to matriculation in the first graduate quarter of the M.A. program (please note that no courses taken earlier than Autumn quarter of sophomore year may count toward the M.A.).
- Undergraduate courses cannot be transferred for graduate credit after a student's B.A. is conferred.
- Submission of an approved Master's degree program proposal form by the last day of the first quarter of the Master's degree program.
- Students are responsible for knowing and adhering to University and Departmental policies, standards, and requirements for coterminal students.

## Master of Arts in Art History

University requirements for the M.A. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

### Admission

The department offers M.A. and Ph.D. degrees, although the M.A. is only granted as a step toward fulfilling requirements for the Ph.D. The department does not admit students who wish to work only toward the M.A. degree. Please see the Ph.D. section for admissions information.

### Degree Requirements

#### Units

Completing a total of at least 45 units of graduate work at Stanford in the history of art in courses at the 200 level and above, including a seminar in art historiography/visual theory.

#### Languages

Reading knowledge of at least one foreign language, preferably German, French or Italian. Students in Chinese and Japanese art are ordinarily expected to demonstrate reading competence in modern and classical Chinese or Japanese, depending on the student's area of focus. Final determination of which foreign languages will fulfill the requirement is made in consultation with the student's primary adviser.

#### Papers

Submission of one paper from among those written during the year that demonstrates depth of research and capacity to build an argument. The paper should be perfected under the supervision of a member of the department faculty.

#### Area Coverage

Demonstration to the faculty, by course work and/or examination, that the student has adequate knowledge of the major areas of the history of art represented in the department curriculum.

## Master of Fine Arts in Art Practice (Studio)

University requirements for the M.F.A. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

### Admission

The applicant must have a B.A., B.F.A. or B.S. from an accredited school. It is expected that the applicant will have a strong background in art practice, either an undergraduate degree or at least three years of independent studio practice. Students accepted to the program are admitted for the beginning of the following Autumn Quarter. No applicants for mid-year entrance are considered.

*Portfolio Specifications*—See the department's Graduate Admission (<https://art.stanford.edu/academics/graduate-programs/masters-program/how-apply>) web site for portfolio requirements.

### Fields of Study or Degree Options

Fields of study for the M.F.A. degree are offered in Painting, Sculpture, New Genres, and Photography. These fields of study are not declared on Axxess; they are not printed on the transcript or the diploma.

### Degree Requirements

#### Residency

Completing a minimum of two years (six academic quarters) of graduate work in residence at Stanford.

### Units

The student must complete 48 units of study. Students must discuss their programs of study with their academic adviser and the department's student services manager to ensure that an appropriate program of study is chosen.

### Seminar Requirement

Six quarters (36 units), which includes one (Spring) or two weekly seminars (Autumn and Winter) and Studio Practice, as well as an individual tutorial with a selected member of the faculty; all seminars must be taken for a letter grade.

#### First Year Seminar Requirements

		Units
ARTSTUDI 342A	MFA: Object Seminar (2 units per quarter- Autumn and Winter)	4
ARTSTUDI 342B	MFA: Concept Seminar (2 units per quarter- Autumn and Winter)	4
ARTSTUDI 342C	M.F.A Seminar	2
ARTSTUDI 342	MFA Project: Tutorial (1 unit per quarter)	3

#### Second-Year Seminar Requirements

ARTSTUDI 342A	MFA: Object Seminar (4 units per quarter- Autumn and Winter)	8
ARTSTUDI 342B	MFA: Concept Seminar (4 units per quarter- Autumn and Winter)	8
ARTSTUDI 342C	M.F.A Seminar	2
ARTSTUDI 342	MFA Project: Tutorial (1 unit per quarter)	3

### Elective Requirement

Three courses of academic electives (12 units) are required in the first year. These courses can be chosen from a large variety of disciplines in consultation with the Director of Graduate Studies. All electives must be approved by the DGS prior to enrollment and must be taken for a letter grade unless a letter grade option is not offered.

### Faculty Reviews

The student is expected to pass four formal academic reviews conducted by the faculty. The purpose of these reviews is to evaluate development and to assess the progress of the student.

- At the end of the first quarter, any student judged to be making inadequate progress is placed on probation and requires an additional review at the end of the second quarter.
- At the end of the third quarter, at which time recommendation to proceed to the second year is determined.
- At the start of the fifth quarter. If the review is not satisfactory the student is placed on probation and an additional review is scheduled at the end of the 5th quarter.
- At the time of the M.F.A. exhibition.

### Thesis

The thesis consists of two portions: an exhibition at the end of the final quarter, and a written paper addressing the development of work completed over the two-year period at Stanford, to be completed during the fifth quarter. Both the written portion and participation in the M.F.A. exhibition at the end of the year are required.

### Graduate Student Teaching

Regardless of their source of funding, students are required to assist with the department's teaching program for a minimum of eight hours per week over the period of six quarters; the particulars of this assignment are at the department's convenience.



The Department reserves the right to make use of graduate paintings, sculptures, and photographs in exhibitions serving the interests of the graduate program.

Graduate students must remain in residence at Stanford for the duration (six academic quarters) of the program.

## Master of Fine Arts in Documentary Film and Video

University requirements for the M.F.A. are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

### Admission

The program requires residency for two consecutive years. The admissions committee seeks applicants who have some work experience beyond their undergraduate years and can articulate why they want to learn documentary film and video production. The committee looks for evidence of the likelihood of success in a rigorous academic program that emphasizes creative work. The conceptual and technical skills required for documentary work are sufficiently different from fictional narrative to make the Stanford program inappropriate for students interested in narrative filmmaking. The program does not allow for deferred admission or a mid-year enrollment.

### Portfolio

The department requires a film or video work for which the applicant has had creative control. The sample work must be well labeled and accompanied by a brief synopsis, running time of the clips, the circumstances of production, and the applicant's role. Total running time for the work sample should not exceed 15 minutes and may consist of more than one project. Work on which the applicant had only a production assistant role is not appropriate for submission. Student work, however, is appropriate for consideration. Applicants who have had only minimal film or video production experience should submit an example of their best creative work in any medium.

Portfolio Specifications—See the department's Graduate Admission (<https://art.stanford.edu/academics/graduate-programs/mfa-documentary-film-and-video/mfa-documentary-film-and-video-admissions>) web site for portfolio requirements.

### Fields of Study or Degree Options

Fields of study for the M.F.A. degree are offered in Documentary Film.

### Degree Requirements

#### Residency

Completing two years (six quarters) of graduate work in residence at Stanford.

#### Units

A minimum of 76 units is required for the M.F.A. degree. In the production core, students are required to conceptualize and visualize their ideas in a series of writing and producing courses that focus on documentary story structure. These courses are taken in tandem with project-based production courses that provide training in the technical and conceptual aspects of cinematography, sound recording, and editing. Discussion of form and content is a signature component of the writing and production courses. The production core is complemented by a series of required film studies courses in documentary plus elective courses in the history, aesthetics, ideology, and theory of all genres of moving image media. All courses must be taken for a letter grade.

#### M.F.A. Thesis Project

In the second year of the program, each student produces a 15-20 minute documentary that constitutes the thesis project. In FILMPROD 405

Producing Practicum, students research and develop their project and write a proposal for submission. A project may not begin production until the written proposal has been approved. Most of the production and post-production occurs (in Winter and Spring quarters) in FILMPROD 406A and FILMPROD 406B.

		Units
FILMPROD 406A	Documentary M.F.A. Thesis Seminar I	4
FILMPROD 406B	Documentary M.F.A. Thesis Seminar II	4

### Required Courses

1. Core Production courses (32 units); core courses must be taken in sequence.

		Units
FILMPROD 400	Film/Video Writing and Directing	4
FILMPROD 401	Nonfiction Film Production	4
FILMPROD 402	Digital Video	4
FILMPROD 403	Advanced Documentary Directing	4
FILMPROD 404	Advanced Video Production	4
FILMPROD 405	Producing Practicum	4
FILMPROD 406A	Documentary M.F.A. Thesis Seminar I	4
FILMPROD 406B	Documentary M.F.A. Thesis Seminar II	4

2. Core Film Studies courses (16 units)

		Units
FILMSTUD 302	Theories of the Moving Image	4
FILMSTUD 315	Documentary Issues and Traditions	4
FILMSTUD 316	International Documentary	4
FILMSTUD 410	Documentary Perspectives I	4

3. Electives (to be chosen in consultation with the student's adviser)

	Units
Art History—one course	4
Studio Art and/or Communications—two courses	8
Film Studies—three courses	12
Choice Elective—one course	4

## Doctor of Philosophy in Art History

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin. An expanded explanation of department requirements is given in the Art History Graduate Student Handbook.

### Admission

In addition to University requirements, the department requires a research paper of approximately 15-20 pages demonstrating the student's capacity to pursue independent investigation of an art historical problem as part of the application. All applicants must have been awarded a B.A., B.F.A., or B.S. from an accredited university.

### Degree Requirements

To be eligible for the doctoral degree, the student must complete a minimum of three years of full-time graduate work in Art History, at least two years of which must be in residence at Stanford. Doctoral students must complete a minimum of 135 units. Of these 135, the student must complete at least 100 units of graduate course work at the 200 level or above, including all required courses, with a minimum of 62 units in Art History lecture courses and seminars.

## 1. Collateral Studies

The student is required to take at least three courses in supporting fields of study (such as anthropology, classics, history, literature, or philosophy), determined in consultation with the department advisers. These courses are intended to strengthen the student's interdisciplinary study of art history.

## 2. Distribution Requirements

There are seven areas of distribution: 1) Pre-Modern (Ancient & Medieval), 2) Early Modern (Renaissance/Baroque), 3) 18th Century & 19th Century, 4) Modern/Contemporary, 5) Film and Media Studies, 6) Non-Western: Asia, Africa & Oceania, 7) Architectural History. Students must take at least one course in each of five different areas outside of the student's area of concentration. Students are required to fulfill the distribution requirement in graduate seminars. If students have entered the Stanford program with an M.A., they may transfer courses taken at the graduate level to fulfill up to two areas of the distribution requirement.

## 3. Language Requirement

Students in Western Art must demonstrate reading knowledge of two foreign languages. Students in Asian Art are required to demonstrate competence in one Asian language (equivalent to three years of study) and at least one year of study in a second (which may be a classical version of Chinese or Japanese). One of the language requirements should be satisfied by the end of the first year while the second should be fulfilled by the end of the second year. Students entering with a M.A. should already have satisfied one language requirement prior to admission. Foreign language requirements for the Ph.D. are fulfilled by taking the reading examination given each quarter by the various language departments.

## 4. Graduate Student Teaching

As a required part of their training, graduate students in Art History, regardless of their source of funding, must participate in the department's teaching program.

- a. Students are required to take ARTHIST 405A Graduate Pedagogy Course.
- b. Students are required to serve as a teaching assistant for a minimum of four quarters. Further opportunities for teaching may be available.
- c. At least one quarter assignment in a course from the following list:
  - i

ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval	5
ARTHIST 1B	Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present	5
ARTHIST 2	Asian Arts and Cultures	5
ARTHIST 3	Introduction to World Architecture	5
FILMSTUD 4	Introduction to Film Study	5

## 5. Admission to Candidacy

A graduate student's progress is formally reviewed at the end of Spring Quarter of the second year. The applicant for candidacy must assemble a candidacy file showing that he/she has completed the requirements governing the M.A. program in the History of Art (see above), and an additional 18-24 units by the end of Winter Quarter of the second year. The graduate student does not become a formal candidate for the Ph.D. degree until he/she has fully satisfied these requirements and has been accepted as a candidate by the department faculty.

## 6. The Qualifying Exam

The qualifying exam, ideally to be taken in the Winter Quarter of the student's third year of Ph.D. study, consists of a written and oral

component. These parts are administered on separate days during the same week, with the written part taking place first. Both parts of the exam are graded on a system of High Pass/Pass/Fail. If a student fails one or both parts of the exam, the student is allowed to retake that portion or portions of the exam that s/he has failed. For a detailed account of the format of the written and oral exams, see the graduate student handbook for the Department of Art and Art History. To prepare for the exam, students must enroll in up to two 5-unit reading course, one per quarter:

ARTHIST 620 Qualifying Examination Preparation 5

## 7. Dissertation Colloquium

- a. Each student holds a preliminary intensive conversation with her/his dissertation committee in May or June of the third year. Faculty on leave or out of town are expected to Skype in for the meeting. For that meeting, the student produces a 5-page paper (an early version of the prospectus) that the committee must have read before the meeting.
- b. The purpose of the meeting is to give the student good direction and good momentum going into a summer of prospectus writing—a summer in which the student may be taking a dissertation-writing workshop.
- c. The student must be ready to submit the prospectus for the consideration of the full art history faculty at either the October or November faculty meetings in the student's fourth year.

## 8. Dissertation and Oral Defense Requirements

- a. *Reading Committee:* After passing the Qualifying Exam, each student is responsible for the formation of a dissertation reading committee consisting of a principal adviser, who chairs the reading committee, and two other readers. Normally, both readers are drawn from the department; however, it is possible for one of the readers to be drawn from outside the department. Alternatively, a student may choose to add a fourth reader—from within or outside the department.
- b. *Dissertation Proposal:* By the beginning of Autumn Quarter in the fourth year, students should have identified a dissertation subject and written a proposal in consultation with their principal adviser. To prepare the proposal, students may take:
  - i one 5-unit independent study course:
  - ii

Units ARTHIST 640 Dissertation Proposal Preparation 5

- iii and apply for a funded Summer Quarter to research and write the proposal. The proposal is submitted for approval by the Art History faculty at the beginning of the fourth year for comments. In the event that a proposal is not approved, the faculty establishes conditions for its resubmission and reconsideration at a later date.
- iv There is a required review (via Skype or in person) of the first chapter completed.
- c. *Dissertation:* The final draft of the dissertation must be in all the readers' hands at least four weeks before the date of the oral defense. The dissertation must be completed within five years from the date of the student's admission to candidacy for the Ph.D. degree. A candidate taking more than five years must apply for an extension of candidacy.
- d. *Oral Defense Examinations:* The oral examination consists mainly of a defense of the dissertation but may range, at the committee's discretion, over a wider field. The student is expected to discuss research methods and findings at some length and to answer all questions and criticisms put by members of the examining committee. At the end of the defense, the committee votes to pass or fail the student on the defense. The committee may make recommendations for changes in the dissertation manuscript

Units

before it is submitted to the University as the final requirement for the granting of the Ph.D. degree in the History of Art. After these changes have been incorporated, the manuscript is given a final review and approval by the student's principal adviser.

## Ph.D. Minor in Art History

For a minor in Art History, a candidate is required to complete 24 units of graduate-level Art History courses (300 level or above); all courses must be taken for a letter grade.

*Emeriti:* (Professors) Kristina Branch, Wanda M. Corn, David Hannah, Joel Leivick, Suzanne Lewis, Michael Marrinan, Dwight C. Miller, Kristine Samuelson, Paul V. Turner, Bryan Wolf

*Chair:* Alexander Nemerov

*Area Director for Art History:* Alexander Nemerov

*Area Director for Film and Media Studies:* Pavle Levi

*Area Director for Art Practice:* Gail Wight

*Director of Undergraduate Studies in Art History:* Jody Maxmin

*Director of Undergraduate Studies in Art Practice:* Terry Berlier

*Director of Undergraduate Studies in Film and Media Studies:* Usha Iyer

*Director of Graduate Studies in Art History:* Nancy Troy

*Director of Graduate Studies in Art Practice:* Xiaoze Xie

*Director of Graduate Studies in Documentary Film:* Jamie Meltzer

*Director of Honors Program:* Adam Tobin

*Writing Specialist:* Gabrielle Ann Moyer (Lecturer, Program in Writing and Rhetoric)

*Professors:* Scott Bukatman (Film Studies), Enrique Chagoya (Painting/Drawing/Printmaking), Paul DeMarinis (Electronic Media), Jan Krawitz (Documentary Film), Pamela M. Lee (Contemporary Art), Richard Meyer (American Art), Alexander Nemerov (American Art), Nancy J. Troy (Modern Art), Richard Vinograd (Chinese Art), Xiaoze Xie (Painting/Drawing)

*Associate Professors:* Terry Berlier (Sculpture), Pavle Levi (Film Studies), Jean Ma (Film Studies), Jody Maxmin (Ancient Art), Jamie Meltzer (Documentary Film), Karla Oeler (Film Studies), Bissera Pentcheva (Medieval Art), Gail Wight (Electronic Media)

*Assistant Professors:* Fabio Barry (Architectural History), Jonathan Calm (Photography), Shane Denson (Film Studies), Usha Iyer (Film Studies), Srdan Keca (Documentary Film), Marci Kwon (American Art), Camille Utterback (Design)

*Senior Lecturer:* Adam Tobin (Screenwriting)

*Lecturers:* Robert Dawson (Photography), Yvette Deas (Painting and Drawing), Jamil Hellu (Photography), Lukas Felzmann (Photography), Jenny Odell (Experimental Media/Design), Sarah Peck (Photography)

*Andrew W. Mellon Postdoctoral Fellow:* Shawon Kinew

## Overseas Studies Courses in Art History

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBBER 17	Split Images: A Century of Cinema	3-4
OSPBBER 60	Cityscape as History: Architecture and Urban Design in Berlin	5
OSPFLOR 34	The Virgin Mother, Goddess of Beauty, Grand Duchess, and the Lady: Women in Florentine Art	4
OSPFLOR 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition	4
OSPFLOR 54	High Renaissance and Mannerism: the Great Italian Masters of the 15th and 16th Centuries	4
OSPFLOR 58	Space as History: Social Vision and Urban Change	4
OSPFLOR 111Y	From Giotto to Michelangelo: The Birth and Flowering of Renaissance Art in Florence	4
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4
OSPMADRD 45	Women in Art: Case Study in the Madrid Museums	4
OSPPARIS 54	The Artist's World: The Workshop, Patronage and Public in 19th and 20th Century France	4
OSPPARIS 72	The Ceilings of Paris	4
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4

## Overseas Studies Courses in Art Practice

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPFLOR 41	The Florentine Sketchbook: A Visual Arts Practicum	4
OSPFLOR 55	Academy of Fine Arts: Studio Art	1-5
OSPFLOR 71	A Studio with a View: Drawing, Painting and Informing your Aesthetic in Florence	4
OSPMADRD 46	Drawing with Four Spanish Masters: Goya, Velazquez, Picasso and Dali	4
OSPPARIS 42	EAP: Drawing with Live Models	2
OSPPARIS 43	EAP: Painting and Use of Color	2
OSPPARIS 44	EAP: Analytical Drawing and Graphic Art	2

## Overseas Studies Courses in Film

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 17	Split Images: A Century of Cinema	3-4
OSPFLOR 11	Film, Food and the Italian Identity	4
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
OSPFLOR 67	The Celluloid Gaze: Gender, Identity and Sexuality in Cinema	4

# ARTS INSTITUTE

The Stanford Arts Institute offers interdisciplinary arts curricula and research programs, drawing on the wide-ranging intellectual resources of Stanford University. The Institute forges arts connections across the University; gives grants for faculty, staff, and students; presents arts events; incubates new arts projects; and supports artists and cultural groups across campus. Since its founding in 2006, the Stanford Arts Institute has been a catalyst helping the Stanford arts community to grow.

Courses offered by the Stanford Arts Institute are listed under the subject code ARTSINST (<http://explorecourses.stanford.edu/search?q=ARTSINST&view=catalog&page=0&academicYear=&collapse=&filter-catalognumber-ARTSINST=on&filter-coursestatus-Active=on&filter-departmentcode-ARTSINST=on&filter-catalognumber-ARTSINST=on>) on the Stanford Bulletin's ExploreCourses web site.

## Honors in the Arts

Web site: <https://arts.stanford.edu/for-students/academics/honors-in-the-arts/>

(Information concerning the 2018-19 program will be available on February 1, 2018.)

The Stanford Arts Institute offers the interdisciplinary Honors in the Arts program, which is open to undergraduates in all majors.

- Stanford students in any major can complete a capstone project integrating their major studies with a broad arts perspective.
  - For students majoring in arts disciplines, this involves incorporating multiple arts disciplines into their work.
  - For students majoring in a non-arts discipline, capstone projects incorporate themes, discourse, or learnings from a student's major along with arts practice or research.

Honors in the Arts can be completed in addition to honors work in a student's home department or alongside another capstone program (such as the Senior Reflection in Biology (<http://web.stanford.edu/~suemcc/TSR>)).

## Admission

Honors in the Arts is open to students majoring in any field with an overall GPA of 3.67 or better. Students with demonstrated strengths relevant to the program may petition the GPA requirement at the time of application.

Students are required to take at least three courses identified as preparing them to execute an interdisciplinary capstone project. These courses should be in either an art practice area relevant to the capstone project or should explore the methodology of interdisciplinary arts study. A sample list of courses can be found on the Arts Institute web site. It is recommended that students complete at least two of these courses prior to entering the program. However, upon approval of the program director, students may take these courses while pursuing their honors project. Courses are typically at least 2 units and must be taken for a letter grade.

## How to Apply

Admission to the program is competitive. Students apply for entry into the program during the Spring Quarter of their junior year. The application includes:

Eligibility requirements include:

- Stanford senior during the academic year following the Spring Quarter application

- Effective for applicants to the 2017-18 program, the minimum GPA is 3.25. For applicants to the 2016-17, a minimum overall GPA of 3.67 was required. However, applicants may submit a petition for consideration if the GPA falls below the minimum.
- Completion of at least three creative or artistic courses that prepare the student to execute an interdisciplinary capstone project

Application materials include:

- Capstone project proposal which addresses the following:
  - a. the concept for the interdisciplinary capstone project or research
  - b. a description of the student's background in the disciplines to be drawn upon for the project
  - c. a statement of how the Honors in the Arts workshops will help in the development of the project
  - d. a statement of the relevance of Honors in the Arts to the student's education at Stanford and beyond
- Unofficial transcript
- Name and contact information for a faculty member who can provide a reference upon request
- At least one creative work sample
  - If the proposal will be enhanced by visual, audio, or other media, the committee accepts the following file formats: up to 8 images (compiled in a single PDF file), 5 minutes of video or audio, PDFs, and linked external media (such as YouTube, Vimeo, and SoundCloud). If these limits present a significant obstacle, contact Rebecca Struch ([rstruch@stanford.edu](mailto:rstruch@stanford.edu)).

See the Honors in the Arts web site (<https://arts.stanford.edu/for-students/academics/honors-in-the-arts/>) for additional information on applying to the program

## Preparation for Honors in the Arts

Students wishing to receive Honors in the Arts must take at least three courses identified as preparing them to execute an interdisciplinary capstone project. Students should choose courses that provide a foundation in the artistic disciplines relevant to your proposed project. Students should plan to complete at least two of these courses prior to entering the program. However, upon approval of the program director, students may take these courses while pursuing their Honors project.

The Creativity Course Guide (<https://arts.stanford.edu/for-students/creativity-course-guide>) includes courses that provide an introduction to the study of the arts disciplines as well as incorporating the arts in an interdisciplinary context.

## Requirements

Students admitted to the program are required to take the following sequence of courses during their senior year:

- Each Spring, students present their capstone projects during a public symposium.
- Prior to Spring Quarter, junior year: Two preparatory courses for interdisciplinary study, 4-8 Units
- Prior to Spring Quarter, junior year, concurrent with Capstone: Preparatory course for interdisciplinary study, 2-4 Units
- Winter Quarter, junior year: Apply for admission to Interdisciplinary Arts Honors
- Spring Quarter, junior year: Confirm preparatory courses with honors program director
- Autumn Quarter, Senior Year: ARTSINST 200A Honors in the Arts Workshop (2 units)
- Winter Quarter, Senior Year: ARTSINST 200B Honors in the Arts Workshop (2 units)

- Spring Quarter, Senior Year: ARTSINST 200C Honors in the Arts Workshop (2 units)

## Capstone Projects

All accepted projects are eligible for modest financial support. The capstone project is developed during the senior year through three quarters of workshops.

Through a yearlong process, students develop a capstone project that goes beyond the traditional boundaries of their major.

- Capstone projects are typically creative projects involving an arts practice element. Capstone projects may also be scholarly research projects involving a multidisciplinary approach.
- For individual students majoring in arts disciplines, this involves incorporating multiple arts disciplines into their work.
- For individual students majoring in a non-arts discipline, capstone projects incorporate themes, discourse, or learnings from a student's major along with arts practice or research.
- Effective for the 2017-18 academic year, students can apply with an individual or team-based project. For team-based projects (2-5 students per team), students explore art's role in social justice, climate change, and new creative economies. Examples of possible team-based projects might include devising a new intervention into the education-to-prison pipeline using art as a primary mode of communication, or devising an arts-based curriculum or community project round climate change involving collaborations with geologists, engineers, urban studies scholars, or economists. Students may also choose to propose a topic of their own.
- Students must receive at least an 'A-' on the capstone project. Students receiving a grade of less than an 'A-' but greater than 'NP' receive credit for the workshops but do not receive honors.
- *Mentors:* Each student works closely with two mentors, one academic mentor from the student's home department and one creative mentor, to develop and shape the capstone project. Students are responsible for selecting their own mentors and setting up regular meetings throughout the academic year. Mentors do not need to be finalized or confirmed at the time of application.

## New York City Arts Immersion

The Stanford Arts Institute offers an Arts Immersion trip to New York City during Spring Break, March 24 - 31, 2018.

Students travel with Stanford faculty and Arts Institute staff for a week-long engagement with the arts, meeting institutional leaders, policy makers, and arts practitioners. They visit museums, galleries, concert halls; they see dance rehearsals, opera, and a Broadway show; and they have a chance to meet with alumni in the arts. In the spring quarter class ARTSINST 11Q Art in the Metropolis, students revisit their immersion experience by reading critical literature and participating in rigorous discussion.

See the Arts Immersion (<https://arts.stanford.edu/for-students/academics/arts-immersion>) web site and subscribe to the Arts Update (<https://arts.stanford.edu/for-students/artsupdate>) for information about upcoming information sessions in Autumn 2017.

## Admission

Applications are welcomed from all undergraduate class years. Before applying, students should be aware that they must enroll in and attend the Spring Quarter course: ARTSINST 11Q/TAPS 11Q .

Submit a complete application through the Introductory Seminars (<https://vcais.stanford.edu>) web site or visit the Arts Immersion (<https://arts.stanford.edu/for-students/academics/arts-immersion>) web site. Applications are due by 11:59 p.m. on December 1, 2017.

## Important Dates

- Application Period: September 1—December 1, 2017 at 11:59 pm
- Acceptance Notification: Friday, December 15, 2017
- Travel to New York: Saturday, March 24—Saturday, March 30, 2018
- ARTSINST 11Q Art in the Metropolis, Spring 2018, Thursdays, 12 - 2:50 pm

## Creative Cities

Creative Cities is a year-long arts fellowship program inviting visiting scholars to examine the role of art in cities. The fellowship fosters research, conversation, and artistic projects in urban settings.

## Courses

Each year the fellows offer unique, interdisciplinary courses in their respective areas of research. Courses are open to all undergraduate students.

		<b>Units</b>
ARTSINST 182	Activating Urban Spaces: Materializing Hidden Narratives in the Urban Environment	3-4
ARTSINST 184	Creativity: Anatomy of a Buzzword	4

ARTSINST/TAPS Art in the Metropolis (required)  
11Q

**Units**  
3

# ASTRONOMY

Astronomy courses are offered primarily through the Physics department, with subject code PHYSICS on the Stanford Bulletin's ExploreCourses website.

Although Stanford University does not have a degree program in astronomy or astrophysics, teaching and research in various branches of these disciplines are ongoing activities in the departments of Applied Physics, Physics, SLAC National Accelerator Laboratory, and Hansen Experimental Physics Laboratory (HEPL).

For the convenience of students interested in astronomy, astrophysics, and cosmology, a course program for undergraduate and graduate study is listed in the "Astronomy Cognate Courses (p. 407)" section of this bulletin. The list includes introductory courses for the student who wishes to be informed about the fields of astronomy without the need for prerequisites beyond high school algebra and physics. Courses in astronomy numbered below 100 are designed to serve this group of students. Astronomy courses numbered 100-199 serve the student interested in an initial scientific study of astronomy. The courses numbered 200 and above are for graduate students and advanced undergraduates, subject to prior approval by the course instructor.

## Undergraduate Programs in Astronomy

The University does not offer a separate undergraduate major in Astronomy. Students who intend to pursue graduate study in astronomy or space science are encouraged to major in physics, following the advanced sequence if possible, or in electrical engineering if the student has a strongly developed interest in radioscience. The course descriptions for these basic studies are listed under the appropriate department sections of this bulletin. Students desiring guidance in developing an astronomy-oriented course of study should contact the chair of the Astronomy Program Committee. The following courses are suitable for undergraduates and are recommended to students considering advanced study in astronomy or astrophysics:

		Units
PHYSICS 100	Introduction to Observational Astrophysics	4
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 161	Introduction to Cosmology and Extragalactic Astrophysics	3
GS 222	Planetary Systems: Dynamics and Origins	3-4
Students planning study in astronomy beyond the B.S. are urged to take:		
PHYSICS 262	General Relativity	3

The above-mentioned courses are required for physics majors who choose the curriculum with a concentration in astrophysics (see the "Physics (p. 683)" section of this bulletin).

### Stanford Student Observatory

The student observatory, located in the hills to the west of the campus, is equipped with a 24-inch and other small reflecting telescopes. It is used for instruction of the observation-oriented courses, PHYSICS 50 Astronomy Laboratory and Observational Astronomy and PHYSICS 100 Introduction to Observational Astrophysics.

The Department of Physics offers a minor in Physics with a concentration in Astronomy.

## Minor in Physics with Concentration in Astronomy

Students wishing to pursue advanced work in astrophysical sciences should major in Physics (p. 685) and concentrate in astrophysics. However, students outside of Physics with a general interest in astronomy may organize their studies by completing one of the following Physics minor concentration programs.

Students who take the 20, 40, or 60 series at Stanford in support of their major may count those units towards the minor.

An undergraduate Physics minor with a concentration in Astronomy requires the following courses:

### Non-Technical

For students whose majors do not require the PHYSICS 40 or 60 series:

		Units
PHYSICS 21	Mechanics, Fluids, and Heat	4
PHYSICS 23	Electricity, Magnetism, and Optics	4
PHYSICS 25 & PHYSICS 26	Modern Physics and Modern Physics Laboratory	5
PHYSICS 50	Astronomy Laboratory and Observational Astronomy	3-4
or PHYSICS 100	Introduction to Observational Astrophysics	
Select two of the following:		6
PHYSICS 15	Stars and Planets in a Habitable Universe	
PHYSICS 16	The Origin and Development of the Cosmos	
PHYSICS 17	Black Holes and Extreme Astrophysics	

### Technical

For students whose majors require the PHYSICS 40 or 60 series:

		Units
Select one of the following Series:		14-17
Series A		
PHYSICS 41	Mechanics	
PHYSICS 43	Electricity and Magnetism	
PHYSICS 45 & PHYSICS 46	Light and Heat and Light and Heat Laboratory	
PHYSICS 70	Foundations of Modern Physics	
Series B		
PHYSICS 61	Mechanics and Special Relativity	
PHYSICS 63	Electricity, Magnetism, and Waves	
PHYSICS 65	Quantum and Thermal Physics	
PHYSICS 67	Introduction to Laboratory Physics	
And take the following three courses:		
PHYSICS 100	Introduction to Observational Astrophysics	4
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 161	Introduction to Cosmology and Extragalactic Astrophysics	3
Total Units		24-27

Students are also encouraged to take the electricity and magnetism/optics lab of the appropriate PHYSICS series, PHYSICS 24, PHYSICS 44 or PHYSICS 64 for 1 additional unit.

## Graduate Programs in Astronomy

Graduate programs in astronomy and astrophysics and related topics are carried out primarily in the Department of Physics but also the

departments of Applied Physics and Electrical Engineering. Students should consult the course listings, degree requirements, and research programs of these departments for more detailed information.

Graduate research opportunities are available in many areas of theoretical and observational astronomy. For further information, see the Kavli Institute of Particle Astrophysics and Cosmology (<http://kipac.stanford.edu>) website.

#### Students planning to conduct research in astronomy and astrophysics should take:

Select one of the following:	3
PHYSICS 361 Cosmology	
PHYSICS 362 Advanced Extragalactic Astrophysics and Cosmology ((Not offered 2017-18))	

#### Students lacking a background in astrophysics, gravitation, and plasma physics should take:

PHYSICS 260 Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 261 Introduction to Cosmology and Extragalactic Astrophysics	3
PHYSICS 262 General Relativity	3
PHYSICS 312 Basic Plasma Physics (Not offered 2017-18)	3

#### Students with special interests in gravitation should take:

PHYSICS 364 Advanced Gravitation (Not offered 2017-18)	3
GS 222 Planetary Systems: Dynamics and Origins	3-4

Each year a number of "special topics" course are offered. Refer to courses in the PHYSICS 360 range for more details. Students interested in research programs in space physics involving spacecraft studies of the planets, their satellites, and their near-space environments should see the "Center for Space Science and Astrophysics (p. 850)" section of this bulletin.

*Emeriti: (Professors)* Von R. Eshleman, Peter A. Sturrock, G. Leonard Tyler, Robert V. Wagoner

*Professors:* Tom Abel (Physics, SLAC), Steve Allen (Physics, SLAC), Roger Blandford (Physics, SLAC), Pat Burchat (Physics), Blas Cabrera (Physics), Sarah Church (Physics), Kent Irwin (Physics, SLAC), Steven Kahn (Physics, SLAC), Bruce Macintosh (Physics), Peter Michelson (Physics), Vahé Petrosian (Physics, Applied Physics), Roger W. Romani (Physics)

*Associate Professors:* Chao-Lin Kuo (Physics, SLAC), Risa Wechsler (Physics, SLAC)

*Professor (Research):* Philip H. Scherrer (Physics)

## Astronomy Cognate Courses

### Elementary Lectures

The following courses provide a descriptive knowledge of astronomical objects and astrophysics. PHYSICS 15, PHYSICS 16, and PHYSICS 17 are for students not majoring in the sciences and are taught in different quarters by different instructors, and may be taken individually or in any order.

		Units
PHYSICS 15	Stars and Planets in a Habitable Universe	3
PHYSICS 16	The Origin and Development of the Cosmos	3
PHYSICS 17	Black Holes and Extreme Astrophysics	3

### Observatory

The following courses allow students to use the on-campus Stanford Student Observatory, and are intended to familiarize students with

observational methods and analysis of astronomical data. PHYSICS 50 is for general students, while PHYSICS 100 involves more advanced observations and is intended for students with a college level background in physics.

		Units
PHYSICS 50	Astronomy Laboratory and Observational Astronomy	3
PHYSICS 100	Introduction to Observational Astrophysics	4

### Advanced Undergraduate

The following courses are for students with a more advanced knowledge of basic physics and mathematics, and form the core courses for a concentration in astrophysics for Physics majors.

		Units
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 161	Introduction to Cosmology and Extragalactic Astrophysics	3

### Graduate

		Units
PHYSICS 260	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 261	Introduction to Cosmology and Extragalactic Astrophysics	3
PHYSICS 262	General Relativity	3
PHYSICS 269	Neutrinos in Astrophysics and Cosmology	3
PHYSICS 301	Astrophysics Laboratory	3
PHYSICS 312	Basic Plasma Physics (Not offered 2017-18)	3
PHYSICS 361	Cosmology	3
PHYSICS 362	Advanced Extragalactic Astrophysics and Cosmology (Not offered 2017-18)	3
PHYSICS 366	Special Topics in Astrophysics: Statistical Methods	2
PHYSICS 368	Computational Cosmology and Astrophysics ((Not Offered 2017-18))	2



# BIOLOGY, HOPKINS MARINE STATION

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Courses offered by the Hopkins Marine Station are listed under the subject code BIOHOPK on the Stanford Bulletin's ExploreCourses web site.

The Hopkins Marine Station, located 90 miles from the main University campus in Pacific Grove, was founded in 1892 as the first marine laboratory on the west coast of North America. The modern laboratory facilities on the 11-acre campus on Cabrillo Point house nine faculty, all members of the Department of Biology. The Miller Library has a collection of literature in marine science. The Hopkins faculty offers undergraduate and graduate courses in biology which focus on the marine realm and involve topics including oceanography, environmental and comparative physiology, molecular evolution, biomechanics, cellular biology, conservation biology, and neurobiology and behavior. Most courses have laboratory sections that exploit the potential of working with readily available marine plants and animals. Small class sizes encourage close student-faculty interactions. Undergraduates have opportunities to carry out research projects with Hopkins faculty during the academic year or summer months.

Courses at Hopkins Marine Station can satisfy many requirements, from Ways to major and minor requirements in departments housed in the Schools of Engineering, Humanities and Sciences, and Earth, Energy, and Environmental Sciences. Students are encouraged to check with their department's student services office to see which courses at Hopkins may be used to fulfill major or minor requirements.

## Summer Program at Hopkins Marine Station

The summer program is open to advanced undergraduate, graduate students, and postdoctoral students, and to teachers whose biological backgrounds, teaching, or research activities can benefit from a summer's study of marine life. Applications, deadlines, and further information are available at the Hopkins Marine Station (<http://hopkins.stanford.edu>) web site.

*Emeriti Professors:* David Epel, George N. Somero

*Director:* Mark W. Denny

*Professors:* Barbara A. Block, Larry Crowder, Giulio De Leo, Mark W. Denny, William F. Gilly, Fiorenza Micheli, Stephen R. Palumbi, Stuart H. Thompson

*Associate Professor:* Christopher Lowe

*Assistant Professor:* Jeremy A. Goldbogen

*Lecturer:* James Watanabe

# BIOLOGY

Courses offered by the Department of Biology are listed under the subject code BIO on the Stanford Bulletin's ExploreCourses web site.

The department provides:

- a major program leading to the B.S. degree
- a minor program
- a coterminal program leading to the M.S. degree
- a doctoral program leading to the Ph.D. degree, and
- courses designed for the non-major.

## Mission of the Undergraduate Program in Biology

The mission of the undergraduate program in Biology is to provide students with in-depth knowledge in the discipline, from molecular biology to ecology. Students in the program learn to think and analyze information critically, to draw connections among the different areas of biology, and to communicate their ideas effectively to the scientific community. The major exposes students to the scientific process through a set of core courses and electives from a range of subdisciplines. The Biology major serves as preparation for professional careers, including medicine, dentistry, veterinary sciences, teaching, consulting, research, and field studies.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to use discipline-specific tools and content knowledge to analyze and interpret scientific data, to evaluate the significance of the data, and to articulate conclusions supportable by the data.
2. the ability, independently and collaboratively, to formulate testable scientific hypotheses and to design approaches to obtain data to test the respective hypotheses.
3. the ability to communicate content understanding and research outcomes effectively using various media.

## Mission of the Graduate Program in Biology

For graduate-level students, the department offers resources and experience learning from and working with world-renowned faculty involved in research on ecology, neurobiology, population biology, plant and animal physiology, biochemistry, immunology, cell and developmental biology, genetics, and molecular biology.

The M.S. degree program offers general or specialized study to individuals seeking biologically oriented course work, and to undergraduate science majors wishing to increase or update their science background or obtain advanced research experience.

The training for a Ph.D. in Biology is focused on learning skills required to be a successful research scientist and teacher, including how to ask important questions and then devise and carry out experiments to answer these questions. Students work closely with an established advisor and meet regularly with a committee of faculty members to ensure that they understand the importance of diverse perspectives on experimental questions and approaches. Students learn how to evaluate critically pertinent original literature in order to stay abreast of scientific progress in their areas of interest. They also learn how to

make professional presentations, write manuscripts for publication, and become effective teachers.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Biology and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Biology. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Biology and to interpret and present the results of such research.

## Facilities

The offices, labs, and personnel of the Department of Biology are located in the Gilbert Biological Sciences, Herrin Laboratories, Herrin Hall, James H. Clark Center, Lorry I. Lokey Laboratory, and Jerry Yang and Akiko Yamazaki Environment and Energy (Y2E2) buildings. Along with the Carnegie Institution of Washington all are on the main campus. Jasper Ridge Biological Preserve (JRBP) is located near Stanford University's campus in the eastern foothills of the Santa Cruz Mountains. Hopkins Marine Station is on Monterey Bay in Pacific Grove.

Jasper Ridge Biological Preserve encompasses geologic, topographic, and biotic diversity within its 1,189 acres and provides a natural laboratory for researchers from around the world, educational experiences for students and docent-led visitors, and refuge for native plants and animals. See the JRBP (<http://jrpb.stanford.edu>) web site.

Hopkins Marine Station, located 90 miles from the main University campus in Pacific Grove, was founded in 1892 as the first marine laboratory on the west coast of North America. For more information, including courses taught at Hopkins Marine Station with the subject code BIOHOPK, see the "Hopkins Marine Station (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/biology/%20/schoolofhumanitiesandsciences/biologyhopkinsmarinestation>)" section of this bulletin.

The department's large collections of plants (Dudley Herbarium), fish, reptiles, and amphibians, as well as smaller collections of birds, mammals, and invertebrates, are housed at the California Academy of Sciences in San Francisco, where they, and extensive collections of the Academy, are available to those interested in the systematics of these groups. Entomological collections, restricted to those being used in particular research projects, are housed in the Herrin Laboratories. No general collections are maintained except for teaching purposes.

The Robin Li and Melissa Ma Science Library (<http://library.stanford.edu/libraries/science/about>), located in the Sapp Center for Science Teaching and Learning, supports research and teaching for the Department of Biology and other related disciplines. A specialized library is maintained at Hopkins Marine Station.

## Biology Course Numbering System

The department uses the following course numbering system:

Number	Level
000-099	Introductory and Foundations
100-199	Undergraduate
200-299	Advanced Undergraduate, Coterminal and PhD
300+	PhD

## Bachelor of Science in Biology

The undergraduate major in Biology can serve as a stepping-stone for a wide variety of career opportunities. For students planning to attend medical, dental, or veterinary school, or graduate school in biological and applied sciences, the biology major provides a strong foundation in the basic life sciences. This foundation of knowledge, plus laboratory experience, also prepares students well for research and technical positions in universities, government, and industry.

While a major in Biology provides an excellent background for these technical careers, it can also serve as a valuable and satisfying focus of a liberal arts education for those not planning careers in science-related fields. An understanding of basic biological principles is of increasing importance in today's world. A knowledgeable and concerned citizenry is the best guarantee that these issues will be resolved most effectively. Finally, an understanding of the processes of life can heighten our perception and appreciation of the world around us, in terms of its beauty, variety, and uniqueness.

### Advising

Members of the Biology faculty are available for advising on such academic matters as choice of courses, research, suggested readings, and career plans. The student services office maintains a current list of faculty advisors, advising availability, and research interests.

The student services staff and BioBridge (<https://biology.stanford.edu/academics/undergraduate-program/advising/biobridge-peer-advising>), the department's peer advising group, are prepared to answer questions on administrative matters, such as requirements for the major, approved out-of-department electives, transfer course evaluations, and petition procedures. This office also distributes the department's Bachelor of Science Handbook (<https://stanford.app.box.com/v/bs-handbook>), which delineates policies and requirements, as well as other department forms and informational handouts.

Each undergraduate interested in the Biology major is required to select a department faculty advisor as part of the major declaration process.

### Degree Requirements

Candidates for the general Biology B.S. degree must complete the following requirements, which ranges from 88-102 total units. There is also an option to add honors to the major, regardless of whether a student wishes to complete the general major or a specific field of study. Honors requirements are explained in detail in the "Honors (<https://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/biology/#honorstext>)" tab. Requirements for specific fields of study are explained in the "Fields of Study (p. 412)" tab.

#### Introductory Course

(must be taken for a letter grade):

Select one of the following:

BIO 60	Introduction to Problem Solving in Biology
BIO 61	Science as a Creative Process
BIO 62	Experimental strategy and the bacterial world

Units

4

#### Foundational Courses

(must be taken for a letter grade):

Select 5 of the following:

BIO 81	Introduction to Ecology
or BIOHOPK 81	Introduction to Ecology
BIO 82	Genetics

Units

20

BIO 83	Biochemistry & Molecular Biology
BIO 84	Physiology
or BIOHOPK 84	Physiology
BIO 85	
or BIOHOPK 85	Evolution
BIO 86	Cell Biology

#### Foundational Lab Courses

Two Courses Required:

BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology	4
BIO 46	Introduction to Research in Ecology and Evolutionary Biology	4-5
or BIO 47	Introduction to Research in Ecology and Evolutionary Biology	
or BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology	

Units

#### Required Foundational Breadth Courses

(One course from this section may be taken credit/no credit):

		Units
<b>Chemistry</b>		
The following CHEM courses are required:		
CHEM 31A & CHEM 31B or CHEM 31X	Chemical Principles I and Chemical Principles II Chemical Principles Accelerated	5-10
CHEM 33	Structure and Reactivity of Organic Molecules	5
CHEM 35	Organic Chemistry of Bioactive Molecules	5
<b>Mathematics</b>		
Select one of the following options:		5-10
MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus	
MATH 51	Linear Algebra and Differential Calculus of Several Variables (or beyond)	
CME 100	Vector Calculus for Engineers	
<b>Physics</b>		
Select one of the following Series:		10-12
PHYSICS 20 Series		
PHYSICS 21	Mechanics, Fluids, and Heat	
PHYSICS 22	Mechanics, Fluids, and Heat Laboratory	
PHYSICS 23	Electricity, Magnetism, and Optics	
PHYSICS 24	Electricity, Magnetism, and Optics Laboratory	
PHYSICS 40 Series		
PHYSICS 41	Mechanics	
PHYSICS 43	Electricity and Magnetism	
PHYSICS 45	Light and Heat	
<b>Statistics</b>		
Select one of the following courses:		3-5
BIO/STATS 141	Biostatistics <sup>1</sup>	
BIOHOPK 174H	Experimental Design and Probability <sup>1</sup>	
STATS 60	Introduction to Statistical Methods: Precalculus	
Total Units		33-47

<sup>1</sup> If taken to fulfill the foundational breadth requirement, these courses do not count toward the 23 elective unit requirement.

## Electives

23 units required, distributed as follows:

- Biology (BIO) or Hopkins Marine Station (BIOHOPK) courses numbered 100 or above.
- Approved out-of-department electives (<https://stanford.app.box.com/v/out-of-department-electives>) (list also available in the student services office).
- No more than 6 units from any combination of these courses may be applied toward the total number of elective units:

BIO 196A	Biology Senior Reflection	3
BIO 196B	Biology Senior Reflection	3
BIO 196C	Biology Senior Reflection	3
BIO 197WA	Senior Writing Project: The Personal Essay in Biology	3
BIO 198	Directed Reading in Biology	1-15
BIO 198X	Out-of-Department Directed Reading	1-15
BIO 199	Advanced Research Laboratory in Experimental Biology	1-15
BIO 199W	Senior Honors Thesis: How to Effectively Write About Scientific Research	3
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology	1-15
BIO 290	Teaching of Biology	1-5
BIO 291	Development and Teaching of Core Experimental Laboratories	1-2
BIO 296	TA Training in Biology	1
BIOHOPK 198H	Directed Instruction or Reading	1-15
BIOHOPK 199H	Undergraduate Research	1-15
BIOHOPK 290H	Teaching of Biological Science	1-15

- One course applied toward the elective unit requirement may be taken CR/NC.

## Writing in the Major

Students must take one of the following courses to fulfill the Writing in the Major requirement in Biology:

BIO 46	Introduction to Research in Ecology and Evolutionary Biology
BIO 47	Introduction to Research in Ecology and Evolutionary Biology
BIO 107	Human Physiology Laboratory
BIO 168	Explorations in Stem Cell Biology
BIO 196A	Biology Senior Reflection
BIO 197WA	Senior Writing Project: The Personal Essay in Biology
BIO 199W	Senior Honors Thesis: How to Effectively Write About Scientific Research
BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems

Note: BIO 107, BIO 137, BIO 168, BIO 196A, BIO 197WA, BIO 199W, and BIOHOPK 172H can also count toward the elective requirement.

## Typical Schedule for a Four-Year Program

First Year	Units		
	Autumn	Winter	Spring
Chemical Principles I (CHEM 31A)		5	
Calculus (MATH 19)		3	

Freshman requirements, seminars, or WAYS	8		
Chemical Principles II (CHEM 31B)		5	
Calculus (MATH 20)		3	
Introduction to Problem Solving in Biology (BIO 60)		4	
Freshman requirements, seminars, or WAYS	4		
Structure and Reactivity of Organic Molecules (CHEM 33)		5	
Calculus (MATH 21)		4	
Introduction to Statistical Methods: Precalculus (STATS 60)		5	
Freshman requirements, seminars, or WAYS	4		
<b>Year Total:</b>	<b>16</b>	<b>16</b>	<b>18</b>

Second Year	Units		
	Autumn	Winter	Spring
Genetics (BIO 82)		4	
Organic Chemistry of Bioactive Molecules (CHEM 35)		5	
WAYS, PWR		8	
Biochemistry & Molecular Biology (BIO 83)		4	
Physiology (BIO 84)		4	
Introduction to Laboratory Research in Cell and Molecular Biology (BIO 45)		4	
WAYS		4	
Cell Biology (BIO 86)		4	
Introduction to Research in Ecology and Evolutionary Biology (BIO 47)		4	
WAYS		3	
Biology Electives		3	
<b>Year Total:</b>	<b>17</b>	<b>16</b>	<b>14</b>

Third Year	Units		
	Autumn	Winter	Spring
Abroad (BIO 85)			
Electives		4	
WAYS		4	
Electives		7	
<b>Year Total:</b>		<b>8</b>	<b>7</b>

Fourth Year	Units		
	Autumn	Winter	Spring
Electives	3		
Mechanics, Fluids, and Heat (PHYSICS 21)	4		
Mechanics, Fluids, and Heat Laboratory (PHYSICS 22)	1		
Electives		3	
Electricity, Magnetism, and Optics (PHYSICS 23)		4	
Electricity, Magnetism, and Optics Laboratory (PHYSICS 24)		1	
Electives			3
<b>Year Total:</b>	<b>8</b>	<b>8</b>	<b>3</b>

Total Units in Sequence: 131

- 1 This schedule varies slightly if the student takes CHEM 31X in place of CHEM 31A & CHEM 31B.
- 2 The schedule varies slightly depending on which 5 Bio Foundations courses the student chooses to take, and if any of them will be taken at Hopkins Marine Station.

## Honors

To graduate with departmental honors, a student must conduct an independent research project typically over the course of at least one year; projects are started no later than Autumn or Winter Quarter of the junior year. Research must be done in a Biology Department lab or a lab in another department for which the student has obtained prior approval. Administrative steps include:

1. Submit an approved honors proposal to the department's student services office two quarters prior to graduation. For instance, students graduating Spring Quarter must submit petitions no later than mid-Autumn Quarter.
2. Complete at least 10 units of an approved research project in from the same lab. Students conducting research in a lab outside of the department of Biology must submit an Out of Department Research Petition (<https://stanford.app.box.com/v/198x-199x-petition>) either before they start their research, or if research was started prior to declaring the Biology major, as soon as their major declaration is approved. Only research units from BIO or BIOHOPK are counted toward the 10 unit requirement:

BIO 199	Advanced Research Laboratory in Experimental Biology	1-15
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology	1-15
BIOHOPK 199H	Undergraduate Research	1-15

3. Obtain at least a 3.0 (B) grade point average (GPA) in all Biology major requirements taken at Stanford (foundational, breadth, and elective courses). Grades earned from teaching and research are not computed into this GPA:

BIO 198	Directed Reading in Biology	1-15
BIO 198X	Out-of-Department Directed Reading	1-15
BIO 199	Advanced Research Laboratory in Experimental Biology	1-15
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology	1-15
BIO 290	Teaching of Biology	1-5
BIO 291	Development and Teaching of Core Experimental Laboratories	1-2
BIO 296	TA Training in Biology	1
BIOHOPK 199H	Undergraduate Research	1-15
BIOHOPK 290H	Teaching of Biological Science	1-15

4. If graduating in Spring, participate in the annual Achauer Undergraduate Biology Honors Symposium by presenting a poster or giving an oral presentation. The symposium is typically at the end of May. Students graduating in Autumn, Winter, or Summer Quarter must produce a poster in the quarter in which they graduate to be displayed at the symposium.
5. Complete and, by the published deadline within the quarter graduation is expected, submit online an honors thesis approved by at least two readers. At least one reader must be from the faculty of the Department of Biology and both readers must be Academic Council members. The title page of the honors thesis must include student name, thesis title, name and department of research sponsor, and name and department of second reader. Students must submit this page with original ink signatures to the student services office by the published deadline for the quarter in which graduation is expected.

Further information on the honors program is available in the student services office in Gilbert 108, as well as on the Honors Program and Undergraduate Research in Biology (<https://biology.stanford.edu/academics/undergraduate-program/honors-program>) web site.

## Fields of Study

In addition to the undergraduate general major, the department offers the following seven fields of study for students wishing to concentrate their studies in particular areas of biology:

1. Biochemistry and Biophysics

2. Computational Biology
3. Ecology and Evolution
4. Marine Biology
5. Microbes and Immunity
6. Molecular, Cellular, and Developmental Biology
7. Neurobiology

These fields of study are declared on Axxess at the time of the major declaration; they appear on both the transcript and on the diploma.

## Writing in the Major for the B.S. Degree in Biology with a Field of Study

Students must take one of the following courses to fulfill the Writing in the Major requirement in Biology:

BIO 46	Introduction to Research in Ecology and Evolutionary Biology
BIO 47	Introduction to Research in Ecology and Evolutionary Biology
BIO 107	Human Physiology Laboratory
BIO 168	Explorations in Stem Cell Biology
BIO 196A	Biology Senior Reflection
BIO 197WA	Senior Writing Project: The Personal Essay in Biology
BIO 199W	Senior Honors Thesis: How to Effectively Write About Scientific Research
BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems

*Note:* BIO 107, BIO 137, BIO 168, BIO 196A, BIO 197WA, BIO 199W, and BIOHOPK 172H can also count toward the elective requirement.

## Biochemistry and Biophysics

Candidates for the Biochemistry and Biophysics field of study must complete the following, as well WIM requirement above, for a total ranging from 90-102 units:

### Introductory Course

(must be taken for a letter grade):

Select one of the following:

	Units
BIO 60	Introduction to Problem Solving in Biology
BIO 61	Science as a Creative Process
BIO 62	Experimental strategy and the bacterial world

### Foundational Courses

(must be taken for a letter grade):

All of the following:

	Units
BIO 82	Genetics
BIO 83	Biochemistry & Molecular Biology
BIO 84	Physiology
or BIOHOPK 84	Physiology
BIO 86	Cell Biology

Select 1 of the following:

	Units
BIO 81	Introduction to Ecology
or BIOHOPK 81	Introduction to Ecology
BIO 85	

or BIOHOPK 85 Evolution

### Foundational Lab Courses

Two Courses Required:

BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology	4
BIO 46	Introduction to Research in Ecology and Evolutionary Biology	4-5
or BIO 47	Introduction to Research in Ecology and Evolutionary Biology	
or BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology	

### Required Foundational Breadth Courses

(One course from this section may be taken credit/no credit):

#### Chemistry

The following CHEM courses are required:

CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	5-10
or CHEM 31X	Chemical Principles Accelerated	
CHEM 33	Structure and Reactivity of Organic Molecules	5
CHEM 35	Organic Chemistry of Bioactive Molecules	5

#### Mathematics

Select one of the following options: 5-10

MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus	
MATH 51	Linear Algebra and Differential Calculus of Several Variables (or beyond)	
CME 100	Vector Calculus for Engineers	

#### Physics

PHYSICS 40 Series		12
PHYSICS 41	Mechanics	
PHYSICS 43	Electricity and Magnetism	
PHYSICS 45	Light and Heat	

#### Statistics

Select one of the following courses: 3-5

BIO/STATS 141	Biostatistics <sup>1</sup>	
BIOHOPK 174H	Experimental Design and Probability <sup>1</sup>	
STATS 60	Introduction to Statistical Methods: Precalculus	

Total Units 35-47

<sup>1</sup> If taken to fulfill the foundational breadth requirement, these courses do not count toward the 23 elective unit requirement.

### Electives

23 units required. Students must take the 3 required courses listed, as well as three courses in Biochemistry and Biophysics from the approved list. The remainder of the 23 units of electives may be any BIO or BIOHOPK course at the 100-level or above, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

3 Required Courses:

CHEM 141	The Chemical Principles of Life I	4
CHEM 143	The Chemical Principles of Life II	4

MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
or CME 100	Vector Calculus for Engineers	

Units Select three of the following: 9-13

APPPHYS 236	Biology by the Numbers	
APPPHYS 294	Cellular Biophysics	
BIO 126	Introduction to Biophysics	
BIO 132	Advanced Imaging Lab in Biophysics	
BIO 152	Imaging: Biological Light Microscopy	
BIO 154	Molecular and Cellular Neurobiology	
BIO 214	Advanced Cell Biology	
BIOE 101	Systems Biology	
BIOE 103	Systems Physiology and Design	
BIOE 211	Biophysics of Multi-cellular Systems and Amorphous Computing	
BIOE 220	Introduction to Imaging and Image-based Human Anatomy	
BIOE 231	Protein Engineering	
BIOE 241	Biological Macromolecules	
BIOMEDIN 210	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	
BIOPHYS 241	Biological Macromolecules	
BIOPHYS 242	Methods in Molecular Biophysics	
CHEM 183	Biochemistry II	
CHEM 184	Biological Chemistry Laboratory	
CHEM 185	Biophysical Chemistry	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	
CSB 210	Cell Signaling	
CSB 220	Chemistry of Biological Processes	
EE 236A	Modern Optics	
MCP 256	How Cells Work: Energetics, Compartments, and Coupling in Cell Biology	
PHYSICS 105	Intermediate Physics Laboratory I: Analog Electronics	
STATS 191	Introduction to Applied Statistics	

## Computational Biology

Candidates for the Computational Biology field of study must complete the following, as well as the WIM requirement above, for a total ranging from 90-102 units:

### Introductory Course

(must be taken for a letter grade):

Select one of the following:	Units	
BIO 60	Introduction to Problem Solving in Biology	4
BIO 61	Science as a Creative Process	
BIO 62	Experimental strategy and the bacterial world	

### Foundational Courses

(must be taken for a letter grade):

Select 5 of the following:	Units	
BIO 81	Introduction to Ecology	20
or BIOHOPK 81	Introduction to Ecology	
BIO 82	Genetics	

BIO 83	Biochemistry & Molecular Biology
BIO 84	Physiology
or BIOHOPK 84	Physiology
BIO 85	
or BIOHOPK 85	Evolution
BIO 86	Cell Biology

**Foundational Lab Courses**

Two Courses Required:

BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology	4
BIO 46	Introduction to Research in Ecology and Evolutionary Biology	4-5
or BIO 47	Introduction to Research in Ecology and Evolutionary Biology	
or BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology	

**Required Foundational Breadth Courses**

(One course from this section may be taken credit/no credit):

**Chemistry**

The following CHEM courses are required:

CHEM 31A	Chemical Principles I	5-10
& CHEM 31B	and Chemical Principles II	
or CHEM 31X	Chemical Principles Accelerated	
CHEM 33	Structure and Reactivity of Organic Molecules	5
CHEM 35	Organic Chemistry of Bioactive Molecules	5

**Mathematics**

Select one of the following options: 5-10

MATH 19	Calculus	5-10
& MATH 20	and Calculus	
& MATH 21	and Calculus	
MATH 51	Linear Algebra and Differential Calculus of Several Variables (or beyond)	
CME 100	Vector Calculus for Engineers	

**Physics**

Select one of the following Series: 10-12

PHYSICS 20 Series

PHYSICS 21	Mechanics, Fluids, and Heat
PHYSICS 22	Mechanics, Fluids, and Heat Laboratory
PHYSICS 23	Electricity, Magnetism, and Optics
PHYSICS 24	Electricity, Magnetism, and Optics Laboratory

PHYSICS 40 Series

PHYSICS 41	Mechanics
PHYSICS 43	Electricity and Magnetism
PHYSICS 45	Light and Heat

**Statistics**

The following course is required: 5

BIO/STATS 141	Biostatistics <sup>1</sup>
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Total Units 35-47

<sup>1</sup> If taken to fulfill the foundational breadth requirement, this course cannot count toward the 23 elective unit requirement.**Electives**

23 units required. Students must take the 2 required courses listed, as well as three courses in Computational Biology from the approved list. The remainder of the 23 units of electives may be any BIO or BIOHOPK course at the 100-level or above, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

		Units
2 Required Courses:		
CS 106A	Programming Methodology	3-5
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
or CME 100	Vector Calculus for Engineers	
Select three of the following:		9-13
APPPHYS 315	Methods in Computational Biology	
BIO 126	Introduction to Biophysics	
BIO 182	Modeling Cultural Evolution	
BIO 183	Theoretical Population Genetics	
BIO 268	Statistical and Machine Learning Methods for Genomics	
BIOE 101	Systems Biology	
BIOE 115	Computational Modeling of Microbial Communities	
BIOE 211	Biophysics of Multi-cellular Systems and Amorphous Computing	
BIOMEDIN 217	Translational Bioinformatics	
CS 273A	The Human Genome Source Code	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	
IMMUNOL 206	Introduction to Applied Computational Tools in Immunology	
IMMUNOL 207	Essential Methods in Computational and Systems Immunology	
STATS 155	Statistical Methods in Computational Genetics	

**Ecology and Evolution**

Candidates for the Ecology and Evolution field of study must complete the following, as well as the WIM requirement above, for a total ranging from 88-102 units:

**Introductory Course**

(must be taken for a letter grade):

		Units
Select one of the following:		4
BIO 60	Introduction to Problem Solving in Biology	
BIO 61	Science as a Creative Process	
BIO 62	Experimental strategy and the bacterial world	

**Foundational Courses**

(must be taken for a letter grade):

		Units
All of the following:		12
BIO 81	Introduction to Ecology	
or BIOHOPK 81	Introduction to Ecology	
BIO 82	Genetics	
BIO 85		
or BIOHOPK 85	Evolution	
Select 2 of the following:		8

BIO 83	Biochemistry & Molecular Biology
BIO 84	Physiology
or BIOHOPK 84	Physiology
BIO 86	Cell Biology

### Foundational Lab Courses

Two Courses Required:

BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology	4
BIO 46	Introduction to Research in Ecology and Evolutionary Biology	4-5
or BIO 47	Introduction to Research in Ecology and Evolutionary Biology	
or BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology	

### Required Foundational Breadth Courses

(One course from this section may be taken credit/no credit):

#### Chemistry

The following CHEM courses are required:

CHEM 31A	Chemical Principles I	5-10
& CHEM 31B	and Chemical Principles II	
or CHEM 31X	Chemical Principles Accelerated	
CHEM 33	Structure and Reactivity of Organic Molecules	5
CHEM 35	Organic Chemistry of Bioactive Molecules	5

#### Mathematics

Select one of the following options: 5-10

MATH 19	Calculus	5-10
& MATH 20	and Calculus	
& MATH 21	and Calculus	
MATH 51	Linear Algebra and Differential Calculus of Several Variables (or beyond)	
CME 100	Vector Calculus for Engineers	

#### Physics

Select one of the following Series: 10-12

PHYSICS 20 Series

PHYSICS 21	Mechanics, Fluids, and Heat
PHYSICS 22	Mechanics, Fluids, and Heat Laboratory
PHYSICS 23	Electricity, Magnetism, and Optics
PHYSICS 24	Electricity, Magnetism, and Optics Laboratory

PHYSICS 40 Series

PHYSICS 41	Mechanics
PHYSICS 43	Electricity and Magnetism
PHYSICS 45	Light and Heat

#### Statistics

Select one of the following courses: 3-5

BIO/STATS 141	Biostatistics <sup>1</sup>
BIOHOPK 174H	Experimental Design and Probability <sup>1</sup>
STATS 60	Introduction to Statistical Methods: Precalculus

Total Units 33-47

<sup>1</sup> If taken to fulfill the foundational breadth requirement, these courses do not count toward the 23 elective unit requirement.

### Electives

23 units required. Students must take five courses in Ecology and Evolution from the approved list. The remainder of the 23 units of electives may be any BIO or BIOHOPK course at the 100-level or above, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

Units

Select 5 of the following:

BIO 105A	Ecology and Natural History of Jasper Ridge Biological Preserve	15-23
BIO 105B	Ecology and Natural History of Jasper Ridge Biological Preserve	
BIO 113	Fundamentals of Molecular Evolution	
BIO 116	Ecology of the Hawaiian Islands	
BIO 117	Biology and Global Change	
BIO 118	Genetic Analysis of Biological Processes	
BIO 138	Ecosystem Services: Frontiers in the Science of Valuing Nature	
BIO 144	Conservation Biology: A Latin American Perspective	
BIO 145	Ecology and Evolution of Animal Behavior	
BIO 146	Population Studies	
BIO 174	Human Skeletal Anatomy	
BIO 182	Modeling Cultural Evolution	
BIO 183	Theoretical Population Genetics	
BIOHOPK 161H	Invertebrate Zoology	
BIOHOPK 163H	Oceanic Biology	
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems	
BIOHOPK 173H	Marine Conservation Biology	
BIOHOPK 174H	Experimental Design and Probability	
BIOHOPK 182H	Stanford at Sea	
BIOHOPK 187H	Sensory Ecology	
BIOHOPK 268H	Disease Ecology: from parasites evolution to the socio-economic impacts of pathogens on nations	
EARTHSYS 128	Evolution of Terrestrial Ecosystems	
EARTHSYS 142	Remote Sensing of Land	
EARTHSYS 144	Fundamentals of Geographic Information Science (GIS)	
EARTHSYS 158	Geomicrobiology	
OSPAUSTL 10	Coral Reef Ecosystems	
OSPAUSTL 25	Freshwater Systems	
OSPAUSTL 30	Coastal Forest Ecosystems	

<sup>1</sup> Only 6 units can be counted from BIOHOPK 182H.

<sup>2</sup> OSPAUSTL 10, 25, 30 count as 2 units each for a total of 6 units toward electives.

## Marine Biology

Candidates for the Marine Biology field of study must complete the following, as well as the WIM requirement above, for a total ranging from 88-102 units:

### Introductory Course

(must be taken for a letter grade):

Select one of the following:

BIO 60	Introduction to Problem Solving in Biology	4
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Units



BIO 61	Science as a Creative Process
BIO 62	Experimental strategy and the bacterial world

**Foundational Courses**

(must be taken for a letter grade):

All of the following:

**Units**  
12

BIO 81	Introduction to Ecology
or BIOHOPK 81	Introduction to Ecology
BIO 82	Genetics
BIO 85	or BIOHOPK 85 Evolution

Select 2 of the following:

8

BIO 83	Biochemistry & Molecular Biology
BIO 84	Physiology
or BIOHOPK 84	Physiology
BIO 86	Cell Biology

**Foundational Lab Courses**

Two Courses Required:

BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology	4
BIO 46	Introduction to Research in Ecology and Evolutionary Biology	4-5
or BIO 47	Introduction to Research in Ecology and Evolutionary Biology	
or BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology	

**Required Foundational Breadth Courses**

(One course from this section may be taken credit/no credit):

**Chemistry**

The following CHEM courses are required:

CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	5-10
or CHEM 31X	Chemical Principles Accelerated	
CHEM 33	Structure and Reactivity of Organic Molecules	5
CHEM 35	Organic Chemistry of Bioactive Molecules	5

**Mathematics**

Select one of the following options:

5-10

MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus
MATH 51	Linear Algebra and Differential Calculus of Several Variables (or beyond)
CME 100	Vector Calculus for Engineers

**Physics**

Select one of the following Series:

10-12

PHYSICS 20 Series

PHYSICS 21	Mechanics, Fluids, and Heat
PHYSICS 22	Mechanics, Fluids, and Heat Laboratory
PHYSICS 23	Electricity, Magnetism, and Optics
PHYSICS 24	Electricity, Magnetism, and Optics Laboratory

PHYSICS 40 Series

PHYSICS 41	Mechanics
PHYSICS 43	Electricity and Magnetism

PHYSICS 45 Light and Heat

**Statistics**

Select one of the following courses:

3-5

BIO/STATS 141	Biostatistics <sup>1</sup>
BIOHOPK 174H	Experimental Design and Probability <sup>1</sup>
STATS 60	Introduction to Statistical Methods: Precalculus

Total Units

33-47

<sup>1</sup> If taken to fulfill the foundational breadth requirement, these courses do not count toward the 23 elective unit requirement.**Electives**

23 units required. Students must take five courses in Marine Biology from the approved list. The remainder of the 23 units of electives may be any BIO or BIOHOPK course at the 100-level or above, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

**Units**

Select 5 of the following:

15-23

**Units**

BIO 116	Ecology of the Hawaiian Islands
BIOHOPK 150H	Ecological Mechanics
BIOHOPK 173H	Marine Conservation Biology
BIOHOPK 177H	Dynamics and Management of Marine Populations
BIOHOPK 179H	Physiological Ecology of Marine Megafauna
BIOHOPK 182H	Stanford at Sea
BIOHOPK 185H	Ecology and Conservation of Kelp Forest Communities
BIOHOPK 187H	Sensory Ecology
EARTHSYS 117	Earth Sciences of the Hawaiian Islands
EARTHSYS 118	Heritage, Environment, and Sovereignty in Hawaii
OSPAUSTL 10	Coral Reef Ecosystems
OSPAUSTL 25	Freshwater Systems
OSPAUSTL 30	Coastal Forest Ecosystems

<sup>1</sup> Only 6 units can be counted from BIOHOPK 182H.<sup>2</sup> OSPAUSTL 10, 25, 30 count as 2 units each for a total of 6 units toward electives.**Microbes and Immunity**

Candidates for the Microbes and Immunity field of study must complete the following, as well as the WIM requirement above, for a total ranging from 88-102 units:

**Introductory Course**

(must be taken for a letter grade):

**Units**

Select one of the following:

4

BIO 60	Introduction to Problem Solving in Biology
BIO 61	Science as a Creative Process
BIO 62	Experimental strategy and the bacterial world

**Foundational Courses**

(must be taken for a letter grade):

**Units**

Select 5 of the following:

20

BIO 81	Introduction to Ecology
or BIOHOPK 81	Introduction to Ecology

BIO 82	Genetics
BIO 83	Biochemistry & Molecular Biology
BIO 84	Physiology
or BIOHOPK 84	Physiology
BIO 85	
or BIOHOPK 85	Evolution
BIO 86	Cell Biology

### Foundational Lab Courses

Two Courses Required:

BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology	4
BIO 46	Introduction to Research in Ecology and Evolutionary Biology	4-5
or BIO 47	Introduction to Research in Ecology and Evolutionary Biology	
or BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology	

### Required Foundational Breadth Courses

(One course from this section may be taken credit/no credit):

#### Chemistry

The following CHEM courses are required:

CHEM 31A	Chemical Principles I	5-10
& CHEM 31B	and Chemical Principles II	
or CHEM 31X	Chemical Principles Accelerated	
CHEM 33	Structure and Reactivity of Organic Molecules	5
CHEM 35	Organic Chemistry of Bioactive Molecules	5

#### Mathematics

Select one of the following options: 5-10

MATH 19	Calculus	
& MATH 20	and Calculus	
& MATH 21	and Calculus	
MATH 51	Linear Algebra and Differential Calculus of Several Variables (or beyond)	
CME 100	Vector Calculus for Engineers	

#### Physics

Select one of the following Series: 10-12

PHYSICS 20 Series

PHYSICS 21	Mechanics, Fluids, and Heat
PHYSICS 22	Mechanics, Fluids, and Heat Laboratory
PHYSICS 23	Electricity, Magnetism, and Optics
PHYSICS 24	Electricity, Magnetism, and Optics Laboratory

PHYSICS 40 Series

PHYSICS 41	Mechanics
PHYSICS 43	Electricity and Magnetism
PHYSICS 45	Light and Heat

#### Statistics

Select one of the following courses: 3-5

BIO/STATS 141	Biostatistics <sup>1</sup>
BIOHOPK 174H	Experimental Design and Probability <sup>1</sup>
STATS 60	Introduction to Statistical Methods: Precalculus

Total Units 33-47

<sup>1</sup> If taken to fulfill the foundational breadth requirement, these courses do not count toward the 23 elective unit requirement.

### Electives

23 units required. Students must take the 3 required courses listed, as well as two courses in Microbiology and Immunology from the approved list. The remainder of the 23 units of electives may be any BIO or BIOHOPK course at the 100-level or above, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

Units

Units

3 Required Courses:

BIO 178	Microbiology Literature	3
or MI 185	Topics in Microbiology	
CHEM 141	The Chemical Principles of Life I	4
CHEM 143	The Chemical Principles of Life II	4
Select two of the following:		4-8

BIO 132	Advanced Imaging Lab in Biophysics
BIO 177	Plant Microbe Interaction
BIO 178	Microbiology Literature
BIO 180	Microbial Physiology
BIO 230	Molecular and Cellular Immunology
BIOE 115	Computational Modeling of Microbial Communities
BIOHOPK 274	Hopkins Microbiology Course
CEE 177	Aquatic Chemistry and Biology
CEE 274A	Environmental Microbiology I
CEE 274B	Microbial Bioenergy Systems
CEE 274D	Pathogens and Disinfection
EARTHSYS 158	Geomicrobiology
HUMBIO 155H	Humans and Viruses I
IMMUNOL 201	Advanced Immunology I
IMMUNOL 202	Advanced Immunology II
IMMUNOL 206	Introduction to Applied Computational Tools in Immunology
IMMUNOL 209	Translational Immunology
IMMUNOL 275	Tumor Immunology
IMMUNOL 286	Neuroimmunity
MI 120	Bacteria in Health and Disease
MI 185	Topics in Microbiology
MI 210	Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites

## Molecular, Cellular, and Developmental Biology

Candidates for the Molecular, Cellular, and Developmental Biology field of study must complete the following, as well as the WIM requirement above, for a total ranging from 88-102 units:

### Introductory Course

(must be taken for a letter grade):

Units

Select one of the following:		4
BIO 60	Introduction to Problem Solving in Biology	
BIO 61	Science as a Creative Process	
BIO 62	Experimental strategy and the bacterial world	

**Foundational Courses**

(must be taken for a letter grade):

All of the following:

BIO 82	Genetics
BIO 83	Biochemistry & Molecular Biology
BIO 84	Physiology
or BIOHOPK 84	Physiology
BIO 86	Cell Biology

Select 1 of the following:

BIO 81	Introduction to Ecology
or BIOHOPK 81	Introduction to Ecology
BIO 85	
or BIOHOPK 85	Evolution

**Units**

16

**Foundational Lab Courses**

Two Courses Required:

BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology	4
BIO 46	Introduction to Research in Ecology and Evolutionary Biology	4-5
or BIO 47	Introduction to Research in Ecology and Evolutionary Biology	
or BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology	

**Units****Required Foundational Breadth Courses**

(One course from this section may be taken credit/no credit):

**Chemistry**

The following CHEM courses are required:

CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	5-10
or CHEM 31X	Chemical Principles Accelerated	
CHEM 33	Structure and Reactivity of Organic Molecules	5
CHEM 35	Organic Chemistry of Bioactive Molecules	5

**Mathematics**

Select one of the following options:

MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus	5-10
MATH 51	Linear Algebra and Differential Calculus of Several Variables (or beyond)	
CME 100	Vector Calculus for Engineers	

**Physics**

Select one of the following Series:

PHYSICS 20 Series		10-12
PHYSICS 21	Mechanics, Fluids, and Heat	
PHYSICS 22	Mechanics, Fluids, and Heat Laboratory	
PHYSICS 23	Electricity, Magnetism, and Optics	
PHYSICS 24	Electricity, Magnetism, and Optics Laboratory	
PHYSICS 40 Series		
PHYSICS 41	Mechanics	
PHYSICS 43	Electricity and Magnetism	
PHYSICS 45	Light and Heat	

**Statistics**

Select one of the following courses:

BIO/STATS 141	Biostatistics <sup>1</sup>	
BIOHOPK 174H	Experimental Design and Probability <sup>1</sup>	
STATS 60	Introduction to Statistical Methods: Precalculus	

Total Units

33-47

<sup>1</sup> If taken to fulfill the foundational breadth requirement, these courses do not count toward the 23 elective unit requirement.**Electives**

23 units required. Students must take the 3 required courses listed, as well as two courses in Molecular, Cellular, and Developmental Biology from the approved list. The remainder of the 23 units of electives may be any BIO or BIOHOPK course at the 100-level or above, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

**Units**

3 Required Courses:

BIO 158	Developmental Neurobiology	4
or BIO 160	Developmental Biology	
CHEM 141	The Chemical Principles of Life I	4
CHEM 143	The Chemical Principles of Life II	4

Select two of the following:

5-10

BIO 110	Chromatin Regulation of the Genome	
BIO 118	Genetic Analysis of Biological Processes	
BIO 124	Topics in Cancer Biology	
BIO 154	Molecular and Cellular Neurobiology	
BIO 156	Epigenetics	
BIO 158	Developmental Neurobiology	
BIO 160	Developmental Biology	
BIO 167	Insulin and carbohydrate metabolism in health and disease a history of advances 1850 to current	
BIO 168	Explorations in Stem Cell Biology	
BIO 171	Principles of Cell Cycle Control	
BIO 177	Plant Microbe Interaction	
BIOE 101	Systems Biology	
BIOE 211	Biophysics of Multi-cellular Systems and Amorphous Computing	
BIOE 283	Mechanotransduction in Cells and Tissues	
BIOHOPK 155H	Developmental Biology and Evolution	
BIOPHYS 242	Methods in Molecular Biophysics	
CBIO 243	Principles of Cancer Systems Biology	
CS 273A	The Human Genome Source Code	
CS 273B	Deep Learning in Genomics and Biomedicine	
CS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	
CSB 210	Cell Signaling	
GENE 210	Genomics and Personalized Medicine	
GENE 211	Genomics	
GENE 235	C. Elegans Genetics	
NBIO 258	Information and Signaling Mechanisms in Neurons and Circuits	
STEMREM 201	Stem Cells and Human Development: From Embryo to Cell Lineage Determination	
STEMREM 202	Stem Cells and Translational Medicine	

## Neurobiology

Candidates for the Neurobiology field of study must complete the following, as well as the WIM requirement above, for a total ranging from 88-102 units:

### Introductory Course

(must be taken for a letter grade):

Select one of the following:

BIO 60	Introduction to Problem Solving in Biology
BIO 61	Science as a Creative Process
BIO 62	Experimental strategy and the bacterial world

### Foundational Courses

(must be taken for a letter grade):

All of the following:

BIO 82	Genetics
BIO 83	Biochemistry & Molecular Biology
BIO 84	Physiology
or BIOHOPK 84	Physiology
BIO 86	Cell Biology

Select 1 of the following:

BIO 81	Introduction to Ecology
or BIOHOPK 81	Introduction to Ecology
BIO 85	or BIOHOPK 85 Evolution

### Foundational Lab Courses

Two Courses Required:

BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology	4
BIO 46	Introduction to Research in Ecology and Evolutionary Biology	4-5
or BIO 47	Introduction to Research in Ecology and Evolutionary Biology	
or BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology	

### Required Foundational Breadth Courses

(One course from this section may be taken credit/no credit):

#### Chemistry

The following CHEM courses are required:

CHEM 31A & CHEM 31B or CHEM 31X	Chemical Principles I and Chemical Principles II or Chemical Principles Accelerated	5-10
CHEM 33	Structure and Reactivity of Organic Molecules	5
CHEM 35	Organic Chemistry of Bioactive Molecules	5

#### Mathematics

Select one of the following options:

MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus	5-10
MATH 51	Linear Algebra and Differential Calculus of Several Variables (or beyond)	
CME 100	Vector Calculus for Engineers	

#### Physics

Select one of the following Series: 10-12

##### PHYSICS 20 Series

PHYSICS 21	Mechanics, Fluids, and Heat
PHYSICS 22	Mechanics, Fluids, and Heat Laboratory
PHYSICS 23	Electricity, Magnetism, and Optics
PHYSICS 24	Electricity, Magnetism, and Optics Laboratory

##### PHYSICS 40 Series

PHYSICS 41	Mechanics
PHYSICS 43	Electricity and Magnetism
PHYSICS 45	Light and Heat

#### Statistics

Select one of the following courses: 3-5

BIO/STATS 141	Biostatistics <sup>1</sup>
BIOHOPK 174H	Experimental Design and Probability <sup>1</sup>
STATS 60	Introduction to Statistical Methods: Precalculus

Total Units 33-47

<sup>1</sup> If taken to fulfill the foundational breadth requirement, these courses do not count toward the 23 elective unit requirement.

#### Electives

23 units required. Students must take the 5 required courses listed. The remainder of the 23 units of electives may be any BIO or BIOHOPK course at the 100-level or above, or from the list of approved out-of-department electives. Up to 6 units of teaching and research are allowed. Only one course can be taken credit/no credit.

5 Required Courses:

BIO 149 or BIO 150 or NBIO 206	The Neurobiology of Sleep Human Behavioral Biology The Nervous System	4-8
BIO 154	Molecular and Cellular Neurobiology	4
BIO 158	Developmental Neurobiology	4
CHEM 141	The Chemical Principles of Life I	4
CHEM 143	The Chemical Principles of Life II	4

## Hopkins Marine Station

For additional information, see the "Biology, Hopkins Marine Station (p. 408)" section of this bulletin or the Hopkins Marine Station web site (<http://hopkins.stanford.edu>).

**Units** Courses offered by the Department of Biology are listed under the subject code BIOHOPK on the Stanford Bulletin's ExploreCourses web site.

### Summer Program at Hopkins Marine Station

The summer program is open to advanced undergraduate, graduate students, and postdoctoral students, and to teachers whose biological backgrounds, teaching, or research activities can benefit from a summer's study of marine life. Applications, deadlines, and further information are available at <http://hopkins.stanford.edu>.

### Courses

Courses at Hopkins Marine Station can satisfy many requirements, from the Natural Sciences GER to major and minor requirements in departments housed in the Schools of Engineering, Humanities and Sciences, and Earth Sciences. Students are encouraged to check with their department's student services office to see which courses at Hopkins may be used to fulfill major or minor requirements.

Students may go to Hopkins as early as Spring Quarter in the sophomore year, and can also go in the junior and/or senior year to take elective courses. The following Hopkins Marine Station courses may be used toward the Biology degree requirements:

### Core

		Units
BIOHOPK 43	Plant Biology, Evolution, and Ecology	5
BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology (formerly BIOHOPK 44Y)	5

### Electives

		Units
BIOHOPK 150H	Ecological Mechanics	3
BIOHOPK 154H	Animal Diversity: An Introduction to Evolution of Animal Form and Function from Larvae to Adults	7
BIOHOPK 155H	Developmental Biology and Evolution	4
BIOHOPK 156H	Hands-On Neurobiology: Structure, Function and Development	6
BIOHOPK 160H	Developmental Biology in the Ocean: Diverse Embryonic & Larval Strategies of marine invertebrates	5-8
BIOHOPK 161H	Invertebrate Zoology	5
BIOHOPK 162H	Comparative Animal Physiology	5
BIOHOPK 163H	Oceanic Biology	4
BIOHOPK 165H	The Extreme Life of the Sea	3
BIOHOPK 166H	Molecular Ecology	5
BIOHOPK 167H	Nerve, Muscle, and Synapse	5
BIOHOPK 168H	Disease Ecology: from parasites evolution to the socio-economic impacts of pathogens on nations	3
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems	5
BIOHOPK 173H	Marine Conservation Biology	4
BIOHOPK 174H	Experimental Design and Probability	3
BIOHOPK 177H	Dynamics and Management of Marine Populations	4
BIOHOPK 179H	Physiological Ecology of Marine Megafauna	3
BIOHOPK 182H	Stanford at Sea (only 6 units may count towards the major)	16
BIOHOPK 184H	Holistic Biology (only 6 units may count towards the major)	16
BIOHOPK 185H	Ecology and Conservation of Kelp Forest Communities	5
BIOHOPK 187H	Sensory Ecology	4
BIOHOPK 189H	Sustainability and Marine Ecosystems	3
BIOHOPK 264H	POPULATION GENOMICS	1-2
BIOHOPK 274	Hopkins Microbiology Course	9-12
BIOHOPK 275H	Synthesis in Ecology	2

### Research and/or Teaching (maximum 6 units combined)

		Units
BIOHOPK 198H	Directed Instruction or Reading	1-15
BIOHOPK 199H	Undergraduate Research	1-15
BIOHOPK 290H	Teaching of Biological Science	1-15
BIOHOPK 300H	Research	1-15

See Biology degree requirements above for further information. Many of the Hopkins Marine Station courses may be used to fulfill department major requirements.

## Minor in Biology

Students interested in the minor in Biology must declare the minor and submit their course plan online via Axxess no later than two quarters prior

to the student's intended quarter of degree conferral. The Biology minor requires a minimum of six courses meeting the following criteria:

- All courses must be taken for a letter grade.
- All courses must be worth or approved for 3 or more units.
- All courses, other than BIO/BIOHOPK 81, BIO 82, BIO 83, BIO/BIOHOPK 84, BIO/BIOHOPK 85, BIO 86, OSPAUSTL 10, 25, or 30 must be at or above the 100-level. Stanford Introductory Seminars may not be used to fulfill the minor requirements. Note: OSPAUSTL 10, 25, 30 together count as 2 courses toward the minor.
- Courses used to fulfill the minor may not be used to fulfill any other department degree requirements (minor or major).
- Courses must be chosen from the offerings of the Department of Biology or the Hopkins Marine Station, or from the list of approved out-of-department electives for the minor (<https://stanford.box.com/v/OODEMinor>). Any approved out of department elective must be approved for at least 3 units.
- At least two courses from the Biology Foundations must be taken:

		Units
BIO 81	Introduction to Ecology	4
or BIOHOPK 81	Introduction to Ecology	
BIO 82	Genetics	4
BIO 83	Biochemistry & Molecular Biology	4
BIO 84	Physiology	4
or BIOHOPK 84	Physiology	
BIO 85		4
or BIOHOPK 85	Evolution	
BIO 86	Cell Biology	4

- A third Bio Foundations course may be taken OR students may take one introductory Biology course from the following list:

		Units
BIO 60	Introduction to Problem Solving in Biology	4
BIO 61	Science as a Creative Process	4
BIO 62	Experimental strategy and the bacterial world	3

- The Biology Core Laboratory courses do not count towards the minor:

		Units
BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology	4
BIO 46	Introduction to Research in Ecology and Evolutionary Biology	4
BIO 47	Introduction to Research in Ecology and Evolutionary Biology	4
BIOHOPK 47	Introduction to Research in Ecology and Ecological Physiology	5

- If taken for at least 3 units, independent research conducted in a Biology lab may count as 1 course. Note: Research done in a non-Biology lab cannot be counted toward the minor. Directed reading, either in department or out of the department, also cannot count toward the minor.

		Units
BIO 199	Advanced Research Laboratory in Experimental Biology	1-15
BIOHOPK 199H	Undergraduate Research	1-15

Not allowable is:

BIO 198	Directed Reading in Biology
BIO 198X	Out-of-Department Directed Reading
BIO 199X	Out-of-Department Advanced Research Laboratory in Experimental Biology

## Master of Science in Biology

For information on the University's basic requirements for the M.S. degree, see the "Graduate Degrees (p. 50)" section of this bulletin. Students considering this degree option should meet with staff in the student services office prior to applying.

The M.S. degree program offers general or specialized study to individuals seeking biologically oriented course work and to undergraduate science majors wishing to increase or update their science background or obtain advanced research experience. Students who have majored in related fields are eligible to apply, but course work equivalent to the preparation of a Stanford B.S. in Biology may be required in addition to the general requirements. This includes course work in biology, chemistry, physics and mathematics. The M.S. program does not have an M.S. with thesis option.

### Admissions

The department only accepts M.S. program applications from matriculated Stanford students:

1. undergraduates wishing to pursue a coterminal M.S. degree.
2. graduate students from other Stanford programs wishing to pursue an M.S. degree.
3. current Biology Ph.D. students wishing to discontinue the Ph.D. program with an M.S. degree.

Undergraduates must apply in mid-January to start the program in Spring, Autumn, or the following Winter quarter. Graduate students may apply by the third week of any academic quarter.

### Required application materials

1. Completed Coterminal Online Application (<https://applyweb.com/stanterm>)
2. A statement of purpose which explains why the student wishes to enter the program and what the student plans to accomplish while in the program. The statement should also supply information about the student's science capabilities if his or her undergraduate academic record does not accurately reflect them.
3. Unofficial Stanford transcript.
4. Two letters of recommendation, preferably from Biology faculty members in this department. If two such letters are not available, letters from faculty familiar with the student's ability to succeed in a graduate science curriculum are acceptable.
5. Application fee: an application fee is charged to all students regardless of outcome; application fee is applied directly to students' accounts.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

### General Requirements

The M.S. program consists of Department of Biology and/or Hopkins Marine Station course work, approved out-of-department electives, and foundational breadth courses totaling at least 45 units at or above the 100-level, distributed as follows:

1. A minimum of 23 of the 45 units must be courses designated primarily for graduate students (generally 200-level or higher, but not always).
2. A minimum of 36 units must be chosen from the offerings in the Department of Biology (BIO), Hopkins Marine Station (BIOHOPK), the list of approved out-of-department electives (<https://stanford.app.box.com/v/out-of-department-electives>), research, teaching and/or foundational breadth courses.

		Units
BIO 198	Directed Reading in Biology	1-15
BIO 198X	Out-of-Department Directed Reading	1-15
BIO 290	Teaching of Biology	1-5
BIO 291	Development and Teaching of Core Experimental Laboratories	1-2
BIO 300	Graduate Research	1-10
BIO 300X	Out-of-Department Graduate Research	1-10
BIOHOPK 198H	Directed Instruction or Reading	1-15
BIOHOPK 290H	Teaching of Biological Science	1-15
BIOHOPK 300H	Research	1-15

- a. a maximum of 18 units may be a combination of Biology research, directed reading and/or teaching;
  - b. a maximum of 9 units may be foundational breadth courses in chemistry, mathematics, statistics, computer science, and/or physics beyond the level required for the undergraduate degree in Biology and at least at the 100-level.
3. No more than 9 units may be other Stanford course work relevant to a student's professional development. Students are required to petition for courses that fall into this category using the General Petition form (<https://stanford.app.box.com/v/general-petition>).

Each candidate designs a coherent program of study in consultation with her or his department advisor. Although there are no specific courses required, program proposals must adhere to department parameters.

In addition to the unit requirements outlined above, students must adhere to the following:

1. A program proposal, signed by the student's advisor and approved by the chair of the M.S. committee, must be filed by the third week of the first quarter of enrollment. A revised program proposal is required to be filed whenever there are changes to a student's previously approved program proposal.
2. Students may take only 6 units CR/NC.
3. Students must maintain a GPA of 3.0 or higher.
4. Students must receive a grade of 'B-' or better in all courses taken for the degree.

Students not meeting these minimum requirements are subject to departmental academic review and/or dismissal.

The department's Master of Science Handbook (<https://stanford.box.com/s/js5ul8e1istcmgkqbsdmrc93g29926a>) has additional information about the program, University policy and the department.

## Doctor of Philosophy in Biology

For information on the University's basic requirements for the Ph.D. degree, see the "Graduate Degrees (p. 50)" section of this bulletin. The training for a Ph.D. in Biology is focused on learning skills required for being a successful research scientist and teacher, including how to ask important questions and then devise and carry out experiments to answer these questions. Students work closely with an established advisor and meet regularly with a committee of faculty members to ensure that they understand the importance of diverse perspectives on experimental questions and approaches. Students learn how to evaluate critically pertinent original literature in order to stay abreast of scientific progress in their areas of interest. They also learn how to make professional presentations, write manuscripts for publication, and become effective teachers.

### Admissions

Students seeking entrance to graduate study in Biology ordinarily should have the equivalent of an undergraduate major in Biology at Stanford. However, students from other disciplines, particularly the physical sciences, are also encouraged to apply. Such students are advised at the time of initial registration on how they should complete background training during the first year of graduate study. In addition to the usual basic undergraduate courses in biology, it is recommended that preparation for graduate work include courses in chemistry through organic chemistry, general physics, and mathematics through calculus.

### Application, Admission, and Financial Aid

Prospective graduate students must apply via Stanford's online graduate application (<http://gradadmissions.stanford.edu>).

The training for a Ph.D. in Biology is focused on helping students achieve their goals of being a successful research scientist and teacher, at the highest level. Students work closely with an established advisor and meet regularly with a committee of faculty members to facilitate their progress. The Biology PhD program is part of the larger Biosciences (<https://biosciences.stanford.edu>) community of PhD programs at Stanford, which includes PhD programs in Stanford School of Medicine.

There are three tracks within the Biology PhD program: 1) Cell, Molecular and Organismal Biology, 2) Ecology and Evolution, and 3) Hopkins Marine Station. All are focused on excellence in research and teaching in their respective areas; where there are differences between the tracks, they are indicated in the links below.

Applicants are required to take the Graduate Record Examination (GRE) general test. The GRE subject test is not required. Applicants should plan on taking the GRE at least one month prior to the application deadline to ensure that official scores are available when applications are evaluated.

Admission to the Ph.D. program is competitive and in recent years it has been possible to offer admission to approximately 9-10 percent of the applicants.

Applicants who are eligible should apply for nationally competitive predoctoral fellowships, especially those offered by the National Science Foundation.

Admitted students are typically offered financial support in the form of Stanford Graduate Fellowships, research assistantships, NIH traineeships or biology fellowships.

## General Requirements

All students must be enrolled in exactly 10 units during autumn, winter, spring and summer quarters until reaching Terminal Graduate Registration (TGR) status and are required to pass all courses in which they are enrolled. Students must earn a grade of 'B-' or better in all courses applicable to the degree that are taken for a letter grade. Satisfactory completion of each year's general and track specific requirements listed below is required for satisfactory progress towards the degree. Students not making satisfactory degree progress are subject to departmental academic review and/or dismissal.

### 1. First year advising

Each entering student meets with the first-year advising committee within the first two weeks of Autumn Quarter, Winter Quarter and by May 15 of Spring Quarter. The committee reviews the student's previous academic work and current goals and advises the student on a program of Stanford courses, some of which may be required and others recommended. Completion of the core curriculum listed below under "Track Specific Requirements" is required of all students.

### 2. Ethics

Students must take a course on the ethical conduct of research. This course should be taken in the first year of the program.

		Units
MED 255	The Responsible Conduct of Research	1

### 3. Teaching

Teaching experience and training are part of the graduate curriculum. Each student assists in teaching one course in

- a. the intro/foundational level (BIO 40s, 60s, and 80s level courses)

		Units
BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology (Formerly 44X)	4
BIO 46	Introduction to Research in Ecology and Evolutionary Biology (Formerly 44Y)	4
BIO 47	Introduction to Research in Ecology and Evolutionary Biology (Formerly 44Y)	4
BIO 60	Introduction to Problem Solving in Biology	4
BIO 61	Science as a Creative Process	4
BIO 62	Experimental strategy and the bacterial world	3
BIO 81	Introduction to Ecology	4
BIO 82	Genetics	4
BIO 83	Biochemistry & Molecular Biology	4
BIO 84	Physiology	4
BIO 85		4
BIO 86	Cell Biology	4

- b. and a second course that can be either an intro/foundational course or other Biology or Hopkins Marine Station course

### 4. Seminars

Graduate seminars devoted to current literature and research in particular fields of biology are an important means of attaining professional perspective and competence. Seminars are presented under individual course listings or are announced by the various research groups. Topics of current biological interest are presented by speakers from Stanford and other institutions. During the first year of study, graduate students are required to attend seminars and make one formal seminar presentation which must be evaluated by a minimum of two Biology faculty members.

### 5. Fellowship application

All eligible first year students must apply for a National Science Foundation (NSF) Graduate Research Fellowship.

**6. Advisor/lab selection**

By May 1, each first-year student is required to have selected a lab in which to perform dissertation research and to have been accepted by the faculty member in charge.

**7. Qualifying exam and admission to candidacy**

During the second year, students are required to write a dissertation proposal which is evaluated by a committee of faculty (the dissertation proposal committee) in an oral presentation. Track-specific deadlines are listed below. All students must be admitted to candidacy by the end of their second year. This is contingent upon satisfactory completion of course work, all first and second year requirements, the dissertation proposal and the University's requirements for candidacy outlined in the Candidacy (p. 52) section of this bulletin. If a student does not meet the requirements for admission to candidacy by the end of the second year, the student is subject to dismissal from the Ph.D. program.

**8. Committee meetings**

Students must meet regularly with their advising committees. For more details, see the Biology PhD Handbook (<https://stanford.box.com/v/PhDHandbook>).

**9. Individual Development Plan meetings**

Students must meet once a year with their advisor. For more details, see the Biology PhD Handbook (<https://stanford.box.com/v/PhDHandbook>).

**10. Publishable manuscript**

Each student must complete one publishable manuscript (paper) for which s/he is the major contributor.

**11. Residency requirement**

A minimum of 135 units of graduate registration is required of each candidate at the time of graduation.

**12. Doctoral dissertation**

A substantial draft of the dissertation must be submitted to the student's oral examination committee at least one month before the oral exam is scheduled to take place. The dissertation must be presented to an oral examination committee (p. 52) comprised of at least five faculty members. In addition, the final written dissertation must be approved by the student's reading committee (p. 52) (a minimum of three approved faculty), and submitted to the Registrar's Office. Upon completion of this final requirement, a student is eligible for conferral of the degree.

**Track Specific Requirements**

In addition to the general requirements listed above, students must also complete requirements within their concentration. Written petitions for exemptions to core curriculum and lab rotation requirements are considered by the advising committee and the chair of the graduate studies committee. Approval is contingent upon special circumstances and is not routinely granted.

**Cellular, Molecular, and Organismal Biology (CMOB)**

1. Courses: Students are required to take the following courses prior to Spring Quarter of the 4th year, except for the required first year courses as noted:

BIOS 200	Foundations in Experimental Biology (must be taken Autumn quarter of the first year)	5
BIO 301	Frontiers in Biology (satisfies first-year seminar requirement; must be taken Autumn and Winter quarters of first year)	1-3

One additional course in each of the four scientific areas decided upon by the student and the advising committee<sup>1</sup>

1. Cell Biology
2. Biology of Molecules
3. Genetics/Genomics

**4. Quantitative Methods**

2. Lab Rotations: First-year students are required to do their first rotation in the lab of a Department of Biology faculty member for at least five weeks. The total rotation time in labs of Department of Biology faculty must be at least ten weeks. Students are encouraged to do at least two rotations in the Department of Biology.
3. Two-part qualifying exam: Each student must pass the exam in their second year.
  - a. *Dissertation proposal*: During Autumn Quarter of the second year, the student must prepare a written dissertation proposal that outlines the student's projected dissertation research, including an expert assessment of the current literature; deadline is November 1.
  - b. *Oral examination*: Held after submission of the written proposal to the dissertation proposal committee. It is an evaluation of the student's ability to summarize the field of study, generate a working hypothesis, develop a degree plan that could be completed in 3-4 years, understand the logic of experimental design, develop a decision tree based on (all) possible results of experiments and draw conclusions and adapt hypotheses depending on results. Deadline is November 15.

- 1 Up to two of these courses may be "mini courses" in the Biosciences (BIOS).

**Ecology and Evolution**

1. Courses: Students are required to take the following courses in their first year:

		Units
BIO 302	Current Topics and Concepts in Population Biology, Ecology, and Evolution	1
BIO 303	Current Topics and Concepts in Population Biology, Ecology, and Evolution	1
BIO 304	Current Topics and Concepts in Population Biology, Ecology, and Evolution	1

Students specializing in ecology and evolution may be required to take additional courses as advised by committee.

2. First-year paper: The paper should be read, commented upon and agreed to as satisfactory by two EcoEvo faculty by May 15. This can be satisfied in a number of ways which all involve new writing, undertaken since entering the Stanford program. These may include:
  - a. A new draft research manuscript (a previously published paper is not acceptable).
  - b. Some other piece of new writing, such as a review paper from a course, or an initial literature review of a potential thesis topic. In this case the paper should ordinarily be not less than 10 double-spaced pages in usual sized font, and not more than 10 single spaced pages, plus references. It should be written in the style of a standard scientific paper.
3. Two-part qualifying exam: Each student must pass the exam in their second year.

**Units**

- a. *Dissertation proposal*: During Spring Quarter of the second year, the student must prepare a written dissertation proposal that outlines the student's projected dissertation research, including an expert assessment of the current literature; deadline is May 15.
- b. *Oral examination*: Held after submission of the written proposal to the dissertation proposal committee. The student should prepare a presentation of the goals of the thesis, typically including preliminary data, models, etc. as appropriate which are relevant to at least the first goal, and should be prepared thereafter to



discuss questions raised by the committee in professional scientific depth. Deadline is June 15.

*Emeriti Professors:* Bruce S. Baker, Winslow R. Briggs, Allan M. Campbell, Paul R. Ehrlich, David Epel, Donald Kennedy, Harold A. Mooney, Peter Ray, Joan Roughgarden, Robert D. Simoni, George N. Somero, Ward B. Watt, Norman K. Wessells, Dow O. Woodward, Charles Yanofsky

*Emeritus Professor (Research):* R. Paul Levine

*Emeritus Professor (Teaching):* Carol L. Boggs

*Chair:* Tim P. Stearns

*Professors:* Dominique Bergmann, Barbara A. Block, Steven M. Block, Larry B. Crowder, Martha S. Cyert, Gretchen C. Daily, Giulio De Leo, Mark W. Denny, Rodolfo Dirzo, Marcus W. Feldman, Russell D. Fernald, Christopher B. Field, Judith Frydman, William F. Gilly, Deborah M. Gordon, Or Gozani, Elizabeth A. Hadly, Philip C. Hanawalt, H. Craig Heller, Patricia P. Jones, Richard G. Klein, Ron R. Kopito, Sharon R. Long, Liqun Luo, Susan K. McConnell, Fiorenza Micheli, Mary Beth Mudgett, W. James Nelson, Stephen R. Palumbi, Dmitri Petrov, Jonathan Pritchard, Noah A. Rosenberg, Robert M. Sapolsky, Carla J. Shatz, Kang Shen, Michael A. Simon, Tim P. Stearns, Marc Tessier-Lavigne, Alice Ting, Stuart H. Thompson, Shripad Tuljapurkar, Peter Vitousek, Virginia Walbot

*Associate Professors:* Hunter B. Fraser, Tadashi Fukami, Christopher Lowe, Mark J. Schnitzer, Jan M. Skotheim

*Associate Professor (Research):* Mary Hynes

*Assistant Professors:* Xiaoke Chen, Scott J. Dixon, Jessica L. Feldman, Jeremy A. Goldbogen, Erin Mordecai, Ashby Morrison, Lauren O'Connell, Kabir Peay, M. Kristy Red-Horse

*Courtesy Professors:* Joseph Berry, Devaki Bhaya, Carlos D. Bustamante, Daniel Fisher, Arthur R. Grossman, Joseph S. Lipsick, Alfred Spormann, Irving Weissman

*Courtesy Associate Professors:* Kathryn Barton, José R. Dinneny, David Ehrhardt, Jonathan Payne, Sue Rhee, Zhiyong Wang

*Courtesy Assistant Professor:* Paula V. Welander

*Lecturers:* Jessica Coyle, Daria Hekmat-Scafe, Jamie Imam, Waheeda Khalfan, Shyamala D. Malladi, Patricia Seawell, Andrew Todhunter, James Watanabe

*Librarian:* Michael Newman

## Overseas Studies Courses in Biology

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPAUSTL 10	Coral Reef Ecosystems	3
OSPAUSTL 25	Freshwater Systems	3
OSPAUSTL 30	Coastal Forest Ecosystems	3

# BIOPHYSICS

Courses offered by the Biophysics Program are listed under the subject code BIOPHYS on the Stanford Bulletin's ExploreCourses web site.

The Biophysics Program offers instruction and research opportunities leading to the Ph.D. in Biophysics. Students admitted to the program may perform their graduate research in any appropriate department.

The Stanford Biophysics Program is an interdisciplinary, interdepartmental training program leading to the Ph.D. Degree in biophysics. The program centers on understanding biological function in terms of physical and chemical principles. The Program comprises faculty from 16 departments in the Schools of Humanities and Sciences, Medicine, Engineering, and the Stanford Synchrotron Radiation Laboratory. Research in the Program involves two overlapping branches of biophysics: the application of physical and chemical principles and methods to solving biological problems, and the development of new methods.

The Biophysics Program aims to train students in quantitative approaches to biological problems, while also developing their perspective in choosing forefront biological problems. A balanced academic program is tailored to the diverse backgrounds of the students. The program requires graduate-level coursework in physical and biological sciences, participation in seminar series, and most importantly achievement of a high level of proficiency in independent research.

## Learning Outcomes (Graduate)

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Biophysics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Biophysics and to interpret and present the results of such research.

## Graduate Program in Biophysics

For information on the University's basic requirements for the Ph.D. degree, see the "Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees>)" section of this bulletin.

### Admission

A small number of qualified applicants are admitted to the program each year. Applicants should present strong undergraduate backgrounds in the physical sciences and mathematics. The graduate course program, beyond the stated requirements, is worked out for each student individually with the help of appropriate advisers from the Committee on Biophysics.

The requirements and recommendations for applying to the Ph.D. Program in Biophysics include:

CHEM 131	Organic Polyfunctional Compounds	3
CHEM 171	Physical Chemistry I	4
CHEM 173	Physical Chemistry II	3
CHEM 175	Physical Chemistry III	3
BIOC 200	Applied Biochemistry	2

### Course Requirements

Ph.D. students in the Program in Biophysics are required to complete the following course requirements:

		Units
BIOPHYS 241	Biological Macromolecules	3-5
or BIOE 300A	Molecular and Cellular Bioengineering	
BIOPHYS 242	Methods in Molecular Biophysics (offered every other year)	3
BIOPHYS 250	Seminar in Biophysics	1
MED 255	The Responsible Conduct of Research	1
and 4 graduate-level courses in physical or biological science, with at least 1 course in physical science		
at least 1 course in literature-based biological science		

## Lab Rotation and Settlement

During the first year of graduate school in Biophysics, students are encouraged to complete a minimum two quarters of rotations in any faculty labs of their choice, a third rotation is allowed if necessary. Once the students finish their rotations, they make an official decision on which faculty's lab to settle in. If the faculty is not part of Biophysics, then the student needs to have an additional co-advising faculty member on their committee who is in Biophysics. Once the student settles in a lab, s/he is required to complete the first Individual Development Plan (IDP) and begin forming the reading committee.

## Individual Development Plan (IDP)

In light of the benefits to trainee development and the likelihood that the IDP program will be a factor in NIH funding decisions, the Committee on Graduate Admissions and Policy (CGAP) has adopted a new policy requiring all Biosciences Ph.D. candidates and their mentors in the Schools of Medicine and H&S to create and discuss the Individual Development Plan (IDP) (<https://biosciences.stanford.edu/current/idp>) on an annual basis.

1. Complete the first IDP meeting with the adviser within 30 days of joining the thesis lab.
2. IDP meetings are required annually, in addition to and separate from thesis committee meetings (see below).

## Reading Committee

See the "Degree-Specific Requirements (Doctoral Degrees) (p. 52)" section of this bulletin for University rules concerning doctoral degrees. See GAP 4.8 (<http://gap.stanford.edu/4-8.html>), for further details on the Doctoral Dissertation Reading Committee.

Once a student have chosen a research adviser and begun thesis-related research, s/he is required to select a reading committee. The student's reading committee should be in place no later than Autumn Quarter of the third year in the program. The individuals selected by the student serve as an advising and consultative group for the duration of their graduate studies. They evaluate the student's dissertation proposal and constitute the core of their the defense committee. Students should consult with their research adviser on the selection of their reading committee.

The doctoral dissertation reading committee consists of the principal dissertation adviser and, typically, two other readers. The doctoral dissertation reading committee must have at least three members and may not have more than five members. All members of the reading committee approve the dissertation. At least one member must be from the student's major department. Normally, all committee members are members of the Stanford University Academic Council or are emeritus Academic Council members.

The reading committee, as proposed by the student and agreed to by the prospective members, is endorsed by the chair of the major department on this Doctoral Dissertation Reading Committee form (<https://stanford.app.box.com/docdiss-reading-committee-form>). The student's department chair may, in some cases, approve the appointment of a reader who is not a current or emeritus member of the Academic Council

(via the Petition for Non-Academic Council Doctoral Committee Members form (<https://stanford.app.box.com/doc-ctte-non-acad-council>)), if that person is particularly well qualified to consult on the dissertation topic and holds a Ph.D. or equivalent foreign degree). All examiners must hold a Ph.D. degree (or foreign equivalent). Former Stanford Academic Council members and non-Academic Council members may thus on occasion serve on a reading committee.

Any member of the Academic Council may serve as the principal dissertation adviser. If former Academic Council members, emeritus Academic Council members, or non-Academic Council members are to serve as the principal dissertation adviser, the appointment of a co-adviser who is currently on the Academic Council is required. This is to ensure representation for the student in the department by someone playing a major adviser role in completion of the dissertation. However, a co-adviser is not required during the first two years following retirement for emeritus Academic Council members who are recalled to active service. If the reading committee has four or five members, at least three members (comprising the majority) must be current or emeritus members of the Academic Council.

## Qualifying Exam

Once students enter their third year of graduate studies, they are required to arrange a meeting with their committee to present to them a proposed thesis related research project (dissertation proposal). The meeting is called the qualifying exam, and should be completed no later than the end of Autumn Quarter of the student's third year. In anticipation of the exam, the student should prepare an approximately 10-page summary of their proposed research and/or any progress they have made at that time. The precise format (e.g., inclusion of a timeline, methods section, etc.) is flexible, and naturally can conform to the particular style of papers or proposals coming from their thesis lab. The main goal of the written portion is to briefly summarize the student's progress so far and carefully plan out their future thesis research plans with committee feedback and advice.

At the meeting, the student should be prepared to make a 30-45 minute presentation of their research where they discuss their results to date and propose further experiments. Audiovisual aids are not required, but may be useful if available. After completing the qualifying exam, students need to arrange annual thesis committee meetings with their committee members to review academic progress each year. Completing the qualifying exam serves to meet the student's first thesis committee meeting requirement. The thesis committee meetings should be completed once a year during the student's 3rd and 4th years, and twice a year past their fifth year and above.

## Candidacy

Admission to candidacy for the doctoral degree is granted by the major department following a student's successful completion of qualifying procedures. Students are expected to be admitted to candidacy by the end of the second year of doctoral study. Candidacy is valid for five years, subject to satisfactory academic progress.

## Terminal Graduate Registration (TGR)

Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the University oral exam and dissertation, completed 135 units or 10.5 quarters of residency (if under the old residency policy), and submitted a Doctoral Dissertation Reading Committee form, may request Terminal Graduate Registration (TGR) status to complete their dissertations. Students with more than one active graduate degree program must complete residency units between all active/completed degree programs in order to apply for TGR status. See the "Residency Policy for Graduate Students (p. 57)" section of this bulletin for additional information.

## Dissertation/Oral Exam

The student must prepare a dissertation proposal defining the research to be undertaken, including methods of procedure. This proposal should be submitted by Autumn Quarter of the third year, and it must be approved by a committee of at least three members, including the principal research adviser, and at least one member from the Biophysics Program. The candidate must defend the dissertation proposal in an oral examination. The dissertation reading committee normally evolves from the dissertation proposal review committee.

The student must present a Ph.D. dissertation as the result of independent investigation that expresses a contribution to knowledge in the field of biophysics. The student must pass the University oral exam, taken only after the student has substantially completed the dissertation research. The examination is preceded by a public seminar in which the research is presented by the candidate.

### *Emeritus:*

- Harden M. McConnell (Chemistry)
- Stephen J. Smith (Molecular & Cellular Physiology)

### *Director:*

- KC Huang (Bioengineering)

### *Professors:*

- Russ Altman (Bioengineering, Genetics, Medicine - Biomedical Informatics)
- Steve M. Block (Applied Physics, Biology)
- Steven Boxer (Chemistry)
- Axel Brunger (Molecular & Cellular Physiology)
- Wah Chiu (Bioengineering)
- Gilbert Chu (Oncology, Biochemistry)
- Steven Chu (Physics, Molecular & Cellular Physiology)
- John O. Dabiri (Civil and Environmental Engineering, Mechanical Engineering)
- Hongjie Dai (Chemistry)
- Mark Davis (Microbiology & Immunology)
- Sebastian Doniach (Physics, Applied Physics)
- James Ferrell (Chemical & Systems Biology, Biochemistry)
- Daniel Fisher (Applied Physics)
- Judith Frydman (Biology, Genetics)
- Chris Garcia (Molecular & Cellular Physiology, Structural Biology)
- Gary H. Glover (Radiology)
- Miriam Goodman (Molecular & Cellular Physiology)
- Philip C. Hanawalt (Biology, Dermatology)
- Daniel Herschlag (Biochemistry)
- Keith O. Hodgson (Chemistry)
- Theodore Jardetzky (Structural Biology)
- Peter S. Kim (Biochemistry)
- Brian Kobilka (Molecular & Cellular Physiology)
- Eric Kool (Chemistry)
- Ron Kopito (Biology)
- Roger D. Kornberg (Structural Biology)
- Craig Levin (Radiology)
- Michael Levitt (Structural Biology)
- Richard Lewis (Molecular & Cellular Physiology)
- Sharon Long (Biology)
- Tobias Meyer (Chemical & Systems Biology)
- W. E. Moerner (Chemistry)
- Vijay Pande (Chemistry)

- Norbert Pelc (Bioengineering, Radiology)
- Joseph D. Puglisi (Structural Biology)
- Stephen Quake (Bioengineering, Applied Physics)
- Jianghong Rao (Radiology)
- Edward I. Solomon (Chemistry)
- James A. Spudich (Biochemistry)
- Julie Theriot (Biochemistry, Microbiology & Immunology)
- Alice Y. Ting (Genetics)
- Thomas Wandless (Chemical & Systems Biology)
- William I. Weis (Structural Biology, Molecular & Cellular Physiology)
- Richard Zare (Chemistry)

*Associate Professors:*

- Annelise Barron (Bioengineering)
- Zev Bryant (Bioengineering)
- Jennifer Cochran (Bioengineering)
- Bianxiao Cui (Chemistry)
- Rhiju Das (Biochemistry)
- Ron Dror (Computer Science)
- Alexander Dunn (Chemical Engineering)
- William Greenleaf (Genetics)
- Pehr Harbury (Biochemistry)
- KC Huang (Bioengineering)
- Jan Liphardt (Bioengineering)
- Merritt Maduke (Molecular & Cellular Physiology)
- Beth Pruitt (Mechanical Engineering)
- Mark Schnitzer (Biology, Applied Physics)
- Jan Skotheim (Biology)
- Andrew Spakowitz (Chemical Engineering)

*Assistant Professors:*

- Raag Airan (Radiology)
- Lacramioara Bintu (Bioengineering)
- Alistair Boettiger (Developmental Biology)
- Onn Brandman (Biochemistry)
- Lynette Cegelski (Chemistry)
- Ovijit Chaudhuri (Mechanical Engineering)
- Adam de la Zerda (Structural Biology)
- Liang Feng (Molecular & Cellular Physiology)
- Polly Fordyce (Genetics)
- Possu Huang (Bioengineering)
- Anshul Kundaje (Genetics, Computer Science)
- Jin Billy Li (Genetics)
- Lingyin Li (Biochemistry)
- Manu Prakash (Bioengineering)
- Ingmar H. Riedel-Kruse (Bioengineering)
- Julia Salzman (Biochemistry)
- Sindy Tang (Mechanical Engineering)
- Mary Teruel (Chemical & Systems Biology)
- Bo Wang (Bioengineering)

# CHEMISTRY

Courses offered by the Department are listed under the subject code CHEM on the Stanford Bulletin's ExploreCourses web site.

For further information about the Department of Chemistry, see the department's web site (<https://chemistry.stanford.edu>).

Chemistry is about the nature of matter, how to make it, how to measure it, how to model it. In that sense chemistry really matters; it is essential to explaining all the real world. It holds the key to making new drugs, creating new materials, and understanding and controlling material properties of all sorts. It is no wonder then that chemistry is called the "Central Science." Traditionally, it is divided into subdisciplines, such as organic, inorganic, physical, biological, theoretical, and analytical, but these distinctions blur as it is increasingly appreciated how all of science, let alone chemistry, is interconnected.

A deeper understanding of chemistry enables students to participate in research and studies involving biotechnology, nanotechnology, catalysis, human health, materials, earth and environmental sciences, and more. Together, faculty, postdoctoral scholars, graduate and undergraduate students actively work side by side developing new probes of biological molecules, modeling protein folding and reactivity, manipulating carbon nanotubes, developing new oxidation and polymerization catalysts, and synthesizing organic molecules to probe ion-channels. The overarching theme of these pursuits is a focus at the atomic and molecular levels, whether this concerns probing the electronic structure and reactivity of molecules as small as dihydrogen or synthesizing large polymer assemblies. The ability to synthesize new molecules and materials and to modify existing biological structures allows the properties of complex systems to be analyzed and harnessed with huge benefit to both the scientific community and society at large.

## Undergraduate Program

### Mission

The mission of the undergraduate program in Chemistry is to provide students with foundational knowledge in the subdisciplines of chemistry as well as depth in one or more advanced areas, including cutting-edge research. Introductory course work allows students to gain hands-on experience with chemical phenomena, gather data, and propose models and explanations for their observations, thus participating in the scientific process from the start. In advanced labs and lectures, students build an in-depth knowledge of the molecular principles of chemistry empowering them to become molecular engineers comfortable with the methodologies necessary to solve complex problems and effectively articulate their ideas to the scientific community. Ultimately the analytical thinking and problem solving skills developed within the chemistry major make students successful candidates for a wide range of careers in chemistry and beyond, including engineering, teaching, consulting, medicine, law, science writing, and science policy.

### Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. demonstrate the knowledge and skills required to solve problems in the synthesis, measurement, and modeling of chemical systems.
2. apply this set of chemical knowledge and skills to analyze scientific data, evaluate and interpret its significance, and articulate conclusions supportable by the data.
3. be able to construct a scientific hypothesis and devise appropriate experiments to test and evaluate this hypothesis.

4. communicate scientific research effectively in written and spoken form.

## Graduate Program

The University's basic requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

### Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Chemistry and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in the field of chemistry. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of chemistry and to interpret and present the results of such research.

### Fellowships and Scholarships

In addition to University and school fellowships and scholarships open to properly qualified students, there are several department fellowships in chemistry awarded based on merit. Teaching assistantships and research assistantships are provided to eligible graduate students. Teaching assistantships beyond the required quarters are available for those interested. Graduate fellowships, scholarships, and teaching assistantships are administered through the Department of Chemistry student services office.

### Teaching Credentials

The requirements for certification to teach chemistry in the secondary schools of California may be ascertained by consulting the section on credentials under the "School of Education (p. 193)" section of this bulletin and the credential administrator of the School of Education.

### Chemical Physics

Students with an exceptionally strong background in physics and mathematics may, with special arrangement, pursue a program of studies in chemical physics.

## Bachelor of Science in Chemistry

### Entrance Preparation

Entrance credit in the preparatory subjects of chemistry, physics, and especially mathematics provides flexibility in creating a four-year schedule for students intending to major in Chemistry.

### Degree Requirements

Additional information on the undergraduate program can be found on the Department of Chemistry web site under Academics beginning with the section on The Major for the B.S. Degree (<https://chemistry.stanford.edu/academics/undergraduate-program/major>). All degree courses must be taken for a letter grade.

### Lab Courses

Lab courses have a mandatory, non-refundable fee. Students who have not yet taken a lab course must purchase a department-approved lab coat and safety glasses. The department makes these available for purchase at the lowest possible price during the first few days of each quarter.

**Traditional Chemistry Concentration**

Requirements:

Select one of the following: Units  
5-10

CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	
CHEM 31X	Chemical Principles Accelerated	

**Required Chemistry Courses**

CHEM 33	Structure and Reactivity of Organic Molecules	5
CHEM 35	Organic Chemistry of Bioactive Molecules	5
CHEM 130	Organic Chemistry Laboratory	3
CHEM 131	Organic Polyfunctional Compounds	3
CHEM 132	Synthesis Laboratory	3
CHEM 134	Analytical Chemistry Laboratory	5
CHEM 151	Inorganic Chemistry I	4
CHEM 153	Inorganic Chemistry II	3
CHEM 171	Physical Chemistry I	4
CHEM 173	Physical Chemistry II	3
CHEM 174	Electrochemical Measurements Lab	3
CHEM 175	Physical Chemistry III	3
CHEM 176	Spectroscopy Laboratory	3

**Mathematics or CME**

MATH 19	Calculus	3
MATH 20	Calculus	3
MATH 21	Calculus	4

Select one of the following series: 10-15

**Series A**

MATH 51	Linear Algebra and Differential Calculus of Several Variables	
MATH 53	Ordinary Differential Equations with Linear Algebra	

**Series B**

CME 100	Vector Calculus for Engineers	
CME 102	Ordinary Differential Equations for Engineers	
CME 104	Linear Algebra and Partial Differential Equations for Engineers	

**Physics Required Courses**

PHYSICS 41	Mechanics	4
PHYSICS 42	Classical Mechanics Laboratory	1
PHYSICS 43	Electricity and Magnetism	4
PHYSICS 44	Electricity and Magnetism Lab	1

Total Units 82-92

**Biological Chemistry Concentration**

Requirements:

Select one of the following: Units  
5-10

CHEM 31A & CHEM 31B	Chemical Principles I and Chemical Principles II	
CHEM 31X	Chemical Principles Accelerated	

**Required Chemistry and Biology courses**

CHEM 33	Structure and Reactivity of Organic Molecules	5
CHEM 35	Organic Chemistry of Bioactive Molecules	5
CHEM 130	Organic Chemistry Laboratory	3
CHEM 131	Organic Polyfunctional Compounds	3
CHEM 132	Synthesis Laboratory	3
CHEM 134	Analytical Chemistry Laboratory	5
CHEM 151	Inorganic Chemistry I	4

CHEM 171	Physical Chemistry I	4
CHEM 173	Physical Chemistry II	3
CHEM 176	Spectroscopy Laboratory	3
CHEM 181	Biochemistry I	4
CHEM 183	Biochemistry II	3
CHEM 184	Biological Chemistry Laboratory	3
CHEM 185	Biophysical Chemistry	3

Select one of the following BIO courses: 4

BIO 82	Genetics	
BIO 84	Physiology	
BIO 86	Cell Biology	

**Mathematics or CME**

MATH 19	Calculus	3
MATH 20	Calculus	3
MATH 21	Calculus	4

Select one of the following Series: 10-15

**Series A**

MATH 51	Linear Algebra and Differential Calculus of Several Variables	
MATH 53	Ordinary Differential Equations with Linear Algebra	

**Series B**

CME 100	Vector Calculus for Engineers	
CME 102	Ordinary Differential Equations for Engineers	
CME 104	Linear Algebra and Partial Differential Equations for Engineers	

**Required Physics Courses**

PHYSICS 41	Mechanics	4
PHYSICS 42	Classical Mechanics Laboratory	1
PHYSICS 43	Electricity and Magnetism	4
PHYSICS 44	Electricity and Magnetism Lab	1

**Elective**

3-4

Select one graduate-level elective course related to your biochemical interests.

CHEM 221	Advanced Organic Chemistry	
CHEM 223	Advanced Organic Chemistry	
CHEM 225	Advanced Organic Chemistry	
CHEM 226	Synthesis and Analysis at the Chemistry-Biology Interface	
CHEM 227	Therapeutic Science at the Chemistry - Biology Interface	
CHEM 235	Applications of NMR Spectroscopy	
CHEM 255	Advanced Inorganic Chemistry	
CHEM 271	Advanced Physical Chemistry	
CHEM 277	Materials Chemistry and Physics	
CHEM 297	Bio-Inorganic Chemistry	
BIO 214	Advanced Cell Biology	
BIO 230	Molecular and Cellular Immunology	
BIO 232	Advanced Imaging Lab in Biophysics	
BIOC 241	Biological Macromolecules	
BIOE 214	Representations and Algorithms for Computational Molecular Biology	
BIOE 224	Probes and Applications for Multi-modality Molecular Imaging of Living Subjects	
BIOE 300A	Molecular and Cellular Bioengineering	
BIOE 335	Molecular Motors I	
BIOPHYS 232	Advanced Imaging Lab in Biophysics	
BIOPHYS 279	Computational Biology: Structure and Organization of Biomolecules and Cells	

CSB 220	Chemistry of Biological Processes
CSB 260	Concepts and Applications in Chemical Biology
<b>Total Units</b>	<b>93-104</b>

## Chemistry Major Schedule

Below are possible schedules for the traditional concentration and the biological chemistry concentration, each followed by an accelerated schedule.

### Schedule for Traditional Chemistry Concentration

First Year	Units		
	Autumn	Winter	Spring
Chemical Principles I (CHEM 31A)		5	
Calculus (MATH 19)	3		
Chemical Principles II (CHEM 31B)			5
Calculus (MATH 20)		3	
Structure and Reactivity of Organic Molecules (CHEM 33)			5
Calculus (MATH 21)			4
<b>Year Total:</b>	<b>8</b>	<b>8</b>	<b>9</b>

Second Year	Units		
	Autumn	Winter	Spring
Organic Chemistry of Bioactive Molecules (CHEM 35)		5	
Linear Algebra and Differential Calculus of Several Variables (MATH 51)		5	
Inorganic Chemistry I (CHEM 151)			4
Mechanics (PHYSICS 41)			4
Classical Mechanics Laboratory (PHYSICS 42)			1
Analytical Chemistry Laboratory (CHEM 134)			5
Physical Chemistry I (CHEM 171)			4
<b>Year Total:</b>	<b>10</b>	<b>9</b>	<b>9</b>

Third Year	Units		
	Autumn	Winter	Spring
Organic Chemistry Laboratory (CHEM 130)	3		
Organic Polyfunctional Compounds (CHEM 131)	3		
Synthesis Laboratory (CHEM 132)		3	
Ordinary Differential Equations with Linear Algebra (MATH 53)		5	
Electricity and Magnetism (PHYSICS 43)			4
Electricity and Magnetism Lab (PHYSICS 44)			1
<b>Year Total:</b>	<b>6</b>	<b>8</b>	<b>5</b>

Fourth Year	Units		
	Autumn	Winter	Spring
Physical Chemistry II (CHEM 173)	3		
Electrochemical Measurements Lab (CHEM 174)	3		
Physical Chemistry III (CHEM 175)		3	
Spectroscopy Laboratory (CHEM 176)		3	
Inorganic Chemistry II (CHEM 153)			3
<b>Year Total:</b>	<b>6</b>	<b>6</b>	<b>3</b>

Total Units in Sequence: 87

### Accelerated Schedule for the Traditional Chemistry Concentration

First Year	Units		
	Autumn	Winter	Spring
Chemical Principles Accelerated (CHEM 31X)		5	
Linear Algebra and Differential Calculus of Several Variables (MATH 51)		5	
Structure and Reactivity of Organic Molecules (CHEM 33)			5
Mechanics (PHYSICS 41)			4
Classical Mechanics Laboratory (PHYSICS 42)			1
Organic Chemistry of Bioactive Molecules (CHEM 35)			5
Electricity and Magnetism (PHYSICS 43)			4
Electricity and Magnetism Lab (PHYSICS 44)			1

Year Total: 10 10 10

Second Year	Units		
	Autumn	Winter	Spring
Organic Chemistry Laboratory (CHEM 130)		3	
Organic Polyfunctional Compounds (CHEM 131)		3	
Ordinary Differential Equations with Linear Algebra (MATH 53)		5	
Synthesis Laboratory (CHEM 132)			3
Inorganic Chemistry I (CHEM 151)			4
Analytical Chemistry Laboratory (CHEM 134)			5
Physical Chemistry I (CHEM 171)			4
<b>Year Total:</b>	<b>11</b>	<b>7</b>	<b>9</b>

Third Year	Units		
	Autumn	Winter	Spring
Physical Chemistry II (CHEM 173)		3	
Electrochemical Measurements Lab (CHEM 174)		3	
Physical Chemistry III (CHEM 175)			3
Spectroscopy Laboratory (CHEM 176)			3
Inorganic Chemistry II (CHEM 153)			3
<b>Year Total:</b>	<b>6</b>	<b>6</b>	<b>3</b>

Total Units in Sequence: 72

### Schedule for Biological Chemistry Concentration

First Year	Units		
	Autumn	Winter	Spring
Chemical Principles I (CHEM 31A)		5	
Calculus (MATH 19)		3	
Chemical Principles II (CHEM 31B)			5
Calculus (MATH 20)			3
Structure and Reactivity of Organic Molecules (CHEM 33)			5
Calculus (MATH 21)			4
<b>Year Total:</b>	<b>8</b>	<b>8</b>	<b>9</b>

Second Year	Units		
	Autumn	Winter	Spring
Organic Chemistry of Bioactive Molecules (CHEM 35)		5	
Linear Algebra and Differential Calculus of Several Variables (MATH 51)		5	
Inorganic Chemistry I (CHEM 151)			4
Mechanics (PHYSICS 41)			4
Classical Mechanics Laboratory (PHYSICS 42)			1
Analytical Chemistry Laboratory (CHEM 134)			5
Physical Chemistry I (CHEM 171)			4
Cell Biology (BIO 86)			4
<b>Year Total:</b>	<b>10</b>	<b>9</b>	<b>13</b>

Third Year	Units		
	Autumn	Winter	Spring
Organic Chemistry Laboratory (CHEM 130)	3		
Organic Polyfunctional Compounds (CHEM 131)	3		
Biochemistry I (CHEM 181)		4	
Synthesis Laboratory (CHEM 132)			3
Biochemistry II (CHEM 183)			3
Ordinary Differential Equations with Linear Algebra (MATH 53)			5
Biological Chemistry Laboratory (CHEM 184)			3
Electricity and Magnetism (PHYSICS 43)			4
Electricity and Magnetism Lab (PHYSICS 44)			1
<b>Year Total:</b>	<b>10</b>	<b>11</b>	<b>8</b>

Fourth Year	Units		
	Autumn	Winter	Spring
Physical Chemistry II (CHEM 173)	3		
Spectroscopy Laboratory (CHEM 176)			3
Biophysical Chemistry (CHEM 185)			3

Therapeutic Science at the Chemistry - Biology Interface (CHEM 227)			3
Year Total:	3	3	6

Total Units in Sequence: 98

### Accelerated Schedule for the Biological Chemistry Concentration

First Year	Units		
	Autumn	Winter	Spring
Chemical Principles Accelerated (CHEM 31X)		5	
Linear Algebra and Differential Calculus of Several Variables (MATH 51)	5		
Structure and Reactivity of Organic Molecules (CHEM 33)			5
Mechanics (PHYSICS 41)			4
Classical Mechanics Laboratory (PHYSICS 42)			1
Organic Chemistry of Bioactive Molecules (CHEM 35)			5
Electricity and Magnetism (PHYSICS 43)			4
Electricity and Magnetism Lab (PHYSICS 44)			1
Year Total:	10	10	10

Second Year	Units		
	Autumn	Winter	Spring
Organic Chemistry Laboratory (CHEM 130)	3		
Organic Polyfunctional Compounds (CHEM 131)	3		
Ordinary Differential Equations with Linear Algebra (MATH 53)	5		
Synthesis Laboratory (CHEM 132)			3
Inorganic Chemistry I (CHEM 151)			4
Physiology (BIO 84) (BIO 82 Autumn; BIO 86 Spring) or Genetics (BIO 82) or Cell Biology (BIO 86)			4
Analytical Chemistry Laboratory (CHEM 134)			5
Physical Chemistry I (CHEM 171)			4
Year Total:	11	11	9

Third Year	Units		
	Autumn	Winter	Spring
Physical Chemistry II (CHEM 173)	3		
Biochemistry I (CHEM 181)	4		
Spectroscopy Laboratory (CHEM 176)			3
Biochemistry II (CHEM 183)			3
Biological Chemistry Laboratory (CHEM 184)			3
Biophysical Chemistry (CHEM 185)			3
Therapeutic Science at the Chemistry - Biology Interface (CHEM 227)			3
Year Total:	7	6	9

Total Units in Sequence: 83

### Related Courses

Courses offered by other departments that may be of interest to Chemistry majors include:

BIO 82	Genetics	4
BIO 84	Physiology	4
BIO 86	Cell Biology	4
CHEMENG 20	Introduction to Chemical Engineering	4
CHEMENG 120A	Fluid Mechanics	4
CHEMENG 120B	Energy and Mass Transport	4
CHEMENG 130	Separation Processes	3
CS 106A	Programming Methodology (recommended for students planning graduate study)	3-5
CS 106B	Programming Abstractions (recommended for students planning graduate study)	3-5

ENGR 50	Introduction to Materials Science, Nanotechnology Emphasis	4
MATH 106	Functions of a Complex Variable	3
MATH 109	Applied Group Theory	3
MATH 113	Linear Algebra and Matrix Theory	3
MATH 131P	Partial Differential Equations	3
MATSCI 151	Microstructure and Mechanical Properties	4
PHYSICS 110	Advanced Mechanics	4
STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5
STATS 116	Theory of Probability	3-5

## American Chemical Society (ACS) Certification

Students who wish to be certified as having met the minimum requirements of the American Chemical Society for professional training must complete, in addition to the above requirements:

		Units
CHEM 181	Biochemistry I	4
CHEM 190	Advanced Undergraduate Research	1-5

Effective for Chemistry students graduating 2018-19 and beyond, an A.C.S. certified bachelor's degree is no longer offered.

## Honors Program

A bachelor's degree in Chemistry with honors is available to those students interested in chemical research. Admission to the honors program requires a grade point average (GPA) of 3.3 in science courses and an overall GPA of 3.0 in all University courses. Beyond the standard B.S. course requirements for each track, 9 units of research credit and 9 units of course work need to be completed during the junior and senior academic years. A thesis, approved by the honors adviser, must be completed during the senior year. The theses must be submitted to the research adviser, at least one week before the end of regular classes in Spring Quarter, and must be completed by May 15 to be considered for the Firestone or Golden award. The use of a single course for multiple requirements for honors, major, minor, or coterminal requirements is not allowed. Students who wish to be admitted to the honors program should register with the student services manager in the Mudd Chemistry Building in Spring Quarter of their junior year.

CHEM 190 Advanced Undergraduate Research research units towards honors may be completed, after being accepted into the program, in any laboratory within Chemistry or with courtesy faculty in Chemistry. Other chemical research can be approved through a formal petitioning of the Undergraduate Studies Committee. At least 3 units must be completed during the senior year. Participation in a summer research program in an academic setting between junior and senior years may be used in lieu of 3 units of CHEM 190 Advanced Undergraduate Research. For each quarter, a progress report reflecting the units undertaken is required. This report must be signed by the honors adviser, and filed in the department student services office before the last day of finals in the quarter during which the research is performed.

The 9 units of course work for honors must be completed from courses approved by the Undergraduate Studies Committee and taken for a letter grade. At least six of these units need to be taken from the following CHEM courses:

		Units
CHEM 153	Inorganic Chemistry II	3
CHEM 174	Electrochemical Measurements Lab	3
CHEM 175	Physical Chemistry III	3



CHEM 181	Biochemistry I	4
CHEM 183	Biochemistry II	3
CHEM 184	Biological Chemistry Laboratory	3
CHEM 185	Biophysical Chemistry	3
CHEM 221	Advanced Organic Chemistry	3
CHEM 223	Advanced Organic Chemistry	3
CHEM 225	Advanced Organic Chemistry	3
CHEM 227	Therapeutic Science at the Chemistry - Biology Interface	3
CHEM 235	Applications of NMR Spectroscopy	3
CHEM 251	Advanced Inorganic Chemistry	3
CHEM 255	Advanced Inorganic Chemistry	3
CHEM 271	Advanced Physical Chemistry	3
CHEM 273	Advanced Physical Chemistry	3
CHEM 275	Advanced Physical Chemistry	3
CHEM 297	Bio-Inorganic Chemistry	3

## Minor in Chemistry

Courses required for a minor must be taken for a letter grade and all courses below are required:

		Units
CHEM 33	Structure and Reactivity of Organic Molecules	5
CHEM 35	Organic Chemistry of Bioactive Molecules	5
CHEM 130	Organic Chemistry Laboratory	3
CHEM 131	Organic Polyfunctional Compounds	3
CHEM 134	Analytical Chemistry Laboratory	5
CHEM 151	Inorganic Chemistry I	4
CHEM 171	Physical Chemistry I	4
Total Units		29

## Master of Science in Chemistry

The Master of Science is available only to current Ph.D. students or as part of a coterminal program. Applicants for the M.S. degree in Chemistry are required to complete, in addition to the requirements for the bachelor's degree, a minimum of 45 graduate-level units and a M.S. thesis. Of the 45 units, approximately two-thirds must be in the department and must include at least 12 units of graduate level lecture courses exclusive of the thesis.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

Units

Of the 12 units, at least 6 units must be from:

CHEM 221	Advanced Organic Chemistry	3
CHEM 223	Advanced Organic Chemistry	3
CHEM 225	Advanced Organic Chemistry	3
CHEM 227	Therapeutic Science at the Chemistry - Biology Interface	3
CHEM 235	Applications of NMR Spectroscopy	3
CHEM 251	Advanced Inorganic Chemistry	3
CHEM 253	Advanced Inorganic Chemistry	3
CHEM 255	Advanced Inorganic Chemistry	3
CHEM 271	Advanced Physical Chemistry	3
CHEM 273	Advanced Physical Chemistry	3
CHEM 275	Advanced Physical Chemistry	3
CHEM 277	Materials Chemistry and Physics	3
CHEM 297	Bio-Inorganic Chemistry	3

## Doctor of Philosophy in Chemistry Process to Candidacy

Graduate students are eligible to become formal candidates for the Ph.D. degree after taking the department placement examinations, satisfactory completion of most of the formal lecture course requirements, and satisfactory progress on a dissertation research project. There is no foreign language requirement for the Ph.D. degree. Admission to candidacy for the Ph.D. degree must be done before July of the second year of graduate registration.

### Placement Examinations

Each new graduate student must take placement examinations upon entrance. These consist of three written examinations of two hours each in the fields of inorganic, organic, and physical chemistry, and cover such material as ordinarily is given in a rigorous one-year undergraduate course in each of these subjects. Students concentrating in biophysical chemistry or chemical physics must take examinations in biophysical or chemical physics, physical chemistry, and organic or inorganic chemistry. Students concentrating in chemical biology must take examinations in biophysical, organic chemistry, and physical chemistry or inorganic chemistry. All placement examinations are given the week before instruction begins in Autumn Quarter, and must be taken at that time. Each new graduate student meets with a member of the graduate study committee to define a program of courses based on results of the placement examinations.

### General Requirements

After taking the departmental placement examinations, students select a research adviser by interviewing members of the Chemistry faculty. An Application to Start Research form is submitted to the Department as research begins under the supervision of the adviser. All students in good standing are required to start research by the end of February, during Winter Quarter of the first year of graduate registration.

Candidates for the Ph.D. degree are required to participate continually in the department colloquium (CHEM 300 Department Colloquium) and in the division seminar of the major subject (CHEM 229 Organic Chemistry Seminar, CHEM 259 Inorganic Chemistry Seminar, or CHEM 279 Physical Chemistry Seminar).

Candidates for advanced degrees must have a minimum grade point average (GPA) of 3.0 for all Chemistry lecture courses as well as for all courses taken during graduate study. Required courses must be taken for a letter grade. Most course work ends in the second year of studies, and students will then focus on full-time dissertation research.

Students may major in organic, chemical biology, physical, biophysical, chemical physics, or inorganic chemistry. All graduate students are required to take six graduate-level lecture courses (course numbers greater than 199) of at least 3 units each in chemistry or related disciplines (e.g., biochemistry, electrical engineering, mathematics, chemical engineering, chemical and systems biology, physics, materials science), to be selected in consultation with their research adviser and the Graduate Study Committee. All six courses must be taken for a letter grade. At least three of the six courses should be taken within the Chemistry Department. A minimum of four courses should be completed by the end of the first year.

## Course Requirements

### Students majoring in organic chemistry or chemical biology must complete:

CHEM 231	Organic Chemistry Seminar Presentation (Autumn, Winter, and Spring of the second year)	1
CHEM 233A	Creativity in Organic Chemistry (Research Progress)	1
CHEM 233B	Creativity in Organic Chemistry (Research Progress)	1
CHEM 233C	Creativity in Organic Chemistry (Research Progress)	1

### Students majoring in physical or biophysical chemistry or chemical physics must complete:

CHEM 271	Advanced Physical Chemistry (in the first year)	3
CHEM 273	Advanced Physical Chemistry (in the first year)	3
CHEM 275	Advanced Physical Chemistry (in the first year)	3
CHEM 278A	Research Progress in Physical Chemistry	1
CHEM 278B	Research Progress in Physical Chemistry	1

### Students majoring in inorganic chemistry must complete:

CHEM 258A	Research Progress in Inorganic Chemistry	1
CHEM 258B	Research Progress in Inorganic Chemistry (Seminar Presentation)	1
CHEM 258C	Research Progress in Inorganic Chemistry (Research Proposal)	1

Continuous enrollment in CHEM 301 Research in Chemistry is expected after the student has chosen a research supervisor.

## Post-Candidacy

Before candidates may request scheduling of the University oral examination, clearance must be obtained from the dissertation adviser and an academic review meeting made with the Student Services Manager for the Department of Chemistry.

During the period in which a dissertation is being read by members of the faculty, candidates must be available for personal consultation until the dissertation has received final department approval.

## Ph.D. Minor in Chemistry

Candidates for the Ph.D. degree in other departments who wish to obtain a minor in chemistry must complete, with a GPA of 3.0 or higher, 20 graduate-level units in Chemistry including four lecture courses of at least three units each.

*Emeriti:* (Professors) Hans C. Andersen, John I. Brauman, James P. Collman, Wray H. Huestis, Robert Pecora

*Chair:* Keith O. Hodgson

*Vice Chair:* T. Daniel P. Stack

*Professors:* Carolyn R. Bertozzi, Steven G. Boxer, Hongjie Dai, Michael D. Fayer, Keith O. Hodgson, Chaitan Khosla, Eric T. Kool, Todd J. Martínez, W. E. Moerner, Vijay S. Pande, Edward I. Solomon, Barry M. Trost, Robert M. Waymouth, Paul A. Wender, Richard N. Zare

*Associate Professors:* Christopher E. D. Chidsey, Bianxiao Cui, Justin Du Bois, Matthew Kanan, Lynette Cegelski, T. Daniel P. Stack

*Assistant Professors:* Noah Z. Burns, Hemamala Karunadasa, Thomas E. Markland, Yan Xia

*Courtesy Professors:* Zhenan Bao, Stacey F. Bent, James K. Chen, Karlene A. Cimprich, Curtis W. Frank, Daniel Herschlag, Jianghong Rao, Alice Y. Ting, Thomas J. Wandless

*Courtesy Associate Professors:* Yi Cui

*Lecturers:* Megan K. Brennan, Charles C. Cox, Jennifer Schwartz Poehlmann, Heidi Vollmer-Snarr

Units

# CLASSICS

Courses offered by the Department of Classics are listed on the *Stanford Bulletin's* ExploreCourses web site under the subject code CLASSICS (<https://explorecourses.stanford.edu/search?q=CLASSICS&view=catalog&page=0&academicYear=&filter-coursestatus-Active=on&filter-departmentcode-CLASSICS=on&collapse=&filter-catalognumber-CLASSICS=on>).

The study of Classics has traditionally centered on the literature and material culture of ancient Greece and Rome, including Greek and Latin language, literature, philosophy, history, art, and archaeology. At Stanford, Classics also explores connections with other ancient cultures and with the modern world, as well as specialized fields such as ancient economics, law, papyrology, and science. The department's faculty approaches Classics from an interdisciplinary perspective that crosses geographical, temporal, and thematic territories. Studying ancient epic poetry can lead to looking at modern cinema afresh; ancient Athenian politics opens new perspectives on modern politics; and the study of Rome presents parallels with other empires just as Latin illuminates the history of English and the Romance languages. In short, Classics at Stanford is an interdisciplinary subject concerned not only with Greek and Roman civilization but also with the interaction of cultures and societies that influenced the ancient Mediterranean basin and continue to influence human society across the globe.

## Mission of the Undergraduate Program in Classics

The mission of the undergraduate program in Classics is to provide students with a broad background centered on the literature and material culture of ancient Greece and Rome, including Greek and Latin language, literature, philosophy, history, art, and archaeology. At Stanford, students in the Classics program also explore the connections between ancient cultures and the modern world as well as specialized fields such as ancient economics, law, papyrology, and science. The program's faculty approaches Classics from an interdisciplinary perspective that crosses geographical, temporal and thematic territories. The program is concerned not only with Greek and Roman civilization but also with the interaction of cultures and societies that influenced the ancient Mediterranean basin and continue to influence human society across the globe.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. The ability to develop effective and nuanced lines of interpretation.
2. Critical thinking skills using primary source materials.
3. Facility with the methodologies and presuppositions underlying interpretive positions in secondary literature and in their own work.
4. Well-developed analytical writing skills and close reading skills.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Classics and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Classics. Through completion of advanced course work

and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Classics and to interpret and present the results of such research.

## Course Numbering

CLASSICS courses are numbered according to level and area of study.

Digit	Area
001-099	Introductory Courses
001-030	Beginning and Intermediate Language and Introductory Seminars
031-050	General Topics
051-075	Art And Archaeology
076-099	Ancient History
100-199	Undergraduate Language, Core, Electives, and Independent Study
100-110	Advanced Language
111-150	General Topics
151-175	Art and Archaeology
176-196	Ancient History
197-199	Independent Study
200-299	Graduate Language Surveys and Electives
200-210	Language
211-250	General Topics
251-275	Art and Archaeology
276-297	Ancient History
298-299	Independent Study
300-399	Graduate Seminars and Dissertation Research
300-310	Workshops
311-350	General Topics
351-375	Art and Archaeology
376-398	Ancient History
399	Independent Study (dissertation research)

## Bachelor of Arts in Classics

Those interested in majoring in Classics are encouraged to declare by spring of sophomore year, but are urged to discuss their plans with the undergraduate director as early as possible. Students who choose the Greek and Latin field of study (option E below) should begin the curriculum as soon as possible because it is difficult to complete the language requirements without an early start; those with no previous knowledge of Latin or Greek should begin study in the freshman year, in a summer program following freshman year, or at the beginning of the sophomore year.

## How to Declare

To declare the major, a student must fill out the Declaration of Major on Axess and meet with the Director of Undergraduate Studies in the Department of Classics. At that time, the Director Undergraduate Studies assists the student to select a department adviser. To build a mentoring relationship, students should meet with their adviser at least once a quarter. At the time of declaration, the student should also meet with the Department of Classics' student services officer. Each student's progress towards fulfillment of the major requirements is recorded in a file kept in the student services officer's office. It is the student's responsibility to work with the adviser and student services officer to keep this file up to date.

## Grade and Course Requirements

A letter grade is required for all courses taken for the major. No course receiving a grade lower than 'C' is counted toward fulfilling major requirements. Enrollment in an independent study section (CLASSICS 198 Directed Readings) requires the prior approval of the Director of Undergraduate Studies, and a maximum of three such enrollments for a maximum total of 10 units may be counted toward the major. University credit earned by placement tests or advanced placement work in secondary school is not counted towards any major requirement in the department. Work done at other universities or colleges is subject to department evaluation and the university's transfer credit process. Counting graduate courses or cognate courses towards the major requires advance approval by the Director of Undergraduate Studies. Students are encouraged to meet with the Director of Undergraduate Studies to discuss options for pursuing a period of study in the Mediterranean region (see Study Abroad below).

The B.A. degree may be earned by fulfilling the requirements for one of the following fields of study. These fields of study are declared on Axess; they appear on the transcript but not on the diploma. The fields of study are:

- Classical Studies
- Ancient History
- Greek
- Latin
- Greek and Latin

The Philosophy and Literature focus described below may be added to some of the major plans. This focus is not declared on Axess, and does not appear on the transcript or diploma.

### A. Classical Studies

This major is recommended for students who wish to study classical civilizations in depth but do not wish to study the languages to the extent required by the Greek, Latin or Greek and Latin options described below. It is not suitable for students who wish to do graduate work in Classics or to teach Latin or Greek in high school, as the language work is insufficient for these purposes.

Students must complete at least 60 units of approved courses including:<sup>+</sup>

CLASSICS 150	Majors Seminar	5
at least two courses in Latin or Greek at the intermediate-level or higher <sup>1</sup>		10
CLASSICS 11L	Intermediate Latin: Introduction to Literature	
CLASSICS 12L	Intermediate Latin: Cicero and Catullus	
CLASSICS 13L	Intermediate Latin: Vergil's Aeneid, Books 7-12	
CLASSICS 101L	Advanced Latin: Seneca	
CLASSICS 102L	Advanced Latin: Rebel with a cause: Catiline	
CLASSICS 103L	Advanced Latin: Ovid's Metamorphoses	
CLASSICS 11G	Intermediate Greek: Prose	
CLASSICS 12G	Intermediate Greek: Sophocles' Antigone	
CLASSICS 13G	Intermediate Greek: Homer's Iliad	
CLASSICS 101G	Advanced Greek: Lyric Poetry	
CLASSICS 102G	Advanced Greek: Greek Scientific Writings	
CLASSICS 103G	Advanced Greek: Plato's Crito	
or one course in one of the languages at the intermediate-level or higher, plus the beginning series of the other language <sup>1</sup>		20
CLASSICS 1L	Beginning Latin	
CLASSICS 2L	Beginning Latin	
CLASSICS 3L	Beginning Latin	

CLASSICS 1G	Beginning Greek	
CLASSICS 2G	Beginning Greek	
CLASSICS 3G	Beginning Greek	
remaining units from your choice of CLASSICS courses <sup>2</sup>		35-45
Total Units		60

- + Students enrolled in the CS+Classics joint major program must complete the Major's Seminar (5 units), all language courses (10 or 20 units), ePortfolio (2 units), senior capstone project (5 units), and additional CLASSICS courses for a total minimum of 55 units. See the Joint Major with CS (p. 437) tab for more information.
- <sup>1</sup> Language courses may be repeated for credit towards the degree only with advance written permission from the Director of Undergraduate Studies.
- <sup>2</sup> Up to 8 units of THINK 10, THINK 16, THINK 35/THINK 35A (note that this is the same course), ESF 7/ESF 7A (note that this is the same course), IHUM 39A,B, IHUM 69A, the Autumn Quarter of SIMILE, or SLE may be counted toward the major; IHUM courses are no longer offered.

### B. Ancient History:

	Units	
Students must complete at least 60 units of approved courses and must satisfy the following requirements: <sup>+</sup>		
CLASSICS 150	Majors Seminar	5
<b>Core Requirement</b>		6-10
Complete any two survey courses in ancient history:		
CLASSICS 81	Ancient Empires: Near East	
CLASSICS 82	The Egyptians	
CLASSICS 83	The Greeks	
CLASSICS 84	The Romans	
<b>Depth Requirement</b>		33
Complete at least 33 units of ancient history and civilization courses, drawn from CLASSICS 31-99 and CLASSICS 110-197. <sup>1,2</sup>		
<b>Breadth Requirements</b>		
Complete at least 4 units in each of the following three areas <sup>3</sup>		
1. Archaeology and art; suggested courses include CLASSICS 51-75 and CLASSICS 151-175. <sup>4</sup>		4-5
2. Comparative ancient civilizations: complete a course on the ancient world outside the Mediterranean and western Asia. Suggested courses include:		4-5
ANTHRO 101	The Aztecs and Their Ancestors: Introduction to Mesoamerican Archaeology	
ANTHRO 102A	Ancient Civilizations: Complexity and Collapse	
ANTHRO 106	Incas and their Ancestors: Peruvian Archaeology	
ANTHRO 115B	Peoples and Cultures of Ancient Mesoamerica	
ANTHRO 124	Maya Mythology and the Popol Vuh	
ARCHLGY 111	Emergence of Chinese Civilization from Caves to Palaces	
CLASSICS 146	Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire	
3. Historical and social theory. Suggested courses include:		4-5
ANTHRO 1	Introduction to Cultural and Social Anthropology	
ANTHRO 90B	Theory of Cultural and Social Anthropology	
ANTHRO 90D		
SOC 1	Introduction to Sociology at Stanford	
SOC 140	Introduction to Social Stratification	
SOC 142	Sociology of Gender	
SOC 170	Classics of Modern Social Theory	
HUMBIO 2B	Culture, Evolution, and Society	

Total Units	60	At least 31 units of Latin courses at the intermediate-level or higher. 31 It is recommended that this include CLASSICS 104A/B, though this series should not be taken until students have completed three years of Latin. <sup>1</sup>
+ Students enrolled in the CS+Classics joint major program must complete the Major's Seminar (5 units), two history core courses (10 units), courses in ancient history and civilization (21 units), ancient history breadth courses (12 units), ePortfolio (2 units) and the senior capstone project (5 units) for a total minimum of 55 units. See the Joint Major with CS (p. 437) tab for more information.		
<sup>1</sup> 4 units of THINK 10, THINK 16, THINK 35A, IHUM 39A or B, IHUM 69A, or Autumn Quarter of SIMILE may be counted toward this requirement (IHUM courses are no longer offered).		CLASSICS 11L Intermediate Latin: Introduction to Literature CLASSICS 12L Intermediate Latin: Cicero and Catullus CLASSICS 13L Intermediate Latin: Vergil's Aeneid, Books 7-12 CLASSICS 101L Advanced Latin: Seneca CLASSICS 102L Advanced Latin: Rebel with a cause: Catiline CLASSICS 103L Advanced Latin: Ovid's Metamorphoses
<sup>2</sup> Latin, Ancient Greek and IntroSems courses may count toward this requirement if approved by the Director of Undergraduate Studies.		At least three additional CLASSICS courses from CLASSICS 31-99 or 110-197 <sup>2</sup> 9-15
<sup>3</sup> The courses chosen must be approved in advance by the undergraduate director, and are normally chosen from the list of areas noted.		Remaining units from your choice of CLASSICS courses (Ancient Greek, Biblical Greek or ancient history recommended) 9-15
<sup>4</sup> IHUM 40B may be counted toward this requirement (this course is no longer offered).		Total Units: 60

## C. Greek

Students must complete at least 60 units of approved courses including:<sup>+</sup>

CLASSICS 150 Majors Seminar	5
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At least 31 units of Ancient Greek courses at the intermediate-level or higher. It is recommended that these include CLASSICS 105A/B, though this series should not be taken until students have completed three years of Greek.<sup>1</sup>

CLASSICS 11G Intermediate Greek: Prose	
CLASSICS 12G Intermediate Greek: Sophocles' Antigone	
CLASSICS 13G Intermediate Greek: Homer's Iliad	
CLASSICS 101G Advanced Greek: Lyric Poetry	
CLASSICS 102C Advanced Greek: Greek Scientific Writings	
CLASSICS 103G Advanced Greek: Plato's Crito	

At least three additional CLASSICS courses from CLASSICS 31-99 or 110-197<sup>2</sup> 9-15

Remaining units from your choice of CLASSICS courses (Latin, Biblical Greek, Sanskrit or ancient history recommended). 9-15

Total Units 60

+ Students enrolled in the CS+Classics joint major program must complete the Major's Seminar (5 units), Greek courses at the intermediate-level or higher (31 units), additional CLASSICS courses (12 units), ePortfolio (2 units) and the senior capstone project (5 units) for a total minimum of 55 units. See the Joint Major with CS (p. 437) tab for more information.

<sup>1</sup> Language courses may be repeated for credit towards the degree only with advance written permission from the Director of Undergraduate Studies.

<sup>2</sup> Up to 8 units of THINK 10, THINK 16, THINK 35/THINK 35A (note that this is the same course), ESF 7/ESF 7A (note that this is the same course), IHUM 39A/B, IHUM 69A, the Autumn Quarter of SIMILE, or SLE may be counted toward the major (IHUM courses are no longer offered).

## D. Latin

Students must complete at least 60 units of approved courses including:<sup>+</sup>

CLASSICS 150 Majors Seminar	5
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### Units

+ Students enrolled in the CS+Classics joint major program will need to complete the Major's Seminar (5 units), Latin courses at the intermediate-level and above (31 units), additional CLASSICS courses (12 units), ePortfolio (2 units) and the senior capstone project (5 units) for a total minimum of 55 units. See the Joint Major with CS (p. 437) tab for more information.

<sup>1</sup> Language courses may be repeated for credit towards the degree only with advance written permission from the Director of Undergraduate Studies.

<sup>2</sup> Up to 8 units of THINK 10, THINK 16, THINK 35/THINK 35A (note that this is the same course), ESF 7/ESF 7A (note that this is the same course), IHUM 39A/B, IHUM 69A, the Autumn Quarter of SIMILE, or SLE may be counted toward the major (IHUM courses are no longer offered).

## E. Greek and Latin

Students must complete at least 65 units of approved courses including:<sup>+</sup>

CLASSICS 150 Majors Seminar	5
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At least 30 units of Latin courses at the intermediate-level and higher. 30<sup>1,2</sup>

OR at least 30 units of Latin at the beginning-level and higher, as long as Greek is at the intermediate-level and higher

CLASSICS 1L Beginning Latin	
CLASSICS 2L Beginning Latin	
CLASSICS 3L Beginning Latin	
CLASSICS 11L Intermediate Latin: Introduction to Literature	
CLASSICS 12L Intermediate Latin: Cicero and Catullus	
CLASSICS 13L Intermediate Latin: Vergil's Aeneid, Books 7-12	
CLASSICS 101L Advanced Latin: Seneca	
CLASSICS 102L Advanced Latin: Rebel with a cause: Catiline	
CLASSICS 103L Advanced Latin: Ovid's Metamorphoses	
CLASSICS 104L Latin Syntax	
CLASSICS 104BLatin Syntax	

At least 30 units of Ancient Greek courses at the intermediate-level or higher. <sup>1,2</sup> 30

OR at least 30 units of Greek at the beginning-level and higher, as long as Latin is at the intermediate-level and higher

### Units

CLASSICS 1G Beginning Greek	
CLASSICS 2G Beginning Greek	
CLASSICS 3G Beginning Greek	
CLASSICS 11G Intermediate Greek: Prose	
CLASSICS 12G Intermediate Greek: Sophocles' Antigone	

CLASSICS 13G Intermediate Greek: Homer's Iliad	
CLASSICS 101(Advanced Greek: Lyric Poetry	
CLASSICS 102GAdvanced Greek: Greek Scientific Writings	
CLASSICS 103(Advanced Greek: Plato's Crito	
CLASSICS 105A	
CLASSICS 105E	
Recommended additional coursework in Biblical Greek, Sanskrit or ancient history <sup>3</sup>	
<b>Total Units:</b>	<b>65</b>

- + Students enrolled in the CS+Classics joint major program must complete the Major's Seminar (5 units), Latin courses (24 units), Greek courses (24 units), ePortfolio (2 units) and the senior capstone project (5 units) for a total minimum of 60 units. See the Joint Major with CS (p. 437) tab for more information.
- <sup>1</sup> Language courses may be repeated for credit towards the degree only with advance written permission from the Director of Undergraduate Studies.
- <sup>2</sup> It is recommended that this include CLASSICS 104A and CLASSICS 104B (for Latin); and CLASSICS 105A and CLASSICS 105B (for Greek). But this series should not be taken until completion of advanced-level course work in the relevant language.
- <sup>3</sup> Sanskrit is only allowed if both Greek and Latin requirements are fulfilled with course work at the intermediate-level and above.

## F. Philosophy and Literature Focus:

Students may apply a focus in Classics and Philosophy to the Classical Studies, Latin, or Greek major tracks. A focus is not reflected in the transcript or diploma, but provides a guided curriculum for those interested in this interdisciplinary study. Students who choose this focus must still complete the Majors' Seminar and language courses required by their chosen track. In addition, all students must take a set of core requirements and breadth requirements as described below.

### Core Requirements for all Philosophy and Literature Focuses

	<b>Units</b>
PHIL 81 Philosophy and Literature	5
PHIL 80 Mind, Matter, and Meaning	5
one course in each of the following areas:	
<b>1. aesthetics, ethics, and social and political philosophy</b>	<b>3-5</b>
PHIL 170 Ethical Theory	
PHIL 170D Trust and Trustworthiness	
<b>2. philosophy of language, mind, metaphysics, and epistemology</b>	<b>3-5</b>
PHIL 180 Metaphysics	
PHIL 180A Realism, Anti-Realism, Irrealism, Quasi-Realism	
<b>3. history of philosophy (course with subject code PHIL at the 100-level or above)</b>	<b>3-5</b>
Two related courses in Classics or Philosophy. Discuss your course selection in advance with the Director of Undergraduate Studies.	6-10
One capstone seminar. Discuss your course selection in advance with the Director of Undergraduate Studies.	3-5

### Breadth Requirements for Classical Studies: Philosophy and Literature Focus

	<b>Units</b>
one CLASSICS course in ancient history	3-5
one CLASSICS course in art and archaeology	3-5
one CLASSICS course in literature in translation	
one CLASSICS course in philosophy and history of science	3-5
one CLASSICS course in religion/mythology	3-5

### Breadth Requirements for Greek: Philosophy and Literature Focus

	<b>Units</b>
one CLASSICS course in ancient history or archaeology	3-5
one CLASSICS course in religion, philosophy, or ancient science	3-5
one CLASSICS course in literature in translation	3-5

### Breadth Requirements for Latin: Philosophy and Literature Focus

	<b>Units</b>
one CLASSICS course in ancient history or archaeology	3-5
one CLASSICS course in literature in translation	3-5
one CLASSICS course in religion, philosophy, or ancient science	3-5

## Honors Program

A minimum grade point average (GPA) of 3.6 within the major is required for students to enroll in the honors program. To be considered for honors in Classics, the student must select a professor who can supervise his or her honors thesis. A preliminary proposal, approved by the supervisor, is due April 15 of the junior year, and a final version is due at the beginning of the senior year. The proposal must outline the project in detail, list relevant courses that have been taken, and name the supervisor. The department gives approval only if a suitable faculty supervisor is available and if it is satisfied that the student has a sufficient basis of knowledge derived from department course work in the general areas the thesis covers, such as art, Greek, Latin, history, literature, or philosophy. If the proposal is approved, the student may sign up for CLASSICS 199 Undergraduate Thesis: Senior Research, during the senior year for a maximum of 6 units per term, up to an overall total of 10 units. These units may be counted towards fulfillment of the student's major requirements if relevant. Honors are awarded only if the essay receives a grade of 'B+' or higher from the supervisor and a second reader, who is chosen by the department. In addition, students must graduate with a GPA of 3.6 or higher within the major to receive honors.

## Study Abroad

Classics students may travel for several reasons: to complete accredited coursework (typically language courses or history surveys) for transfer towards the degree, to participate in archaeological digs of ancient sites, and to perform independent travel-research related to an honors project or independent study. Students considering academic programs sponsored by other institutions are encouraged to review Stanford's policies on transfer credit and to discuss possible programs with the Director of Undergraduate Studies before applying. Students seeking archaeological dig experience should inquire for opportunities through the Classics Department and through the Stanford Archaeology Center (<http://archaeology.stanford.edu>). Students who would like to construct an independent travel-research project should discuss their goals and itinerary with the Director of Undergraduate Studies.

While Classics-specific coursework is not always available through the Bing Overseas Program, students sometimes find Classics faculty at Bing campuses who are willing to provide independent instruction for credit. Pre-approval of courses and independent study syllabi by the Director of Undergraduate Studies is required for credit towards the major or minor.

Some departmental funding is available for summer language programs in the United States, and departmental funds are also available for travel and study in the Mediterranean. Students are encouraged to seek out multiple sources of funding, including offerings from UAR, to supplement their departmental applications. After discussing their plans with the Director of Undergraduate Study, applicants submit a departmental research grant application that includes expenses, a statement of purpose, and an endorsement by the student's faculty adviser. Food expenses are not normally reimbursed. Limited funding is available each year; preference is shown to majors and students with strong records.

## Joint Major Program: Classics and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

### Classics Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Progra (p. 278)m" section of this bulletin for details on Computer Science requirements.

Students majoring in the joint major program in Classics and Computer Science complete the degree requirements for Classics with the following changes:

1. Completion of 5 less overall units than a usual Classics major. The + footnote on each track describes where the unit relief may be taken.
2. ePortfolio course (2 units): The ePortfolio is preparation for the capstone project, and as such, must be taken by Spring quarter of the Junior year. The ePortfolio will reflect on the intersections (and possible disjunctions) between Computer Science and Classics. This may be an independent study or group seminar class. Topics might center on critical review of existing projects that join Computer Science and Classics, including analyses and reflections on two-to-three different digital humanities projects in the field of Classics. It might also include a commentary from a Classicist perspective on work in foundational Computer Science courses, an analysis of the implications of computational technology for historical or literary study in Classics, or the application of Classicists' methodologies to technological problems or issues.
3. Senior capstone project (5 units): The capstone project will be an original and integrative research project, guided by advisers in both departments, drawing on knowledge and skills in both areas, and counting towards the joint major on the Classics side. This will likely be independent study with Classics faculty or a course with a required project. It is also possible for honors thesis work in Classics to count towards this requirement, if the thesis project has a significant computational component. Projects might include analysis of archaeological or historical data, digital editions of texts, analyses of ancient corpora, digital representations and engagements with historical problems in the study of the ancient world, study of natural language processing as applied to literary analysis of ancient texts.

All ePortfolio and senior capstone projects must be approved by the Director of Undergraduate Studies.

### Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

### Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>). Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

### Transcript and Diploma

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

### Minor in Classics

The Director of Undergraduate Studies meets with each student who opts for the minor to discuss curriculum choices and assigns the student an adviser in the relevant field. Students are required to work closely with their advisers to create a cohesive curriculum within each area. Students who minor in Classics are required to take CLASSICS 150 Majors Seminar, which is writing intensive. Completion of the minor requires a minimum of 20 units.

Students may choose among four fields of study for the minor in Classics:

- Classical Languages
- Ancient History
- Literature and Philosophy
- Classical Studies

These fields of study are declared on Axess; they do not appear on the transcript or the diploma.

### I. Classical Languages

Students are required to take a minimum of five courses in Greek or in Latin. In addition to the five required courses, students must take CLASSICS 150 Majors Seminar. Students wishing to combine Greek and Latin may only do so if courses for one of the two languages are all intermediate level or above. Choose from the following courses this year:

		Units
CLASSICS 1L	Beginning Latin	5
CLASSICS 2L	Beginning Latin	5
CLASSICS 3L	Beginning Latin	5
CLASSICS 11L	Intermediate Latin: Introduction to Literature	5
CLASSICS 12L	Intermediate Latin: Cicero and Catullus	5
CLASSICS 13L	Intermediate Latin: Vergil's Aeneid, Books 7-12	5
CLASSICS 101L	Advanced Latin: Seneca	3-5
CLASSICS 102L	Advanced Latin: Rebel with a cause: Catiline	4-5
CLASSICS 103L	Advanced Latin: Ovid's Metamorphoses	3-5
CLASSICS 1G	Beginning Greek	5
CLASSICS 2G	Beginning Greek	5
CLASSICS 3G	Beginning Greek	5
CLASSICS 11G	Intermediate Greek: Prose	5
CLASSICS 12G	Intermediate Greek: Sophocles' Antigone	5
CLASSICS 13G	Intermediate Greek: Homer's Iliad	5
CLASSICS 101G	Advanced Greek: Lyric Poetry	3-5
CLASSICS 102G	Advanced Greek: Greek Scientific Writings	3-5
CLASSICS 103G	Advanced Greek: Plato's Crito	3-5

## II. Ancient History

Students are required to take a minimum of five courses in history, art history, and archaeology (any course within CLASSICS 51-99 or CLASSICS 151-197). Courses taken outside of the department may be substituted for one or more of these courses with prior, written approval from the Director of Undergraduate Studies. In addition to the five required courses, students must take CLASSICS 150 Majors Seminar. Courses offered in Latin and Greek that focus on historical topics or authors may count toward this minor with prior, written approval from the Director of Undergraduate Studies. Students may count up to 4 units of IHUM 69A or the fall quarter of SIMILE towards the breadth requirement; note that IHUM courses are no longer offered. Choose from the following courses this year:

		Units
CLASSICS 51	Introduction to Greek Archaeology	3-5
CLASSICS 52	Introduction to Roman Archaeology	3-5
CLASSICS 54	Introduction to World Architecture	5
CLASSICS 56	Introduction to the Visual Arts: Prehistoric through Medieval	5
CLASSICS 81	Ancient Empires: Near East	4-5
CLASSICS 82	The Egyptians	3-5
CLASSICS 83	The Greeks	4-5
CLASSICS 84	The Romans	3-5
CLASSICS 151	Ten Things: An Archaeology of Design	3
CLASSICS 154	Sailing the Wine-Dark Sea: Maritime Archaeology of the Ancient Mediterranean	3-4
CLASSICS 156	Design of Cities	3-5
CLASSICS 158	Iconoclasm	5
CLASSICS 164	Roman Gladiators	3-5
CLASSICS 166	The Body in Roman Art	4-5
CLASSICS 167		4-5
CLASSICS 159		4-5
CLASSICS 161	Introduction to Greek Art I: The Archaic Period	4
CLASSICS 162	Introduction to Greek Art II: The Classical Period	4
CLASSICS 163	Artists, Athletes, Courtesans and Crooks	5
CLASSICS 168	Engineering the Roman Empire	4-5
CLASSICS 169	Archaeology of Britannia	3-4

## III. Literature and Philosophy

Students are required to take a minimum of five courses in classical literature or philosophy, including classical science. Courses taken outside of the department (for instance, from the Philosophy department) may be substituted for one or more of these courses with prior, written approval from the Director of Undergraduate Studies. In addition to the five required courses, students must take CLASSICS 150 Majors Seminar. Courses offered in Latin and Greek that focus on philosophical or literary topics or authors may count toward the minor. Choose from the following courses this year:

		Units
CLASSICS 16N	Sappho: Erotic Poetess of Lesbos	3
CLASSICS 35	Becoming Like God: An Introduction to Greek Ethical Philosophy	3-5
CLASSICS 42	Philosophy and Literature	5
CLASSICS 121	Ecology in Philosophy and Literature	3-5
CLASSICS 136	The Greek Invention of Mathematics	3-5
CLASSICS 181	Classical Seminar: Origins of Political Thought	4-5

## IV. Classical Studies

Students are required to take a minimum of five courses in Classics (any course with subject code CLASSICS) plus CLASSICS 150 Majors Seminar. Students may count up to 4 units of THINK 10, THINK 16, THINK 35 (no longer offered), IHUM 39A, IHUM 69A (IHUM courses no longer offered), SLE or fall quarter of SIMILE towards the breadth requirement.

## Master of Arts in Classics

University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

### I. Language and Literature, II. Philosophy Fields of Study

Students who have completed an undergraduate major in Classics (Greek, Latin, or Greek and Latin fields of study) or equivalent may be accepted as candidates for the M.A. degree in Classics and may expect to complete the program in twelve months (usually three quarters of course work plus three months study for the thesis or examination). Students with an undergraduate major in Classics (Ancient History or Classical Studies fields of study) or without an undergraduate major in Classics may also be accepted as candidates, though they may require a longer period of study before completing the requirements for the degree. These requirements are:

1. A minimum of 25 of the 45 units must be graduate-level courses (generally 200-level or higher, but not always). The remaining units must be at the 100-level or higher.
2. Completion of one Greek language course at the 100 level (if the undergraduate major field of study was Latin) or one Latin language course at the 100 level (if the undergraduate major field of study was Greek). This requirement is waived for students with an undergraduate major in Classics with a field of study in Greek and Latin.
3. Passing a Greek or Latin language examination testing the candidate's ability to translate into English from a selected list of Greek or Latin authors. This exam is a minimum of two hours, requiring a grade of "B" or higher to pass.
4. Completion of the syntax sequence in at least one language. For Latin, this is CLASSICS 204A Latin Syntax and CLASSICS 204B Latin Syntax. For Greek, this is CLASSICS 205A and CLASSICS 205B Greek Syntax: Prose Composition.
5. Writing a thesis, or passing of an examination on a particular author or topic, or having written work accepted by the graduate committee as an equivalent. Three completed and satisfactory seminar papers are normally an acceptable equivalent, provided each paper has earned the grade of B+ or higher.
6. Students must pass a modern language reading exam in one of the following languages: German, French or Italian. In exceptional circumstances, the Graduate Studies Committee may permit a different language, e.g., Modern Greek or Russian, to be substituted in keeping with research plans. Students are allowed to use paper and online dictionaries. Exams are offered once a quarter (Autumn, Winter, Spring). Incoming graduates may choose to be tested as early as the Autumn Quarter. The department strongly encourages students to take modern language exams as early as possible in the program. If the first attempt to pass the exam is unsuccessful, the student is allowed to retake the test only once. Failing the second examination means automatic dismissal from the program. A grade of 'B-' or higher is required to pass.
7. Completion and approval of a Program Proposal for a Master's Degree form during the first quarter of enrollment, at least five days prior to the Final Study List deadline.

Candidates for the Ph.D. degree in Classics may also, on the recommendation of the department, become candidates for the M.A.



degree. In this case, requirement 5 above is waived provided that the student has completed some work beyond the course requirements listed under requirements 1 and 2 above. Current Stanford graduate students in other degree programs may be considered for the M.A. degree, but must be admitted into the program and must complete all requirements listed above.

### III. Classical Archaeology

Students who have completed an undergraduate major in Classics with a Classical Archaeology field of study, or in a closely related field, may be accepted as candidates for the M.A. degree in Classics with a Classical Archaeology field of study, and may expect to complete the program in twelve months (usually three quarters of course work plus three months study for the thesis or examination). Students without an undergraduate major in Classics with a Classical Archaeology field of study may also be accepted as candidates, though they may require a longer period of study before completing the requirements for the degree. These requirements are:

1. A minimum of 25 of the 45 units must be graduate-level courses (generally 200-level or higher, but not always). The remaining units must be at the 100-level or higher.
2. Completion with a grade of 'B' or higher of at least 15 units of graduate-level courses in classical archaeology, in addition to CLASSICS 331 Words and Things in the History of Classical Scholarship. (see 4).
3. Passing a Greek or Latin language examination testing the candidate's ability to translate into English from a selected list of Greek or Latin authors. This exam is a minimum of two hours, requiring a grade of "B" or higher to pass.
4. Completion with a grade of 'B' or higher of CLASSICS 331 Words and Things in the History of Classical Scholarship, or an equivalent course on the history of thought in classical archaeology approved by the Graduate Studies Committee.
5. Writing a thesis, or passing an exam on a particular topic, or having written work accepted by the graduate committee as an equivalent. Three completed and satisfactory seminar papers are normally an acceptable equivalent, provided each paper has earned the grade of B+ or higher.
6. Students must pass a modern language reading exam in one of the following languages: German, French or Italian. In exceptional circumstances, the Graduate Studies Committee may permit a different language, e.g., Modern Greek or Russian, to be substituted in keeping with research plans. Students are allowed to use paper and online dictionaries. Exams are offered once a quarter (Autumn, Winter, Spring). Incoming graduates may choose to be tested as early as the Autumn Quarter. The department strongly encourages students to take modern language exams as early as possible in the program. If the first attempt to pass the exam is unsuccessful, the student is allowed to retake the test only once. Failing the second examination means automatic dismissal from the program. A grade of 'B-' or higher is required to pass.
7. Completion and approval of a Program Proposal for a Master's Degree form during the first quarter of enrollment, at least five days prior to the Final Study List deadline.

Candidates for the Ph.D. degree may also, on the recommendation of the department, become candidates for the M.A. degree. In their case, requirement 5 above is waived provided that the student has completed some work beyond the course requirements listed under requirements 1 and 2 above. Current Stanford graduate students in other degree programs may be considered for the M.A. degree, but must be admitted into the program and must complete all requirements listed above.

### IV. Ancient History

Students who have completed an undergraduate major in Classics with an Ancient History field of study, or in a closely related field may be

accepted as candidates for the M.A. degree in Classics with an Ancient History field of study, and may expect to complete the program in twelve months (usually three quarters of course work plus three months study for the thesis or examination). Students without an undergraduate major in Classics with an Ancient History field of study may also be accepted as candidates, though they may require a longer period of study before completing the requirements for the degree. These requirements are:

1. A minimum of 30 of the 45 units must be graduate-level courses (generally 20-level or higher, but not always) and the remaining 15 units of work must be at the 100-level or higher.
2. Satisfactory completion of 20 units of graduate-level courses in Classics and of 10 units of graduate-level courses in other programs.
3. Satisfactory completion of 15 additional units of courses in either ancient Greek or Latin at the 100-level or higher.
4. Writing a thesis, or passing an exam on a particular topic, or having written work accepted by the Graduate Committee as an equivalent. Three completed and satisfactory seminar papers are normally an acceptable equivalent, provided each paper has earned the grade of B+ or higher.
5. Students must pass a modern language reading exam in one of the following languages: German, French or Italian. In exceptional circumstances, the Graduate Studies Committee may permit a different language, e.g., Modern Greek or Russian, to be substituted in keeping with research plans. Students are allowed to use paper and online dictionaries. Exams are offered once a quarter (Autumn, Winter, Spring). Incoming graduates may choose to be tested as early as the Autumn Quarter. The department strongly encourages students to take modern language exams as early as possible in the program. If the first attempt to pass the exam is unsuccessful, the student is allowed to retake the test only once. Failing the second examination means automatic dismissal from the program. A grade of 'B-' or higher is required to pass.
6. Completion and approval of a Program Proposal for a Master's Degree form during the first quarter of enrollment, at least five days prior to the Final Study List deadline.

Candidates for the Ph.D. degree may also (on the recommendation of the department) become candidates for the M.A. degree. In their case, requirement 4 above is waived provided that they have completed some work beyond the course requirements listed under requirements 1 and 2 above. Current Stanford graduate students in other degree programs may be considered for the M.A. degree, but must be admitted into the program and must complete all requirements listed above.

### Coterminal Master's Degree in Classics

Stanford students in any undergraduate major who wish to pursue graduate work in Classics may apply for Stanford's coterminal master's program. Students considering a coterm are encouraged to consult with the Director of Undergraduate Studies and the department's student services officer about their plans before filing an application. Applicants must have a minimum GPA of 3.7 in the major, and no incomplete grades on record. Undergraduate course work in Greek and Latin and one of the required modern languages is normally a prerequisite for graduate-level work.

To apply, students must complete the Coterminal Online Application (<https://applyweb.com/stanterm>), submit two letters of recommendation from Classics faculty, an unofficial copy of their undergraduate transcript, a 1-3 page statement of purpose and a 10-15 page writing sample. GRE scores are not required. Applications are due in early January of the intended graduation year for the undergraduate degree; please see the departmental website (<http://classics.stanford.edu>) for the specific deadline.

## University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Doctor of Philosophy in Classics

University requirements for the Ph.D. are described in the "Graduate Degrees" section of this bulletin. There are four specializations within the Classics Ph.D. program: language and literature; classical archaeology; ancient history; and the joint program in ancient philosophy. These specializations appear on the transcript and the diploma.

### I. Language and Literature

Candidates for the Ph.D. degree in Classics with specialization in language and literature must fulfill the following requirements:

1. Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree no later than the end of the fourth year. These must include the following courses:

		Units
CLASSICS 201L	Survey of Latin Literature: Literature of the Roman Republic	3-5
CLASSICS 202L	Survey of Latin Literature: Augustan Age Latin	3-5
CLASSICS 203L	Survey of Latin Literature: Imperial Latin	3-5
CLASSICS 201G	Survey of Greek Literature: Archaic Greek	3-5
CLASSICS 202G	Survey of Greek Literature: Classical Greek	3-5
CLASSICS 203G	Survey of Greek Literature: Hellenistic and Late Greek	3-5
CLASSICS 204A	Latin Syntax	4
CLASSICS 204B	Latin Syntax	2
CLASSICS 205A		2
CLASSICS 205B	Greek Syntax: Prose Composition	4
CLASSICS 206A	The Semantics of Grammar	2
CLASSICS 206B	The Semantics of Grammar	2

Plus twelve graduate seminars, nine of which must be Classics seminars, and one of the remaining three of which must be outside the department. The other two seminars may be in Classics, from other departments (with the graduate director's approval), and/or directed readings.<sup>1,2</sup>

- <sup>1</sup> No more than two directed readings may be counted towards this requirement.
- <sup>2</sup> Classics seminars are sometimes offered for a spread of units (3, 4 or 5). In some cases, instructors allow a student to complete a seminar for less units without requiring a written paper but with completion of all other requirements.

2. Maintain satisfactory progress throughout the degree program. The Classics department sets a higher standard for satisfactory progress than the University minimum requirements. To maintain that standard, students are expected to:
  - Maintain good grades (within the Classics department, this normally means grades in the A range; an accumulation of grades of B+ or lower may indicate problems).
  - pass all required exams by the required deadlines
  - write a minimum of three seminar papers per year in the first three years
  - demonstrate high-quality research and writing
  - take no more than one incomplete grade at a time (unless given special permission by the Director of Graduate Studies)
  - take incomplete grades only occasionally and finish any incompletes in a timely manner
  - demonstrate effective teaching when serving as a Teaching Assistant or Teaching Fellow

Students who fail to maintain satisfactory progress have travel and discretionary funds withheld until the situation is redressed.

3. Students must apply and be approved to advance to candidacy by the end of Summer Quarter of their second year.
4. Examinations:
  - As soon as students arrive, they must take diagnostic exams in Greek and Latin. Depending on performance, students may be required to enroll in undergraduate language classes in that language to improve their skills to the level required for graduate work.
  - Students must take Greek and Latin translation exams at the end of each survey sequence (Spring Quarter of the first and second years). Students are exempted from the final exam in Spring Quarter Survey in order to prepare for these translations exams. These exams are based on the Greek and Latin reading lists available on the Classics Department (<http://classics.stanford.edu>) website. Greek and Latin survey courses cover less than half of the material on which the translation exams test, and students need to prepare much of the work on their own. It is possible to take both exams in the first year if the student chooses. However, the student cannot choose to delay the first year exam to take both in the second year. The exam consists of translating four passages from a selection of six to eight passages, and students are allowed three hours. A grade of 'B-' or higher, on every passage, is required to pass. If a student does not attain a 'B-', the exam must be retaken and passed later in the summer before registering for the Autumn Quarter, in order to continue in the program. The exam can only be retaken once.
  - Students must pass two modern language translation exams: (1) German and (2) French or Italian. In exceptional circumstances, the Graduate Studies Committee may permit a different language, e.g., Modern Greek or Russian, to be substituted for (2), in keeping with dissertation research plans. Students are allowed to use paper and online dictionaries. Exams are offered once per quarter. Incoming graduates may choose to be tested as early as Autumn Quarter of their first year. The department strongly encourages students to take modern language exams as early as possible in the program (at least one modern language by the end of the first year), and certainly after any summer language courses they may have taken. Students have two opportunities to pass the modern language examinations. Failing the second opportunity means automatic dismissal from the program. Students are

required to pass the first modern language exam by the end of the second year, and the second modern language exam by the end of the third year, in order to maintain satisfactory progress. A grade of 'B-' or higher is required to pass.

- Students must take general examinations in Greek literature and Latin literature, and choose two more exams from the following fields: Ancient philosophy, Greek history, Roman history, Greek archaeology and Roman archaeology. The first exam is administered in Autumn Quarter of the second year, while the remaining three exams are administered in Autumn Quarter of the third year. Moving the timing of any of the exams, or increasing the number of exams requires prior consultation and approval by the Director of Graduate Studies. All exam choices must be approved by the Director of Graduate Studies in the Spring Quarter prior to the examination. To prepare for the exams, students must take at least one course in each of their chosen exam fields (in the case of ancient philosophy, a seminar or its equivalent) and may also consult with the faculty examiner. Reading lists for each of the exams are posted on the Classics website.
  - The University Oral Examination is the defense of the candidate's dissertation. In order to take this exam, a significant portion of the dissertation must be completed and approved by the dissertation adviser(s), the exam committee must have been established and approved by the Chair, and a date and time must have been arranged with the department. The exam consists of a public presentation with question and answer period (no longer than an hour), followed by a private examination between the student and the exam committee (also no longer than an hour).
5. During the third year, the candidate, in consultation with the dissertation proposal adviser (often the same as the dissertation adviser) writes a dissertation proposal, which is evaluated by a committee of faculty (dissertation proposal committee). The dissertation proposal defense should take place by the end of Autumn Quarter of the fourth year. If the proposal does not pass, the defense is repeated in the following quarter and must be passed. Failure to pass on the second attempt results in dismissal of the student from the program.
  6. Students are required to teach four one-quarter courses under department supervision. This teaching requirement is normally completed during the second and third years of study. Under certain circumstances, summer teaching may satisfy this requirement.

## II. Classical Archaeology

Candidates for the Ph.D. degree in Classics with a specialization in classical archaeology must fulfill the requirements following below.

Students are encouraged to enroll in or audit other undergraduate courses that may fill gaps in their undergraduate training. All students are expected to take part in archaeological fieldwork in the classical world areas. At least three consecutive quarters of course work must be taken at Stanford.

1. Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree at the end of the candidate's fourth year, including:

CLASSICS 331	Words and Things in the History of Classical Scholarship <sup>1</sup>	4-5
At least three graduate (200 or 300) level courses in Latin or Greek literature <sup>3</sup>		9-15
CLASSICS 201	Survey of Latin Literature: Literature of the Roman Republic	
CLASSICS 202	Survey of Latin Literature: Augustan Age Latin	
CLASSICS 203	Survey of Latin Literature: Imperial Latin	
CLASSICS 201	Survey of Greek Literature: Archaic Greek	

CLASSICS 202	Survey of Greek Literature: Classical Greek	
CLASSICS 203	Survey of Greek Literature: Hellenistic and Late Greek	

The interdepartmental graduate core sequence in archaeology. The Archaeology Center announces the courses which fulfill this requirement. The core sequence currently comprises a seminar in archaeology theory and a course on archaeological methods.

ANTHRO 303	Introduction to Archaeological Theory	
ANTHRO 307	Archaeological Methods	

At least one further course outside the Classics department.<sup>2</sup> 3-5  
 At least five graduate seminars in classical archaeology. 15-25  
 Suggested courses this year include:<sup>2</sup>

CLASSICS 370	Topics in Roman Art and Visual Culture	
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At least three graduate seminars in ancient history. Suggested courses this year include:<sup>2</sup> 9-15

CLASSICS 381	Classical Seminar: Origins of Political Thought	
CLASSICS 382	High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests	

CLASSICS 389	Dark Ages Compared: Early Iron Age Greece and Early Medieval Britain	
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2. <sup>1</sup> Must be taken as early as possible in the candidate's Stanford career.
- <sup>2</sup> Students may petition to count independent study courses in place of up to two required courses, but no more.
- <sup>3</sup> Students who enter the program with only one ancient language at the level needed for graduate study are strongly encouraged to take additional course work to reach graduate (200 and above) level in another language.

Maintain satisfactory progress throughout the degree program. The Classics department sets a higher standard for satisfactory progress than the University minimum requirements. To maintain that standard, students are expected to:

- Maintain good grades (within the Classics department, this normally means grades in the A range; an accumulation of grades of B+ or lower may indicate problems).
- pass all required exams by the required deadlines
- write a *minimum* of three seminar papers per year in the first three years
- demonstrate high-quality research and writing
- take no more than one incomplete grade at a time (unless given special permission by the Director of Graduate Studies)
- take incomplete grades only occasionally and finish any incompletes in a timely manner
- demonstrate effective teaching when serving as a Teaching Assistant or Teaching Fellow

Students who fail to maintain satisfactory progress have travel and discretionary funds withheld until the situation is redressed.

3. Students must apply and be approved to advance to candidacy by the end of Summer Quarter of their second year.
4. Examinations:
  - As soon as students arrive, they must take diagnostic exams in Greek and Latin. Depending on performance, students may be required to enroll in undergraduate language classes in that language to improve their skills to the level required for graduate work.
  - Students must pass two modern language translation exams: (1) German and (2) French or Italian. In exceptional circumstances, the Graduate Studies Committee may permit a different language, e.g., Modern Greek or Russian, to be substituted for (2), in keeping with dissertation research plans. Students are allowed to use paper and online dictionaries. Exams are offered once per quarter.

Units

Incoming graduates may choose to be tested as early as Autumn Quarter of their first year. The department strongly encourages students to take modern language exams as early as possible in the program (at least one modern language by the end of the first year), and certainly after any summer language courses they may have taken. Students have two opportunities to pass the modern language examinations. Failing the second opportunity means automatic dismissal from the program. Students are required to pass the first modern language exam by the end of the second year, and the second modern language exam by the end of the third year, in order to maintain satisfactory progress. A grade of 'B-' or higher is required to pass.

- Students must demonstrate graduate-level competency with an ancient language in one of two ways:
    - i *Option 1*: Greek or Latin translation exam. This examination must be taken Spring Quarter of the first year or Spring Quarter of the second year. A grade of 'B-' or higher on every passage is required to pass. If a student does not meet that standard, the exam must be retaken and passed later in the summer before registering for Autumn Quarter, in order to continue in the program. The exam can only be retaken once.
    - ii *Option 2*: Students must complete the course and take the final offered at the end of each quarter of Greek or Latin Survey. Students must earn a 'B-' or higher on each final to pass.
  - Students must take general examinations in Greek archaeology and Roman archaeology, and choose two more exams from the following fields: Ancient philosophy, Greek history, Roman history, Greek literature and Latin literature. The first exam is administered in Autumn Quarter of the second year, while the remaining three exams are administered in Autumn Quarter of the third year. Moving the timing of any of the exams, or increasing the number of exams requires prior consultation and approval by the Director of Graduate Studies. All exam choices must be approved by the Director of Graduate Studies in the Spring Quarter prior to the examination. To prepare for the exams, students must take at least one course in each of their chosen exam fields (in the case of ancient philosophy, a seminar or its equivalent) and may also consult with the faculty examiner. Reading lists for each of the exams are posted on the Classics website.
  - The University oral examination is the defense of the candidate's dissertation. In order to take this exam, a significant portion of the dissertation must be completed and approved by the dissertation adviser(s), the exam committee must have been established and approved by the Chair, and a date and time must have been arranged with the department. The exam consists of a public presentation with question and answer period (no longer than an hour), followed by a private examination between the student and the exam committee (also no longer than an hour).
5. During the third year, the candidate, in consultation with the dissertation proposal adviser (often the same as the dissertation adviser) writes a dissertation proposal, which is evaluated by a committee of faculty (dissertation proposal committee). The dissertation proposal defense should take place by the end of Autumn Quarter of the fourth year. If the proposal does not pass, the defense is repeated in the following quarter and must be passed. Failure to pass on the second attempt results in dismissal of the student from the program.
  6. Students are required to teach four one-quarter courses under department supervision. This teaching requirement is normally completed during the second and third years of study. Under certain circumstances, summer teaching may satisfy this requirement.

### III. Ancient History

Candidates for the Ph.D. degree in Classics with specialization in ancient history must fulfill the following requirements:

1. Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree at the end of the fourth year. These must include:
 

HISTORY 304 Approaches to History	8-10	
Two proseminars. These introduce students to primary sources of evidence for ancient history that require special training: papyrology, epigraphy, paleography, numismatics, and archaeology. <sup>1,2</sup>		
CLASSICS 211 PROSEMINAR: LATIN WORD ORDER		
CLASSICS 213 Proseminar: Documentary Papyrology		
CLASSICS 214 Proseminar: Ancient Numismatics		
CLASSICS 215		
CLASSICS 216 Advanced Paleography		
Three skills courses relevant to the individual student's chosen research approach. For example, a student could take classes in economics, demography, legal history, or anthropology. Courses can also be used to learn other ancient or modern languages, either by course work or directed reading. <sup>1</sup>	9-15	
Ten graduate seminars (200-level or above). At least five of these seminars must be taken in the department. <sup>2,3</sup>		30-50
<b>ANCIENT LANGUAGE COURSEWORK</b>		
Option 1: Students focus more on one ancient language by taking 15 units of one survey series (CLASSICS 201L/202L/203L or CLASSICS 201G/202G/203G) and 5 units of the alternate series, plus the following courses: <sup>4</sup>		30
CLASSICS 206 The Semantics of Grammar		
CLASSICS 206 The Semantics of Grammar		
CLASSICS 204 Latin Syntax		
CLASSICS 204 Latin Syntax		
CLASSICS 205		
CLASSICS 205 Greek Syntax: Prose Composition		
Option 2: Student emphasize broader linguistic skills. This requires students to take both ancient language surveys.		30
CLASSICS 201 Survey of Latin Literature: Literature of the Roman Republic		
CLASSICS 202 Survey of Latin Literature: Augustan Age Latin		
CLASSICS 203 Survey of Latin Literature: Imperial Latin		
CLASSICS 201 Survey of Greek Literature: Archaic Greek		
CLASSICS 202 Survey of Greek Literature: Classical Greek		
CLASSICS 203 Survey of Greek Literature: Hellenistic and Late Greek		
2. Maintain satisfactory progress throughout the degree program. The Classics department sets a higher standard for satisfactory progress than the University minimum requirements. To maintain that standard, students are expected to:
  - <sup>1</sup> Students must consult their advisers and the graduate director to determine the appropriate coursework.
  - <sup>2</sup> With the approval of their advisers and graduate director, students may take seminars outside of the department or at another university with which Stanford has an exchange agreement to fulfill this requirement.
  - <sup>3</sup> Two of these seminars may be replaced by directed readings with adviser and graduate director approval.
  - <sup>4</sup> Students who select Greek for their primary language should consult with the graduate director for a course to replace the Semantics of Grammar requirement.

satisfactory progress have travel and discretionary funds withheld until the situation is redressed.

- Maintain good grades (within the Classics department, this normally means grades in the A range; an accumulation of grades of B+ or lower may indicate problems).
- pass all required exams by the required deadlines
- write a *minimum* of three seminar papers per year in the first three years
- demonstrate high-quality research and writing
- take no more than one incomplete grade at a time (unless given special permission by the Director of Graduate Studies)
- take incomplete grades only occasionally and finish any incompletes in a timely manner
- demonstrate effective teaching when serving as a Teaching Assistant or Teaching Fellow

Students who fail to maintain satisfactory progress have travel and discretionary funds withheld until the situation is redressed.

3. Students must apply and be approved to advance to candidacy by the end of Summer Quarter of their second year.

4. Examinations:

- As soon as students arrive, they must take diagnostic exams in Greek and Latin, as well as Greek and Roman history. Depending on performance, students may be required to enroll in undergraduate language classes in that language to improve their skills to the level required for graduate work. The history exams are mainly on narrative history, especially important names, dates, and events. Depending on performance, students may be asked to sit in on the undergraduate history courses and take a directed reading or a graduate survey if offered.
- Students must take the final offered at the end of each quarter of Greek or Latin survey (for Option 1 above) or both Greek and Latin surveys (for Option 2 above). Students must earn a 'B-' or higher on each final to pass.
- Students must pass two modern language translation exams: (1) German and (2) French or Italian. In exceptional circumstances, the Graduate Studies Committee may permit a different language, e.g., Modern Greek or Russian, to be substituted for (2), in keeping with dissertation research plans. Students are allowed to use paper and online dictionaries. Exams are offered once per quarter. Incoming graduates may choose to be tested as early as Autumn Quarter of their first year. The department strongly encourages students to take modern language exams as early as possible in the program (at least one modern language by the end of the first year), and certainly after any summer language courses they may have taken. Students have two opportunities to pass the modern language examinations. Failing the second opportunity means automatic dismissal from the program. Students are required to pass the first modern language exam by the end of the second year, and the second modern language exam by the end of the third year, in order to maintain satisfactory progress. A grade of 'B-' or higher is required to pass.
- Students must take general examinations in Greek history and Roman history, and choose two more exams from the following fields: Ancient philosophy, Greek archaeology, Roman archaeology, Greek literature and Latin literature. The first exam is administered in Fall Quarter of the second year, while the remaining three exams are administered in Fall Quarter of the third year. Moving the timing of any of the exams, or increasing the number of exams requires prior consultation and approval by the Director of Graduate Studies. All exam choices must be approved by the Director of Graduate Studies in the Spring Quarter prior to the examination. To prepare for the exams, students must take at least one course in each of their chosen exam fields (in the case of ancient philosophy, a seminar or its equivalent) and may also consult with the faculty examiner.

Reading lists for each of the exams are posted on the Classics website.

- The University oral examination is the defense of the candidate's dissertation. In order to take this exam, a significant portion of the dissertation must be completed and approved by the dissertation adviser(s), the exam committee must have been established and approved by the Chair, and a date and time must have been arranged with the department. The exam consists of a public presentation with question and answer period (no longer than an hour), followed by a private examination between the student and the exam committee (also no longer than an hour).
5. During the third year, the candidate, in consultation with the dissertation proposal adviser (often the same as the dissertation adviser) writes a dissertation proposal, which is evaluated by a committee of faculty (dissertation proposal committee). The dissertation proposal defense should take place by the end of Autumn Quarter of the fourth year. If the proposal does not pass, the defense is repeated in the following quarter and must be passed. Failure to pass on the second attempt results in dismissal of the student from the program.
  6. Students are required to reach four one-quarter courses under department supervision. This teaching requirement is normally completed during the second and third years of study. Under certain circumstances, summer teaching may satisfy this requirement.

## IV. Joint Program in Ancient Philosophy

This specialization is jointly administered by the departments of Classics and Philosophy and is overseen by a joint committee composed of members of both departments. It provides students with the training, specialist skills, and knowledge needed for research and teaching in ancient philosophy while producing scholars who are fully trained as either philosophers or classicists.

Graduate students admitted by the Classics department receive their Ph.D. from the Classics department. This specialization includes training in ancient and modern philosophy. Each student in the program is advised by a committee consisting of one professor from each department.

Candidates for the Ph.D. degree in Classics with specialization in ancient philosophy must fulfill the following requirements:

	Units
Students must take three courses in the Philosophy department <sup>1</sup>	9-15
One course in logic which can be fulfilled at the 100-level or higher	
One course in aesthetics, ethics, or political philosophy (200-level or higher)	
One course in metaphysics, epistemology, philosophy of mind, or philosophy of science.	

At least three courses in ancient philosophy at the 200 level or above, 9-15 one of which must be in the Philosophy department. <sup>1</sup>

1. <sup>1</sup> All courses taken in the Philosophy department count for seminar credit (i.e., as contributing to the 12-seminar requirement in the Language and Literature track in the Classics department).

Complete 135 units of academic credit or equivalent in study beyond the bachelor's degree at the end of the fourth year. This includes all the requirements listed for the language and literature specialization in the graduate program in Classics (see above). Students must also take the below courses focusing on philosophy.

2. *Examinations:* The requirements are the same as those listed in the language and literature specialization, except that one of the four areas of general examination must be taken in ancient philosophy in addition to the exams in Greek literature and Latin literature.

3. *Dissertation Proposal*: The requirements are the same as those listed in the language and literature specialization.
4. *Teaching*: The requirements are the same as those listed in the language and literature specialization.

*Lecturers*: David Driscoll, Maud Gleason (on leave), John Klopacz, Tom Recht

\* Recalled to active duty.

## Classics and a Minor Field

The Ph.D. in Classics may be combined with a minor in another field, such as anthropology, history, humanities, or classical linguistics. Requirements for the minor field vary, but can include about six graduate-level courses in the field and one written examination, plus a portion of the University oral exam (dissertation defense). Students must consult with the department in which the minor is offered for exact requirements. Students who pursue this are expected to take five years. The department encourages such programs for especially able and well-prepared students. The following timetable would be typical for a five-year program:

- First Year: course work, almost entirely in Classics. One translation exam taken in June. One or both modern language exams taken.
- Second Year: course work, both in Classics and the minor field. Second translation exam completed. French and German exams completed.
- Third Year: course work, both in Classics and the minor field. General examinations in Classics.
- Fourth Year: remaining course work, both in Classics and the minor field. General examination in the minor field. Preparation for dissertation.
- Fifth Year: dissertation, University oral examination.

## Ph.D. Minor in Classics

For a graduate minor, the department recommends at least 20 units in Latin or Greek at the intermediate-level or above, and at least one course at the graduate (200) level or above. Students interested in this minor must discuss their proposed course plan with the Director of Graduate Studies as well as their Ph.D. department before obtaining Classics department approval.

*Emeriti*: (Professors) Mark W. Edwards, Marsh H. McCall, Jr.\*, Susan Treggiari

*Chair*: Grant Parker

*Director of Graduate Studies*: Walter Scheidel

*Director of Undergraduate Studies and Joint Major Advisor*: John Klopacz

*Professors*: Andrew M. Devine, Richard P. Martin (on leave), Ian Morris (on leave), Reviel Netz, Andrea Nightingale, Josiah Ober (Classics, Political Science), Anastasia-Erasmia Peponi, M. Rush Rehm (Classics, TAPS; on leave), Richard Saller (Classics, History), Walter Scheidel (Classics, History), Michael Shanks (on leave, Autumn Quarter), Susan A. Stephens (on leave)

*Associate Professors*: Giovanna Ceserani, Christopher B. Krebs, Jody Maxmin (Art and Art History, Classics; on leave, Winter Quarter), Grant Parker, Jennifer Trimble

*Assistant Professor*: Justin Leidwanger

*Courtesy Professors*: Fabio Barry (Art and Art History), Chris Bobonich (Philosophy), Alan Code (Philosophy), Charlotte Fonrobert (Religious Studies), Ian Hodder (Anthropology), Bissera Pentcheva (Art and Art History), Caroline Winterer (History), Yiqun Zhou (East Asian Languages and Cultures)

*Visiting Professors*: Stephen Harrison, Anne Kolb

# COMMUNICATION

Courses offered by the Department of Communication are listed under the subject code COMM on the Stanford Bulletin's ExploreCourses web site.

Stanford's Department of Communication focuses on media in all its forms. The department studies the processes and effects of mass communication: the nature and social role of the various media; their structure, function, and ethics; and their impact on the political system, culture, and society. In this context, it considers not only traditional mass media, such as newspapers, magazines, radio, television, and film, but also information technology, online media, virtual reality, and the Internet. Students are trained as social scientists who can study the media and as potential practitioners in the use of the media in journalism, mass communications, and digital media. The department combines theory and practice and fosters individual research opportunities for its students, employing both quantitative and qualitative approaches.

The Department of Communication engages in research in communication and offers curricula leading to the B.A., M.A., and Ph.D. degrees. The M.A. degree prepares students for a career in journalism. The department also offers current Stanford University undergraduates a coterminal program with an M.A. emphasis in Media Studies. The Ph.D. degree leads to careers in university teaching and research-related specialties.

The John S. Knight Journalism Fellowships supports journalism and journalism innovators who are deeply engaged in working on solutions to the biggest challenges facing journalism. Each year, up to 20 fellows come to Stanford from all over the world and all types of journalism. They collaborate to build tools, launch organizations, and become leaders in news innovation.

## Mission of the Undergraduate Program in Communication

The mission of the undergraduate program in Communication is to expose students to a broad-based understanding of communication theory and research. Students in this major are expected to become familiar with the fundamental concerns, theoretical approaches, and methods of the field, and to acquire advanced knowledge in one or more sub-areas of the discipline. This is accomplished by several levels of study: a core curriculum; intermediate-level electives; and optional internships. Majors also have the opportunity to do advanced research projects. The department is committed to providing students with analytical and critical skills needed for success in graduate programs, professional schools, or immediate career entry.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of communication.
2. the ability to communicate ideas clearly and persuasively in writing.
3. the ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. the ability to evaluate theory and critique research within the discipline of communication.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Communication and to prepare students for professional careers or doctoral studies. This is achieved through completion of courses in the primary field, as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Communication. Through completion of advanced coursework and rigorous training in research, the doctoral program prepares students to make original contributions to the knowledge of Communication and to interpret and present the results of such research.

## Admission

*Prospective Undergraduates:* Applications are available at Undergraduate Admissions (<http://admission.stanford.edu>).

*Prospective Coterminal Students:* Applications are available online on the University Registrar's (<https://registrar.stanford.edu/resources-and-help/student-forms/coterminal-forms>) web site.

*Prospective Graduate Students:* Applications are available online at Graduate Admissions (<http://gradadmissions.stanford.edu>).

The department requires that applicants for graduate admission submit verbal, quantitative, and analytic scores from the Graduate Record Examination (GRE). Admission to each graduate degree program is competitive and based on the pool of applicants each year rather than on standard criteria that can be stated in advance. See Communication Department admission procedures and requirements (<http://comm/phd/general/commdeptapplicationguide.pdf>) for detailed information about admission to the department.

Stanford students who are completing an M.A. degree and who desire entry into the Ph.D. program must file a Graduate Program Authorization Petition (<https://registrar.stanford.edu/students/graduate-degree-progress/graduate-program-authorization-petition>) in Axess. Such students are considered alongside all other doctoral applicants.

## Bachelor of Arts in Communication

### Preparation

Before declaring the major, students must have completed or be concurrently enrolled in one of the following:

		Units
COMM 1	Introduction to Communication	5
COMM 1B	Media, Culture, and Society	5
COMM 106	Communication Research Methods	5
COMM 108	Media Processes and Effects	5

Students interested in declaring the major should apply via Axess and meet with the student services administrator in Building 120, Room 110A, during scheduled office hours. Students are required to take at least 60 units (approximately 12 courses), not counting statistics, to complete the major.

### Program of Study

The undergraduate curriculum is intended for liberal arts students who wish to develop an understanding of communication in society, drawing on the perspective of the social sciences. Undergraduates majoring in Communication are expected to become acquainted with the fundamental concerns, theoretical approaches and methods of the field,

and to acquire advanced knowledge in one or more of the sub-areas of communication: institutions, processes, and effects.

While the department does not attempt to provide comprehensive practical training at the undergraduate level, the curriculum provides a diverse range of internship opportunities, including professional print journalism, some of which are funded by the department's Rebele Internship Program. The department is committed to providing students with analytical and critical skills for future success in graduate programs, professional schools, or immediate career entry.

The major is structured to provide several levels of study: a core curriculum intended to expose students to a broad-based understanding of communication theory and research, and a number of intermediate-level options and electives. Majors also have the opportunity to do advanced research in the form of an honors thesis.

All undergraduate majors are required to complete a set of core communication courses which include:

		Units
COMM 1	Introduction to Communication	5
or COMM 1B	Media, Culture, and Society	
COMM 106	Communication Research Methods	5
COMM 108	Media Processes and Effects	5
COMM 104W	Reporting, Writing, and Understanding the News	5
or COMM 120W	Digital Media in Society	
or COMM 137W	The Dialogue of Democracy	
or COMM 142W	Media Economics	
or COMM 143W	Communication Policy and Regulation	

COMM 104W, COMM 120W, COMM 137W, COMM 142W, and COMM 143W satisfy the WIM (Writing in the Major) requirement. Core courses are usually offered only once each year.

The department also requires completion of or concurrent registration in an introductory statistics course (STATS 60 Introduction to Statistical Methods: Precalculus) when registering for COMM 106 Communication Research Methods in preparation for courses in methodology and advanced courses in communication processes and effects. It is recommended that this be done as soon as possible so as not to prevent registration in a course requiring statistical understanding. The statistics course does not count toward the 60 units to complete the Communication major.

In addition to the core courses and the statistics requirement, undergraduate majors select courses from the two areas described below. Many of the courses require core courses as prerequisites. Majors select a total of four area courses, taking at least one from each area.

**Area I: Communication Processes and Effects**

Area I emphasizes the ways in which communication scholars conduct research in, and consider the issues of, human communication. These studies aim to provide expert guidance for social policy makers and media professionals and include the following courses:

		Units
COMM 121	Behavior and Social Media	5
COMM 124	Lies, Trust, and Tech	5
COMM 135	Deliberative Democracy and its Critics	3-5
COMM 137W	The Dialogue of Democracy	5
COMM 162	Campaigns, Voting, Media, and Elections	5
COMM 164	The Psychology of Communication About Politics in America	4
COMM 166	Virtual People	5
COMM 172	Media Psychology	5

COMM 326      Advanced Topics in Human Virtual Representation 1-5

**Area II: Communication Systems and Institutions**

Area II considers the roles and interaction of institutions such as broadcasting, journalism, constitutional law, and business within communication and mass communication contexts and includes the following courses:

		Units
COMM 104W	Reporting, Writing, and Understanding the News	5
COMM 113	Computational Methods in the Civic Sphere	5
COMM 116	Journalism Law	5
COMM 120W	Digital Media in Society	5
COMM 125	Perspectives on American Journalism	5
COMM 131	Media Ethics and Responsibility	5
COMM 142W	Media Economics	5
COMM 143W	Communication Policy and Regulation	5
COMM 151	The First Amendment: Freedom of Speech and Press	5
COMM 152	Constitutional Law	3
COMM 153	Political Campaigning in the Internet Age	3
COMM 154	The Politics of Algorithms	5
COMM 157	Information Control in Authoritarian Regimes	5
COMM 177A	Computational Journalism	5
COMM 177I	Becoming a Watchdog: Law, Order & Algorithms	5
COMM 177Y	Specialized Writing and Reporting: Foreign Correspondence	5

**Additional Requirements**

The remainder of the 60 required units may be fulfilled with any elective Communication courses or crosslisted courses in other departments.

To be recommended for the B.A. degree in Communication, the student must complete at least 60 units (approximately 12 courses) in the department. No more than 10 units of course work outside of the department or transfer credit may be applied to meet department requirements. Communication majors must receive a letter grade for all Communication courses unless they are offered only for satisfactory/no credit (S/NC), and must maintain a grade point average (GPA) of 2.0 (C) in courses towards the major. Only courses with a grade of 'C-' or above count towards the major. Therefore, majors who receive a grade of 'D+' or below in one of the core courses must repeat the course.

**Honors Program**

The honors program provides Communication majors the opportunity to undertake a significant program of research in an individual professor/student mentoring relationship. The aim is to guide students through the process of research, analysis, drafting, rethinking, and redrafting, which is essential to excellence in scholarship. Working one-on-one with a faculty adviser, seniors earn 15 Communication units culminating in an honors thesis. In order to be eligible for the honors program, interested majors must have a GPA of 3.3 in Communication courses, completed the following requirements, and received a grade of 'B+' or better in COMM 106, Communication Research Methods:

1. Core Requirements

Complete the following core requirements:

		Units
COMM 1	Introduction to Communication	5
or COMM 1B	Media, Culture, and Society	
COMM 106	Communication Research Methods (receive a grade of B+ or better)	5



COMM 108	Media Processes and Effects	5
STATS 60/ PSYCH 10	Introduction to Statistical Methods: Precalculus	5

2. Select an adviser; and
3. Submit an application to the department by the end of their junior year. See the department's honors web site to download an application form (<http://comm.stanford.edu/undergraduate/honors>).

Students are expected to make steady progress on their honors thesis throughout the year.

A final copy of the honors thesis must be submitted to the thesis advisor for review and grading and a second copy uploaded to the Stanford Digital Repository (<https://sdr.stanford.edu>) by the end of week eight of Spring Quarter of the student's senior year (exact date to be arranged). Honors work may be used to fulfill Communication elective credit, but must be completed and a letter grade submitted prior to graduation. A student failing to fulfill all honors requirements may still receive independent study credit for work completed, which may be applied toward fulfilling major requirements.

The designation "with honors" is awarded by the Department of Communication to those graduating seniors who, in addition to having completed all requirements for the Communication major:

1. complete an honors thesis;
2. maintain a distinguished GPA in all Communication course work;
3. are recommended by the Communication faculty.

## Minor in Communication

### Preparation

Before declaring the minor, students must have completed or be concurrently enrolled in one of the following:

		Units
COMM 1	Introduction to Communication	5
COMM 1B	Media, Culture, and Society	5
COMM 106	Communication Research Methods	5
COMM 108	Media Processes and Effects	5

Students interested in declaring the minor should do so no later than the deadline to for their application to graduate by applying via Axess and meeting with the student services administrator in building 120, room 110A.

### Program of Study

The minor is structured to provide a foundation for advanced course work in communication through a broad-based understanding of communication theory and research.

Students are required to take 35 units (approximately 7 courses), not counting statistics, to complete the minor. The curriculum consists of three introductory communication core courses that include:

		Units
COMM 1 or COMM 1B	Introduction to Communication Media, Culture, and Society	5
COMM 106	Communication Research Methods	5
COMM 108	Media Processes and Effects	5

Core courses are usually offered only once each year. The department also requires completion of – or concurrent registration in – an introductory statistics course (STATS 60 Introduction to Statistical Methods: Precalculus) when registering for COMM 106 Communication

Research Methods in preparation for courses in methodology and advanced courses in communication processes and effects. It is recommended that this be done as soon as possible so as not to prevent registration in a course requiring statistical understanding. The statistics course does not count toward the 35 units to complete the Communication minor.

In addition to the three core courses and the statistics course, students are required to take one course in each of the two areas as specified below.

The remainder of the 35 required units may be fulfilled with any intermediate-level elective Communication courses or crosslisted courses in other departments. No more than 5 units of course work outside of the department or transfer credit may be applied to meet department requirements. Communication minors must receive a letter grade for all Communication courses unless they are offered only for satisfactory/no credit (S/NC), and must maintain a grade point average (GPA) of 2.0 (C) in courses towards the minor. Only courses with a grade of C- or above count towards the minor. Some courses are not offered every year. Refer to ExploreCourses (<http://explorecourses.stanford.edu>) for details.

### Area I: Communication Processes and Effects

Units

Select one of the following:

COMM 121	Behavior and Social Media	5
COMM 124	Lies, Trust, and Tech	5
COMM 135	Deliberative Democracy and its Critics	5
COMM 137W	The Dialogue of Democracy	5
COMM 162	Campaigns, Voting, Media, and Elections	5
COMM 164	The Psychology of Communication About Politics in America	5
COMM 166	Virtual People	5
COMM 172	Media Psychology	5
COMM 326	Advanced Topics in Human Virtual Representation	1-5

### Area II: Communication Systems/Institutions

Units

Select one of the following:

COMM 104W	Reporting, Writing, and Understanding the News	5
COMM 113	Computational Methods in the Civic Sphere	5
COMM 116	Journalism Law	5
COMM 120W	Digital Media in Society	5
COMM 125	Perspectives on American Journalism	5
COMM 131	Media Ethics and Responsibility	5
COMM 142W	Media Economics	5
COMM 143W	Communication Policy and Regulation	5
COMM 151	The First Amendment: Freedom of Speech and Press	5
COMM 152	Constitutional Law	3
COMM 153	Political Campaigning in the Internet Age	3
COMM 154	The Politics of Algorithms	5
COMM 157	Information Control in Authoritarian Regimes	5
COMM 177A	Computational Journalism	5
COMM 177I	Becoming a Watchdog: Law, Order & Algorithms	5
COMM 177Y	Specialized Writing and Reporting: Foreign Correspondence	5

### Elective courses

Totaling 10 units.

## Master of Arts in Communication / Graduate Program in Journalism

University requirements for the master's degree are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

The department awards a terminal M.A. degree in Communication with a subplan in Journalism. This subplan prints on the transcript, but not on the diploma. Applicants for this program are evaluated for admission on different criteria. Work to fulfill graduate degree requirements must be in courses numbered 100 or above.

### Journalism

Stanford's graduate program in Journalism focuses on the knowledge and skills required to report, analyze, and write authoritatively about public issues and digital media. The curriculum combines a sequence of specialized reporting and writing courses with seminars and courses devoted to deepening the students' understanding of the roles and responsibilities of American news media in their coverage of public issues.

The program emphasizes preparation for the practice of journalism and a critical perspective from which to understand it. The program's objective is twofold:

1. to graduate talented reporters and writers to foster public understanding of the significance and consequences of public issues and the debates they engender; and
2. to graduate thoughtful journalists to respond openly and eloquently when called upon to explain and defend the methods and quality of their reporting and writing.

### Curriculum

The curriculum includes several required courses as shown below, including a master's project class:

		Units
COMM 216	Journalism Law	4
COMM 225	Perspectives on American Journalism	4
COMM 273D	Public Affairs Data Journalism I	4
COMM 274D	Public Affairs Data Journalism II	4
COMM 275	Multimedia Storytelling: Reporting and Production Using Audio, Still Images, and Video	3-4
COMM 279	News Reporting & Writing Fundamentals	3-4
COMM 289P	Journalism Thesis	4

Additionally, students are required to take two specialized reporting courses, chosen from a list of about ten, and three approved electives from among graduate-level courses in the Department of Communication, or from among courses on campus that deal substantively with issues of public importance. The M.A. degree in Communication (Journalism) requires a minimum of 45 units. Coterminal journalism students may count coursework taken after summer of freshman year towards the 45 units of unduplicated work with approval by the Director of the Graduate Program in Journalism.

Except for COMM 289P Journalism Thesis, all courses must be taken for a letter grade. To remain in good academic standing, students must maintain a grade point average (GPA) of 3.0 or better. Graduation requires a GPA of 3.0 or better.

### Journalism Project

The Journalism Thesis (COMM 289P), a requirement for graduation, is intended as an opportunity for students to showcase their talents as writers and reporters. It is also an opportunity to undertake an in-depth critique of an area of journalism in which the author has a special

interest. Work on the project usually begins during Winter Quarter and continues through Spring Quarter in the form of the class Journalism Thesis (COMM 289P). Completed master's projects must be submitted to the project adviser and an electronic copy uploaded to the Stanford Digital Repository (<https://sdr.stanford.edu>) no later than the last day of classes in the Spring Quarter.

The project represents a major commitment of time, research, and writing. Although it is not a requirement that the project be published, it must be judged by a member of the faculty to be of a quality acceptable for publication. At a minimum, the project should demonstrate the rigor and discipline required of good scholarship and good journalism; it should offer ample evidence of students' ability to gather, analyze, and synthesize information in a manner that goes beyond what ordinarily appears in daily news media.

## Coterminal Master's Program in Communication

The Department of Communication offers current Stanford University undergraduates the opportunity to apply for a one-year coterminal master's program with an M.A. subplan in Media Studies or Journalism. This subplan prints on the transcript, but not on the diploma.

### Admission

Applicants must submit their application and, if admitted, respond to the offer of admission no later than the quarter prior to the expected completion of their undergraduate degree. Applicants must have declared an undergraduate major and earned a minimum of 120 units toward graduation (UTG) as shown on the undergraduate unofficial transcript (including allowable advanced placement (AP) and transfer credit) and completed at least six academic quarters.

Applications must be submitted no later than January 31, 2018, for admission beginning in Spring Quarter 2017-18. Journalism track students may begin the program only in Spring Quarter of their senior year.

Requirements include:

- Application for Admission to Coterminal Masters' Program (<http://registrar.stanford.edu/pdf/CotermApplic.pdf>)
- preliminary program proposal
- statement of purpose
- letters of recommendation and recommendation forms from Stanford professors (two for media studies, three for journalism track)
- a written statement from a Communication professor agreeing to act as a graduate adviser (media studies track only)
- three samples of writing (journalism track only)
- undergraduate coterm application approval form
- a current unofficial Stanford transcript

GRE scores are not required.

Coterminal applications are submitted online.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer

of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Degree Requirements

The coterminal master's program in Communication provides a broad introduction to scholarly literature in mass communication and offers a media studies and a journalism track.

Media studies track students must satisfy the following four requirements:

1. *Required Units and GPA:* students must complete a minimum of 45 units in Communication and related areas, including items 2 and 3 below. Courses must be taken for a letter grade if offered. Courses in related areas outside the department must be approved by the student's adviser. A minimum of 36 units must be in the Communication department. No more than two courses (not including the statistics prerequisite) may be at the 100 level. To remain in good academic standing students must maintain a grade point average (GPA) of 3.0 or better. Graduation requires a GPA of 3.0 or better.
2. *Core Requirements:* students must complete COMM 206 Communication Research Methods, COMM 208 Media Processes and Effects and an approved statistics course such as STATS 160 Introduction to Statistical Methods: Precalculus. Other courses occasionally are approved as a substitute before the student is admitted to the program. The statistics course does not count toward the 45 units.
3. *Six Media Studies Courses:* Students must complete a minimum of six additional Communication courses concerned with the study of media from the following list. Not all the listed courses are offered every year and the list may be updated from one year to the next. In addition to the core requirements and a minimum of six courses listed below, students may choose additional courses from the list and any related course approved by the student's adviser.

		Units
COMM 213	Computational Methods in the Civic Sphere	4
COMM 216	Journalism Law	4
COMM 220	Digital Media in Society	4
COMM 224	Lies, Trust, and Tech	4
COMM 225	Perspectives on American Journalism	4
COMM 231	Media Ethics and Responsibility	4
COMM 235	Deliberative Democracy and its Critics	3-5
COMM 237	The Dialogue of Democracy	4
COMM 242	Media Economics	4
COMM 243	Communication Policy and Regulation	4
COMM 245	Personality and Digital Media	4-5
COMM 251	The First Amendment: Freedom of Speech and Press	4
COMM 252	Constitutional Law	3

COMM 253	Political Campaigning in the Internet Age	3
COMM 254	The Politics of Algorithms	4
COMM 257	Information Control in Authoritarian Regimes	4
COMM 262	Campaigns, Voting, Media, and Elections	4
COMM 264	The Psychology of Communication About Politics in America	4
COMM 266	Virtual People	4
COMM 272	Media Psychology	4
COMM 277A	Computational Journalism	4
or COMM 277C	Specialized Writing and Reporting: Environmental and Food System Journalism	
or COMM 277D	Specialized Writing and Reporting: Narrative Journalism	
or COMM 277E	Specialized Writing and Reporting: Telling the Story	
or COMM 277I	Becoming a Watchdog: Law, Order & Algorithms	
or COMM 277S	Specialized Writing and Reporting: Sports Journalism	
or COMM 277Y	Specialized Writing and Reporting: Foreign Correspondence	
or COMM 271	Moving Pictures: Video Journalism for mobile and social platforms	
or COMM 275	Multimedia Storytelling: Reporting and Production Using Audio, Still Images, and Video	
or COMM 276	Advanced Digital Media Production	
COMM 324	Language and Technology	3-5
COMM 326	Advanced Topics in Human Virtual Representation	1-5

4. *The Media Studies M.A. Project:* students following the media studies track enroll in COMM 290 Media Studies M.A. Project to complete a project over two consecutive quarters that must be preapproved and supervised by the adviser. The completed M.A. project must be submitted to the adviser and an electronic copy to the Stanford Digital Repository (<https://sdr.stanford.edu>) no later than the last day of classes of the second consecutive quarter. Additional courses are chosen in consultation with an academic adviser.

## Doctor of Philosophy in Communication

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin. The minimum number of academic units required for the Ph.D. at Stanford is 135, up to 45 of which can be transferred either from a master's degree at the University or from another accredited institution.

The department offers a Ph.D. in Communication, which focuses on theory and research. First-year students are required to complete introductory courses in communication theory and research, research methods, and statistics. These core courses, grounded in the social science literature, emphasize how people respond to media and how media institutions function. In addition, Ph.D. students must complete a minimum of three literature survey courses and related advanced seminars in Communication. Students also take significant course work outside the department in their area of interest. Each student builds a research specialty relating communication to current faculty interests in such areas as ethics, computational journalism, information processing, information technology, law, online communities, politics and voting, and virtual reality. Regardless of the area of specialization, the Ph.D. program is designed primarily for students interested in university research and teaching or other research or analyst positions.

Students must complete the following department requirements for the Ph.D. degree in Communication:

1. Complete all departmental course requirements listed below with grades of 'B+' or above, with the exception of STATS 160 ('B' minimum) and an advanced methods course ('B-' minimum). Required courses:

		Units
COMM 206	Communication Research Methods	4
COMM 208	Media Processes and Effects	4
COMM 301	Communication Research, Curriculum Development and Pedagogy	1
COMM 311	Theory of Communication	1-5
COMM 314	Ethnographic Methods	1-5
COMM 317	The Philosophy of Social Science	1-5
COMM 318	Quantitative Social Science Research Methods	1-5
STATS 160	Introduction to Statistical Methods: Precalculus	5

One advanced methods course.

2. Pass the general qualifying examinations by the end of the second academic year of study and pass a specialized area examination by the end of the fourth academic year of study.

3. Demonstrate proficiency in tools required in the area of research specialization. Identified with the advice of the faculty, such tools may include detailed theoretical knowledge, advanced statistical methods, a foreign language, computer programming, or other technical skills.

4. Complete at least two pre-dissertation research projects (the Major Project and the Minor Project) by the end of the student's 11th academic quarter.

5. Teach or assist in teaching at least two courses offered by the Department of Communication, preferably two different courses, at least one of which is ideally a core undergraduate course:

		Units
COMM 1	Introduction to Communication	5
COMM 1A		5
COMM 1B	Media, Culture, and Society	5
COMM 106	Communication Research Methods	5
COMM 108	Media Processes and Effects	5

6. Complete a dissertation proposal and proposal meeting approved by the dissertation committee.

7. Apply for candidacy by the end of the first week of the student's sixth quarter.

8. Complete a dissertation satisfactory to a reading committee of three or more faculty members in the Department of Communication and one faculty member outside of the Department of Communication.

9. Pass the University oral examination, which is a defense of the dissertation.

Because the multifaceted nature of the department makes it possible for the Ph.D. student to specialize in areas that draw on different related disciplines, the plan of study is individualized and developed between the faculty adviser and the student.

Ph.D. candidacy is valid for five years.

Additional information is available on the Ph.D. program page (<http://comm.stanford.edu/phd/rules>) of the department web site.

## Ph.D. Minor in Communication

Candidates for the Ph.D. degree in other departments who elect a minor in Communication are required to complete a minimum of 20 units of graduate courses in the Department of Communication, including a total

of three theory or research methods courses, and are examined by a representative of the department. A department adviser in consultation with the individual student determines the particular communication theory and methods courses.

## Joint Degree Program in Communication with the School of Law J.D./PH.D.

The Department of Communication and the School of Law offer a joint degree program leading to a J.D. combined with a Ph.D. in Communication.

The J.D./Ph.D. degree program offers students the opportunity to pursue academic, public policy, and private practice careers at the intersection of a variety of cutting edge debates in theory and policy, including: legal and normative First Amendment theories of speech and the press; media and communications economy and policy issues; questions of the relationship between citizens and the state, especially regarding mass surveillance and big data; and cultural and normative questions about the implications of the shift to the digital realm.

Students interested in the joint degree program must apply and gain entrance separately to the School of Law and the Communication Ph.D. program, and, as an additional step, must secure permission from both academic units to pursue degrees in those units as part of a joint degree program. Interest in the joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either program may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or the Communication Ph.D. program. Faculty advisers from each academic unit participate in the planning and supervising of the student's joint program. Students must be enrolled full time in the Law School for the first year of Law School, and are required to be enrolled full time for the first year of the Ph.D. program in Communication. At all other times, enrollment may be in either academic unit, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the Ph.D. degrees as specified in this bulletin or by the School of Law. The sequencing and schedules for individual joint degree students may vary substantially depending on the student's background and interests, and on the guidance of faculty advisers from both academic units.

No more than 54 quarter hours of approved courses may be counted toward both degrees, but no more than 36 quarter hours of courses that originate outside the Law School may count toward the Law degree. To the extent that courses under this joint degree program originate outside the Law School but count toward the Law degree, the Law School credits permitted under Section 17(1) of the Law School Regulations are reduced on a unit-per-unit basis, but not below zero. Students must complete 192 quarter units to complete both degrees.

Joint degree students are eligible for the same funding arrangements in both academic units, including scholarships and grants, as students who are not pursuing a joint degree plus one additional quarter of funding from the Communication Ph.D. Program.

*Emeriti:* (Professor) Theodore L. Glasser, Donald F. Roberts; (Professor, Teaching) Marion Lewenstein

*Chair:* Fred Turner

*Director, Doctoral Program in Communication:* Jeremy Bailenson

*Director, John S. Knight Journalism Fellowships:* Dawn E. Garcia

*Director, Journalism:* James T. Hamilton

*Director, Media Studies:* Byron Reeves

*Director, Undergraduate Studies:* James T. Hamilton

*Professors:* Jeremy Bailenson, James S. Fishkin, James T. Hamilton, Jeffrey T. Hancock, Shanto Iyengar, Jon Krosnick, Byron B. Reeves, Fred Turner

*Assistant Professors:* Angèle Christin, Gabriella Harari, Jennifer Pan

*Consulting Professor:* Philip Taubman

*Courtesy Professors:* Nathaniel Persily, Walter Powell

*Lorry I. Lokey Visiting Professor in Professional Journalism:* Dan Nguyen, Cheryl Phillips

*Hearst Professionals in Residence:* Geralyn Migielicz

*Carlos Kelly McClatchy Visiting Lecturer:* Janine Zacharia

*Lecturers:* Gary Pomerantz, James Wheaton

## Overseas Studies Courses in Communication

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5

# COMPARATIVE LITERATURE

Courses offered by the Department of Comparative Literature are listed under the subject code COMPLIT on the Stanford Bulletin's ExploreCourses web site.

The Department of Comparative Literature offers courses in the history and theory of literature through comparative approaches. The department accepts candidates for the degrees of Bachelor of Arts and Doctor of Philosophy. The department is a part of the Division of Literatures, Cultures, and Languages (p. 482).

The field of Comparative Literature provides students the opportunity to study imaginative literature in a wide array of contexts: historical, formal, theoretical, and more. While other literary disciplines focus on works of literature within national or linguistic traditions, Comparative Literature draws on multiple contexts in order to examine the nature of literary phenomena from around the globe and from different historical moments, while exploring how literature interacts with other elements of culture and society. We study fictional narratives, performance, and poetry as well as cinema, music, and emerging aesthetic media.

Along with the traditional models of comparative literature that compare two or more national literary cultures and examine literary phenomena in light of literary theory, the department encourages study of the relationship between literature and philosophy and the enrichment of literary study with other disciplinary methodologies. Comparative Literature also encourages the study of aspects of literature that overgo national boundaries, such as transnational literary movements or the creative adaptation of particular genres to local cultures. In each case, students emerge from the program with enhanced verbal and writing skills, a command of literary studies, the ability to read analytically and critically, and a more global knowledge of literature.

## Mission of the Undergraduate Program in Comparative Literature

The mission of the undergraduate program in Comparative Literature is to develop students' verbal and written communication skills, their ability to read analytically and critically, and their global knowledge of literary cultures and the specific properties of literary texts. The program provides students with the opportunity to study imaginative literature with several methods and a consciousness of methodology.

Along with providing core courses that introduce students to major literary phenomena in a comparative frame, our program of study accommodates the interests of students in areas such as specific geographic regions, historical periods, and interdisciplinary connections between literature and other fields such as philosophy, music, the visual arts, gender and queer theory, and race and ethnicity. A Comparative Literature major prepares a student as a reader and interpreter of literature through sophisticated examination of texts and the development of a critical vocabulary with which to discuss them. Attention to verbal expression and interpretive argument serves students who will proceed into careers requiring strong language and communication skills and cross-cultural knowledge of the world.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to interpret a literary text in a non-native language or to compare literary texts from different linguistic traditions, which may be read in translation.

2. a self-reflective understanding of the critical process necessary to read and understand texts.
3. skills in writing effectively about literature.
4. skills in oral communication and public speaking about literature.

## Graduate Programs in Comparative Literature

The department offers a Doctor of Philosophy and a Ph.D. minor in Comparative Literature.

## Learning Outcomes (Graduate)

Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to

1. make original contributions to the knowledge of Comparative Literature and to interpret and present the results of such research,
2. teach literary analysis and interpretation at all levels with broad historical, cultural and linguistic understanding, and
3. apply such analysis, interpretation and understanding to a range of fields and vocations.

## Bachelor of Arts in Comparative Literature

The major in Comparative Literature requires students to enroll in a set of core courses offered by the department, to complete electives in the department, and to enroll in additional literature courses, or other courses approved by the Chair of Undergraduate Studies, offered by other departments. This flexibility to combine literature courses from several departments and to address literature from multiple traditions is the hallmark of the Comparative Literature major. Students may count courses which read literature in translation; however, students, and especially those planning to pursue graduate study in Comparative Literature, are encouraged to develop a command of non-native languages.

## Declaring the Major

Students declare the major in Comparative Literature through Axess. Students should meet with the Chair of Undergraduate Studies to discuss appropriate courses and options within the major, and to plan the course of study. Majors are also urged to attend department events such as public talks and conferences.

## Advising

Upon declaring the major, each student is assigned an adviser by the Chair of Undergraduate Studies. Students should consult with their advisers at least once a quarter. While the chair monitors progress to completion of the degree, the adviser oversees the student's general intellectual development and offers advice about courses and projects. Students are also encouraged to develop relationships with other faculty members who may act as mentors.

## Overseas Campuses and Abroad Programs

The Department of Comparative Literature encourages time abroad, both for increased proficiency in language and the opportunity for advanced course work. Course work done at campuses other than Stanford is counted toward the major at the discretion of the Chair of Undergraduate Studies and is contingent upon the Office of the University Registrar's approval of transfer credit. To that end, students abroad are advised to save syllabi, notes, papers, and correspondence.

## Degree Requirements

All majors in Comparative Literature (including honors) are required to complete the following requirements. All courses applied to the major

must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each core course.

1. **COMPLIT 101 What Is Comparative Literature?** This gateway to the major is normally taken by the end of sophomore year. It provides an introduction to literature and its distinctions from other modes of linguistic expression, and a fundamental set of interpretive skills. This course fulfills the Writing in the Major requirement.
2. **Core Courses (5 units each)**  
Students should complete these courses as soon as possible. Each course draws on examples from multiple traditions to ask questions about the logic of the individual genres.

COMPLIT 121	Poems, Poetry, Worlds	5
COMPLIT 122	Literature as Performance	5
COMPLIT 123	The Novel and the World	5

3. **COMPLIT 199.** This senior seminar is designed as a culmination to the course of study while providing reflection on the nature of the discipline. Topics vary.
4. **Electives:** Majors must complete at least 40 units of electives. 15 of the 40 units must be COMPLIT courses. The remaining courses should form a coherent intellectual focus requiring approval from the Chair of Undergraduate Studies and may be drawn from Comparative Literature offerings, from other literature departments, or from other fields of interdisciplinary relevance. Up to 10 units of Thinking Matters or SLE courses may be counted towards the elective requirement. Electives are subject to adviser consultation and approval.
5. **Total unit load:** Students must complete course work for a total of at least 65 units.

## Philosophical and Literary Thought

Undergraduates may major in Comparative Literature and Philosophy. The Philosophy specification is not declared in Axxess and does not appear on either the transcript or the diploma. Students in this option take courses alongside students from other departments that also have specialized options associated with the program for the study of Philosophical and Literary Thought. Each student in this option is assigned an adviser in Comparative Literature, and student schedules and courses of study must be approved in writing by the adviser, the Chair of Undergraduate Studies of Comparative Literature, and the Chair of Undergraduate Studies of the program. See the Philosophy + Literature @ Stanford (<https://philil.stanford.edu/programs/philosophyandliterature.html>) web site.

A total of 65 units must be completed for this option, including the following requirements:

1. Seven courses taught by Comparative Literature faculty. Of the seven, the following five (5 units each) are required courses:

COMPLIT 101	What Is Comparative Literature?	5
COMPLIT 121	Poems, Poetry, Worlds	5
COMPLIT 122	Literature as Performance	5
COMPLIT 123	The Novel and the World	5

The remaining two courses must be instructed by Comparative Literature faculty and approved by the Chair of Undergraduate Studies. Up to five units of SLE may be counted in lieu of one of these two courses.

COMPLIT 199	Senior Seminar	5
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2. **Philosophy and Literature Gateway Course (4 units):** COMPLIT 181 Philosophy and Literature. This course should be taken as early as possible in the student's career, normally in the sophomore year.

3. **Philosophy Writing in the Major (5 units):** PHIL 80 Mind, Matter, and Meaning. Prerequisite: introductory philosophy course.
4. **Aesthetics, Ethics, Political Philosophy (ca. 4 units):** One course from the PHIL 170 series.
5. **Language, Mind, Metaphysics, and Epistemology (ca. 4 units):** One course from the PHIL 180 series.
6. **History of Philosophy (ca. 8 units):** Two courses in the history of philosophy, numbered above PHIL 100. Up to five units of SLE may be counted in lieu of one of these two courses.
7. **Related Courses (ca. 8 units):** Two upper division courses relevant to the study of philosophy and literature as identified by the committee in charge of the program. A list of approved courses is available from the undergraduate adviser of the Program in Philosophical and Literary Thought.
8. One course, typically in translation, in a literature distant from that of the student's concentration and offering an outside perspective on that literary tradition.
9. **Capstone Seminar (ca. 4 units):** In addition to COMPLIT 199 Senior Seminar, students take a capstone seminar of relevance to philosophy and literature approved by the undergraduate adviser of the Program in Philosophical and Literary Thought. The student's choice of a capstone seminar must be approved in writing by the Chair of Undergraduate Studies of Comparative Literature and by the Chair of Undergraduate Studies of the program. Offered this year are:

		Units
ITALIAN 236E	Dante's "Purgatorio" and "Paradiso"	4-5
COMPLIT 223	Literature and Human Experimentation	3-5
PHIL 194W	Capstone Seminar: Literature and the Moral Imagination	4

1. **Seminar Paper Requirement:** Students must write at least one seminar paper that is interdisciplinary in nature. This paper brings together material from courses taken in philosophy and literature, and may be an honors paper (see below), an individual research paper (developed through independent work with a faculty member), or a paper integrating materials developed for two separate courses (by arrangement with the two instructors). Though it may draw on previous course work, the paper must be an original composition, 18-20 pages in length. It must be submitted to the Chair of Undergraduate Studies and receive approval no later than the end of Winter Quarter in the fourth year of study.

At least two of the courses counted toward requirements 1, 2, 7, 8, and 9 must be taught by Comparative Literature faculty. Transfer units may not normally be used to satisfy requirements 2, 3, 4, 5, 6 and 9. Units devoted to acquiring language proficiency are not counted toward the 65-unit requirement.

## Honors Program

Comparative Literature majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including

bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College (<https://undergrad.stanford.edu/programs/bhc/about-bing-honors-college>) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors (<https://undergrad.stanford.edu/programs/bhc/about-bing-honors-college>) website.

**Enrollment:** A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A' or better by the thesis adviser, honors are granted at the time of graduation.

1. Spring Quarter of the junior year (optional): DLCL 189C Honors Thesis Seminar, 2-4 units S/NC, under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the Director of the department and will be approved or returned for submission.
2. Autumn Quarter of the senior year (required): DLCL 189A Honors Thesis Seminar, 4 units S/NC, taught by a DLCL appointed faculty member. Course focuses on researching and writing the honors thesis.
3. Winter Quarter of the senior year (required): DLCL 189B Honors Thesis Seminar, 2-4 units letter grade, under the primary thesis adviser. Focus is on writing under guidance of primary adviser. The letter grade will determine if honors is granted or not.
4. Spring quarter of the senior year (option; mandatory if not taken during junior year): DLCL 189C Honors Thesis Seminar, 2-4 units S/NC, under the primary thesis adviser. Honors essays are due to the thesis adviser and Student Service Officer no later than 5:00 p.m. on May 15th of the terminal year.
5. Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation, 1 unit S/NC. Enroll with primary thesis adviser.

## Joint Major Program: Comparative Literature and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

### Comparative Literature Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Program (p. 278)" section of this bulletin for details on Computer Science requirements.

### Degree Requirements

All majors in Comparative Literature (including honors) are required to complete the following requirements. All courses applied to the major

must be taken for a letter grade, and a grade of 'C' or better must be achieved in each core course.

1. **COMPLIT 101** What is Comparative Literature?. This gateway to the major is normally taken by the end of sophomore year. It provides an introduction to literature and its distinctions from other modes of linguistic expression, and a fundamental set of interpretive skills. This course fulfills the Writing in the Major requirement.
2. **Core Courses (5 units each)**  
Students should complete these courses as soon as possible. Each course draws on examples from multiple traditions to ask questions about the logic of the individual genres.

		<b>Units</b>
COMPLIT 121	Poems, Poetry, Worlds	5
COMPLIT 122	Literature as Performance	5
COMPLIT 123	The Novel and the World	5

3. **COMPLIT 199 Senior Seminar:** This senior seminar is designed as a culmination to the course of study while providing reflection on the nature of the discipline. Topics vary.

4. **Capstone Project:** Senior year, the student enrolls in a 2-unit independent study DLCL 299 with a DLCL faculty member. The faculty member advising this project must sign off on this description. In order to have it approved as their capstone Comparative Literature and Computer Science project, the student must submit a description of the project to the Chair of Undergraduate Studies in Comparative Literature by May 15 of their junior year or no later than October 1 of their senior year.

5. **Electives:** Majors must complete at least 28 units of electives. 15 of the 28 units must be COMPLIT courses. The remaining courses should form a coherent intellectual focus requiring approval from the Chair of Undergraduate Studies and may be drawn from Comparative Literature offerings, from other literature departments, or from other fields of interdisciplinary relevance. Up to 10 units of Thinking Matters or SLE courses may be counted towards the elective requirement. Electives are subject to adviser consultation and approval.

### Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

### Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>). Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

### Transcript and Diploma

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

### Minor in Comparative Literature

The undergraduate minor in Comparative Literature represents an abbreviated (22 unit minimum) version of the major. It is designed for students who are unable to pursue the major, but who nonetheless seek an opportunity to gain a deeper understanding of literature. Plans



for the minor should be discussed with the Chair of Undergraduate Studies. All courses must be taken for a letter grade. Up to 5 units of SLE or Independent Study may count towards one of the four additional Comparative Literature courses with approval from the Chair of Undergraduate Studies. Requirements for the minor in Comparative Literature include:

	<b>Units</b>
COMPLIT 101 What Is Comparative Literature?	5
Select one of the following:	5
COMPLIT 121 Poems, Poetry, Worlds	
COMPLIT 122 Literature as Performance	
COMPLIT 123 The Novel and the World	
At least four other Comparative Literature courses.	12-20

## Minor in Modern Languages

The Division of Literatures, Cultures, and Languages offers an undergraduate minor in Modern Languages. This minor draws on literature and language courses offered in this and other literature departments. See the "Literatures, Cultures, and Languages (p. 483)" section of this bulletin for requirements.

## Doctor of Philosophy in Comparative Literature

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The Ph.D. program is designed for students whose linguistic background, breadth of interest in literature, and curiosity about the problems of literary scholarship and theory (including the relation of literature to other disciplines) make this program more appropriate to their needs than the Ph.D. in one of the national literatures. Students take courses in at least three literatures (one may be that of the native language), to be studied in the original. The program is designed to encourage familiarity with the major approaches to literary study prevailing today.

Before starting graduate work at Stanford, students should have completed an undergraduate program with a strong background in one literature and some work in a second literature studied in the original language. Since the program demands an advanced knowledge of two non-native languages and a reading knowledge of a third non-native language, students should at the time of application have an advanced enough knowledge of one of the three to take graduate-level courses in that language when they enter the program. They should be making enough progress in the study of a second language to enable them to take graduate courses in that language not later than the beginning of the second year, and earlier if possible. Language courses at the 100- or 200- level may be taken with approval from the Director of the department or the Chair of Graduate Studies. Applicants are expected to take an intensive course in the third language before entrance.

Students are admitted under a financial plan that attempts to integrate financial support and completion of residence requirements with their training as prospective university teachers. Assuming satisfactory academic progress, fellowship support as a Ph.D. student is for five years.

### Application Procedures

Competition for entrance into the program is extremely keen. The program is kept small so that students have as much opportunity as possible to work closely with faculty throughout the period of study. Applicants should review all course and examination requirements, advancement requirements, and teaching obligations carefully before applying to the program. Because of the special nature of comparative

literary studies, the statement of purpose included in the application for admission must contain the following information:

1. A detailed description of the applicant's present degree of proficiency in each of the languages studied, indicating the languages in which the applicant is prepared to do graduate work at present and outlining plans to meet additional language requirements of the program.
2. A description of the applicant's area of interest (for instance, theoretical problems, genres, periods) within literary study and the reasons for finding comparative literature more suitable to his or her needs than the study of a single literature. Applicants should also indicate their most likely prospective primary field, including the literatures on which they intend to concentrate.
3. An explanation of how the applicant's undergraduate education has prepared her or him for work in our program. If there are any gaps in the applicant's preparation, a plan to address those gaps should be discussed.
4. The applicant's reasons for wishing to study in the department.
5. The results of the general section of the Graduate Record Examination. These results should be sent to Stanford University, ETS code 4704.
6. A letter of recommendation that focuses on the applicant's language skills, or a current ACTFL Oral Proficiency Interview (OPI) certificate, or a critical paper written in a non-native language.
7. Recommendations from faculty members in at least two of the literatures in which the student proposes to work, if possible.
8. An undergraduate term paper that the candidate considers to represent his or her best work, preferably demonstrating a comparative analysis.

For further information see the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

### Degree Requirements

A candidate for the Ph.D. degree must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the bachelor's degree. The student must take 135 units of graduate work and submit the doctoral dissertation. At least three consecutive quarters of course work must be taken at Stanford.

### Languages

Students must present three non-native languages, two of them sufficiently to qualify for graduate courses in these languages and the third sufficiently to demonstrate the ability to read a major author in this language. Two languages are certified by graduate-level course work specified below. Only the third language may be certified by examination. Language preparation must be sufficient to support graduate-level course work in at least one language during the first year and in the second language during the second year. Students must demonstrate a reading knowledge of the third non-native language no later than the beginning of the third year.

Literatures in the same language (such as Spanish and Spanish American) are counted as one. One of the student's three literatures usually is designated as the primary field, the other two as secondary fields, although some students may offer two literatures at the primary level (six or more graduate courses).

### Teaching

Whatever their sources of financial support, students are normally expected to undertake a total of five quarters of supervised apprenticeships and teaching at half time. Students must complete those pedagogy courses required by the departments in which they teach.

### Minimum Course Requirements

Students are advised that the range and depth of preparation necessary to support superior work on the dissertation, as well as demands in the

present professional marketplace for coverage of both traditional and interdisciplinary areas of knowledge, render these requirements as bare minimums. The following are required:

1. Required Courses:

COMPLIT 369	Introduction to the Profession of Literary Studies	1-2
DLCL 301	The Learning and Teaching of Second Languages	3

2. A sufficient number of courses (six or more) in the student's primary field to assure knowledge of the basic works in one national literature from its beginnings until the present.
3. At least two additional complementary courses, with most of the reading in the original, in each of two different national literatures. Students whose primary field is a non-native language are required to take two courses in one additional literature not their own.

Minimum course requirements must be completed before the student is scheduled to take the University oral examination. These requirements are kept to a minimum so that students have sufficient opportunity to seek out new areas of interest. A course is an offering of 3-5 units. Independent study may take the place of up to two of the required courses, but no more; no undergraduate courses may be counted toward the required 135 credits. Courses should be taken for letter grades when the option is available.

The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of the university, department, and program requirements for the degree, and fulfillment of minimum progress requirements. Failure to meet these requirements results in corrective measures that may include a written warning, academic probation, and/or the possible release from the program.

### Dissertation Reading Committee

Every doctoral dissertation is read and approved by the three members of the student's doctoral dissertation reading committee. The doctoral dissertation reading committee consists of the principal dissertation adviser and, typically, two other readers. The doctoral dissertation reading committee must have no fewer than three and no more than five members. At least one member must be from the student's major department. Normally, all committee members are members of the Stanford University Academic Council or are emeritus Academic Council members. The student's department chair may, in some cases, approve the appointment of a reader who is not a current or emeritus member of the Academic Council, if that person is particularly well qualified to consult on the dissertation topic and holds a Ph.D. or equivalent degree. Former Stanford Academic Council members and non-Academic Council members may thus, on occasion, serve on a reading committee. A non-Academic Council member (including former Academic Council members) may replace only one of three required members of dissertation reading committees. If the reading committee has four or five members, at least three members (comprising the majority) must be current or emeritus members of the Academic Council.

### Examinations

Three examinations are required. The first two are one hour in duration. The first of these two is taken at the end of the student's first year of study, the second at the start of the second year. Students should meet with the members of the exam committee to discuss their plans. The first examination is on literary genre, designed to demonstrate the student's knowledge of a substantial number of literary works in a single genre, ranging over several centuries and over at least three national literatures. This exam is also designed to demonstrate the student's grasp of the theoretical problems involved in his or her choice of genre and in the matter of genre in general. The second of these examinations is on literary theory and criticism, designed to demonstrate the student's

knowledge of a particular problem in the history of literary theory and criticism, or the ability to develop a particular theoretical position. In either case, this exam should demonstrate wide reading in theoretical and critical texts from a variety of periods. The third and last is the University oral examination, which covers a literary period, to consist of in-depth knowledge of a period of about a century in three or more literatures with primary emphasis on a single national literature or, in occasional cases, two national literatures.

1. *First One-Hour Examination:* The genre exam is generally administered at the beginning of the spring quarter of the student's first year. All first-year students take the exam during the same period, with an examination committee established by the department. Exam lists should be approved by the Chair of Graduate Studies well in advance. Students are urged to focus on poetry, drama, or narrative (including the novel), combining core recommendations from the department with selections from their own areas of concentration. Any student who does not pass the exam has the opportunity to retake it prior to the end of the same spring quarter. Students who do not pass this exam a second time may be dismissed from the program.
2. *Second One-Hour Examination:* The theory exam is administered in the autumn quarter of the student's second year. All second-year students take the exam during the same period, with an examination committee established by the department. Exam lists should be approved by the Chair of Graduate Studies well in advance. Any student who does not pass the exam has the opportunity to retake the exam the second week of the winter quarter. Students who do not pass this exam a second time may be dismissed from the program.
3. *University Oral Examination:* Students are required to take this exam during the autumn quarter of their third year. The oral exam is individually scheduled, with a committee established by the student in consultation with the Chair of Graduate Studies. The reading list covers chiefly the major literary texts of a period of approximately one hundred years but may also include some studies of intellectual backgrounds and modern critical discussions of the period. Students must demonstrate a grasp of how to discuss and define this period as well as the concept of periods in general. This examination is to be not on the dissertation topic, on a single genre, or on current criticism, but rather on diverse works from the period. Students whose course work combines an ancient with a modern literature have the option of dividing the period sections into two wholly separate periods.

### Qualifying Procedures Candidacy

Admission to candidacy is an important decision by the department based on its overall assessment of a student's ability to successfully complete the Ph.D. program. According to University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, course work, performance on the qualifying (i.e. genre) examination, and successful completion of teaching and research assistantships. A student must also have completed at least 3 units of work with each of four Stanford faculty members before consideration for candidacy. In addition to successful completion of department prerequisites, a student is admitted to candidacy only if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The department conducts regular reviews of each student's academic performance, both before and after successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University

candidacy policy is available in the Bulletin (p. ) and GAP (<http://gap.stanford.edu/4-6.html>).

### Yearly Review

The faculty provide students with timely and constructive feedback on their progress toward the Ph.D. Yearly reviews provide a general assessment and identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems.

Possible outcomes of the yearly review include (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

### Prospectus Colloquium

The prospectus colloquium normally takes place during the spring of the third year. No later than one week before the colloquium, the student should furnish the committee with a prospectus of about ten pages, a twenty-page draft of a chapter, and a working bibliography of primary and secondary sources. The colloquium lasts one hour, begins with a brief introduction to the dissertation prospectus by the student lasting no more than ten minutes, and consists of a discussion of the prospectus by the student and the three readers of the dissertation. At the end of the hour, the faculty readers vote on the outcome. If the outcome is favorable by majority vote, the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory by majority vote, the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second colloquium.

The prospectus must be prepared in close consultation with the dissertation adviser during the months preceding the colloquium. It should offer a synthetic overview of the dissertation, describe its methodology and the project's relation to past scholarship on the topic, and lay out a complete plan of the chapters.

It is the student's responsibility to arrange the colloquium no later than the first half of the next quarter after the student has passed the University oral examination. The student should set the date and time in consultation with the department administrator and with the three examiners. The department administrator schedules an appropriate room for the colloquium.

Members of the dissertation reading committee are normally drawn from the University oral examination committee.

## Ph.D. Minor in Comparative Literature

This minor is designed for students working toward the Ph.D. in the various national literature departments. Students working toward the Ph.D. in English are directed to the program in English and Comparative Literature described among the Department of English offerings. Students must have:

1. A knowledge of at least two non-native languages, one of them sufficient to qualify for graduate-level courses in that language, the second sufficient to read a major author in the original language.
2. A minimum of six graduate courses, of which three must be in the department of the second literature and three in the Department of Comparative Literature, the latter to include a seminar in literary theory or criticism. At least two of the three courses in comparative literature should originate in a department other than the one in

which the student is completing the degree. Except for students in the Asian languages, students must choose a second literature outside the department of their major literature.

## Faculty in Comparative Literature

*Emeriti:* (Professors) John Freccero, Hans U. Gumbrecht, Herbert Lindenberger, Elisabeth Mudimbe-Boyi, Mary Pratt

*Director:* Roland Greene

*Chair of Graduate Admissions:* Roland Greene

*Chair of Graduate Studies:* Roland Greene

*Chair of Undergraduate Studies:* Roland Greene (Autumn), Alexander Key (Winter, Spring)

*Professors:* Vincent Barletta (also Iberian and Latin American Cultures), John Bender (also English) (on leave Autumn), Russell Berman (also German Studies), Margaret Cohen (also English) (on leave), Adrian Daub (also German Studies), Amir Eshel (also German Studies), Roland Greene (also English), Joshua Landy (also French and Italian), David Palumbo-Liu, Patricia Parker (also English), Joan Ramon Resina (also Iberian and Latin American Cultures), José David Saldívar, Ramón Saldívar (also English), Ban Wang (also East Asian Languages and Cultures)

*Associate Professors:* Monika Greenleaf (also Slavic Languages and Literatures), Haiyan Lee (also East Asian Languages and Cultures), Indra Levy (also East Asian Languages and Cultures) (on leave)

*Assistant Professor:* Marie Huber (on leave Autumn, Winter), Alexander Key (on leave Autumn), Alvan Ikoku (also Medicine)

*Senior Lecturer:* Vered K. Shemtov

*Lecturers:* Petra Dierkes-Thrun, Burcu Karahan

*Courtesy Professor:* Nancy Ruttenburg

*Adjunct Professor:* Timothy J. Reiss (Autumn, Winter)

# COMPARATIVE STUDIES IN RACE AND ETHNICITY (CSRE)

The Undergraduate Program in Comparative Studies in Race and Ethnicity is home to five areas of study:

- Asian American Studies (courses listed as ASNAMST (<https://explorecourses.stanford.edu/search?q=ASNAMST&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-ASNAMST=on&filter-catalognumber-ASNAMST=on>) on ExploreCourses)
- Chicana/o-Latina/o Studies (courses listed as CHILATST ([https://explorecourses.stanford.edu/search?q=CHILATST&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=\)](https://explorecourses.stanford.edu/search?q=CHILATST&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=))) on ExploreCourses)
- Comparative Studies (courses listed as CSRE (<https://explorecourses.stanford.edu/search?q=CSRE&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-CSRE=on&filter-catalognumber-CSRE=on>) on ExploreCourses)
- Jewish Studies (courses listed as JEWISHST (<https://explorecourses.stanford.edu/search?q=JEWISHST&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-JEWISHST=on&filter-catalognumber-JEWISHST=on>) on ExploreCourses)
- Native American Studies (courses listed as NATIVEAM (<https://explorecourses.stanford.edu/search?q=NATIVEAM&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-NATIVEAM=on&filter-catalognumber-NATIVEAM=on>) on ExploreCourses)

Students can pursue a major or minor in any of these five areas, and are encouraged to build their interdisciplinary study around a focus or theme. Students can then select from more than 150 course options from across many departments and schools to put together a curriculum, in consultation with our staff and faculty. The major requires 60 units of study and a culminating research project (either a senior paper or honors thesis).

## Mission of the Undergraduate Program in Comparative Studies in Race and Ethnicity

The Interdepartmental Program in Comparative Studies in Race and Ethnicity (CSRE) is an interdisciplinary program offering students the opportunity to investigate the significance of race and ethnicity in all areas of human life.

Devoted to a rigorous analysis of race and ethnicity and using a comparative and interdisciplinary approach, CSRE promotes and deepens students' understanding of the multiple meanings of racial and ethnic diversity both in the United States and abroad. The program prepares students for living and working effectively in a multicultural, global society.

The interdisciplinary and integrated nature of the academic programs means that students take courses from across the university including: anthropology, art, communication, economics, education, history, languages, linguistics, literature, music, philosophy, political science, psychology, religion, sociology, theater and performance, among others.

## Learning Outcomes (Undergraduate)

The Program in Comparative Studies in Race and Ethnicity expects undergraduate majors in the program to be able to demonstrate the following learning outcomes:

1. an understanding of interdisciplinary approaches to the knowledge of experiences related to race and ethnicity in the United States;
2. an ability to employ diverse analytical resources and comparative modes of study as tools to frame and address research questions;
3. an ability to critically engage both primary and secondary sources, and properly use both types of evidence in crafting an argument;
4. an ability to actively and critically engage in verbal and/or written discussion of issues;
5. demonstration of analytical writing skills that convey their understanding of the topic;
6. an expanded ability to think critically about issues in political, social, scientific, economic, and cultural life stemming from the diversity of experiences related to race and ethnicity.

## Undergraduate Program in Comparative Studies in Race and Ethnicity

### Majors: Core Curriculum

The Interdepartmental Program in Comparative Studies in Race and Ethnicity (CSRE) provides students the opportunity to structure a major or minor in comparative ethnic studies or to focus their course work in a single ethnic studies area.

Five majors and minors (Asian American Studies, Chicana/o-Latina/o Studies, Comparative Studies, Jewish Studies, and Native American Studies) are offered as part of the Interdisciplinary Program (IDP) in CSRE. The directors of the program and of each major constitute the CSRE curriculum committee, the policy making body for the interdisciplinary program.

All comparative-core, major-core, and methodology courses taken for the major (or minor) must be taken for a letter grade, with an earned grade of 'C-' or above in order to be counted toward fulfilling the degree requirements.

Students who declare any of the five majors participate in a common curriculum consisting of at least two core courses, one of which must be CSRE 196C Introduction to Comparative Studies in Race and Ethnicity, a methodologies course, and a senior seminar. In addition, students must complete the Interdisciplinary Breadth Requirement, which requires students take one 3-5 unit course in the Social Sciences and one 3-5 unit course in the Arts & Humanities that explore race and ethnicity. These requirements illustrate how different disciplines approach the study and interpretation of race and ethnicity and provide a foundation for the student's interdisciplinary program of study.

There are two types of introductory courses taught by senior CSRE affiliated faculty:

- comparative-core courses that are interdisciplinary and compare how race and ethnicity have historically appeared across groups; and
- major-core courses that focus on a specific racial or ethnic group.

## Minors

Students who wish to minor in the study areas must complete a minimum of 30 units of letter-graded work, except where letter grades are not offered, from the approved course list, one of which must be CSRE 196C Introduction to Comparative Studies in Race and Ethnicity, and a second that is either a comparative-core course or major-core course relevant to the area of study. Proposals for the minor must be approved by the director of each study area.

## Directed Reading and Research

Directed reading and research allows students to focus on a special topic of interest. In organizing a reading or research plan, the student consults with the director of the major and one or more faculty members specializing in the area or discipline. Students who want to petition directed reading units to count toward a major or minor should see the guidelines in the requirements for their program of interest.

Courses that fulfill directed reading and research requirements:

	Units
ASNAMST 200R Directed Research	1-5
ASNAMST 200W Directed Reading	1-5
CHILATST 200R Directed Research	1-5
CHILATST 200W Directed Reading	1-5
CSRE 200R Directed Research	1-5
CSRE 200W Directed Reading	1-5
NATIVEAM 200R Directed Research	1-5
NATIVEAM 200W Directed Reading	1-5

## Senior Seminar

Research and writing of the senior honors thesis or senior paper is under the supervision of a faculty project adviser. All majors in the IDP in CSRE, even those who opt to write honors theses in other departments and programs, must enroll in CSRE 200X CSRE Senior Seminar, offered in Autumn Quarter. The course takes students through the process of researching an honors thesis, including conceptualization, development of prospectus, development of theses, research, analysis, and finally the process of drafting and writing. This course meets the Writing in the Major requirement (WIM). Those who opt to write senior papers are organized into tutorial groups in Autumn Quarter.

## Special Programs

CSRE majors have several unique opportunities available to them. The program offers students an opportunity for support of full-time paid summer research internships for those who apply to the Community Based Research Fellowship and complete a self-designed research project in collaboration with a community agency. The Public Policy Institute is a two week, pre-Autumn Quarter seminar that provides exposure to critical public policy issues. The residence-based institute provides room and board and all seminar materials for participants. CSRE also sponsors quarterly luncheons and community programs for all majors and minors, and has a number of service learning courses that couple academic work with work in communities.

## Murray House

Murray House, 566 Governor's Avenue, is an undergraduate residence with a CSRE focus that is devoted to developing an intellectual community among students interested in the study of race and ethnicity. Programs, including an in-house seminar, are developed with the guidance of CSRE faculty to increase the understanding of issues of race and ethnicity among its residents through social events and discussions. Students may apply for pre-assignment to Murray House to participate in the CSRE Focus. Contact Residential Education for more information.

Director: Anthony Antonio (Education)

Asian American Studies (AAS) provides an interdisciplinary approach to understanding the historical and current experiences of persons of Asian ancestry in the United States. In using the term Asian American, the AAS faculty recognize that the term seeks to name a rapidly developing, complex, and heterogeneous population and that there is neither a single Asian American identity nor one community that comprises all Asian Americans. Asian Americans include those with ancestral ties to countries or regions in East Asia, South Asia, Southeast Asia, or the Philippines, among others.

AAS brings together courses that address the artistic, historical, humanistic, political, and social dimensions of Asian Americans and is an appropriate course of study for students interested in a variety of concerns related to Asian Americans, including: artistic and cultural contributions; current social significance; historical experiences; immigration, intellectual, and policy issues; relationships with other social groups; and the construction of the notion of Asian American as it addresses important theoretical and practical issues.

## Requirements

1. A minimum grade of 'C-' is required for a student to count a class towards the Core, Major-Core Foundational, and Methods requirements. Additional units toward the major require a minimum 'D-' passing grade.
2. Comparative and Major-Core courses must be taken for the maximum units offered (4 or more) and for letter grade. Methods courses must be taken for a minimum of 3 units and for letter grade.
3. All majors, minors, and interdisciplinary honors students in the CSRE Family of Programs must take Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C).
4. Students may count 2 classes with the Satisfactory/No Credit (SNC) grading basis toward Additional Units.
  - Courses in which Credit/No Credit (CR/NC) is the only grading basis option may always be counted toward the major.
5. All majors are required to take at least one Community Engaged Learning course which must be CSRE, race, and/or ethnicity related.
  - Students may petition courses from outside departments to count, so long as they meet the race and/or ethnicity related requirement.
6. Students may petition up to 5 units of Internship for Public Service (CSRE 198) to count toward the major or minor when the work completed relates directly to race, ethnicity, or area of study. CSRE 198, however, may be repeated multiple times for University credit and the 180 units required to graduate.
7. Students may petition up to 5 units of Directed Reading classes (CSRE 200W) to count toward the major or minor. CSRE related courses offered only as Directed Reading (such as Muwékma House Seminar or ASB Prep courses) may be counted without a petition.
  - a. Students must inform the student services coordinator and the Director of CSRE that they intend to petition a Directed Reading class to count toward their major before taking the class, and submit a petition for the class while they are in it.
  - b. A syllabus with a series of readings, including themes, set by the instructor and the student must be submitted with the petition.
  - c. The Directed Reading must include assignments that go beyond the readings, such as response papers, a final paper, and/or creative project.
  - d. Units earned must align with the University's Unit of Credit (p. 67) policy, i.e., 1 unit being equal to 3 hours/week of work. Meetings with the instructor of the Directed Reading may count up to one hour per unit of work per week.

- e. In general, students are discouraged from using Directed Reading units toward their major unit requirement. Petitions are evaluated and approved by the Program Director on a case-by-case basis.
8. Students may major in two CSRE programs; see the "Multiple Majors (p. 30)" section of this bulletin for University rules concerning multiple majors. Such students may not double count courses between programs, with the exception of the course used to fulfill the Methodology requirement. In order to fulfill the WIM requirement, students write two papers during Autumn Quarter of the senior year, enrolling in both CSRE 200X and CSRE 201X.

## Core Curriculum in Asian American Studies

Asian American majors must take the 15-unit CSRE core curriculum including Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C), an additional comparative-core course, and a senior seminar taken in Autumn Quarter of the senior year. One major-core course that focuses on a non-Asian ethnic group may be counted toward the 15-unit core requirement.

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
PSYCH 75	Introduction to Cultural Psychology	5

### 1. Major-Core Course

Majors are required to take one major-core course in Asian American Studies. Students who completed ENGLISH 43C/143C in a previous year may count this toward their foundational course requirement.

ASNAMST 146S/ COMPLIT 146/ CSRE 146S	(not offered 2017-18)	3-5
ASNAMST 155D	The Asian American Movement: A History of Activism	3-5
ASNAMST 186B	Asian American Art: 1850-Present	4

### 2. Area Study

Majors must complete an additional 35 units of course work from an approved list. One course must have an international dimension, preferably a focus on Asia. The remaining courses must have an Asian American focus and primarily be selected from social science and humanities departments.

### 3. Language Study (optional)

Students may obtain credit for their study of a related Asian language towards their degree. If students take 15 or more units of an advanced, second-year Asian language relevant to Asian American Studies, they may apply 5 of those units toward their Asian American Studies degree.

### 4. Research/Methodology Requirement

Majors are required to complete 3-5 units of course work focused on research methods relevant to their disciplinary approach as a student in Asian American Studies. Students select the research and/or methodology course in consultation with their faculty adviser.

### 5. Interdisciplinary Breadth Requirement

To fulfill the Interdisciplinary Breadth Requirement, students should take one 3-5 unit course from the Social Sciences and one 3-5 unit course from the Arts & Humanities that focus on race and ethnicity, especially if the courses are comparative.

### 6. Community Engaged Learning Requirement

All students in one of the CSRE majors are required to complete at least one service-learning experience. This requirement may be fulfilled by enrolling in a service-learning course, participating in an identity, race, or ethnicity focused service-learning Alternative Spring Break, participating in the Community Based Research Fellowship program, or enrolling in CSRE 198 Internship for Public Service while completing independent service work.

### 7. Senior Paper or Honors Thesis

All Asian American Studies majors complete a culminating research paper under the supervision of a faculty adviser. Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Senior Honors Research (CSRE 200Y and CSRE 200Z) courses cannot count for the 60 units towards the major but do count for the 180 units towards your bachelor's degree. Students must complete their theses with a minimum grade of 'B+' to receive honors in CSRE.

## Chicana/o-Latina/o Studies

Director: Guadalupe Valdés

Chicana/o-Latina/o Studies is an interdisciplinary major focusing on the U.S. population with origins in the countries of Mexico, Latin America, and/or South America. Students who major or minor in Chicana/o-Latina/o Studies have an opportunity to select from courses in the humanities, social sciences, and courses offered by affiliated faculty in the School of Education. The Chicana/o-Latina/o Studies program affords students an opportunity to explore the culture, society, economy, and politics of this important and growing segment of our national population.

### Units Bachelor of Arts in Chicana/o-Latina/o Studies

A total of 60 units of course work are required for the major.

1. A minimum grade of 'C-' is required for a student to count a class towards the Core, Major-Core Foundational, and Methods requirements. Additional units toward the major require a minimum 'D-' passing grade.
2. Comparative and Major-Core courses must be taken for the maximum units offered (4 or more) and for letter grade. Methods courses must be taken for a minimum of 3 units and for letter grade.

3. All majors, minors, and interdisciplinary honors students in the CSRE Family of Programs must take Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C).
4. Students may count 2 classes with the Satisfactory/No Credit (SNC) grading basis toward Additional Units.
  - Courses in which Credit/No Credit (CR/NC) is the only grading basis option may always be counted toward the major.
5. All majors are required to take at least one Community Engaged Learning course which must be CSRE, race, and/or ethnicity related.
  - Students may petition courses from outside departments to count, so long as they meet the race and/or ethnicity related requirement.
6. Students may petition up to 5 units of Internship for Public Service (CSRE 198) to count toward the major or minor when the work completed relates directly to race, ethnicity, or area of study. CSRE 198, however, may be repeated multiple times for University credit and the 180 units required to graduate.
7. Students may petition up to 5 units of Directed Reading classes (CSRE 200W) to count toward the major or minor. CSRE related courses offered only as Directed Reading (such as Muwekma House Seminar or ASB Prep courses) may be counted without a petition.
  - a. Students must inform the student services coordinator and the Director of CSRE that they intend to petition a Directed Reading class to count toward their major before taking the class, and submit a petition for the class while they are in it.
  - b. A syllabus with a series of readings, including themes, set by the instructor and the student must be submitted with the petition.
  - c. The Directed Reading must include assignments that go beyond the readings, such as response papers, a final paper, and/or creative project.
  - d. Units earned must align with the University's Unit of Credit (p. 67) policy, i.e., 1 unit being equal to 3 hours/week of work. Meetings with the instructor of the Directed Reading may count up to one hour per unit of work per week.
  - e. In general, students are discouraged from using Directed Reading units toward their major unit requirement. Petitions are evaluated and approved by the Program Director on a case-by-case basis.
8. Students may major in two CSRE programs; see the "Multiple Majors (p. 30)" section of this bulletin for University rules concerning multiple majors. Such students may not double count courses between programs, with the exception of the course used to fulfill the Methodology requirement. In order to fulfill the WIM requirement, students write two papers during Autumn Quarter of the senior year, enrolling in both CSRE 200X and CSRE 201X.

## 1. Core Curriculum

Chicana/o-Latina/o Studies majors must take the 15-unit CSRE core curriculum including Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C), an additional comparative-core course, and a senior seminar taken in Autumn Quarter of the senior year. One major-core course that focuses on a non-Latino origin group may be counted toward the 15-unit core requirement.

ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5

CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in 3-5 Literature	3-5
PSYCH 75	Introduction to Cultural Psychology	5

## 2. Major-Core Courses

Majors are required to take one foundational course in Chicana/o-Latina/o Studies. Students who completed CHICANST/SOC 166 in a previous year may count this toward their foundational course requirement.

		Units
CHILATST 180E	Introduction to Chicana/Latina Studies	5
CHILATST 171	Mexicans in the United States	5

## 3. Area Study

Majors must complete an additional 35 units of course work from an approved list. To fulfill the Interdisciplinary Breadth Requirement, students should take one 3-5 unit course from the Social Sciences and one 3-5 unit course from the Arts & Humanities that focus on race and ethnicity, especially if the courses are comparative. The remaining courses must have a Chicana/Latina focus and primarily be selected from social science and humanities departments.

## 4. Language Study (optional)

Students may obtain credit for the study of the Spanish language towards their degree. If students take 15 or more units of advanced, second-year Spanish language relevant to Chicana/o-Latina/o Studies, they may apply 5 of those units toward their Chicana/o-Latina/o Studies degree.

## 5. Research/Methodology Requirement

Majors are required to complete 3-5 units of course work focused on research methods relevant to their disciplinary approach as a student in Chicana/o-Latina/o Studies. Students select the research and/or methodology course in consultation with their faculty adviser.

## 6. Interdisciplinary Breadth Requirement

To fulfill the Interdisciplinary Breadth Requirement, students should take one 3-5 unit course from the Social Sciences and one 3-5 unit course from the Arts & Humanities that focus on race and ethnicity, especially if the courses are comparative.

## 7. Community Engaged Learning Requirement

All students in one of the CSRE majors are required to complete at least one service-learning experience. This requirement may be fulfilled by enrolling in a service-learning course, participating in an identity, race, or ethnicity focused service-learning Alternative Spring Break, participating in the Community Summer Research Internship program, or enrolling in CSRE 198 – Public Service Internship while completing independent service work.

## 8. Senior Paper or Honors Thesis

All Chicana/o-Latina/o Studies majors complete a culminating research paper under the supervision of a faculty adviser. Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Senior Honors Research (CSRE 200Y and CSRE 200Z) courses cannot count for the 60 units towards your major but do count for the 180 units towards

your bachelor's degree. Students must complete their theses with a minimum grade of 'B+' to receive honors in CSRE.

## Comparative Studies in Race and Ethnicity

Director: Tomás Jiménez

Comparative Studies in Race and Ethnicity does not focus on a particular ethnic group. Rather, a student in consultation with the adviser designs a curriculum in relation to a thematic concentration that compares various ethnic groups or explores topics that cut across group experiences in the United States and elsewhere in the world. For example, students may compare groups within the U.S., or compare groups in the U.S. to ethnic groups elsewhere, or study the diaspora of a single group or the sovereignty of indigenous peoples within and across different national contexts. Students in this major are able to take advantage of courses in over 22 fields offered by the affiliated faculty of CSRE.

## Bachelor of Arts in Comparative Studies in Race and Ethnicity

A total of 60 units of course work are required for the major.

1. A minimum grade of 'C-' is required for a student to count a class towards the Core, Major-Core Foundational, and Methods requirements. Additional units toward the major require a minimum 'D-' passing grade.
2. Comparative and Major-Core courses must be taken for the maximum units offered (4 or more) and for letter grade. Methods courses must be taken for a minimum of 3 units and for letter grade.
3. All majors, minors, and interdisciplinary honors students in the CSRE Family of Programs must take Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C).
4. Students may count 2 classes with the Satisfactory/No Credit (SNC) grading basis toward Additional Units.
  - Courses in which Credit/No Credit (CR/NC) is the only grading basis option may always be counted toward the major.
5. All majors are required to take at least one Community Engaged Learning course which must be CSRE, race, and/or ethnicity related.
  - Students may petition courses from outside departments to count, so long as they meet the race and/or ethnicity related requirement.
6. Students may petition up to 5 units of Internship for Public Service (CSRE 198) to count toward the major or minor when the work completed relates directly to race, ethnicity, or area of study. CSRE 198, however, may be repeated multiple times for University credit and the 180 units required to graduate.
7. Students may petition up to 5 units of Directed Reading classes (CSRE 200W) to count toward the major or minor. CSRE related courses offered only as Directed Reading (such as Muwekma House Seminar or ASB Prep courses) may be counted without a petition.
  - a. Students must inform the student services coordinator and the Director of CSRE that they intend to petition a Directed Reading class to count toward their major before taking the class, and submit a petition for the class while they are in it.
  - b. A syllabus with a series of readings, including themes, set by the instructor and the student must be submitted with the petition.
  - c. The Directed Reading must include assignments that go beyond the readings, such as response papers, a final paper, and/or creative project.
  - d. Units earned must align with the University's Unit of Credit (p. 67) policy, i.e., 1 unit being equal to 3 hours/week of work. Meetings with the instructor of the Directed Reading may count up to one hour per unit of work per week.

- e. In general, students are discouraged from using Directed Reading units toward their major unit requirement. Petitions are evaluated and approved by the Program Director on a case-by-case basis.
8. Students may major in two CSRE programs; see the "Multiple Majors (p. 30)" section of this bulletin for University rules concerning multiple majors. Such students may not double count courses between programs, with the exception of the course used to fulfill the Methodology requirement. In order to fulfill the WIM requirement, students write two papers during Autumn Quarter of the senior year, enrolling in both CSRE 200X and CSRE 201X.

In addition to the above rules, the following apply to CSRE majors:

1. Majors may petition to have up to 8 units of special language or advanced (i.e., at least at the second year level) reading and writing language courses count toward their degree. The courses may not be crosslisted with CSRE subjects (e.g., some advanced language courses).
  - a. Students must take a full year of a language course in order to be able to submit a petition.
  - b. Students may count a maximum of 5 units of a language toward the major.
  - c. Students may submit an additional petition to count up to 3 units of a second special language or advanced language course toward the major, but the student must also have taken the sequence associated with the second language for a full-year.
2. Concentrations within the CSRE Major should follow the general guideline of having approximately 20 units (typically 4 to 5 classes) that are related to the study and exploration of the students' chosen concentration.
3. EDUC 199A Undergraduate Honors Seminar counts as a WIM course for CSRE students doing Honors in Education.
4. **Core Curriculum**

All CSRE majors enroll in the 15-unit core curriculum, which consists of Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C), an additional comparative-core course, and a senior seminar taken in Autumn Quarter of the senior year. One major-core course may be counted toward the 15-unit core requirement.

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Jewish Literature	3-5
PSYCH 75	Introduction to Cultural Psychology	5



## 5. Thematic Concentration

Comparative Studies majors complete another 40 units of course work toward the major, with approximately 20 units relevant to the thematic concentration (p. 466) they have chosen.

## 6. Research/Methodology Requirement

Majors are required to complete 3-5 units of coursework focused on research methods relevant to their disciplinary approach as a student in Comparative Studies in Race & Ethnicity. Students select the research and/or methodology course in consultation with their faculty adviser.

## 7. Interdisciplinary Breadth Requirement

To fulfill the Interdisciplinary Breadth Requirement, students should take one 3-5 unit course from the Social Sciences and one 3-5 unit course from the Arts & Humanities that focus on race and ethnicity, especially if the courses are comparative.

## 8. Community Engaged Learning Requirement

All students in one of the CSRE majors are required to complete at least one service-learning experience. This requirement may be fulfilled by enrolling in a service-learning course, participating in an identity, race, or ethnicity focused service-learning Alternative Spring Break, participating in the Community Summer Research Internship program, or enrolling in CSRE 198 – Public Service Internship while completing independent service work.

## 9. Senior Paper or Honors Thesis

All CSRE majors complete a culminating research paper under the supervision of a faculty adviser. Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Senior Honors Research (CSRE 200Y and CSRE 200Z) courses cannot count for the 60 units towards your major but do count for the 180 units towards your bachelor's degree. Students must complete their theses with a minimum grade of 'B+' to receive honors in CSRE.

## Jewish Studies

*Interim Director:* Ari Y. Kelman

The Jewish Studies major provides students with an understanding of Jewish history, language, literature, religion, thought and politics. Jewish culture originated in the ancient Near East and continues today in many different forms across the globe. Drawing from the Humanities, the Social Sciences and from courses offered by affiliated faculty in the School of Education, the Jewish Studies major seeks to help students understand Jewish identity, thought and self-expression within larger historical and social contexts, and to develop their ability to analyze human experience from different disciplinary perspectives.

In addition to the undergraduate major and minor offered through the interdepartmental program in CSRE, the Taube Center for Jewish Studies offers a full range of guest lectures, conferences, and symposia. Graduate students interested in Jewish Studies should see the separate Jewish Studies (p. 631) section of this bulletin for program information, opportunities, and additional course descriptions.

## Bachelor of Arts in Jewish Studies

A total of 60 units of course work are required for the major.

1. A minimum grade of 'C-' is required for a student to count a class towards the Core, Major-Core Foundational, and Methods requirements. Additional units toward the major require a minimum 'D-' passing grade.

2. Comparative and Major-Core courses must be taken for the maximum units offered (4 or more) and for letter grade. Methods courses must be taken for a minimum of 3 units and for letter grade.
3. All majors, minors, and interdisciplinary honors students in the CSRE Family of Programs must take Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C).
4. Students may count 2 classes with the Satisfactory/No Credit (SNC) grading basis toward Additional Units.
  - Courses in which Credit/No Credit (CR/NC) is the only grading basis option may always be counted toward the major.
5. All majors are required to take at least one Community Engaged Learning course which must be CSRE, race, and/or ethnicity related.
  - Students may petition courses from outside departments to count, so long as they meet the race and/or ethnicity related requirement.
6. Students may petition up to 5 units of Internship for Public Service (CSRE 198) to count toward the major or minor when the work completed relates directly to race, ethnicity, or area of study. CSRE 198, however, may be repeated multiple times for University credit and the 180 units required to graduate.
7. Students may petition up to 5 units of Directed Reading classes (CSRE 200W) to count toward the major or minor. CSRE related courses offered only as Directed Reading (such as Muwekma House Seminar or ASB Prep courses) may be counted without a petition.
  - a. Students must inform the student services coordinator and the Director of CSRE that they intend to petition a Directed Reading class to count toward their major before taking the class, and submit a petition for the class while they are in it.
  - b. A syllabus with a series of readings, including themes, set by the instructor and the student must be submitted with the petition.
  - c. The Directed Reading must include assignments that go beyond the readings, such as response papers, a final paper, and/or creative project.
  - d. Units earned must align with the University's Unit of Credit (p. 67) policy, i.e., 1 unit being equal to 3 hours/week of work. Meetings with the instructor of the Directed Reading may count up to one hour per unit of work per week.
  - e. In general, students are discouraged from using Directed Reading units toward their major unit requirement. Petitions are evaluated and approved by the Program Director on a case-by-case basis.
8. Students may major in two CSRE programs; see the "Multiple Majors (p. 30)" section of this bulletin for University rules concerning multiple majors. Such students may not double count courses between programs, with the exception of the course used to fulfill the Methodology requirement. In order to fulfill the WIM requirement, students write two papers during Autumn Quarter of the senior year, enrolling in both CSRE 200X and CSRE 201X.

## 1. Core Curriculum

Jewish Studies majors must take the 15-unit CSRE core curriculum including Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C), an additional comparative-core course, and a senior seminar taken in Autumn Quarter of the senior year.

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5

CSRE 200X	CSRE Senior Seminar	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in 3-5 Literature	3-5
PSYCH 75	Introduction to Cultural Psychology	5

CSRE 200Z) courses cannot count for the 60 units towards your major but do count for the 180 units towards your bachelor's degree. Students must complete their theses with a minimum grade of 'B+' to receive honors in CSRE.

## Native American Studies

Director: Teresa LaFromboise

Native American Studies (NAS) provides an intensive approach to understanding the historical and contemporary experiences of Native American people. Attention is paid not only to the special relationship between tribes and the federal government, but to issues across national boundaries, including tribal nations within Canada, and North, Central, and South America. In using the term Native American, the NAS faculty recognize the heterogeneous nature of this population. Native Americans include the Alaska Native population, which comprises Aleuts, Eskimo, and other Native American people residing in Alaska, as well as Native Hawaiian communities.

The purpose of the Native American Studies major and minor is to introduce students to approaches in the academic study of Native American people, history, and culture. Students who major in Native American Studies have the opportunity of doing advanced work in related fields, including literature, sociology, education, and law. In addition to specialized course work on Native American issues, students also are expected to concentrate in a traditional discipline such as anthropology, history, or psychology to ensure a well rounded educational experience. The area of concentration and related course work should be chosen in consultation with a faculty adviser in Native American Studies. All courses in the program promote the discussion of how academic knowledge about Native Americans relates to the historical and contemporary experiences of Native American people and communities.

## Bachelor of Arts in Native American Studies

A total of 60 units of course work are required for the major.

1. A minimum grade of 'C-' is required for a student to count a class towards the Core, Major-Core Foundational, and Methods requirements. Additional units toward the major require a minimum 'D-' passing grade.
2. Comparative and Major-Core courses must be taken for the maximum units offered (4 or more) and for letter grade. Methods courses must be taken for a minimum of 3 units and for letter grade.
3. All majors, minors, and interdisciplinary honors students in the CSRE Family of Programs must take Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C).
4. Students may count 2 classes with the Satisfactory/No Credit (SNC) grading basis toward Additional Units.
  - Courses in which Credit/No Credit (CR/NC) is the only grading basis option may always be counted toward the major.
5. All majors are required to take at least one Community Engaged Learning course which must be CSRE, race, and/or ethnicity related.
  - Students may petition courses from outside departments to count, so long as they meet the race and/or ethnicity related requirement.
6. Students may petition up to 5 units of Internship for Public Service (CSRE 198) to count toward the major or minor when the work completed relates directly to race, ethnicity, or area of study. CSRE 198, however, may be repeated multiple times for University credit and the 180 units required to graduate.
7. Students may petition up to 5 units of Directed Reading classes (CSRE 200W) to count toward the major or minor. CSRE related courses offered only as Directed Reading (such as Muwékma House Seminar or ASB Prep courses) may be counted without a petition.

### 2. Major-Core Courses

Majors are required to take one major-core course in Jewish Studies. Courses include:

JEWISHST 183	The Holocaust	4-5
JEWISHST 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5

### 3. Area Study

Jewish Studies majors complete at least 15 units of courses that focus on Jewish history, issues, and identity. To fulfill the Interdisciplinary Breadth Requirement, students should take one 3-5 unit course from the Social Sciences and one 3-5 unit course from the Arts & Humanities that focus on race and ethnicity, especially if the courses are comparative. The remaining courses must have an Jewish Studies focus and primarily be selected from social science and humanities departments.

### 4. Language

One year of Hebrew or another approved Jewish language. Students able to satisfy the first year Hebrew requirement through a proficiency exam are still expected to take an additional year of Hebrew at a higher level or a first year in an additional Jewish language. A maximum of 15 units of language may be counted toward the 60 unit total required for the major.

### 5. Research/Methodology Requirement

Majors are required to complete 3-5 units of coursework focused on research methods relevant to their disciplinary approach as a student in Jewish Studies. Students select the methodology course(s) in consultation with their faculty adviser.

### 6. Interdisciplinary Breadth Requirement

To fulfill the Interdisciplinary Breadth Requirement, students should take one 3-5 unit course from the Social Sciences and one 3-5 unit course from the Arts & Humanities that focus on race and ethnicity, especially if the courses are comparative.

### 7. Community Engaged Learning Requirement

All students in one of the CSRE majors are required to complete at least one service-learning experience. This requirement may be fulfilled by enrolling in a service-learning course, participating in an identity, race, or ethnicity focused service-learning Alternative Spring Break, participating in the Community Summer Research Internship program, or enrolling in CSRE 198 – Public Service Internship while completing independent service work.

### 8. Senior Paper or Honors Thesis

All Jewish Studies majors complete a culminating research paper under the supervision of a faculty adviser. Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Senior Honors Research (CSRE 200Y and

- a. Students must inform the student services coordinator and the Director of CSRE that they intend to petition a Directed Reading class to count toward their major before taking the class, and submit a petition for the class while they are in it.
  - b. A syllabus with a series of readings, including themes, set by the instructor and the student must be submitted with the petition.
  - c. The Directed Reading must include assignments that go beyond the readings, such as response papers, a final paper, and/or creative project.
  - d. Units earned must align with the University's Unit of Credit (p. 67) policy, i.e., 1 unit being equal to 3 hours/week of work. Meetings with the instructor of the Directed Reading may count up to one hour per unit of work per week.
  - e. In general, students are discouraged from using Directed Reading units toward their major unit requirement. Petitions are evaluated and approved by the Program Director on a case-by-case basis.
8. Students may major in two CSRE programs; see the "Multiple Majors (p. 30)" section of this bulletin for University rules concerning multiple majors. Such students may not double count courses between programs, with the exception of the course used to fulfill the Methodology requirement. In order to fulfill the WIM requirement, students write two papers during Autumn Quarter of the senior year, enrolling in both CSRE 200X and CSRE 201X.

## 1. Core Curriculum

Native American Studies majors must take the 15-unit CSRE core curriculum, including Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C), an additional comparative-core course, and a senior seminar taken in Autumn Quarter of the senior year. One major-core course that focuses on a non-Native American group may be counted toward the 15-unit core requirement.

ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
PSYCH 75	Introduction to Cultural Psychology	5

## 2. Major-Core Courses

Majors are required to take one major-core course in Native American Studies.

Select one of the following:

NATIVEAM 138	American Indians in Comparative Historical Perspective	4
NATIVEAM 139	American Indians in Contemporary Society	4

NATIVEAM 115	Introduction to Native American History	5
NATIVEAM 16	Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America	5

## 3. Area Study

Majors complete an additional 38-41 units of course work that satisfy three categories in their area of study: Native American focus, Interdisciplinary Breadth Requirement, and a methodology/research course.

## 4. Language Study (optional)

Students may obtain credit for their study of a related native language towards their degree. If students take 15 or more units of an advanced, second-year native language, or first year special language course relevant to Native American Studies, they may apply 5 of those units toward their Native American Studies degree.

## 5. Research/Methodology Requirement

Majors are required to complete 3-5 units of coursework focused on research methods relevant to their disciplinary approach as a student in Native American Studies. Students select the research and/or methodology course in consultation with their faculty adviser.

## 6. Interdisciplinary Breadth Requirement

To fulfill the Interdisciplinary Breadth Requirement, students should take one 3-5 unit course from the Social Sciences and one 3-5 unit course from the Arts & Humanities that focus on race and ethnicity, especially if the courses are comparative.

## 7. Community Engaged Learning Requirement

All students in one of the CSRE majors are required to complete at least one service-learning experience. This requirement may be fulfilled by enrolling in a service-learning course, participating in an identity, race, or ethnicity focused service-learning Alternative Spring Break, participating in the Community Summer Research Internship program, or enrolling in CSRE 198 – Public Service Internship while completing independent service work.

## 8. Senior Paper or Honors Thesis

All Native American Studies majors complete a culminating research paper under the supervision of a faculty adviser. Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Senior Honors Research (CSRE 200Y and CSRE 200Z) courses cannot count for the 60 units towards your major but do count for the 180 units towards your bachelor's degree. Students must complete their theses with a minimum grade of 'B+' to receive honors in CSRE.

Units

Units

## Thematic Concentration in American Diversity

The American Diversity concentration is designed for students who wish to explore how the United States was and is constituted with relation to issues of race and ethnicity. The concentration investigates how American domestic and foreign policy, law, history, culture, and society are formed within conversations, debates, policies and studies regarding race and ethnicity. Issues of immigration, citizenship, empire and expansion, defense, diplomacy, human rights, public welfare, social justice and law, educational rights and other topics are explored from the angle of how racial and ethnic difference impacts debate and policy.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in the American Diversity

thematic concentration should contact the CSRE undergraduate program office.

The American Diversity concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology requirement (5 units). The remaining 40 units of course work should be relevant to the thematic concentration and selected in consultation with the faculty adviser.

Students may find the following courses useful in fulfilling requirements in the American Diversity thematic concentration.

		Units
AMSTUD 183	Re- Imagining American Borders	5
COMPLIT 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 14N	Growing Up Bilingual	3
CSRE 45Q	Understanding Race and Ethnicity in American Society	4
CSRE 108	Introduction to Feminist, Gender, and Sexuality Studies	4-5
CSRE 125V	The Voting Rights Act	5
CSRE 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	2-4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 150	Race and Political Sociology	3
CSRE 164	Immigration and the Changing United States	4
CSRE 201B	Making Meaning: Art, Culture & Social Change	3
EDUC 114N	Growing Up Bilingual	3
EDUC 201	History of Education in the United States	3-5
HISTORY 50B	Nineteenth Century America	3
HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
POLISCI 120B	Campaigns, Voting, Media, and Elections	4-5
POLISCI 125V	The Voting Rights Act	5
POLISCI 327	Minority Behavior and Representation	5
SOC 135	Poverty, Inequality, and Social Policy in the United States	4
SOC 140	Introduction to Social Stratification	3
SOC 150	Race and Political Sociology	3
SOC 155	The Changing American Family	4
SOC 164	Immigration and the Changing United States	4

## Thematic Concentration in Education, Access, and Equity

The concentration in Education, Access, and Equity explores history, policy, and practice in education to understand how educational opportunity is shaped by issues of race, ethnicity, and difference. The goal of the concentration is to develop an understanding of the core issues facing educators and policy makers so that students may learn how they can contribute to the social and political discourse surrounding issues of education and opportunity policy in the U.S.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in the Education, Access, and Equity concentration should contact the CSRE undergraduate program office.

The Education, Access, and Equity concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology requirement (5 units). The remaining 40 units of course work should be relevant to the thematic concentration and selected in consultation with the faculty adviser.

Students may find the following courses useful in fulfilling requirements in the Education, Access, and Equity thematic concentration.

		Units
AFRICAAM 112	Urban Education	3-5
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	3-5
CSRE 11W	Service-Learning Workshop on Issues of Education Equity	1
CSRE 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
CSRE 126B	Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population	3-4
CSRE 216X	Education, Race, and Inequality in African American History, 1880-1990	3-5
CSRE 233A	Counseling Theories and Interventions from a Multicultural Perspective	3-5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
EDUC 100B	EAST House Seminar: Current Issues and Debates in Education	1
EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
EDUC 110	Sociology of Education: The Social Organization of Schools	4
EDUC 120C	Education and Society	4-5
EDUC 149	Theory and Issues in the Study of Bilingualism	3-5
EDUC 165	History of Higher Education in the U.S.	3-5
EDUC 197	Gender and Education in Global and Comparative Perspectives	4
EDUC 277	Education of Immigrant Students: Psychological Perspectives	4
HISTORY 158C	History of Higher Education in the U.S.	3-5
LINGUIST 65	African American Vernacular English	3-5
SOC 132	Sociology of Education: The Social Organization of Schools	4

## Thematic Concentration in Identity, Diversity and Aesthetics (IDA)

Students in the Comparative Studies in Race and Ethnicity major can choose a concentration in Identity, Diversity and Aesthetics (IDA). The Identity, Diversity, and Aesthetics Concentration in Comparative Studies in Race & Ethnicity is a program designed to explore the intersections of culture, race, the arts, and social transformation. In IDA courses taught by Stanford faculty, lecturers, and distinguished Visiting Artists, students learn how the arts, activism, and the academy interact to produce aesthetic and societal change.

The concentration is not declared in Axess; it does not appear on the transcript or diploma. Students interested in IDA should contact the CSRE undergraduate program office.

The IDA concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn

Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. CSRE majors are also required to take a course in research methods (5 units). In addition to the core curriculum, students complete 40 units of course work relevant to the thematic concentration. Thematic courses may focus on artistic practice and performance, art history, creative writing, community arts, art and social change, writing for performance, critical studies in art and performance, and critical arts theory.

Additionally, IDA concentration students must complete a creative senior project. Possible senior projects include a stage production, a set of recorded music, an anthology of creative writing, a curated or solo exhibition, or a community arts workshop. Students who elect to write an honors thesis may incorporate their project as the basis for their thesis.

Students may find the following courses useful in fulfilling requirements in the Identity, Diversity and Aesthetics (IDA) concentration.

		Units			
AFRICAAM 3E	Michelle Obama in American Culture	1	AFRICAAM 200N	Funkentelechy: Technologies, Social Justice and Black Vernacular Cultures	4
AFRICAAM 5I	Hamilton: An American Musical	1	AFRICAAM 223	Literature and Human Experimentation	3-5
AFRICAAM 10A	Introduction to Identity, Diversity, and Aesthetics: Arts, Culture, and Pedagogy	1	AFRICAAM 226	Mixed-Race Politics and Culture	5
AFRICAAM 18A	Jazz History: Ragtime to Bebop, 1900-1940	3	AFRICAAM 229	Literature and Global Health	3-5
AFRICAAM 18B	Jazz History: Bebop to Present, 1940-Present	3	AFRICAAM 258	Black Feminist Theater and Theory	4
AFRICAAM 20A	Jazz Theory	3	AFRICAAM 265G	African-American Independent Film- On Both Sides of the Camera	4-5
AFRICAAM 21	African American Vernacular English	3-5	AFRICAAM 352	The Novel in Africa	3-5
AFRICAAM 36	REPRESENT! Covering Race, Culture, and Identity In The Arts through Writing, Media, and Transmedia.	5	AFRICAST 132	Literature and Society in Africa and the Caribbean	4
AFRICAAM 37	Chocolate Heads Performance Project: Dance & Intercultural Performance Creation	2	AFRICAST 145B	The African Atlantic	3-5
AFRICAAM 45	Dance Improv StratLab: Freestyle Improvisation from Contemporary to Hip Hop & Beyond	1-2	AFRICAST 229	Literature and Global Health	3-5
AFRICAAM 71	Introduction to Capoeira: An African Brazilian Art Form	1	AFRICAST 246L	Studies in Ethnomusicology: Musics of Africa and the African Diaspora	3-5
AFRICAAM 94	Public Space in Iran: Murals, Graffiti, Performance	3-4	AMSTUD 3E	Michelle Obama in American Culture	1
AFRICAAM 101	Black & White Race Relations in American Fiction & Film	3-5	AMSTUD 5I	Hamilton: An American Musical	1
AFRICAAM 102B	Art and Social Criticism	5	AMSTUD 12A	Introduction to English III: Introduction to African American Literature	5
AFRICAAM 120F	Buying Black: Economic Sovereignty, Race, and Entrepreneurship in the USA	4-5	AMSTUD 51Q	Comparative Fictions of Ethnicity	4
AFRICAAM 128	Roots Modern Experience - Mixed Level	1	AMSTUD 101	Black & White Race Relations in American Fiction & Film	3-5
AFRICAAM 133	Literature and Society in Africa and the Caribbean	4	AMSTUD 102	Art and Social Criticism	5
AFRICAAM 146L	Studies in Ethnomusicology: Musics of Africa and the African Diaspora	3-5	AMSTUD 134	Museum Cultures: Material Representation in the Past and Present	3-5
AFRICAAM 148	The African Atlantic	3-5	AMSTUD 143M	American Indian Mythology, Legend, and Lore	3-5
AFRICAAM 154G	Black Magic: Ethnicity, Race, and Identity in Performance Cultures	3-4	AMSTUD 151	Migration and Diaspora in American Art, 1800-Present	4
AFRICAAM 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4	AMSTUD 152K	Mixed-Race Politics and Culture	5
AFRICAAM 159	James Baldwin & Twentieth Century Literature	5	AMSTUD 186D	Asian American Art: 1850-Present	4
AFRICAAM 160J	Conjure Art 101: Performances of Ritual, Spirituality and Decolonial Black Feminist Magic	2	AMSTUD 255D	Racial Identity in the American Imagination	4-5
AFRICAAM 165G	Afro-German Art Forms	3-5	AMSTUD 261	Personal Narratives in Feminist, Gender, and Sexuality Studies	4-5
AFRICAAM 181Q	Alternative Viewpoints: Black Independent Film	4	ANTHRO 120F	Buying Black: Economic Sovereignty, Race, and Entrepreneurship in the USA	4-5
AFRICAAM 188	Who We Be: Art, Images & Race in Post-Civil Rights America	2-4	ANTHRO 320A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
AFRICAAM 194	Topics in Writing & Rhetoric: Contemporary Black Rhetorics: Black Twitter and Black Digital Cultures	4	ARCHLGY 134	Museum Cultures: Material Representation in the Past and Present	3-5
AFRICAAM 194A	Topics in Writing & Rhetoric: Freedom's Mixtape: DJing Contemporary African American Rhetorics	4	ARCHLGY 234	Museum Cultures: Material Representation in the Past and Present	3-5
			ARTHIST 118A	Public Space in Iran: Murals, Graffiti, Performance	3-4
			ARTHIST 151	Migration and Diaspora in American Art, 1800-Present	4
			ARTHIST 162B	Art and Social Criticism	5
			ARTHIST 186B	Asian American Art: 1850-Present	4
			ARTHIST 193	Jacob Lawrence's Twentieth Century: African American Art and Culture	5
			ARTHIST 211	The California Missions: Art History and Reconciliation	5
			ARTHIST 221E	Peripheral Dreams: The Art and Literature of Miró, Dalí, and other Surrealists in Catalonia	3-5
			ARTHIST 284B	Museum Cultures: Material Representation in the Past and Present	3-5
			ARTHIST 351	Migration and Diaspora in American Art, 1800-Present	4
			ARTHIST 502	Methods: Objecthood	5
			ARTSINST 50	Arts in Context: The Process of Cultural Production	1-2
			ARTSINST 182	Activating Urban Spaces: Materializing Hidden Narratives in the Urban Environment	3-4
			ARTSTUDI 170	PHOTOGRAPHY I: BLACK AND WHITE	4

ARTSTUDI 270	Advanced Photography Seminar	1-5	CSRE 111	The California Missions: Art History and Reconciliation	5
ASNAMST 31N	Perspectives in North American Taiko	3	CSRE 114	Sound Tracks: Music, Memory, and Migration in the Twentieth Century	3-4
ASNAMST 91A	ASIAN-AMERICAN AUTOBIOGRAPHY/W	5	CSRE 120F	Buying Black: Economic Sovereignty, Race, and Entrepreneurship in the USA	4-5
ASNAMST 157	An Introduction to Asian American Literature: The Short Story	3	CSRE 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
ASNAMST 174S	When Half is Whole: Developing Synergistic Identities and Mestiza Consciousness	5	CSRE 122E	Art in the Streets: Identity in Murals, Site-specific works, and Interventions in Public Spaces	4
ASNAMST 186B	Asian American Art: 1850-Present	4	CSRE 123A	American Indians and the Cinema	5
CHILATST 109	GENTE: An incubator for transforming national narratives	5	CSRE 123B	Literature and Human Experimentation	3-5
CHILATST 179	Chicano & Chicana Theater: Politics In Performance	4	CSRE 127A	Can't Stop Won't Stop: A History Of The Hip-Hop Arts	2-4
CLASSICS 16N	Sappho: Erotic Poetess of Lesbos	3	CSRE 129B	Literature and Global Health	3-5
COMPLIT 37Q	Zionism and the Novel	3	CSRE 134	Museum Cultures: Material Representation in the Past and Present	3-5
COMPLIT 51Q	Comparative Fictions of Ethnicity	4	CSRE 141E	Counterstory and Narrative Inquiry in Literature and Education	3
COMPLIT 55N	Batman, Hamilton, Díaz, and Other Wondrous Lives	3-5	CSRE 145B	The African Atlantic	3-5
COMPLIT 82	Making Palestine Visible	3-5	CSRE 146J	Studies in Ethnomusicology: Listening to the Local: Music Ethnography of the Bay Area	3-5
COMPLIT 106	Public Writing for Human Rights	1-3	CSRE 147L	Studies in Music, Media, and Popular Culture: Latin American Music and Globalization	3-4
COMPLIT 110	Introduction to Comparative Queer Literary Studies	3-5	CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
COMPLIT 113	Feminist Poetry in the U.S., 1973-2017	3-5	CSRE 151D	Migration and Diaspora in American Art, 1800-Present	4
COMPLIT 145B	The African Atlantic	3-5	CSRE 154D	Black Magic: Ethnicity, Race, and Identity in Performance Cultures	3-4
COMPLIT 149	The Laboring of Diaspora & Border Literary Cultures	3-5	CSRE 156T	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
COMPLIT 182	Making Palestine Visible	3-5	CSRE 160J	Conjure Art 101: Performances of Ritual, Spirituality and Decolonial Black Feminist Magic	2
COMPLIT 204	Indigenous Poetics and the Politics of Resistance	3	CSRE 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	3-4
COMPLIT 216	Jazz and Literature	3-5	CSRE 165I	Afro-German Art Forms	3-5
COMPLIT 223	Literature and Human Experimentation	3-5	CSRE 174S	When Half is Whole: Developing Synergistic Identities and Mestiza Consciousness	5
COMPLIT 229	Literature and Global Health	3-5	CSRE 177	Dramatic Writing: The Fundamentals	4
COMPLIT 247	Bollywood and Beyond: An Introduction to Indian Film	3-5	CSRE 179C	Chroniclers of Desire: Creative Non-Fiction Writing Workshop	3-5
COMPLIT 310	Introduction to Comparative Queer Literary Studies	3-5	CSRE 188Q	Imagining Women: Writers in Print and in Person	4-5
COMPLIT 345B	The African Atlantic	3-5	CSRE 194KT	Topics in Writing & Rhetoric: The Last Hopi On Earth: The Rhetoric of Entertainment Inequity	4
COMPLIT 348	US-Mexico Border Fictions: Writing La Frontera, Tearing Down the Wall	3-5	CSRE 201B	Making Meaning: Art, Culture & Social Change	3
COMPLIT 352A	The Novel in Africa	3-5	CSRE 201D	Public Art Interventions in Social & Cultural Spaces	4-5
CSRE 3E	Michelle Obama in American Culture	1	CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 5I	Hamilton: An American Musical	1	CSRE 258	Black Feminist Theater and Theory	4
CSRE 10A	Introduction to Identity, Diversity, and Aesthetics: Arts, Culture, and Pedagogy	1	CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
CSRE 10AY	Pacific Standard Time LA/LA creative projects in a Celebration Beyond Borders	1-2	DANCE 1	Introduction to Contemporary Dance & Movement: Liquid Flow	1
CSRE 21	African American Vernacular English	3-5	DANCE 2	Introduction to Dance & Movement: Afro Flows	1
CSRE 41	Black & White Race Relations in American Fiction & Film	3-5	DANCE 30	Chocolate Heads Performance Project: Dance & Intercultural Performance Creation	2
CSRE 44	Living Free: Embodying Healing and Creativity in The Era of Racial Justice Movements	1-4	DANCE 45	Dance Improv StratLab: Freestyle Improvisation from Contemporary to Hip Hop & Beyond	1-2
CSRE 47Q	Heartfulness: Mindfulness, Compassion, and Responsibility	3	DANCE 58	Beginning Hip Hop	1
CSRE 51Q	Comparative Fictions of Ethnicity	4	DANCE 59	Intermediate-Advanced Hip-Hop	1
CSRE 55N	Batman, Hamilton, Díaz, and Other Wondrous Lives	3-5			
CSRE 61	Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders	3-4			
CSRE 78	Art + Community: Division, Resilience & Reconciliation	1-5			
CSRE 82G	Making Palestine Visible	3-5			
CSRE 95I	Revolutionary Practices: Space and Public Discourse in Iran	4			
CSRE 102A	Art and Social Criticism	5			

DANCE 71	Introduction to Capoeira: An African Brazilian Art Form	1	FEMGEN 361	Personal Narratives in Feminist, Gender, and Sexuality Studies	4-5
DANCE 102	Musical Theater Dance Styles	1	FILMSTUD 100C	History of World Cinema III, 1960-Present	4
DANCE 106I	Stanford Dance Community: Inter-Style Choreography Workshop	1-2	FILMSTUD 132A	Indian Cinema	5
DANCE 128	Roots Modern Experience - Mixed Level	1	FILMSTUD 213	Global Melodrama	5
DANCE 160J	Conjure Art 101: Performances of Ritual, Spirituality and Decolonial Black Feminist Magic	2	FILMSTUD 300C	History of World Cinema III, 1960-Present	4
DANCE 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	3-4	FILMSTUD 332A	Indian Cinema	5
DANCE 161D	Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders	3-4	FILMSTUD 413	Global Melodrama	5
EARTHSYS 95	Liberation Through Land: Organic Gardening and Racial Justice	2	FRENCH 133	Literature and Society in Africa and the Caribbean	4
EDUC 141	Counterstory and Narrative Inquiry in Literature and Education	3	FRENCH 145B	The African Atlantic	3-5
EDUC 214	Museum Cultures: Material Representation in the Past and Present	3-5	FRENCH 205	Songs of Love and War: Gender, Crusade, Politics	3-5
EDUC 314	Technologies, Social Justice and Black Vernacular Culture	3-5	FRENCH 229	Literature and Global Health	3-5
EDUC 341	Counterstory and Narrative Inquiry in Literature and Education	3	FRENCH 345B	The African Atlantic	3-5
EDUC 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5	GERMAN 165	Afro-German Art Forms	3-5
ENGLISH 12A	Introduction to English III: Introduction to African American Literature	5	GLOBAL 145	Revolutionary Practices: Space and Public Discourse in Iran	4
ENGLISH 43A	American Indian Mythology, Legend, and Lore	3-5	GLOBAL 250	Bollywood and Beyond: An Introduction to Indian Film	3-5
ENGLISH 91A	ASIAN-AMERICAN AUTOBIOGRAPHY/W	5	HISTORY 3E	Michelle Obama in American Culture	1
ENGLISH 143A	American Indian Mythology, Legend, and Lore	3-5	HISTORY 3G	Hamilton: An American Musical	1
ENGLISH 152G	Harlem Renaissance and Modernism	5	HISTORY 36N	Gay Autobiography	4
ENGLISH 152K	Mixed-Race Politics and Culture	5	HISTORY 82G	Making Palestine Visible	3-5
ENGLISH 159	James Baldwin & Twentieth Century Literature	5	HISTORY 182G	Making Palestine Visible	3-5
ENGLISH 287G	A Woman's Life: 20th- (and 21st-) Century Memoirs by Women	5	HISTORY 255D	Racial Identity in the American Imagination	4-5
FEMGEN 3E	Michelle Obama in American Culture	1	HISTORY 265G	African-American Independent Film- On Both Sides of the Camera	4-5
FEMGEN 12SI	Beyond the Athlete: Intersection of Diversity, Storytelling, and Athletics	1-2	HISTORY 355D	Racial Identity in the American Imagination	4-5
FEMGEN 13N	Women Making Music	3	HISTORY 365G	African-American Independent Film- On Both Sides of the Camera	4-5
FEMGEN 21S	StoryCraft: On Relationships	2	HUMBIO 175H	Literature and Human Experimentation	3-5
FEMGEN 21T	StoryCraft: On Sexuality	2	HUMBIO 175L	Literature and Global Health	3-5
FEMGEN 24N	Sappho: Erotic Poetess of Lesbos	3	ILAC 149	The Laboring of Diaspora & Border Literary Cultures	3-5
FEMGEN 36N	Gay Autobiography	4	ILAC 193	The Cinema of Pedro Almodovar	3-5
FEMGEN 97	Bow Down: Queer Hip-Hop Pedagogy	3	ILAC 281E	Peripheral Dreams: The Art and Literature of Miró, Dalí, and other Surrealists in Catalonia	3-5
FEMGEN 102	Art and Social Criticism	5	ILAC 348	US-Mexico Border Fictions: Writing La Frontera, Tearing Down the Wall	3-5
FEMGEN 110X	Introduction to Comparative Queer Literary Studies	3-5	JEWISHST 37Q	Zionism and the Novel	3
FEMGEN 113X	Feminist Poetry in the U.S., 1973-2017	3-5	JEWISHST 143	Literature and Society in Africa and the Caribbean	4
FEMGEN 133	Transgender Performance and Performativity	4	LIFE 124	Counterstory and Narrative Inquiry in Literature and Education	3
FEMGEN 154G	Black Magic: Ethnicity, Race, and Identity in Performance Cultures	3-4	LINGUIST 65	African American Vernacular English	3-5
FEMGEN 159	James Baldwin & Twentieth Century Literature	5	LINGUIST 253	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
FEMGEN 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	3-4	MED 220	Literature and Human Experimentation	3-5
FEMGEN 188Q	Imagining Women: Writers in Print and in Person	4-5	MED 234	Literature and Global Health	3-5
FEMGEN 205	Songs of Love and War: Gender, Crusade, Politics	3-5	MUSIC 4SI	Interactive Introduction to North American Taiko	1
FEMGEN 258X	Black Feminist Theater and Theory	4	MUSIC 14N	Women Making Music	3
FEMGEN 261	Personal Narratives in Feminist, Gender, and Sexuality Studies	4-5	MUSIC 18A	Jazz History: Ragtime to Bebop, 1900-1940	3
FEMGEN 310X	Introduction to Comparative Queer Literary Studies	3-5	MUSIC 18B	Jazz History: Bebop to Present, 1940-Present	3
FEMGEN 314	Performing Identities	4	MUSIC 20A	Jazz Theory	3
			MUSIC 31N	Perspectives in North American Taiko	3
			MUSIC 37N	Ki ho'alu: The New Renaissance of a Hawaiian Musical Tradition	3
			MUSIC 50	Arts in Context: The Process of Cultural Production	1-2
			MUSIC 114	Sound Tracks: Music, Memory, and Migration in the Twentieth Century	3-4

MUSIC 146J	Studies in Ethnomusicology: Listening to the Local: Music Ethnography of the Bay Area	3-5
MUSIC 146K	Studies in Ethnomusicology: Music of South Asia	3-5
MUSIC 146L	Studies in Ethnomusicology: Musics of Africa and the African Diaspora	3-5
MUSIC 184E	Musical Theater Dance Styles	1
MUSIC 246J	Studies in Ethnomusicology: Listening to the Local: Music Ethnography of the Bay Area	3-5
MUSIC 246K	Studies in Ethnomusicology: Music of South Asia	3-5
MUSIC 246L	Studies in Ethnomusicology: Musics of Africa and the African Diaspora	3-5
NATIVEAM 134	Museum Cultures: Material Representation in the Past and Present	3-5
NATIVEAM 143A	American Indian Mythology, Legend, and Lore	3-5
NATIVEAM 211	The California Missions: Art History and Reconciliation	5
PWR 1WI	Writing & Rhetoric 1: By Any Means Necessary: The Rhetoric of Black Radical Movements	4
PWR 2JC	Writing & Rhetoric 2: Walk(s) of Shame: The Rhetoric of Respectability	4
PWR 194AB	Topics in Writing & Rhetoric: Freedom's Mixtape: DJing Contemporary African American Rhetorics	4
PWR 194ABA	Topics in Writing & Rhetoric: Contemporary Black Rhetorics: Prince	2-3
PWR 194AJ	Topics in Writing & Rhetoric: Contemporary Black Rhetorics: Black Twitter and Black Digital Cultures	4
PWR 194KT	Topics in Writing & Rhetoric: The Last Hopi On Earth: The Rhetoric of Entertainment Inequity	4
STS 200N	Funkentelechy: Technologies, Social Justice and Black Vernacular Cultures	4
TAPS 20N	Prisons and Performance	3
TAPS 21S	StoryCraft: On Relationships	2
TAPS 21T	StoryCraft: On Sexuality	2
TAPS 50	Arts in Context: The Process of Cultural Production	1-2
TAPS 133T	Transgender Performance and Performativity	4
TAPS 154G	Black Magic: Ethnicity, Race, and Identity in Performance Cultures	3-4
TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
TAPS 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	3-4
TAPS 161D	Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders	3-4
TAPS 258	Black Feminist Theater and Theory	4
TAPS 314	Performing Identities	4
TAPS 356	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
URBANST 182	Activating Urban Spaces: Materializing Hidden Narratives in the Urban Environment	3-4
WELLNESS 180	The Flourishing Activist: Mindfully Being the Revolution	1-2

## Thematic Concentration in Intersectionality

The intersectionality concentration is designed for students who wish to explore the intersections between race and ethnicity and other social identities including gender, sexuality, class, and ability. This concentration investigates how notions of racial and ethnic identity are complicated by gender, sexuality and other categories. Students will examine the construction of power systems to better contextualize

how certain identities become privileged over others. Drawing from contributions of women of color feminism and queer of color studies, this concentration challenges normative constructions of 'race' and 'ethnicity' by equipping students with analytical tools from feminist theory, queer theory, post-colonial theory, critical race theory, and other critical methods.

The concentration is not declared on Axxess; it does not appear on the transcript or diploma. Students interested in Intersectionality thematic concentration should contact the CSRE undergraduate program office.

The Intersectionality concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology requirement (5 units). The remaining 40 units of course work should be relevant to the thematic concentration and selected in consultation with the faculty adviser.

Students may find the following courses useful in fulfilling requirements in the Intersectionality thematic concentration.

		Units
AFRICAAM 54N	African American Women's Lives	3
AFRICAAM 121X	Hip Hop, Youth Identities, and the Politics of Language	3-4
AMSTUD 106	Spectacular Trials: Sex, Race and Violence in Modern American Culture	5
ARTHIST 176	Feminism and Contemporary Art	4
COMPLIT 110	Introduction to Comparative Queer Literary Studies	3-5
CSRE 28SI	What is Whiteness? Historical and Contemporary Definitions of White Racial Identity in the U.S.	1-2
CSRE 63N	The Feminist Critique: The History and Politics of Gender Equality	3-4
CSRE 108	Introduction to Feminist, Gender, and Sexuality Studies	4-5
CSRE 133B	Covering Islam: On What We Learn to See, Think and Hear about Islam & Muslims	3-5
CSRE 147L	Studies in Music, Media, and Popular Culture: Latin American Music and Globalization	3-4
CSRE 162	The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History	3-5
CSRE 168	New Citizenship: Grassroots Movements for Social Justice in the U.S.	5
CSRE 183	Re- Imagining American Borders	5
CSRE 255D	Racial Identity in the American Imagination	4-5
FEMGEN 103	Feminist and Queer Theories and Methods Across the Disciplines	2-5
FEMGEN 188Q	Imagining Women: Writers in Print and in Person	4-5
HISTORY 257C	LGBT/Queer Life in the United States	4-5
LINGUIST 156	Language and Gender	3-5
NATIVEAM 103S	Gender in Native American Societies	5
TAPS 164T	Queer Art and Performance	4-5

## Thematic Concentration in Public Service

The Public Service thematic concentration is open to students in any major in the Comparative Studies in Race and Ethnicity Undergraduate Program. The concentration allows a student to develop an area of study focused on community development, public service, and social change. Studying how issues of race and ethnicity impact and are impacted by community and social problems, this concentration is designed to ensure that students interested in service and community have access to a structured curriculum that provides a solid grounding in the theory and



practice of community and civic engagement in order to provide the skills and experiences that enable students to become leaders and actors in the sphere of public life.

Students who wish to pursue a thematic concentration in public service must organize their studies to include 15 units, including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology requirement (5 units). Public Service concentration students should also prepare to complete 25 units (at least 5 courses) relevant to the theme of public service. Three of these courses should include a service learning component (i.e., require the student to participate in service in the local community as a central component to the course).

Students who select a thematic concentration in public service must complete an internship as part of their program of study. This internship can be completed during the academic year for credit or during the summer, but must be at least 300 hours.

Finally, students who pursue the concentration in public service should select a topic for their senior paper or honors thesis that reflects their interest in community work (i.e., service or organizing) or a community issue or concern that is addressed through public service.

This concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in this thematic concentration should contact the CSRE Undergraduate Program Office for details about its requirements.

Students may find the following courses useful in fulfilling requirements for the Public Service thematic concentration:

		Units
ANTHRO 169A	New Citizenship: Grassroots Movements for Social Justice in the U.S.	5
ASNAMST 112	Public Archaeology: Market Street Chinatown Archaeology Project	4-5
ASNAMST 144	Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class	5
CHILATST 177A	Well-Being in Immigrant Children & Youth: A Service Learning Course	4
CHILATST 183X	Practicum in English-Spanish School & Community Interpreting	3-4
CSRE 11W	Service-Learning Workshop on Issues of Education Equity	1
CSRE 100	Grassroots Community Organizing: Building Power for Collective Liberation	3-5
CSRE 128	What We Want is We: Identity in Visual Arts, Social Engagement, and Civic Propositions	4
CSRE 146	Community Matters: Research and Service with Community Organizations	3-4
CSRE 162A	Spirituality and Nonviolent Urban and Social Transformation	3
CSRE 168	New Citizenship: Grassroots Movements for Social Justice in the U.S.	5
CSRE 178	Ethics and Politics of Public Service	3-5
CSRE 201	From Confederate Monuments to Wikipedia: The Politics of Remembering the Past	5
CSRE 201B	Making Meaning: Art, Culture & Social Change	3
CSRE 260	California's Minority-Majority Cities	4-5
ETHICSOC 133	Ethics and Politics of Public Service	3-5
HISTORY 259A	Poverty and Homelessness in America	4-5
HUMBIO 178	Ethics and Politics of Public Service	3-5

PHIL 175A	Ethics and Politics of Public Service	3-5
POLISCI 133	Ethics and Politics of Public Service	3-5
PUBLPOL 103D	Ethics and Politics of Public Service	3-5
SOC 118	Social Movements and Collective Action	4
SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5
SOC 135	Poverty, Inequality, and Social Policy in the United States	4
SOC 141	Controversies about Inequality	5
URBANST 112	The Urban Underclass	4
URBANST 122	Ethics and Politics of Public Service	3-5

## Thematic Concentration in Race and Health

The concentration in Race and Health is designed for students who are seeking an interdisciplinary exploration of health disparities, health access, and health policy. Through course work, students examine how health experiences are influenced by issues of race and ethnicity.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in the Race and Health concentration should contact the CSRE undergraduate program office.

The Race and Health concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology requirement (5 units). The remaining 40 units of course work should be relevant to the thematic concentration and selected in consultation with the faculty adviser.

Students may find the following courses useful in fulfilling requirements in the Race and Health thematic concentration.

		Units
ANTHRO 82	Medical Anthropology	4
ANTHRO 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5
ANTHRO 185A	Race and Biomedicine	3-5
CSRE 41A	Genes and Identity	3
CSRE 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5
EDUC 340	Psychology and American Indian Mental Health	3-5
HRP 212	Cross Cultural Medicine	3
HUMBIO 120	Health Care in America: An Introduction to U.S. Health Policy	4
HUMBIO 121E	Ethnicity and Medicine	1-3
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
HUMBIO 128	Community Health Psychology	4
HUMBIO 129	Critical Issues in International Women's Health	4
MED 159A	Service-Learning in Migrant Health	2
MED 159B	Service-Learning in Migrant Health	2
NATIVEAM 240	Psychology and American Indian Mental Health	3-5
PEDS 150	Social and Environmental Determinants of Health	3
PEDS 222	Beyond Health Care: the effects of social policies on health	3
PEDS 250	Social and Environmental Determinants of Health	3
PSYCH 101	Community Health Psychology	4

PWR 194DH	Topics in Writing and Rhetoric: Empathy, Ethics, and Compassion Meditation	4
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## Thematic Concentration in Race and the American City

The Race and the American City concentration is designed for students who wish to develop methodologies, data, and theoretical and conceptual materials concerning how urban life, infrastructure, and policies are influenced by race and ethnicity. As virtual laboratories of social interaction, cities embody negotiations around resources, residences, financial districting, economic flow, health and educational resources, environmental policies, and city planning. A primary goal is for students to learn how they might contribute to the social and political discourse on race and ethnicity in the U.S. Participation in a public service internship and/or Stanford in Washington is encouraged.

The concentration is not declared on Axess; it does not appear on the transcript or diploma. Students interested in the Race and the American City concentration should contact the CSRE undergraduate program office.

The Race and the American City concentration requires 15 units including two approved CSRE core courses and CSRE 200X CSRE Senior Seminar (WIM), taken Autumn Quarter of the senior year. One foundational course may be counted toward the 15 unit core requirement. In addition to the core curriculum, students complete a Research/Methodology requirement (5 units). The remaining 40 units of course work should be relevant to the thematic concentration and selected in consultation with the faculty adviser.

Students may find the following courses useful in fulfilling requirements in the Race and the American City thematic concentration.

		Units
CSRE 260	California's Minority-Majority Cities	4-5
PEDS 250	Social and Environmental Determinants of Health	3
SOC 135	Poverty, Inequality, and Social Policy in the United States	4
SOC 155	The Changing American Family	4
URBANST 112	The Urban Underclass	4
URBANST 114	Urban Culture in Global Perspective	5
URBANST 162	Managing Local Governments	4

## Honors Program in Comparative Studies in Race and Ethnicity

### For Majors in Comparative Studies in Race and Ethnicity

The Interdepartmental Program in Comparative Studies in Race and Ethnicity offers a program leading to honors for majors in:

- Asian American Studies
- Chicana/o-Latina/o Studies
- Comparative Studies
- Jewish Studies
- Native American Studies

The honors program offers an opportunity to do independent research for a senior thesis. It is open to majors who have maintained a grade point average (GPA) of at least 3.5 in the major and 3.3 overall. The honors thesis is intended to enable students to synthesize skills to produce a document or project demonstrating a measure of competence in their specialty.

The application for honors must be submitted by May 25 of the junior year, but students are encouraged to apply earlier. The application includes a proposal describing the project that is approved by the faculty adviser and director of the undergraduate program. Students are required to identify both a faculty adviser and a second reader for the thesis project. The faculty adviser for the honors thesis must be an academic council faculty member and affiliated faculty of the student's major.

Honors students take CSRE 200X CSRE Senior Seminar, which fulfills the program's WIM requirement, and also enroll in CSRE 200Y CSRE Senior Honors Research and CSRE 200Z CSRE Senior Honors Research, in Winter and Spring quarters to continue to access peer and faculty support as they write their theses. Senior Honors Research (CSRE 200Y and CSRE 200Z) courses cannot count for the 60 units towards your major but do count for the 180 units towards your bachelor's degree. Students must complete their theses with a grade of 'B+' to receive honors in CSRE.

An honors colloquium held near the end of Spring Quarter affords students an opportunity to present their research formally. Prizes for best undergraduate honors thesis are awarded annually by the CSRE Program.

Applications are available in the CSRE Undergraduate Program office and on the program web site (<https://ccsre.stanford.edu/academics/undergraduate-program/honors>).

### For Majors in Other Departments

The Interdisciplinary Honors Program for Non-Majors in Comparative Studies in Race and Ethnicity is intended to complement study in any major. Students who participate in the honors program receive their degree from their program of study with departmental honors in Comparative Studies in Race and Ethnicity.

Honors certification will be open to students majoring in any field with a GPA in their chosen major of 3.5 and an overall GPA of 3.3. As a prerequisite, students apply for entry by Spring Quarter of the junior year (deadline May 25), but students are encouraged to begin earlier. During the application process, students outline a plan for course work and design an honors project in consultation with their proposed thesis adviser and the CSRE senior seminar coordinator.

The application describes how the student may fulfill the course requirements for interdisciplinary honors in CSRE and includes a proposal describing the project that is approved by the faculty adviser and director of the undergraduate program. Students are required to identify both a faculty adviser and a second reader for the thesis project. The faculty adviser for the honors thesis must be an academic council faculty member and affiliated faculty of the Center for Comparative Studies in Race and Ethnicity. Applications are available in the CSRE undergraduate program office and on the program web site (<https://ccsre.stanford.edu/academics/undergraduate-program/honors>).

Students pursuing a minor in Asian American Studies, Chicana/o-Latina/o Studies, Comparative Studies in Race and Ethnicity, Jewish Studies or Native American Studies who wish to pursue honors in their area of study, apply through the process for non-majors. Students may use their course work for the minor toward the requirements of the interdisciplinary honors program.

### Requirements:

Students applying for the interdisciplinary honors program in CSRE are required to take the following courses:

		Units
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5

And a second course identified as a comparative or major-core course within the CSRE Family of Programs.

## Core Courses

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
PSYCH 75	Introduction to Cultural Psychology	5

## Major-Core Courses

		Units
AFRICAAM 43	Introduction to English III: Introduction to African American Literature	5
AFRICAAM 105	Introduction to African and African American Studies	5
ASNAMST 155D	The Asian American Movement: A History of Activism	3-5
ASNAMST 186B	Asian American Art: 1850-Present	4
CHILATST 171	Mexicans in the United States	5
CHILATST 180E	Introduction to Chicana/Latinx Studies	5
JEWISHST 183	The Holocaust	4-5
JEWISHST 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5
NATIVEAM 16	Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America	5
NATIVEAM 115	Introduction to Native American History	5
NATIVEAM 138	American Indians in Comparative Historical Perspective	4
NATIVEAM 139	American Indians in Contemporary Society	4

These courses must be completed with a grade of 'B+' or better for the honors program.

In addition, students are required to take:

A core, foundational, thematic, or cognate course related to the topic of the proposal or honors research (selected in consultation with the thesis advisor)

		Units
CSRE 200X	CSRE Senior Seminar	5
CSRE 200Y	CSRE Senior Honors Research (in Winter and Spring quarters)	1-10

CSRE 200Z	CSRE Senior Honors Research (in Winter and Spring quarters)	1-10
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Throughout the year, students work with faculty adviser, secondary reader, and the senior seminar coordinator to complete their theses. Students must complete their theses with a minimum grade of 'B+' to receive honors in CSRE.

## Asian American Studies Minor

A total of 30 units of approved course work is required for the minor. Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C), at least one Asian American Studies major-core course, and 20 units of Asian American focus courses are needed to fulfill the requirements for the minor. Proposals must be approved by the director.

Students in Asian American Studies may find the following courses useful in fulfilling course requirements in the major or minor.

## Comparative-Core Courses

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
PSYCH 75	Introduction to Cultural Psychology	5

## Major-Core Courses

Students who completed ASNAMST 159/HISTORY 159 or ENGLISH 43C/143C in previous years may count this toward their Major-Core Course Requirement.

		Units
ASNAMST 146S		3-5
HISTORY 155D	The Asian American Movement: A History of Activism	3-5
ARTHIST 186B	Asian American Art: 1850-Present	4

## Thematic Courses

		Units
ASNAMST 112	Public Archaeology: Market Street Chinatown Archaeology Project	4-5
ASNAMST 52D	Asian American Human Development: Cultural Perspectives on Psychology, Education and Critical Issues	3
ASNAMST 185A	Race and Biomedicine	3-5
ASNAMST 131		3-5

ASNAMST 107	Asian American Leadership: Controversies, Dilemmas, and Decision-Making Strategies (adding new course for spring quarter)	3-5
ASNAMST 187	Geography, Time, and Trauma in Asian American Literature	5
ASNAMST 189	The Vietnamese Experience in America	3
ASNAMST 265	Writing Asian American History	5
ASNAMST 110	The Development of the Southeast Asian American Communities: A comparative analysis	3
ASNAMST 174S	When Half is Whole: Developing Synergistic Identities and Mestiza Consciousness	5

## Chicana/o-Latina/o Studies Minor

A total of 30 units of approved course work is required for the minor. Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C), at least one Chicana/Latina Studies major-core course, and 20 units of Chicana/Latina focus courses are needed to fulfill the requirements for the minor. Proposals must be approved by the director.

Students in Chicana/o-Latina/o Studies may find the following courses useful in fulfilling course requirements in the major or minor.

### Comparative-Core Courses

ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
PSYCH 75	Introduction to Cultural Psychology	5

### Major-Core Courses

CHILATST 180E	Introduction to Chicana/Latina Studies	5
CHILATST 171	Mexicans in the United States	5

### Thematic Courses

CHILATST 14N	Growing Up Bilingual	3
CHILATST 125S	Chicano/Latino Politics	5
CHILATST 179	Chicano & Chicana Theater: Politics In Performance	4
CHILATST 125S	Chicano/Latino Politics	5
CHILATST 172		4-5
CHILATST 164	Immigration and the Changing United States	4

CHILATST 177A	Well-Being in Immigrant Children & Youth: A Service Learning Course	4
CHILATST 177B	Well-Being in Immigrant Children & Youth: A Service Learning Course	1-2
CHILATST 177C	Well-Being in Immigrant Children & Youth: A Service Learning Course	1-3
CHILATST 183X	Practicum in English-Spanish School & Community Interpreting	3-4
CHILATST 201B	Making Meaning: Art, Culture & Social Change	3
CHILATST 147L	Studies in Music, Media, and Popular Culture: Latin American Music and Globalization	3-4
CHILATST 181	Latino Social Movements	5
CHILATST 275B	History of Modern Mexico	5

## Comparative Studies Minor

A total of 30 units of approved course work is required for the minor. Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C), either one more comparative-core or major-core course, and 20 units of Comparative Studies in Race & Ethnicity focus courses are needed to fulfill the requirements for the minor. Proposals must be approved by the director.

Students in Comparative Studies may find the following courses useful in fulfilling course requirements in the major or minor.

### Comparative-Core Courses

ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
PSYCH 75	Introduction to Cultural Psychology	5

### Major-Core Courses

AFRICAAM 43	Introduction to English III: Introduction to African American Literature	5
AFRICAAM 105	Introduction to African and African American Studies	5
ASNAMST 155D	The Asian American Movement: A History of Activism	3-5
ASNAMST 186B	Asian American Art: 1850-Present	4
CHILATST 171	Mexicans in the United States	5
CHILATST 180E	Introduction to Chicana/Latina Studies	5
JEWISHST 183	The Holocaust	4-5

JEWISHST 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5
NATIVEAM 16	Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America	5
NATIVEAM 115	Introduction to Native American History	5
NATIVEAM 138	American Indians in Comparative Historical Perspective	4
NATIVEAM 139	American Indians in Contemporary Society	4

## Thematic Courses

		Units
CSRE 1A	My Journey: Conversations on Race and Ethnicity	1
CSRE 5C		3
CSRE 14N	Growing Up Bilingual	3
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 41A	Genes and Identity	3
CSRE 45Q	Understanding Race and Ethnicity in American Society	4
CSRE 51Q	Comparative Fictions of Ethnicity	4
CSRE 52H	I, Biologist: Diversity Improves the Science of Biology	1
CSRE 54N	African American Women's Lives	3
CSRE 55N	Batman, Hamilton, Díaz, and Other Wondrous Lives	3-5
CSRE 63N	The Feminist Critique: The History and Politics of Gender Equality	3-4
CSRE 74	History of South Africa	3
CSRE 85B	Jews in the Contemporary World: Faith and Ethnicity, Visibility and Vulnerability	3
CSRE 102A	Art and Social Criticism	5
CSRE 103	Intergroup Communication	3
CSRE 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
CSRE 103S	Gender in Native American Societies	5
CSRE 109A	Federal Indian Law	5
CSRE 115		4
CSRE 119	Novel Perspectives on South Africa	2-3
CSRE 123B	Literature and Human Experimentation	3-5
CSRE 124A	Youth in the Global South: Beyond Active Subjects and Passive Objects	5
CSRE 129	Camus	4-5
CSRE 129B	Literature and Global Health	3-5
CSRE 130	Community-based Research As Tool for Social Change: Discourses of Equity in Communities & Classrooms	3-5
CSRE 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	5
CSRE 141X	Intersectionality and Social Movements: Gender, Race, Sexuality and Collective Organizing	4
CSRE 145B	The African Atlantic	3-5
CSRE 146J	Studies in Ethnomusicology: Listening to the Local: Music Ethnography of the Bay Area	3-5
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 150A	Race and Crime	3
CSRE 154	Anthropology of Drugs: Experience, Capitalism, Modernity	5
CSRE 154T	The Politics of Algorithms	4-5
CSRE 162	The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History	4-5

CSRE 162A	Spirituality and Nonviolent Urban and Social Transformation	3
CSRE 165	Identity and Academic Achievement	3
CSRE 174	History of South Africa	5
CSRE 177E	Well-Being in Immigrant Children & Youth: A Service Learning Course	4
CSRE 177F	Well-Being in Immigrant Children & Youth: A Service Learning Course	1-2
CSRE 178	Ethics and Politics of Public Service	3-5
CSRE 180E	Introduction to Chicana/Latina Studies	5
CSRE 183	Re-Imagining American Borders	5
CSRE 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 201	From Confederate Monuments to Wikipedia: The Politics of Remembering the Past	5
CSRE 201B	Making Meaning: Art, Culture & Social Change	3
CSRE 249	The Algerian Wars	3-5
CSRE 260	California's Minority-Majority Cities	4-5
CSRE 295F	Race and Ethnicity in East Asia	4-5

## Jewish Studies Minor

Students who wish to minor in Jewish Studies must complete Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C), one Jewish Studies major-core course, at least one quarter of the Hebrew language or another approved Jewish language, and draw remaining courses from an approved list of Jewish Studies courses. A total of 30 units of approved course work is required for the Jewish Studies minor. Proposals must be approved by the director.

Students in Jewish Studies may find the following courses useful in fulfilling course requirements in the major or minor.

## Comparative-Core Courses

		Units
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
PSYCH 75	Introduction to Cultural Psychology	5

## Major-Core Courses

JEWISHST 183	The Holocaust	Units 4-5
JEWISHST 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5

## Thematic Courses

Students may take any JEWISHST courses in fulfillment of this requirement.

JEWISHST 5	Biblical Greek	3-5
JEWISHST 5B	Biblical Greek	3-5
JEWISHST 37Q	Zionism and the Novel	3
JEWISHST 130		3
JEWISHST 138A		5
JEWISHST 145	Masterpieces: Kafka	3-5
JEWISHST 147B	The Hebrew and Jewish Short Story	3-5
JEWISHST 155D	Jewish American Literature	5
JEWISHST 237	Religion and Politics: A Threat to Democracy?	4-5
JEWISHST 284C	Genocide and Humanitarian Intervention	3

## Native American Studies Minor

A total of 30 units of approved course work is required for the minor. Introduction to Comparative Studies in Race and Ethnicity (CSRE 196C), at least one Native American Studies major-core course, and 20 units of Native American focus courses are needed to fulfill the requirements for the minor. Proposals must be approved by the director.

Students in Native American Studies may find the following courses useful in fulfilling course requirements in the major or minor.

## Comparative-Core Courses

ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	Units 5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CSRE 32	Theories in Race and Ethnicity: A Comparative Perspective	5
CSRE 148	Comparative Ethnic Conflict	4
CSRE 149	The Laboring of Diaspora & Border Literary Cultures	3-5
CSRE 196C	Introduction to Comparative Studies in Race and Ethnicity	5
CSRE 200X	CSRE Senior Seminar	5
CSRE 245	Understanding Racial and Ethnic Identity Development	3-5
CSRE 246	Constructing Race and Religion in America	4-5
CSRE 255D	Racial Identity in the American Imagination	4-5
CSRE 389A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5
HISTORY 64	Racial and Ethnic Diversity in Modern America	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
PSYCH 75	Introduction to Cultural Psychology	5

## Major-Core courses

NATIVEAM 16	Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America	Units 5
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NATIVEAM 138	American Indians in Comparative Historical Perspective	4
NATIVEAM 139	American Indians in Contemporary Society	4

## Thematic courses

NATIVEAM 103S	Gender in Native American Societies	Units 5
NATIVEAM 109A	Federal Indian Law	5
NATIVEAM 111B	Muwekma: Landscape Archaeology and the Narratives of California Natives	3-5
NATIVEAM 115	Introduction to Native American History	5
NATIVEAM 121	Discourse of the Colonized: Native American and Indigenous Voices	5
NATIVEAM 143A	American Indian Mythology, Legend, and Lore	3-5
NATIVEAM 240	Psychology and American Indian Mental Health	3-5

## Asian American Studies

*Director:* Anthony Antonio (Education)

*Affiliated Faculty and Teaching Staff:* Gordon Chang (History), Hien Do (Asian American Studies), Marci Kwon (Art History), Kathryn Gin Lum (Religious Studies), Pamela Lee (Art and Art History), Jean Ma (Art and Art History), David Palumbo-Liu (Comparative Literature), Stephen Sano (Music), Stephen Murphy-Shigematsu (Asian American Studies), Jeanne L. Tsai (Psychology), Linda Uyechi (Music), Barbara Voss (Anthropology), Christine Min Wotipka (Education), Sylvia Yanagisako (Anthropology)

## Chicana/o-Latina/o Studies

*Director:* Guadalupe Valdés (Education)

*Affiliated Faculty and Teaching Staff:* Albert Camarillo (History), Susana Gallardo (Chicana/o-Latina/o Studies), Angela Garcia (Anthropology), Kenji Hakuta (Education), Tomás Jiménez (Sociology), Ramón Martínez (Education), Melissa Michaelson (Chicana/o-Latina/o Studies), Ana Minian (History), Cherríe Moraga (Drama), Paula Moya (English), Amado Padilla (Education), Jonathan Rosa (Education), José David Saldívar (Comparative Literature), Ramón Saldívar (English), Gary Segura (Political Science), Guadalupe Valdés (Education), Yvonne Yarbro-Bejarano (Iberian and Latin American Cultures)

## Comparative Studies in Race and Ethnicity

*Director:* Tomás Jiménez (Sociology)

*Core Affiliated Faculty:*

- Anthropology: Duana Fullwiley, Angela Garcia, Barbara Voss, Sylvia Yanagisako
- Art & Art History: Jonathan Calm, Marci Kwon
- Comparative Literature: David Palumbo-Liu, José David Saldívar, Alexander Key
- Drama: Jennifer Brody, Harry Elam
- English: Michele Elam, Chang-rae Lee, Paula Moya, Vaughn Raspberry, Ramón Saldívar
- History: Al Camarillo, James Campbell, Gordon Chang, Allyson Hobbs, Ana Minian
- Iberian and Latin American Cultures: Lisa Surwillo, Hector Hoyos
- Linguistics: John Rickford
- Political Science: Lauren Davenport
- Psychology: Jennifer Eberhardt, Hazel Markus, Jeanne Tsai
- Religious Studies: Kathryn Gin Lum, Charlotte Fonrobert
- Sociology: Tomás Jiménez, Matthew Snipp, Aliya Saperstein
- Taube Center for Jewish Studies: Vered Shemtov

- Graduate School Education: Anthony Antonio, Prudence Carter, Teresa LaFromboise, Guadalupe Valdés, Christine Min Wotipka, Ari Kelman, Jonathan Rosa, Ramón Martínez
- School of Law: Richard Banks, Richard Ford, Joan Petersilia
- Lecturers: JoEllen Anderson, Karen Biestman, Mark Gonzalez, Gina Hernandez, Vivian Huang, Melissa Michelson, Linda Prieto, Stephen Murphy-Shigematsu

*Affiliated Faculty and Teaching Staff:* David Abernethy (Political Science, emeritus), Arnetha Ball (Education), Lucius Barker (Political Science, emeritus), Donald Barr (Pediatrics), Bryan Brown (Education), Cheryl Brown (African and African American Studies), Martin Carnoy (Education), Clayborne Carson (History), Jeff Chang (Comparative Studies in Race and Ethnicity), Karen Cook (Sociology), Michele Dauber (Law), Linda Darling-Hammond (Education), Carolyn Duffey (American Studies), Jennifer Eberhardt (Psychology), Ala Ebtakar (Comparative Studies in Race and Ethnicity), Paulla Ebron (Anthropology), Penny Eckert (Linguistics), James Ferguson (Anthropology), Shelley Fisher Fishkin (English), James Fishkin (Communication), Estelle Freedman (History), Susana Gallardo (Chicana/o Studies), Gabriel Garcia (Medicine), Kathryn Gin Lum (Religious Studies), Leah Gordon (Education), David Grusky (Sociology), Sean Hanretta (History), Gina Hernandez-Clarke (Comparative Studies in Race and Ethnicity), Miyako Inoue (Anthropology), Shanto Iyengar (Communication), Tomás Jiménez (Sociology), Gavin Jones (English), Terry Karl (Political Science), Pamela Karlan (Law), Matthew Kohrman (Anthropology), Jan Krawitz (Art and Art History), Jon Krosnick (Communication), Teresa LaFromboise (Education), David Laitin (Political Science), Liisa Malkki (Anthropology), Hazel Markus (Psychology), Ruben Martínez (Comparative Studies in Race and Ethnicity), Barbro Martínez-Ruiz (Art and Art History), Douglas McAdam (Sociology), Jisha Menon (Theater and Performance Studies), Ana Minian (History), Elisabeth Mudimbe-Boyi (French and Italian), Thomas S. Mullaney (History), Stephen Murphy-Shigematsu (Asian American Studies), Hilton Obenzinger (American Studies), Susan Olzak (Sociology), Amado Padilla (Education), Arnold Rampersad (English), Vaughn Rasberry (English), Robert Reich (Political Science), Cecilia Ridgeway (Sociology), Richard Roberts (History), Aron Rodrigue (History), Michael Rosenfeld (Sociology), Joel Samoff (History), Debra Satz (Philosophy), Vered Shemtov (Division of Literatures, Cultures and Languages), C. Matthew Snipp (Sociology), Paul Sniderman (Political Science), Jayashiri Srikanthiah (Law), Ewart Thomas (Psychology), Jeanne L. Tsai (Psychology), Linda Uyechi (Music), Gregory Walton (Psychology), Richard White (History), Jeremy Weinstein (Political Science), Michael Wilcox (Anthropology), Bryan Wolf (Art and Art History), Sylvia Yanagisako (Anthropology), Yvonne Yarbro-Bejarano (Iberian and Latin American Cultures), Steven Zipperstein (History)

*Teaching Fellows:* Lucy Zhang-Bencharit, Rachel Hill

*Senior Seminar Coordinator:* Takuya Sawaoka

## Jewish Studies

*Interim Director:* Ari Kelman (Education)

*Affiliated Faculty and Teaching Staff:* Zachary Baker (Stanford University Libraries), Joel Beinin (History), Jonathan Berger (Music), Arnold Eisen (Religious Studies, emeritus), Amir Eshel (German Studies), John Felstiner (English, emeritus), Shelley Fisher Fishkin (English), Charlotte Fonrobert (Religious Studies), Avner Greif (Economics), Katherine Jolluck (History), Ari Kelman (Education), Jon Levitow (Language Center), Mark Mancall (History, emeritus), Norman Naimark (History), Reviel Netz (Classics), Jack Rakove (History), Aron Rodrigue (History), Noah Rosenberg (Biology), Gabriella Safran (Slavic Languages and Literatures), Vered Karti Shemtov (Language Center, Comparative Literature), Lee Shulman (Education, emeritus), Peter Stansky (History, emeritus), Marie-Pierre Ulloa (French), Amir Weiner (History), Sam Wineburg (Education), Steven Zipperstein (History)

*Hebrew Instructional Staff:* Gallia Porat, Estee Greif

*Visiting Faculty:* Avi Tchamni (Music)

*Writer in Residence:* Maya Arad

## Native American Studies

*Director:* Teresa LaFromboise (Education)

*Affiliated Faculty and Teaching Staff:* JoEllen Anderson (Native American Studies), Jared Aldern (Native American Studies), Karen Biestman (Native American Studies), Kenneth Fields (English), Teresa LaFromboise (Education), Samantha Peralto (Language Center), Delphine Red Shirt Shaw (Native American Studies), C. Matthew Snipp (Sociology), Michael Wilcox (Anthropology)

## Asian American Studies

Students in Asian American Studies may find the following related courses useful in fulfilling course requirements in the major or minor.

		Units
EDUC 181	Multicultural Issues in Higher Education	4
EDUC 193F	Psychological Well-Being on Campus: Asian American Perspectives	1
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 265	Writing Asian American History	5
PSYCH 217	Topics and Methods Related to Culture and Emotion	1-3
ASNAMST 31N	Perspectives in North American Taiko	4
ASNAMST 110	The Development of the Southeast Asian American Communities: A comparative analysis	3
ASNAMST 155D	The Asian American Movement: A History of Activism	3-5
ASNAMST 174S	When Half is Whole: Developing Synergistic Identities and Mestiza Consciousness	5
ASNAMST 186B	Asian American Art: 1850-Present	4
ASNAMST 295F	Race and Ethnicity in East Asia	4-5

## Chicana/o-Latina/o Studies

Students in Chicana/o-Latina/o Studies may find the following related courses useful in fulfilling course requirements in the major or minor.

		Units
EDUC 149	Theory and Issues in the Study of Bilingualism	3-5
EDUC 193B	Peer Counseling in the Chicano/Latino Community	1
EDUC 277	Education of Immigrant Students: Psychological Perspectives	4
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 201	From Confederate Monuments to Wikipedia: The Politics of Remembering the Past	5
ILAC 193	The Cinema of Pedro Almodovar	3-5
POLISCI 125V	The Voting Rights Act	5
POLISCI 327	Minority Behavior and Representation	5
CHILATST 110	Sabias Creadoras y Activistas: Chicana/Latina Ways of Knowing	4
CHILATST 201B	Making Meaning: Art, Culture & Social Change	3

## Comparative Studies in Race and Ethnicity

Students in Comparative Studies in Race and Ethnicity may find the following related courses useful in fulfilling course requirements in the major or minor.

		Units			
AFRICAAM 21	African American Vernacular English	3-5	CSRE 10A	Introduction to Identity, Diversity, and Aesthetics: Arts, Culture, and Pedagogy	1
AFRICAAM 37	Chocolate Heads Performance Project: Dance & Intercultural Performance Creation	2	CSRE 47Q	Heartfulness: Mindfulness, Compassion, and Responsibility	3
AFRICAAM 43	Introduction to English III: Introduction to African American Literature	5	CSRE 102A	Art and Social Criticism	5
AFRICAAM 47	History of South Africa	3	CSRE 108	Introduction to Feminist, Gender, and Sexuality Studies	4-5
AFRICAAM 52N	Mixed-Race Politics and Culture	3	CSRE 124A	Youth in the Global South: Beyond Active Subjects and Passive Objects	5
AFRICAAM 54N	African American Women's Lives	3	DANCE 1	Introduction to Contemporary Dance & Movement: Liquid Flow	1
AFRICAAM 64C	From Freedom to Freedom Now!: African American History, 1865-1965	3	DANCE 30	Chocolate Heads Performance Project: Dance & Intercultural Performance Creation	2
AFRICAAM 105	Introduction to African and African American Studies	5	DANCE 45	Dance Improv StratLab: Freestyle Improvisation from Contemporary to Hip Hop & Beyond	1-2
AFRICAAM 147	History of South Africa	5	EDUC 100A	EAST House Seminar: Current Issues and Debates in Education	1
AFRICAAM 159	James Baldwin & Twentieth Century Literature	5	EDUC 100B	EAST House Seminar: Current Issues and Debates in Education	1
AFRICAAM 188	Who We Be: Art, Images & Race in Post-Civil Rights America	2-4	EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
AFRICAAM 194	Topics in Writing & Rhetoric: Contemporary Black Rhetorics: Black Twitter and Black Digital Cultures	4	EDUC 149	Theory and Issues in the Study of Bilingualism	3-5
AFRICAAM 194A	Topics in Writing & Rhetoric: Freedom's Mixtape: DJing Contemporary African American Rhetorics	4	EDUC 165	History of Higher Education in the U.S.	3-5
AFRICAAM 241	Race, Justice, and Integration	3	EDUC 181	Multicultural Issues in Higher Education	4
AFRICAAM 261E	Mixed Race Literature in the U.S. and South Africa	5	EDUC 193B	Peer Counseling in the Chicano/Latino Community	1
AFRICAAM 262D	African American Poetics	5	EDUC 193C	Psychological Well-Being On Campus: Perspectives Of The Black Diaspora	1
AFRICAST 119	Novel Perspectives on South Africa	2-3	EDUC 193F	Psychological Well-Being on Campus: Asian American Perspectives	1
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	3-5	EDUC 193N	Peer Counseling in the Native American Community	1
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5	EDUC 201	History of Education in the United States	3-5
AMSTUD 106	Spectacular Trials: Sex, Race and Violence in Modern American Culture	5	EDUC 232	Culture, Learning, and Poverty	2-3
AMSTUD 140	Stand Up Comedy and the "Great American Joke" Since 1945	5	EDUC 277	Education of Immigrant Students: Psychological Perspectives	4
ANTHRO 22N	Ethnographies of North America: An Introduction to Cultural and Social Anthropology	3-4	EDUC 340	Psychology and American Indian Mental Health	3-5
ANTHRO 30Q	The Big Shift	4	EDUC 367	Cultural Psychology	3-5
ANTHRO 32	Theories in Race and Ethnicity: A Comparative Perspective	5	EDUC 381	Multicultural Issues in Higher Education	4
ANTHRO 82	Medical Anthropology	4	ENGLISH 15SC	A New Millennial Mix: The Art & Politics of the "Mixed Race Experience"	2
ANTHRO 102	Urban Ethnography	5	ENGLISH 91A	ASIAN-AMERICAN AUTOBIOGRAPHY/W	5
ANTHRO 111B	Muwekma: Landscape Archaeology and the Narratives of California Natives	3-5	ENGLISH 152G	Harlem Renaissance and Modernism	5
ANTHRO 122A	Race and Culture in Mexico and Central America	3-5	FEMGEN 50Q	Life and Death of Words	4
ANTHRO 123A	Debating Repatriation	5	FEMGEN 140D	LGBT/Queer Life in the United States	4-5
ANTHRO 142A	Youth in the Global South: Beyond Active Subjects and Passive Objects	5	FEMGEN 154	Black Feminist Theory	5
ANTHRO 162	Indigenous Peoples and Environmental Problems	3-5	FEMGEN 188Q	Imagining Women: Writers in Print and in Person	4-5
ANTHRO 320A	Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations	3-5	HISTORY 48Q	South Africa: Contested Transitions	4
ARTHIST 176	Feminism and Contemporary Art	4	HISTORY 50B	Nineteenth Century America	3
ASNAMST 155D	The Asian American Movement: A History of Activism	3-5	HISTORY 50C	The United States in the Twentieth Century	3
CHILATST 109	GENTE: An incubator for transforming national narratives	5	HISTORY 54N	African American Women's Lives	3
CHILATST 179	Chicano & Chicana Theater: Politics In Performance	4	HISTORY 150B	Nineteenth Century America	5
COMPLIT 110	Introduction to Comparative Queer Literary Studies	3-5	HISTORY 150C	The United States in the Twentieth Century	5
COMPLIT 216	Jazz and Literature	3-5	HISTORY 158C	History of Higher Education in the U.S.	3-5
CS 82	Social Impacts of Media Innovation	1	HISTORY 201	From Confederate Monuments to Wikipedia: The Politics of Remembering the Past	5
			HISTORY 252C	The Old South: Culture, Society, and Slavery	5
			HISTORY 255	Martin Luther King, Jr.: The Social Gospel and the Struggle for Justice	5
			HISTORY 255E	Education, Race, and Inequality in African American History, 1880-1990	3-5



HISTORY 257C	LGBT/Queer Life in the United States	4-5
HISTORY 259A	Poverty and Homelessness in America	4-5
HISTORY 261	Race, Gender, and Class in Jim Crow America	5
HRP 212	Cross Cultural Medicine	3
HUMBIO 120	Health Care in America: An Introduction to U.S. Health Policy	4
HUMBIO 121E	Ethnicity and Medicine	1-3
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
HUMBIO 129	Critical Issues in International Women's Health	4
ILAC 193	The Cinema of Pedro Almodovar	3-5
JEWISHST 71	Jews and Christians: Conflict and Coexistence	3
JEWISHST 183	The Holocaust	4-5
JEWISHST 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5
JEWISHST 291X	Learning Religion: How People Acquire Religious Commitments	4
LAWGEN 112N	Law and Inequality	3
LINGUIST 65	African American Vernacular English	3-5
LINGUIST 150	Language and Society	4
LINGUIST 156	Language and Gender	3-5
LINGUIST 265	African American Vernacular English	3-5
MED 159A	Service-Learning in Migrant Health	2
MED 159B	Service-Learning in Migrant Health	2
MED 256SI	Race, Class and Global Health	2
MUSIC 37N	Ki ho'alu: The New Renaissance of a Hawaiian Musical Tradition	3
MUSIC 114	Sound Tracks: Music, Memory, and Migration in the Twentieth Century	3-4
NATIVEAM 111B	Muwekma: Landscape Archaeology and the Narratives of California Natives	3-5
PEDS 150	Social and Environmental Determinants of Health	3
POLISCI 28N	The Changing Nature of Racial Identity in American Politics	3
POLISCI 120B	Campaigns, Voting, Media, and Elections	4-5
POLISCI 121L	Racial-Ethnic Politics in US	5
POLISCI 327	Minority Behavior and Representation	5
PSYCH 25N	Psychology, Inequality, and the American Dream	3
PSYCH 29N	Growing Up in America	3
PSYCH 75	Introduction to Cultural Psychology	5
PSYCH 101	Community Health Psychology	4
PSYCH 150	Race and Crime	3
PSYCH 183	SPARQ Lab	2-3
PSYCH 215	Mind, Culture, and Society	3
PSYCH 217	Topics and Methods Related to Culture and Emotion	1-3
PWR 194AB	Topics in Writing & Rhetoric: Freedom's Mixtape: DJing Contemporary African American Rhetorics	4
PWR 194DH	Topics in Writing and Rhetoric: Empathy, Ethics, and Compassion Meditation	4
RELIGST 135	Islam in America	4
SOC 14N	Inequality in American Society	4
SOC 46N	Race, Ethnic, and National Identities: Imagined Communities	3
SOC 118	Social Movements and Collective Action	4
SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5
SOC 120	Interpersonal Relations	4
SOC 132	Sociology of Education: The Social Organization of Schools	4

SOC 133	Law and Wikinomics: The Economic and Social Organization of the Legal Profession	1-5
SOC 135	Poverty, Inequality, and Social Policy in the United States	4
SOC 136	Sociology of Law	4
SOC 140	Introduction to Social Stratification	3
SOC 141	Controversies about Inequality	5
SOC 142	Sociology of Gender	3
SOC 145	Race and Ethnic Relations in the USA	4
SOC 149	The Urban Underclass	4
SOC 154	The Politics of Algorithms	4-5
SOC 155	The Changing American Family	4
SOC 156A	The Changing American City	4
TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	4
TAPS 161D	Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders	3-4
TAPS 164T	Queer Art and Performance	4-5
URBANST 112	The Urban Underclass	4
URBANST 114	Urban Culture in Global Perspective	5
URBANST 123B	Approaching Research in the Community: Design and Methods	3
URBANST 140	Urban Ethnography	5
URBANST 161	U.S. Urban History since 1920	5

## Jewish Studies

Students in Jewish Studies may find the following related courses useful in fulfilling course requirements in the major or minor.

JEWISHST 37Q	Zionism and the Novel	3
JEWISHST 38A		3
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5
JEWISHST 130		3
JEWISHST 138A		5
JEWISHST 145	Masterpieces: Kafka	3-5
JEWISHST 147B	The Hebrew and Jewish Short Story	3-5
JEWISHST 155D	Jewish American Literature	5
JEWISHST 183	The Holocaust	4-5
JEWISHST 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5
JEWISHST 237	Religion and Politics: A Threat to Democracy?	4-5
JEWISHST 284C	Genocide and Humanitarian Intervention	3

## Native American Studies

Students in Native American Studies may find the following related courses useful in fulfilling course requirements in the major or minor.

		Units
ANTHRO 162	Indigenous Peoples and Environmental Problems	3-5
EDUC 193N	Peer Counseling in the Native American Community	1
MUSIC 37N	Ki ho'alu: The New Renaissance of a Hawaiian Musical Tradition	3
SPECLANG 189A	First-Year Hawaiian, First Quarter	4
SPECLANG 189B	First-Year Beginning Hawaiian, Second Quarter	4
SPECLANG 189C	First-Year Hawaiian, Third Quarter	4
SPECLANG 247A	First-Year Lakota, First Quarter	4
SPECLANG 247B	First-Year Lakota, Second Quarter	4

SPECLANG 247C	First-Year Lakota, Third Quarter	4
SPECLANG 248	Introduction to Siouan Language & Culture II	5

## Overseas Studies Courses in Comparative Studies in Race and Ethnicity

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPCPTWN 16	Sites of Memory	3
OSPCPTWN 18	Xhosa Language and Culture	2
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	3
OSPCPTWN 55	Arts of Change	2-4
OSPCPTWN 70	Youth Citizenship and Community Engagement	3
OSPFLO 23	Italian Emigration, Immigration, and the Making of Nation	3
OSPMADR 47	Cultural Relations between Spain and the United States: Historical Perceptions and Influences, 1776-2	4
OSPMADR 60	Integration into Spanish Society: Service Learning and Professional Opportunities	4
OSPMADR 74	Islam in Spain and Europe: 1300 Years of Contact	4
OSPMADR 75	Sefarad: The Jewish Community in Spain	4
OSPMADR 83	Narrating the Nation: National and Post-National Spanish and Latin American Literature	4
OSPSANTG 118X	Artistic Expression in Latin America	5
OSPSANTG 129X	Latin America in the International System	4-5

# DIVISION OF LITERATURES, CULTURES, AND LANGUAGES

Courses offered by the Division of Literatures, Cultures, and Languages are listed under the subject code DLCL on the Stanford Bulletin's ExploreCourses web site.

The Division of Literatures, Cultures, and Languages consists of five academic departments (Comparative Literature (p. 453), French and Italian (p. 538), German Studies (p. 555), Iberian and Latin American Cultures (p. 600), and Slavic Languages and Literatures (p. 734)), five focal groups (Digital Humanities, Humanities Education, Philosophy and Literature, Poetics, and Renaissance) as well as the Language Center (p. 632), which oversees language instruction at Stanford.

All the departments of the division offer academic programs leading to B.A., M.A., and Ph.D. degrees.

The division brings together scholars and teachers dedicated to the study of literatures, cultures, and languages from humanistic and interdisciplinary perspectives. The departments in the division are distinguished by the quality and versatility of their faculty, a wide variety of approaches to cultural traditions and expressions, and the intense focus on the mastery of languages. This wealth of academic resources, together with small classes and the emphasis on individual advising, creates a superior opportunity for students who wish to be introduced to or develop a deeper understanding of non-English speaking cultures.

The division's departments and the Language Center offer instruction at all levels, including introductory and general courses that do not require knowledge of a language other than English. These courses satisfy a variety of undergraduate requirements and can serve as a basis for developing a minor or a major program in the member departments. The more advanced and specialized courses requiring skills in a particular language are listed under the relevant departments, as are descriptions of the minor and major programs.

The DLCL itself offers four undergraduate minor programs, one Ph.D. minor program, and several graduate courses focused on the teaching of second languages, the teaching of literature, and academic professionalization.

## Focal Groups

While the five departments in the Division of Literatures, Cultures, and Languages serve common interests in literary and cultural traditions and their languages, the DLCL's Focal Groups bring together faculty members and graduate students who share topics and approaches that range across languages and national literatures. These groups are designed to respond directly to the research interests of the faculty as a community, and reflect long-term commitments by the participants. They are conceived as portals that open from the Division outward to the wider community of literary and humanities scholars at Stanford. The membership may include any member of the Stanford faculty or any Ph.D. student with an interest in the topic. Most Focal Groups include participants from several humanities departments outside the DLCL.

Thus the DLCL is characterized by two axes of intellectual inquiry:

- the departmental axis, which is organized by language, nation, and culture
- the focal axis, which may be organized by genre, period, methodology, or other criteria.

The convergence of the two axes, departments and Focal Groups, locates faculty members and graduate students in at least two intersecting communities. The DLCL believes that this convergence gives institutional

form to the intellectual conditions under which many scholars of literature and culture presently work.

Each Focal Group maintains a standing research workshop at which both faculty and graduate student members discuss their work. Several Focal Groups offer formal courses; and all groups are responsible for overseeing research-oriented activities and extracurricular events in the relevant area, including sponsoring conferences, publications, podcasts, and other activities that disseminate the outcomes of their research.

## Humanities Education

*Chair:* Russell Berman (Comparative Literature, German Studies)

*Faculty Members:* Cécile Alduy (French and Italian), Elizabeth Bernhardt (German Studies, Language Center), Eamonn Callan (School of Education), Adrian Daub (German Studies), Thomas Ehrlich (School of Education), Marisa Galvez (French and Italian), Pam Grossman (School of Education), David Lummus (French and Italian), Orrin Robinson (German Studies), Gabriella Safran (Slavic Languages and Literatures), Kathryn Starkey (German Studies), Mitchell Stevens (School of Education), Guadalupe Valdés (School of Education)

*Web Site:* <http://dlcl.stanford.edu/groups/humanities-education>

The Focal Group on Humanities Education explores issues concerning teaching and learning in the humanities, including research on student learning, innovation in pedagogy, the role of new technologies in humanities instruction, and professional issues for humanities teachers at all educational levels.

## Philosophy and Literature

*Chairs:* R. Lanier Anderson (Philosophy), Joshua Landy (French and Italian)

*Faculty Members:* Keith Baker (History), John Bender (Comparative Literature, English), Russell Berman (Comparative Literature, German Studies), Alexis Burgess (Philosophy), Martón Dornbach (German Studies), Jean-Pierre Dupuy (French and Italian), Amir Eshel (Comparative Literature, German Studies), Gregory Freidin (Slavic Languages and Literatures), Robert Harrison (French and Italian), David Hills (Philosophy), Héctor Hoyos (Iberian and Latin American Cultures), Michelle Karnes (English), Alexander Key (Comparative Literature), Sianne Ngai (English), Marília Librandi Rocha (Iberian and Latin American Cultures), Joan Ramon Resina (Iberian and Latin American Cultures, Comparative Literature), Nariman Skakov (Slavic Languages and Literatures), Blakey Vermeule (English), Laura Wittman (French and Italian), Lee Yearley (Religious Studies)

*Web Site:* <http://dlcl.stanford.edu/groups/humanities-education-0>

The Focal Group on Philosophy and Literature brings together faculty and students from nine departments to investigate questions in aesthetics and literary theory, philosophically-inflected literary texts, and the form of philosophical writings. Fields of interest include both continental and analytic philosophy, as well as cognitive science, political philosophy, rational choice theory, and related fields. The group offers undergraduate tracks within eight majors, a graduate workshop, and a lecture series.

## Workshop in Poetics

*Chairs:* Roland Greene (Comparative Literature, English), Nicholas Jenkins (English)

*Faculty Members:* Marisa Galvez (French and Italian), Alexander Key (Comparative Literature), David Lummus (French and Italian), Michael Predmore (Iberian and Latin American Cultures)

*Web Site:* <http://dlcl.stanford.edu/workshop-poetics-0+>

The Workshop in Poetics Focal Group is concerned with the theoretical and practical dimensions of the reading and criticism of poetry. During the four years of its existence, the Workshop has become a central venue at Stanford enabling participants to share their individual projects in a general conversation outside of disciplinary and national confinements. The two dimensions that the workshop sees as urgent are:

- poetics in its specificity as an arena for theory and interpretive practice.
- historical poetics as a particular set of challenges for the reader and scholar.

The core mission is to offer Stanford graduate students a space to develop and critique their current projects.

## Renaissances

*Chair:* Roland Greene (Comparative Literature, English)

*Faculty Members:* Cécile Alduy (French and Italian), Shahzad Bashir (Religious Studies), Paula Findlen (History), Tamar Herzog (History), Nicholas Jenkins (English), Alexander Key (Comparative Literature), David Lummus (French and Italian), Bissera Pentcheva (Art and Art History), Morten Steen Hansen (Art and Art History).

*Web Site:* <http://dlcl.stanford.edu/groups/renaissances>

The Renaissances Group brings together faculty members and students from over a dozen departments at Stanford to consider the present and future of early modern literary studies (a period spanning the fourteenth through the seventeenth centuries). Taking seriously the plural form of the group’s name, we seek to explore the early modern period from a wide range of disciplinary, cultural, linguistic, and geographical perspectives.

## Persian, Arabic, Turkish, and Hebrew Languages, Literatures, and Cultures (PATH+)

*Chair:* Alexander Key (Comparative Literature)

PATH+ is a DLCL focal group that is considering the future of Persian, Arabic, Turkish, and Hebrew languages, literatures, and cultures in the DLCL. The PATH+ conversation includes scholars, artists, and intellectuals working in and around these languages, literatures, and cultures from across Stanford and from peer institutions internationally.

## The Contemporary

*Chair:* Amir Eshel (Comparative Literature, German Studies)

The Contemporary focal group examines “the contemporary” with a focus on defining moments such as 1945, 1973, 1989, and 2001. Building upon a 3 year body of work as a DLCL research group, The Contemporary focal group has particularly focused on U.S., European, and Middle Eastern cultural and political forces that characterize our “contemporary.” The group employs a comparative and interdisciplinary approach to the hybrid term “contemporary” as it intersects various fields and serves as a heuristic device to understand phenomena in politics, culture, and the arts.

## Minor in Medieval Studies

Faculty Director: Marisa Galvez

The Division of Literatures, Cultures, and Languages offers an undergraduate minor in Medieval Studies. The minor in Medieval Studies:

- provides Stanford students with the historical knowledge and framework through which to view globalism;

- embeds the study of medieval culture in a coherent framework that resonates with contemporary issues of community building, the virtual world and mobility;
- and promotes an innovative cross-disciplinary and skill-based approach to Medieval Studies.

Students in any field qualify for the minor by meeting the following requirements:

Students complete a total of 25 units (including a core course) and 6 courses relevant to the major in departments across the University including, but not restricted to, English, East Asian Studies, History, Religious Studies, Music, and DLCL courses (Comparative Literature, German, French, Italian, Iberian and Latin American Cultures, and Slavic Languages and Literatures), and Classics.

One of the following three introductory core courses is required to be taken for 5 units. The core courses are offered on a regular basis by faculty across the University.

		Units
FRENCH 205	Songs of Love and War: Gender, Crusade, Politics (Counts as DLCL 121)	3-5
DLCL 122	Medieval Manuscripts, Digital Methodologies	3-5
HISTORY 115D	Europe in the Middle Ages, 300-1500 (Counts as DLCL 123)	3-5

Electives may be selected from a large number of offerings in a variety of disciplines according to student interests, but they must follow a coherent course of study. This course of study must be approved by the faculty director. Up to 5 units may be taken in a medieval language, such as (but not limited to) Old English, Old Norse, Medieval Latin, Old French, Middle High German, Classical Arabic. No transfer credit may be used toward the Medieval Studies minor. Appropriate courses offered through BOSP may count toward this minor.

Course work in this minor may not duplicate work counted toward other majors or minors. Advanced placement credit and transfer credit do not apply to this minor. All courses must be taken for a letter grade. By University policy, no more than 36 units may be required in this minor. Students declare the Minor in Medieval Studies through Axess.

## Minor in Modern Languages

Faculty Director: Dan Edelstein

The Division of Literatures, Cultures, and Languages offers an undergraduate minor that draws upon courses in literature and language within the division’s departments and elsewhere in the University. The minor in Modern Languages is offered to students who want to supplement the course work in their major with course work in modern languages and literatures. Students declare the Minor in Modern Languages through Axess. Appropriate courses offered through BOSP may count toward this minor with Professor Edelstein’s pre-approval.

Students are required to complete 6 courses of 3 units or more in any field qualify for the minor by meeting the following requirements:

	Units
A minimum of 16 units (4 courses and 8 units per language) at the intermediate level (second year) or beyond, not including conversational, oral communication, business, or medical language courses in two languages other than English all Modern languages offered at Stanford can qualify.	16
At least two additional courses of 3 units or more, one in each modern language being studied in the minor. These courses must be taught by Academic Council members or other senior members of Stanford faculty.	6-10

It is recommended that students study, work, or intern abroad for at least eight weeks at a location where one of the languages is spoken. Course work in this minor may not duplicate work counted toward other majors or minors. Advanced Placement credit and transfer credit cannot be applied to this minor. All courses must be taken for a letter grade. By University policy, no more than 36 units may be required in this minor.

## Minor in Translation Studies

*Faculty Director:* Dan Edelstein

The Division of Literatures, Cultures, and Languages, in cooperation with East Asian Languages and Cultures and the English Department, teaches undergraduates to develop and apply their foreign language knowledge to the production and analysis of translations. The minor is designed to give students majoring in a variety of fields the tools to consider the practical and theoretical issues brought up by translation as an aesthetic, cultural, and ethical practice.

Course work in this minor may not duplicate work counted toward other majors or minors. Course selection must be approved by the minor adviser. For further information, contact the minor adviser, Cintia Santana (csantana@stanford.edu).

Students must take a minimum of 23 units for a letter grade, in fulfillment of the following requirements:

	Units
1. Prerequisite: Complete or test out of a first-year course in the language of interest.	
2. Core course: At least 4 units in a Translation Studies core course: ENGLISH/DLCL 293 or DLCL 113Q. *	4
3. Language study: At least 8 units, second year or beyond (not including conversation/oral communication) and/or relevant literature courses taught in the target language. OSP and transfer units may be considered in consultation with the minor adviser.	8
4. Literature study: At least 7 units in relevant literature courses at the 100-level or above, taught in a DLCL department, East Asian Languages and Cultures, or Classics, and determined in consultation with the minor adviser. For students interested in translation from English into another language, appropriate literature courses in the English department may be substituted.	7
5. Electives: At least 4 units in a creative writing course, or a course that foregrounds translation in departments such as Anthropology, any DLCL department, English, East Asian Languages and Cultures, Classics, Linguistics (e.g., LINGUIST 130A), or Computer Science (e.g., CS 124), determined in consultation with the minor adviser.	4
6. Final Project: Students must also complete a capstone project: a significant translation and/or translation studies project (e.g. 20 pages of prose, 10 poems, or similar appropriate amount to be determined in consultation with the minor adviser). This work may be carried out under the supervision of an instructor in a required course or as an independent study.	
<b>Total Units</b>	<b>23</b>

## Minor in Middle Eastern Languages, Literatures, and Cultures

*Faculty Director:* Alexander Key

The undergraduate minor in Middle Eastern Languages, Literatures, and Cultures (MELLAC) has been designed to give students majoring in other departments an opportunity to gain a substantial introduction to Arabic, Hebrew, Middle Eastern, and African languages, and the cultures and civilizations of the Middle East and Africa. Contact the faculty director, Marie Huber at marieh@stanford.edu before declaring the minor:

- Courses for the minor must be taken for a letter grade unless only offered for faculty-elected satisfactory/no credit. All courses must be completed with a letter grade of 'C' or better.
- Students may not overlap (double-count) courses for completing major and minor requirements
- Students declaring the minor must do so no later than the last day of Spring Quarter of their junior year.

The minor in Middle Eastern Languages, Literatures and Cultures (MELLAC) has two tracks. Their requirements are as follows.

### Minor in Middle Eastern Languages, Literatures, and Cultures, Arabic Track

Requirements for the minor include:

- Completion of four ARABLANG courses at the second-year level or higher, for a total of 20 units
- Up to 5 units of transfer credit may count towards this minor with the Faculty Director's approval.
- Two literature courses taught with Arabic texts, generally offered in Comparative Literature (COMPLIT) for a total of 6-10 units
- One course relating to Arabic taught with English texts, generally offered in Comparative Literature (COMPLIT), for a total of 3-5 units.
- Students must test for Proficiency in Arabic through the Language Center by Winter Quarter of their senior year.
  - Students should minimally receive a notation of intermediate-high.
  - Those requiring outside tutoring are advised to seek resources available through the DLCL.
- All courses must be approved by the faculty director.

### Minor in Middle Eastern Languages, Literatures, and Cultures, Hebrew, Persian, Turkish, or African Languages, Literatures and Cultures Track

Requirements for the minor include:

- Three language classes in Hebrew, Persian, Turkish, or an African language.
  - All three courses must be in the same language and first year or beyond.
- 20 additional units from relevant literature and culture courses.
  - Courses are offered through the Language Center and DLCL departments.
  - One of these courses must be a (COMPLIT) Comparative Literature course.
  - Additional courses are offered through Jewish Studies (JEWISHST), and the Center for African Studies (AFRICAST).
- The faculty director may approve some upper-level language classes to count towards the 20 additional units.
- All courses must be approved by the faculty director.

## Ph.D. Minor in Philosophy, Literature, and the Arts

*Faculty Director:* Joshua Landy, French and Italian, and Comparative Literature

*Director of Graduate Studies:* Adrian Daub, German Studies, and Comparative Literature

## Overview

The PhD minor in Philosophy, Literature, and the Arts offers rigorous, structured training for students interested in the interdisciplinary intersection of philosophy with criticism in literature and the arts.

## Application and Admission

Students declare the minor after admission to candidacy and before attaining TGR status by submitting:

- an Application for Ph.D. Minor ([http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app\\_phd\\_minor.pdf](http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app_phd_minor.pdf)) form
- a one-page statement of intent

## Requirements for the Ph.D. Minor in Philosophy, Literature, and the Arts

All students in the Ph.D. Minor in Philosophy, Literature, and the Arts take:

1. PHIL 333/DLCL 333 Philosophy, Literature, and the Arts Core Seminar, team taught by faculty from philosophy and from a literature or arts department.
2. At least 3 units of independent work registered either under a departmental independent work number, or under DLCL 220 Humanities Education or DLCL 222 Philosophy and Literature. This work should be undertaken with a faculty adviser identified to the Faculty Director.
3. Two additional courses at the 200 level or above which are deemed by the Committee in Charge to include material of substantial special relevance to the domain of philosophy, literature, and the arts. At least one of these courses should be offered in a participating department other than the student's major department (e.g., a philosophy course for students in literature and arts departments, a literature or arts course for philosophy students).
4. All students take two graduate-level courses providing a structured program of course work in the student's minor field (such as philosophy for literature and arts students, or literary or arts criticism for philosophy students):
  - Graduate students in Philosophy take two graduate-level courses in a single literature, or in one of the arts.
  - Graduate students in literature or arts departments, including Classics, take two graduate-level courses in Philosophy, at least one of which must be in metaphysics, epistemology, or the philosophies of language, mind, or action (the PHIL 280s series and related upper-level seminars), and at least one of which must be in value theory (understood to include ethics, aesthetics, and political philosophy, the PHIL 270s series and related upper-level seminars)
  - Graduate students in other departments submit a plan of study for approval by the Faculty Director reflecting graduate-level course work that provides a background both within philosophy and within the study of literature or the arts that is substantially equivalent to that achieved by philosophy, literature, or arts students in their minor field. Students are advised that this plan of study may involve more course work than would be needed for students whose major field is in literature, arts, or philosophy departments.
5. If the six required courses do not total 20 units, students may satisfy the 20 unit requirement by taking units of DLCL 222 Philosophy and Literature or by taking additional graduate level courses of special relevance at their discretion and with the agreement of their minor adviser.

### Notes:

- Students are encouraged to include a member from the minor field on the University Oral Committee or on another of the general examination committees if that is judged more appropriate by the

student's departmental and minor advisers. Students in departments which deploy the University Oral as a dissertation defense are advised that a member from the student's minor field should be involved on the dissertation committee throughout the dissertation writing period.

- Currently-enrolled students (as of 8/31/17) in the old PhD Minor in the Humanities, or in its Philosophy, Literature, and the Arts subplan, have the option to continue under the current PhD Minor name or to change to the new PhD Minor name of PhD Minor in Philosophy, Literature, and the Arts. Students will be required to make this election by the end of Autumn Quarter 2017-18. New students (as of 9/1/17) would enroll in the PhD Minor name of PhD Minor in Philosophy, Literature, and the Arts. The subplan would no longer be available for student enrollment as of 9/1/17.

## Certificate in Language Program Management

*Faculty Director:* Elizabeth Bernhardt

Programs in contemporary foreign language teaching preparation entail a knowledge base that has grown over the past 30 years, rooted in data from an explosion of linguistic as well as applied linguistic research.

In tandem with the Language Center's primary focus on learning research and theory, which graduate students explore in the teaching preparation program, the Language Program Management certificate focuses on developing the professional leadership and academic skills necessary for a career that includes the coordination and management of language learning.

The program funds summer internships which enable the completion of a certificate in Language Program Management and are intended to help Stanford graduate students prepare themselves for such work in complement to their literary studies. The certificate program is not declared on Axess and does not appear on the transcript or diploma.

### Prerequisites

1. Foreign language acquisition: Oral Proficiency Interview (OPI) rating of at least advanced mid
2. Academic and professional development:
  - DLCL 301 The Learning and Teaching of Second Languages
  - Modified Oral Proficiency Interview (MOPI) Assessment workshop (2 days)
  - Limited OPI Tester Certification (average 6 months)
  - Teaching of three first-year language courses through the Language Center

These are generally met by the end of a graduate student's second year in the PhD program. Once meeting these criteria, the student may be admitted to the Program.

### Requirements

Upon admission to the program, students must complete the following:

1. DLCL 302 The Learning and Teaching of Second-Language Literatures: a course designed to focus student attention on the development of oral language proficiency through the upper levels and emphasize the need for upper register speaking and writing for literature learning and teaching.
2. OPI workshop (additional 2 days of training at the Advanced and Superior levels): this workshop is the extension of the MOPI. It focuses on upper register performance on the FSI-ACTFL scale. Hosted by either the Language Center, regional workshop, or at the national meeting of the ACTFL.

3. Completion of Writing Proficiency Familiarization workshop (Winter Quarter): Workshop conducted by a certified writing tester and structured in parallel to the MOPI/OPI assessment paradigm.
4. DLCL 303 Language Program Management (Summer Quarter): an administrative internship including, but not limited to, experiences with the following:
  - Shadow faculty and staff in select areas of administration and supervision within the Language Center and DLCL
  - Placement testing and student advisement
  - Technology in teaching and learning
  - Processes for teacher observation and feedback
  - Procedures in staff supervision and human resources
  - Course scheduling, budgeting, staffing, and searches
  - Interface with external programs (e.g., BOSP, Bechtel, VPTL)

*Division Chair:* Dan Edelstein

*DLCL Senior Lecturer:* Cintia Santana

# EAST ASIAN LANGUAGES AND CULTURES

Courses offered by the Department of East Asian Languages and Cultures are listed on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site under the subject codes:

- CHINA (<https://explorecourses.stanford.edu/search?q=CHINA&view=catalog&page=0&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&filter-departmentcode-CHINA=on&collapse=&filter-catalognumber-CHINA=on&filter-catalognumber-CHINA=on>)
- JAPAN (<https://explorecourses.stanford.edu/search?q=JAPAN&view=catalog&page=0&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-JAPAN=on&filter-catalognumber-JAPAN=on>)
- KOREA (<https://explorecourses.stanford.edu/search?q=KOREA&view=catalog&page=0&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&filter-departmentcode-KOREA=on&collapse=&filter-catalognumber-KOREA=on&filter-catalognumber-KOREA=on>)
- EALC (<https://explorecourses.stanford.edu/search?q=EALC&view=catalog&page=0&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&filter-departmentcode-EALC=on&collapse=&filter-catalognumber-EALC=on&filter-catalognumber-EALC=on>) (East Asian Languages and Cultures)

Language courses are listed on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site under:

- CHINLANG (Chinese Language)
- JAPANLNG (Japanese Language)
- KORLANG (Korean Language)

The Department of East Asian Languages and Cultures offers programs for students who wish to engage with the cultures of China, Japan, and Korea as articulated in language, linguistics, literature, film, cultural studies, and visual arts. Students emerge with a sophisticated understanding of culture as a dynamic process embodied in language and other representational media, especially the verbal and visual forms that are central to humanistic study. Department faculty represent a broad range of research interests and specialties, and visiting scholars and postdoctoral fellows from the Stanford Humanities Center, the Andrew W. Mellon Fellowship of Scholars in the Humanities, the Freeman Spogli Institute for International Studies, and the Center for East Asian Studies add to the intellectual vitality of the department.

East Asian Languages and Cultures offers a full range of courses at the undergraduate and graduate levels. Undergraduate courses concentrate on language, literature, and other cultural forms from the earliest times to the present, covering traditional and contemporary topics from Confucian conceptions of self and society to inflections of gender in the twentieth century. Emphasis in classes is on developing powers of critical thinking and expression that will serve students well no matter what their ultimate career goals. Graduate programs offer courses of study involving advanced language training, engagement with primary texts and other materials, literary history, and training in research methodologies and critical approaches.

East Asian language skills provide a foundation for advanced academic training and professional careers in fields such as business, diplomacy, education, and law. The department also offers opportunities for students

who choose to double-major or minor in other academic disciplines, including anthropology, art history, economics, education, history, linguistics, philosophy, political science, religious studies, and sociology.

The department accepts candidates for the degrees of Bachelor of Arts, Master of Arts, and Doctor of Philosophy in Chinese and Japanese, and Bachelor of Arts in East Asian Studies. It also offers undergraduate minors and the Ph.D. minor in Chinese or Japanese language and literature.

For information concerning other opportunities for study about Asian history, societies, and cultures, see the following departments and programs: Anthropology, Art and Art History, Business, Comparative Literature, East Asian Studies, Economics, History, Law, Linguistics, Philosophy, Political Science, Religious Studies, and Sociology.

## Undergraduate Mission Statements for East Asian Languages and Cultures East Asian Studies Major

The mission of the program in East Asian Studies is to enable students to obtain a comprehensive understanding of East Asia broadly conceived, which is the area stretching from Japan through Korea and China to the contiguous areas of the Central Asian land mass. Majors are expected to have a good mastery of an East Asian language, and focus on a particular sub-region or a substantive issue involving the region as a whole. Emphasis in classes is on developing powers of critical thinking and expression to serve students well no matter what their ultimate career goals in business, government service, academia, or the professions.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. effective and nuanced skills interpreting primary and secondary source materials.
2. a good grasp in their own work of the course material and methodologies in East Asian studies.
3. analytical writing skills and close reading skills.
4. effective oral communication skills.

## East Asian Studies, China Subplan Major

The mission of the undergraduate program in Chinese is to expose students to a variety of perspectives in Chinese language, culture, and history by providing them with training in writing and communication, literature, and civilization. Emphasis in courses is on developing powers of critical thinking and expression that serve students well no matter what their ultimate career goals are. The program prepares students for diverse professions and enterprises, including business, government service, and academia.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. effective and nuanced skills interpreting primary and secondary source materials.
2. a good grasp in their own work of the course material and methodologies in the studies of Chinese.
3. analytical writing skills and close reading skills.



4. effective oral communication skills.

## East Asian Studies, Japan Subplan Major

The mission of the undergraduate program in Japanese is to expose students to a variety of perspectives in Japanese language, culture, and history by providing students with training in writing and communication, literature, and civilization. Emphasis in classes is on developing powers of critical thinking and expression that will serve students well no matter what their ultimate career goals are. The program prepares students for diverse professions and enterprises, including business, government service, and academia.

### Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. effective and nuanced skills interpreting primary and secondary source materials.
2. a good grasp in their own work of the course material and methodologies in the studies of Japanese.
3. analytical writing skills and close reading skills.
4. effective oral communication skills.

## East Asian Studies, Japanese Language Subplan Major

The mission of the undergraduate program in Japanese is to expose students to a variety of perspectives in Japanese language, culture, and history by providing students with training in writing and communication, literature, and civilization. Emphasis in classes is on developing powers of critical thinking and expression that will serve students well no matter what their ultimate career goals are. The program prepares students for diverse professions and enterprises, including business, government service, and academia.

### Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. effective and nuanced skills interpreting primary and secondary source materials.
2. a good grasp in their own work of the course material and methodologies in the studies of Japanese.
3. analytical writing skills and close reading skills.
4. effective oral communication skills.

## East Asian Studies, Korea Subplan Major

The mission of the undergraduate program in Korean is to expose students to a variety of perspectives in Korean language, culture, and history by providing students with training in writing and communication, literature, and civilization. Emphasis in classes is on developing powers of critical thinking and expression that will serve students well no matter what their ultimate career goals are. The program prepares students for diverse professions and enterprises, including business, government service, and academia.

### Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning

outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. effective and nuanced skills interpreting primary and secondary source materials.
2. a good grasp in their own work of the course material and methodologies in the studies of Japanese.
3. analytical writing skills and close reading skills.
4. effective oral communication skills.

## Study Abroad

There are several exciting opportunities for Stanford students interested in Japan and China. The Kyoto Center for Japanese Studies (KCJS (<http://www.kcjs.jp>)), is designed for undergraduates wishing to do advanced work in Japanese language and Japanese studies. The language requirement is two years of Japanese. Students may attend either one or two semesters.

The BOSP Kyoto program (<https://undergrad.stanford.edu/programs/bosp/explore/kyoto>) combines a Winter and/or Spring quarter of academic study with an optional internship in Japan. Founded in collaboration with the School of Engineering, it provides students with the opportunity to fit language immersion and practical classroom experience into their busy schedules. It also welcomes students in the sciences, social sciences, and humanities. Winter quarter participants must have completed JAPANLNG 1. Spring quarter participants must have completed JAPANLNG 2. Preference is given to students with additional language study, as well as those who have taken courses in Japanese literature and culture. It is hosted on the Doshisha University campus in the heart of Kyoto. For information about either program in Kyoto, students should contact the Bing Overseas Studies Program office in Sweet Hall.

The Inter-University Center for Japanese Language Studies (IUC) (<https://web.stanford.edu/dept/IUC/cgi-bin>), located in Yokohama, is designed for students who seek the most advanced level of training in Japanese. This program accepts students with high intermediate Japanese language skills who seek Japan-related careers.

Undergraduates interested in studying Chinese language, history, culture, and society are encouraged to apply to the Stanford Program in Beijing (<https://undergrad.stanford.edu/programs/bosp/explore/beijing>), also offered through the Bing Overseas Studies Program. This program is located at Peking University and is open Autumn and Spring Quarters. There is no language prerequisite for the fall quarter; for spring quarter, students must take CHINLANG 2.

Students should take note of the Inter-University Program for Chinese Language Studies (IUP) (<http://ieas.berkeley.edu/iup>) at Tsinghua University ([iub@socrates.berkeley.edu](mailto:iub@socrates.berkeley.edu); 510-642-3873) and the Inter-University Center (IUC) for Japanese Language Studies (<http://stanford.edu/dept/IUC>) in Yokohama ([stacey.campbell@stanford.edu](mailto:stacey.campbell@stanford.edu); 650-725-1490). Stanford is a member of these consortia.

Graduate students interested in the graduate exchange program with the Department of Chinese at Peking University in Beijing should consult the chair of the department early in the academic year.

## Graduate Programs in East Asian Languages and Cultures Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in East Asian Languages and Cultures and to prepare students for a professional career or doctoral studies. This is achieved through

completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in East Asian Languages and Cultures. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of East Asian Languages and Cultures and to interpret and present the results of such research.

## Admission

All students contemplating application for admission to graduate study must have a creditable undergraduate record. The applicant need not have majored in Chinese or Japanese as an undergraduate, but must have had the equivalent of at least three years of training in the language in which he or she intends to specialize, and must also demonstrate a command of English adequate for the pursuit of graduate study. Applicants should not wish merely to acquire or improve language skills, but to pursue study in one of the following fields: Chinese archaeology, Chinese linguistics, Chinese literature, Chinese philosophy, Japanese cultural history, Japanese literature, Japanese linguistics, and Japanese visual culture.

## Bachelor of Arts

The department offers a Bachelor of Arts degree with the following options:

- Bachelor of Arts in East Asian Studies
- Bachelor of Arts in East Asian Studies, China Subplan
- Bachelor of Arts in East Asian Studies, Japan Subplan
- Bachelor of Arts in East Asian Studies, Japanese Language Subplan
- Bachelor of Arts in East Asian Studies, Korea Subplan

As of September 2016, the department no longer offers the following degrees:

- Bachelor of Arts in Chinese
- Bachelor of Arts in Japanese

Students who previously enrolled in the following degrees may choose to complete the major, following the requirements stated in previous Stanford Bulletins (<http://exploreddegrees.stanford.edu/archive/#text>). Check with the department for further clarification.

## Bachelor of Arts in East Asian Studies

Majors in East Asian Studies begin or continue the mastery of Chinese, Japanese, or Korean. Within the humanities or social sciences, they may focus on a particular sub-region, for example, Japan; South China, Hong Kong, and Taiwan; or western China and Central Asia; or a substantive issue involving the region as a whole, such as environmental protection, public health, rural development, historiography, cultural expression, or religious beliefs. The major seeks to reduce the complexity of a region to intellectually manageable proportions and illuminate the interrelationships among the various facets of a society.

Potential majors must submit a Student Proposal for a Major in East Asian Studies form no later than the end of the first quarter of the junior year; students must declare the major by the end of the sophomore year. Majors must complete at least 75 units of course work on China, Japan, and/or Korea in addition to a 3 unit EALC 198 Senior Colloquium. Courses to be credited toward major requirements must be completed with a letter grade of 'C' or better.

The following requirements are in addition to the University's basic requirements for the bachelor's degree (p. 29). Letter grades are mandatory for required courses.

## Requirements

### I. Language

Proficiency in Chinese, Japanese, or Korean language at the second-year level or above, to be met either by course work or examination. Students who meet the requirement through examination are still expected to take an additional 15 units of language at a higher level, or literature courses taught in the language, or the first year in an additional Asian language. No more than 30 units of language courses are counted toward the major.

### II. Area Courses

A minimum of three area courses, one in each category below: Humanities, History, Social Sciences. Courses listed are examples and not exhaustive; if uncertain whether a particular course fits into one of these categories, contact the department to check.

#### A. Humanities

CHINA 111	Literature in 20th-Century China
CHINA 153	Chinese Bodies, Chinese Selves
JAPAN 124	
JAPAN 138	Introduction to Modern Japanese Literature and Culture
JAPAN 284	
KOREA 101N	Kangnam Style: Korean Soft Power in the Global Economy
KOREA 121	
RELIGST 50	Exploring Buddhism
RELIGST 55	Exploring Zen Buddhism
RELIGST 56	Exploring Chinese Religions

#### B. History

HISTORY 11SC	How Is a Buddhist
HISTORY 95	Modern Korean History
HISTORY 95C	Modern Japanese History: From Samurai to Pokemon
HISTORY 106A	Global Human Geography: Asia and Africa
HISTORY 194B	Japan in the Age of the Samurai
HISTORY 195	Modern Korean History
HISTORY 195C	Modern Japanese History: From Samurai to Pokemon
HISTORY 292F	Culture and Religions in Korean History
HISTORY 295J	

#### C. Social Sciences

JAPAN 151	Japanese Business Culture and Systems
EASTASN 217	Health and Healthcare Systems in East Asia
IPS 244	U.S. Policy toward Northeast Asia
IPS 246	China on the World Stage
POLISCI 148	Chinese Politics
POLISCI 211	
SOC 116	Chinese Organizations and Management
SOC 117A	China Under Mao
SOC 167A	Asia-Pacific Transformation

### III. Substantive Concentration

Additional courses on East Asia, one of which must be a seminar above the 100-level. Majors are encouraged to distribute their course work among at least three disciplines and two subregions in Asia. The subregions need not be traditionally defined. Examples include China, Japan, or Korea; or, in recognition of the new subregions which are emerging, South China and Taiwan, or Central Asia. At least four courses must have a thematic coherence built around a topic. Examples include:

- East Asian religions and philosophies
- Culture and society of modern Japan
- Ethnic identities in East Asia
- Arts and literature in late imperial China
- Foreign policy in East Asia
- Social transformation of modern Korea
- China's political economy

See ExploreCourses under CHINA, EASTASN, JAPAN, KOREA, and EALC or other relevant departments.

#### IV. Capstone Essay

Completion of a paper of approximately 7,500 words, written either in a directed reading course or for one of the courses in item 3 above, which should be built upon the student's thematic interest. Majors are required to take EALC 198 Senior Colloquium in Chinese Studies (3 units) Winter Quarter of the senior year to develop and present the capstone essay or honors paper. A faculty adviser for the capstone essay must be submitted by the beginning of the Autumn Quarter of senior year.

EALC 198	Senior Colloquium
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#### V. Overseas Studies

Majors must study for at least one quarter overseas in the country of focus.

#### VI. Writing in the Major

An East Asian Studies course that satisfies the University Writing in the Major requirement (WIM) should be completed before beginning the senior capstone essay or honors thesis. Depending on the country of focus students should choose from the following 3 WIM courses:

CHINA 111	Literature in 20th-Century China
JAPAN 138/ COMPLIT 138A	Introduction to Modern Japanese Literature and Culture
KOREA 120	

#### VII. Unit Minimum

The courses taken for the major must add up to at least 78 units, comprised of the 3 unit Senior Colloquium and at least 75 additional units, all taken for a letter grade. Courses must be at least 3 units to be counted towards the degree.

### Honors Program

Majors with an overall grade point average (GPA) of 3.5 may apply for the honors program by submitting a senior thesis proposal to the honors committee during Winter or Spring Quarter of the junior year. The proposal must include a thesis outline, a list of all relevant courses the student has taken or plans to take, a preliminary reading list including a work or works in Chinese or Japanese, and the name of a faculty member who has agreed to act as honors supervisor.

If the proposal is approved, research begins in Spring Quarter of the junior year, or by Autumn Quarter at the latest, when the student enrolls in 2-5 units of credit for independent study. In Winter Quarter, students enroll for five units in independent study (CHINA 198H Senior Research, JAPAN 198H Senior Research, or KOREA 198H Senior Research) with the thesis supervisor while writing the thesis, and the finished essay (normally about 15,000 words) is submitted to the committee no later than April 15 of the senior year. Students enroll in the Senior Colloquium, EALC 198 Senior Colloquium, in the senior year to polish and present

their theses (instead of writing a capstone essay). Eight to eleven units of credit are granted for honors course work and the finished thesis. One advanced level colloquium or seminar dealing with China, Japan, or Korea is required as well.

## Bachelor of Arts in East Asian Studies, China Subplan

The Bachelor of Arts in East Asian Studies, China Subplan, offers students the ability to study East Asia with a special focus on Chinese culture and language. The Bachelor of Arts in East Asian Studies, China Subplan, replaced the department's Bachelor of Arts in Chinese. Students currently pursuing the Bachelor of Arts in Chinese may choose to continue his or her plan of study, or opt to complete the Bachelor of Arts in East Asian Studies, China Subplan requirement instead. Note: Once students drop the Bachelor of Arts in Chinese on Axxess, they cannot re-enroll/declare under the Bachelor of Arts in Chinese again. Consult the Director of Undergraduate Studies or Student Services Officer for more clarification.

The following requirements are in addition to the University's basic requirements for the bachelor's degree (p. 29). Letter grades are mandatory for required courses. The following courses as well as their prerequisites must be completed with a grade point average (GPA) of 2.0 or better.

### Requirements

Units

#### I. Gateway Courses

Students must take two gateway courses appropriate to the East Asian Studies, China Subplan. Courses can be from the "East Asian Gateway Course Cluster" and/or the "Gateway Course Cluster for the China Subplan" tables (see below). One of the two courses chosen must be taught by the department.

##### East Asian Gateway Course Cluster

EASTASN 97	The International Relations of Asia since World War II
ECON 124	Economic Development and Challenges of East Asia
HISTORY 92A	The Historical Roots of Modern East Asia
POLISCI 211	
RELIGST 55	Exploring Zen Buddhism
SOC 167A	Asia-Pacific Transformation
THINK 53	Food Talks: The Language of Food

##### Gateway Course Cluster for China Subplan

CHINA 110	How to Be Modern in China: A Gateway to the World Course
CHINA 168	The Chinese Family
ESF 9	Education as Self-Fashioning: Chinese Traditions of the Self
or ESF 9A	Education as Self-Fashioning: Chinese Traditions of the Self
IPS 246	China on the World Stage
POLISCI 148	Chinese Politics
RELIGST 56	Exploring Chinese Religions
SOC 116	Chinese Organizations and Management
SOC 117A	China Under Mao

#### II. Proficiency of the modern Chinese language, at the third year level

Students must be proficient in modern Chinese at the third-year level. Students should take a language assessment test offered at the Language Center to determine language proficiency before signing up for classes. Students without previous experiences in Chinese can begin by selecting one of the following series (see below) and continue until the third-year of modern Chinese. For more clarification, please check with the department.

Series a:

CHINLANG 1	First-Year Modern Chinese, First Quarter
CHINLANG 2	First-Year Modern Chinese, Second Quarter
CHINLANG 3	First-Year Modern Chinese, Third Quarter

Series b:

CHINLANG 1B	First-Year Modern Chinese for Bilingual Students, First Quarter
CHINLANG 2B	First-Year Modern Chinese for Bilingual Students, Second Quarter
CHINLANG 3B	First-Year Modern Chinese for Bilingual Students, Third Quarter

Series c:

CHINLANG 5	Intensive First-Year Modern Chinese
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### III. Classical Chinese

Students must take at least one classical Chinese course.

CHINA 105	Beginning Classical Chinese, First Quarter
CHINA 106	Beginning Classical Chinese, Second Quarter
CHINA 107	Beginning Classical Chinese, Third Quarter

### IV. Additional Courses

22-25

A. Three CHINA courses at the 100 level with one in each of the following areas:

- Pre-modern China
- Modern China
- Chinese linguistics

B. Four other content courses, as approved by the undergraduate faculty adviser. One of these should be a History course offered by the Department of History.

C. CHINA 111 to fulfill the Writing in the Major (WIM) requirement.

CHINA 111	Literature in 20th-Century China
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The following courses are offered for the 2017-18 academic year:

ARCHLGY 124	Archaeology of Food: production, consumption and ritual
CHINA 111	Literature in 20th-Century China
CHINA/ JAPAN/ KOREA 117	Humanities Core: Love and Betrayal in Asia
CHINA 155	The Culture of Entertainment in China
CHINA 166	Chinese Ci Poetry (Song Lyrics)
CHINA 176	Emergence of Chinese Civilization from Caves to Palaces
CHINA 254A	Shaping the Theater: Two Foundational Plays of Early Chinese Drama
CHINA 70N	Animal Planet and the Romance of the Species
CHINA/ JAPAN/ KOREA 118	Humanities Core: Everybody Eats: The Language, Culture, and Ethics of Food in East Asia
CHINA 168	The Chinese Family
CHINA 192	
CHINA 279	For Love of Country: National Narratives in Chinese Literature and Film
THINK 55	Understanding China through Film
CHINA 115	Sex, Gender, and Power in Modern China
CHINA 170	Chinese Language, Culture, and Society

CHINA 177

### V. Senior Capstone Essay

Students enroll in EALC 198: Senior Colloquium Winter Quarter of the senior year to work on their senior capstone essay or senior honors thesis.

EALC 198	Senior Colloquium
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## Honors Program

Majors with an overall grade point average (GPA) of 3.5 may apply for the honors program by submitting a senior thesis proposal to the honors committee during Winter or Spring Quarter of the junior year. The proposal must include:

- a thesis outline
- a list of all relevant courses the student has taken or plans to take
- a preliminary reading list including a work or works in Chinese,
- the name of a faculty member who has agreed to act as honors supervisor.

If the proposal is approved:

1. Research begins in Spring Quarter of the junior year, or by Autumn Quarter of the senior year at the latest, when the student enrolls in CHINA 198H Senior Research.
2. In Winter Quarter of the senior year, students enroll for 5 units in independent study, CHINA 198H Senior Research, with the thesis supervisor while writing the thesis, and the finished essay (normally about 15,000 words) is submitted to the committee no later than April 15 of the senior year.
3. Students also enroll in EALC 198 Senior Colloquium during the Winter Quarter of the senior year to polish and present their thesis (instead of writing a senior capstone essay).
4. 8-11 units of credit are granted for honors course work and the finished thesis.

## Bachelor of Arts in East Asian Studies, Japan Subplan

The Bachelor of Arts in East Asia, Japan Subplan, offers students the ability to study East Asia with a special focus on Japanese culture and language. The Bachelor of Arts in East Asian Studies, Japan Subplan, replaced the department's Bachelor of Arts in Japanese. Students currently pursuing the Bachelor of Arts in Japanese may choose to continue his or her plan of study, or opt to complete the Bachelor of Arts in East Asian Studies, Japan Subplan requirement instead. *Note:* Once students drop the Bachelor of Arts in Japanese on Axess, he or she cannot re-enroll/declare under the Bachelor of Arts in Japanese again. Consult Prof. Yiqun Zhou, Director of Undergraduate Studies, or Ai Tran, EALC's student services officer, for more clarification.

The following requirements are in addition to the University's basic requirements for the bachelor's degree (p. 29). Letter grades are mandatory for required courses. The following courses as well as their prerequisites must be completed with a grade point average (GPA) of 2.0 or better:

Requirements

Units  
6-10

### I. Gateway Courses

Students must take two gateway courses appropriate to the East Asian Studies, Japan Subplan. Courses can be from the "East Asian Gateway Course Cluster" and/or the "Gateway Course Cluster for the Japan Subplan" (see below). One of the two courses chosen must be offered by the department.

East Asian Gateway Course Cluster

EASTASN 97	The International Relations of Asia since World War II
ECON 124	Economic Development and Challenges of East Asia
HISTORY 92A	The Historical Roots of Modern East Asia
POLISCI 211	
RELIGST 55	Exploring Zen Buddhism
SOC 167A	Asia-Pacific Transformation
THINK 53	Food Talks: The Language of Food
Gateway Course Cluster for Japan Subplan	
EASTASN 153	Japan & the World: Innovation, Economic Growth, Globalization, and Int'l Security Challenges
HISTORY 94B	Japan in the Age of the Samurai
HISTORY 95C	Modern Japanese History: From Samurai to Pokemon
JAPAN 82N	Joys and Pains of Growing Up and Older in Japan
JAPAN 110	Romance, Desire, and Sexuality in Modern Japanese Literature
JAPAN 122	Translating Cool: Globalized Popular Culture in Asia
JAPAN 148	
JAPAN 151	Japanese Business Culture and Systems
JAPAN 160	
JAPAN 184	
JAPAN 186	

## II. Proficiency of the modern Japanese language, at the third-year level 45

Students must be proficient in modern Japanese at the third-year level. Students should take a language assessment test offered at the Language Center to determine language proficiency before signing up for classes. Students without previous experiences in Chinese can begin by selecting one of the following series (see below) and continue until the third-year of modern Chinese. For more clarification, please check with the department.

First-year Modern Japanese:

JAPANLNG 1	First-Year Japanese Language, Culture, and Communication, First Quarter
JAPANLNG 2	First-Year Japanese Language, Culture, and Communication, Second Quarter
JAPANLNG 3	First-Year Japanese Language, Culture, and Communication, Third Quarter

Second-year Modern Japanese:

JAPANLNG 21	Second-Year Japanese Language, Culture, and Communication, First Quarter
JAPANLNG 22	Second-Year Japanese Language, Culture, and Communication, Second Quarter
JAPANLNG 23	Second-Year Japanese Language, Culture, and Communication, Third Quarter

Third-year Modern Japanese:

JAPANLNG 101	Third-Year Japanese Language, Culture, and Communication, First Quarter
JAPANLNG 102	Third-Year Japanese Language, Culture, and Communication, Second Quarter
JAPANLNG 103	Third-Year Japanese Language, Culture, and Communication, Third Quarter

## III. Additional Courses 25

A. Three JAPAN courses at the 100-level with one in each of the following areas:

- Pre-modern Japan
- Modern Japan

- Japanese Linguistics

B. Four other content courses dealing with Japan primarily at the 100-level, as approved by the Director of Undergraduate Studies.

C. JAPAN 138 to fulfill the Writing in the Major (WIM) requirement.

JAPAN 138	Introduction to Modern Japanese Literature and Culture
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The following courses are offered in the 2016-17 academic year:

JAPAN/ CHINA/KOREA 117	Humanities Core: Love and Betrayal in Asia
JAPAN 138	Introduction to Modern Japanese Literature and Culture
JAPAN 162	Japanese Poetry and Poetics
JAPAN 170	The Tale of Genji and Its Historical Reception
JAPAN 192	Analyzing Japanese Text and Talk
JAPAN/ CHINA/KOREA 118	Humanities Core: Everybody Eats: The Language, Culture, and Ethics of Food in East Asia
JAPAN 159	The Paranormal in Premodern Japan
JAPAN 163	Japanese Performance Traditions
JAPAN 82N	Joys and Pains of Growing Up and Older in Japan
JAPAN/ CHINA/ KOREA 157/ HISTORY 294J	

## IV. Senior Capstone Essay

Students must also complete of a capstone essay of approximately 7,500 words, written either in a directed reading course or for one of the courses listed above.

EALC 198	Senior Colloquium
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Additional notes:

- Students who complete third-year Japanese at KCJS satisfy the language requirement but are required to take a placement test if they wish to enroll in:
  - JAPANLNG 211 Fourth-Year Japanese, First Quarter
  - JAPANLNG 212 Fourth-Year Japanese, Second Quarter
  - JAPANLNG 213 Fourth-Year Japanese, Third Quarter

These requirements are in addition to the University's basic requirements for the bachelor's degree. Letter grades are mandatory for required courses.

## Honors Program

Majors with an overall grade point average (GPA) of 3.5 may apply for the honors program by submitting a senior thesis proposal to the honors committee during Winter or Spring Quarter of the junior year. The proposal must include a thesis outline, a list of all relevant courses the student has taken or plans to take, a preliminary reading list including a work or works in Japanese, and the name of a faculty member who has agreed to act as honors supervisor.

if the proposal is approved:

- research begins in Spring Quarter of the junior year, or by Autumn Quarter of the senior year at the latest, when the student enrolls in JAPAN 198H Senior Research
- in Winter Quarter of the senior year, students enroll for five units in independent study JAPAN 198H Senior Research with the thesis supervisor while writing the thesis, and the finished essay (normally about 15,000 words) is submitted to the committee no later than April 15 of the senior year

- students enroll in the Senior Colloquium, EALC 198 Senior Colloquium, in the Winter Quarter of the senior year to polish and present their theses (instead of writing a capstone essay)
- eight to eleven units of credit are granted for honors course work and the finished thesis

## Bachelor of Arts in East Asian Studies, Japanese Language Subplan

The Bachelor of Arts in East Asian Studies, Japanese Language Subplan, offers students the ability to study East Asia with a special focus on Japanese language. Students are still required to take courses on Japanese culture, as indicated in the requirements below.

The following requirements are in addition to the University's basic requirements for the bachelor's degree. Letter grades are mandatory for required courses. The following courses as well as their prerequisites must be completed with a grade point average (GPA) of 2.0 or better.

### Requirements

#### I. Proficiency of Japanese at the Fourth-Year Level

Students must be proficient at the 4th year level of Japanese. Students should take a language assessment test offered at the Language Center to determine language proficiency before signing up for classes. Students without prior Japanese language experience should enroll in first-, second-, third-year, and fourth-year modern Japanese.

Students pursuing a Bachelor of Arts in East Asian Studies, Japanese Language Subplan, are encouraged to take advantage of the East Asia Undergraduate Summer Language Study Grants and pursue language and training abroad during summer break.

Those at the advanced level of fourth-year or beyond see Section II.B. (below).

First-Year Modern Japanese:

JAPANLNG 1	First-Year Japanese Language, Culture, and Communication, First Quarter
JAPANLNG 2	First-Year Japanese Language, Culture, and Communication, Second Quarter
JAPANLNG 3	First-Year Japanese Language, Culture, and Communication, Third Quarter

Second-Year Modern Japanese:

JAPANLNG 21	Second-Year Japanese Language, Culture, and Communication, First Quarter
JAPANLNG 22	Second-Year Japanese Language, Culture, and Communication, Second Quarter
JAPANLNG 23	Second-Year Japanese Language, Culture, and Communication, Third Quarter

Third-Year Modern Japanese:

JAPANLNG 101	Third-Year Japanese Language, Culture, and Communication, First Quarter
JAPANLNG 102	Third-Year Japanese Language, Culture, and Communication, Second Quarter
JAPANLNG 103	Third-Year Japanese Language, Culture, and Communication, Third Quarter

Fourth-Year Modern Japanese:

JAPANLNG 211	Fourth-Year Japanese, First Quarter
JAPANLNG 212	Fourth-Year Japanese, Second Quarter
JAPANLNG 213	Fourth-Year Japanese, Third Quarter

#### II. Additional Courses

Four additional courses that deal primarily with materials in Japanese, one in each of the areas of:

- Premodern Japan

- Modern Japan
- Japanese linguistics

B. Students who place out of 4th-year Japanese (JAPAN 213) are required to take six courses in addition to JAPAN 235: Academic Readings in Japanese. The six courses taken must fulfill one of the areas of pre-modern Japan, modern Japan, and Japanese linguistics.

JAPAN 235 Academic Readings in Japanese I

C. In addition to the additional courses, students must also take JAPAN 138: Introduction to Modern Japanese Literature and Culture (Writing in the Major course)

JAPAN 138 Introduction to Modern Japanese Literature and Culture

The following courses are offered in the 2017-18 academic year:

JAPAN 82N Joys and Pains of Growing Up and Older in Japan

JAPAN/ CHINA/KOREA 117 Humanities Core: Love and Betrayal in Asia

JAPAN/ CHINA/KOREA 118 Humanities Core: Everybody Eats: The Language, Culture, and Ethics of Food in East Asia

JAPAN 138 Introduction to Modern Japanese Literature and Culture

JAPAN/ CHINA/ KOREA 157/ HISTORY 294J

JAPAN 159 The Paranormal in Premodern Japan

JAPAN 162 Japanese Poetry and Poetics

JAPAN 163 Japanese Performance Traditions

JAPAN 170 The Tale of Genji and Its Historical Reception

JAPAN 192 Analyzing Japanese Text and Talk

#### III. Senior Capstone Essay

Students must also complete a capstone essay of approximately 7,500 words, written either in a directed reading course or one of the courses listed above. Students may opt to write an Honors Thesis for the East Asian Studies, Japanese Language Subplan, in place of the Senior Capstone Essay. The research must incorporate Japanese-language primary and secondary material. This proposal must be submitted and approved by the honors committee during Winter or Spring Quarter of the junior year. (See below for more information on the Honors Program). Students may also enroll in JAPAN 198C: Senior Research (Capstone Essay) for one unit for each quarter with his or her capstone adviser for credit.

EALC 198 Senior Colloquium

JAPAN 198C Senior Research

#### Honors Program

Majors with an overall grade point average (GPA) of 3.5 may apply for the honors program by submitting a senior thesis proposal to the honors committee during Winter or Spring Quarter of the junior year. The proposal must include a thesis outline, a list of all relevant courses the student has taken or plans to take, a preliminary reading list including a work or works in Japanese, and the name of a faculty member who has agreed to act as honors thesis adviser/supervisor. The research must incorporate Japanese-language primary and secondary materials.

if the proposal is approved:

- research begins in Spring Quarter of the junior year, or by Autumn Quarter of the senior year at the latest, when the student enrolls in JAPAN 198H Senior Research
- in Winter Quarter of the senior year, students enroll for five units in independent study JAPAN 198H Senior Research with the thesis supervisor while writing the thesis, and the finished essay (normally

about 15,000 words) is submitted to the committee no later than April 15 of the senior year

- students enroll in the Senior Colloquium, EALC 198 Senior Colloquium, in the Winter Quarter of the senior year to polish and present their theses (instead of writing a capstone essay)
- 8 - 11 units of credit are granted for honors course work and the finished thesis.

## Bachelor of Arts in East Asian Studies, Korean Subplan

The Bachelor of Arts in East Asia, Korean Subplan, offers students the ability to study East Asia with a special focus on Korean culture and language. The following requirements are in addition to the University's basic requirements for the bachelor's degree (p. 29). Letter grades are mandatory for required courses. The following courses as well as their prerequisites must be completed with a grade point average (GPA) of 2.0 or better.

### Requirements

#### I. Gateway Courses

Students must take two gateway courses appropriate to the East Asian Studies, Korean Subplan. Courses can be from the "East Asian Gateway Course Cluster" and/or the "Gateway Course Cluster for the Korean Subplan" tables (see below). One of the two courses chosen must be taught by the department.

##### East Asian Gateway Course Cluster

THINK 53	Food Talks: The Language of Food
RELIGST 55	Exploring Zen Buddhism
HISTORY 92A	The Historical Roots of Modern East Asia
ECON 124	Economic Development and Challenges of East Asia
SOC 167A	Asia-Pacific Transformation
POLISCI 211	

##### Gateway Course Cluster for Korea Subplan

KOREA 122	Translating Cool: Globalized Popular Culture in Asia
KOREA 101	or KOREA 101NKangnam Style: Korean Soft Power in the Global Economy

#### II. Three Years of Modern Korean

45

Students to take a minimum of 3 years of Korean language courses. Students should take a language assessment test offered at the Language Center to determine language proficiency before signing up for classes. Students without prior Japanese language experience should enroll in first-, second-, and third-year modern Korean.

First-year modern Korean:

KORLANG 1	First-Year Korean, First Quarter
KORLANG 2	First-Year Korean, Second Quarter
KORLANG 3	First-Year Korean, Third Quarter

#### III. Additional Courses

A. Complete the Writing in the Major (WIM) requirement.

KOREA 120

B. Take 6 additional courses at the 100-level, a minimum of two 100-level courses must be offered by the department.

Courses offered by the department:

KOREA 101	or KOREA 101NKangnam Style: Korean Soft Power in the Global Economy
KOREA 121	

KOREA 122	Translating Cool: Globalized Popular Culture in Asia
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KOREA 140	
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KOREA 156	Sino-Korean Relations, Past and Present
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KOREA 157	
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KOREA 230	
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KOREA 231	
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Courses offered outside the department:

HISTORY 195	Modern Korean History
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HISTORY 290/390	North Korea in Historical Perspective
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HISTORY 292F/392F	Culture and Religions in Korean History
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SOC 111/ INTNLREL 143/ SOC 211	
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EASTASN 189K/289K	The Diplomatic and Security Challenges for Korea
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#### IV. Senior Capstone Essay

4

Units

6-10

Students enroll in EALC 198: Senior Colloquium Winter Quarter of the senior year to work on their senior capstone essay or senior honors thesis.

EALC 198	Senior Colloquium
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### Honors Program

Majors with an overall grade point average (GPA) of 3.5 may apply for the honors program by submitting a senior thesis proposal to the honors committee during Winter or Spring Quarter of the junior year. The proposal must include a thesis outline, a list of all relevant courses the student has taken or plans to take, a preliminary reading list including a work or works in Japanese, and the name of a faculty member who has agreed to act as honors supervisor.

The proposal must include:

- a thesis outline
- a list of all relevant courses the student has taken or plans to take
- a preliminary reading list including a work or works in Korean
- the name of a faculty member who has agreed to supervise the honors thesis as the thesis adviser.

if the proposal is approved:

- research begins in Spring Quarter of the junior year, or by Autumn Quarter of the senior year, at the latest, when the student enrolls in KOREA 198H Senior Research
- in Winter Quarter of the senior year, students enroll for 5 units in independent study, KOREA 198H Senior Research, with thesis adviser while writing the thesis, and the finished essay (normally 15,000 works) is submitted to the Director of Undergraduate Studies and honors committee no later than April 15 of the senior year
- students enroll in EALC 198 Senior Colloquium in the Winter Quarter of the senior year to polish and present their thesis (instead of writing a capstone essay).
- 8-11 units of credit are granted for honors coursework and the finished thesis.

### Overseas Studies

Courses approved for the East Asian Languages and Cultures majors which are taught overseas can be found in the "Overseas Studies (p. 124)" section of this Bulletin, or in the Overseas Studies office, Sweet

Hall. To find course offerings in ExploreCourses, click on OSPKYOTO or OSPBEIJ.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site or the Bing Overseas Studies (<http://bosp.stanford.edu>) web site. Students should consult with their faculty adviser for applicability of Overseas Studies courses to a major or minor program.

## Minor in East Asian Studies

The goal of the minor in East Asian Studies is to provide the student with a broad background in East Asian culture as a whole, while allowing the student to focus on a geographical or temporal aspect of East Asia. The minor may be designed from the following, for a total of six courses and a minimum of 20 units. All courses should be taken for a letter grade.

1. Three area courses, one in each category (see East Asian Studies major for listing of area courses).
2. One undergraduate seminar above the 100 level and two other courses from among those listed as approved for East Asian Studies majors, including literature courses but excluding language courses. These courses are listed under the East Asian Studies major in this bulletin.

Applications for the minor should be submitted online through Axess and are due no later than the second quarter of the junior year.

## Minor in East Asian Studies, China Subplan

The undergraduate minor in Chinese has been designed to give students majoring in other departments an opportunity to gain a substantial introduction to the Chinese language, as well as an introduction to the culture and civilization of East Asia. The minors consist of a minimum of 20 units from the following requirements:

### I. Two years of modern Chinese

Units  
9-15

Completion of language study through the second-year level for students with no previous training in Chinese. Students may select one of the following series:

Series A:

CHINLANG 21	Second-Year Modern Chinese, First Quarter
CHINLANG 22	Second-Year Modern Chinese, Second Quarter
CHINLANG 23	Second-Year Modern Chinese, Third Quarter

Series B:

CHINLANG 21B	Second-Year Modern Chinese for Bilingual Students, First Quarter
CHINLANG 22B	Second-Year Chinese for Bilingual Students, Second Quarter
CHINLANG 23B	Second-Year Chinese for Bilingual Students, Third Quarter

Series C:

CHINLANG 25 Intensive Second-Year Modern Chinese

Students who already have first-year competence in Chinese must complete the third-year level of modern Chinese, completing one of the series below:

Series A:

CHINLANG 101	Third-Year Modern Chinese, First Quarter
CHINLANG 102	Third-Year Modern Chinese, Second Quarter
CHINLANG 103	Third-Year Modern Chinese, Third Quarter

Series B:

CHINLANG 101B Third-Year Modern Chinese for Bilingual Students, First Quarter

CHINLANG 102 Third-Year Modern Chinese for Bilingual Students, Second Quarter

CHINLANG 103B Third-Year Modern Chinese for Bilingual Students, Third Quarter

Series C:

CHINLANG 205B Intensive Third-Year Modern Chinese

Students who already have a competence at the second-year level may fulfill the language component of the minor by taking three courses in the department using materials in Chinese. These courses may be language courses such as the third-year sequence mentioned above, the fourth-year language sequence, or they may be advanced literature and linguistics courses, depending on the capabilities and interests of the student.

### II. Two Gateway Courses

Complete two gateway courses offered by the EALC department; students make take courses from the "East Asian Gateway Course Cluster" and/or the "Gateway Course Cluster for China Subplan."

THINK 53	Food Talks: The Language of Food
RELIGST 55	Exploring Zen Buddhism
HISTORY 92A	The Historical Roots of Modern East Asia
EASTASN 97	The International Relations of Asia since World War II
ECON 124	Economic Development and Challenges of East Asia
SOC 167A	Asia-Pacific Transformation
POLISCI 211	
CHINA 110	How to Be Modern in China: A Gateway to the World Course
CHINA 168	The Chinese Family
ESF 9/9A	Education as Self-Fashioning: Chinese Traditions of the Self
RELIGST 56	Exploring Chinese Religions
IPS 246	China on the World Stage
POLISCI 148	Chinese Politics
SOC 116	Chinese Organizations and Management
SOC 117A	China Under Mao

### III. Three content courses

Three courses selected from among the department's other offerings in the literature, linguistics, and civilization of the relevant minor area. All courses for the minor must be taken for a letter grade and completed with a GPA of 2.0 or better. Consult with the department to potentially count one of the BOSP courses taught by a Stanford home campus faculty member toward the minor.

The following courses are offered in the 2017-18 academic year:

ARCHLGY 124	Archaeology of Food: production, consumption and ritual
CHINA 105	Beginning Classical Chinese, First Quarter
CHINA 111	Literature in 20th-Century China
CHINA/ JAPAN/ KOREA 117	Humanities Core: Love and Betrayal in Asia
CHINA 155	The Culture of Entertainment in China
CHINA 166	Chinese Ci Poetry (Song Lyrics)
CHINA 176	Emergence of Chinese Civilization from Caves to Palaces
CHINA 254A	Shaping the Theater: Two Foundational Plays of Early Chinese Drama
CHINA 70N	Animal Planet and the Romance of the Species



CHINA 118	Humanities Core: Everybody Eats: The Language, Culture, and Ethics of Food in East Asia
CHINA 168	The Chinese Family
CHINA 192	
THINK 55	Understanding China through Film
CHINA 107	Beginning Classical Chinese, Third Quarter
CHINA 115	Sex, Gender, and Power in Modern China
CHINA 170	Chinese Language, Culture, and Society
CHINA 177	
CHINA 157	

## Minor in East Asian Studies, Japan Subplan

The undergraduate minor in Japanese has been designed to give students majoring in other departments an opportunity to gain a substantial introduction to the Japanese language, as well as an introduction to the culture and civilization of East Asia. The minors consist of a minimum of 20 units from the following requirements:

### I. Two years of modern Japanese

Completion of language study through the second-year level for students with no previous training in Japanese. Students choose to complete one of the following series:

Series A:

JAPANLNG 21	Second-Year Japanese Language, Culture, and Communication, First Quarter
JAPANLNG 22	Second-Year Japanese Language, Culture, and Communication, Second Quarter
JAPANLNG 23	Second-Year Japanese Language, Culture, and Communication, Third Quarter

Series B:

JAPANLNG 20	Intensive Second-Year Japanese
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Students who already have first-year competence in Japanese must complete the third-year course. Choosing one of the following series:

Series A:

JAPANLNG 101	Third-Year Japanese Language, Culture, and Communication, First Quarter
JAPANLNG 102	Third-Year Japanese Language, Culture, and Communication, Second Quarter
JAPANLNG 103	Third-Year Japanese Language, Culture, and Communication, Third Quarter

Series B:

JAPANLNG 105	Intensive 3rd Year Modern Japanese
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Students who already have a competence at the second-year level may fulfill the language component of the minor by taking three courses in the department using materials in Japanese. These courses may be language courses such as the third-year sequence mentioned above, the fourth-year language sequence, or they may be advanced literature and linguistics courses, depending on the capabilities and interests of the student. Obtain permission from the Director of Undergraduate Studies before proceeding.

### II. Two Gateway Courses

Complete two gateway courses offered by the EALC department; students make take courses from the "East Asian Gateway Course Cluster" and/or the "Gateway Course Cluster for Japan Subplan."

THINK 53	Food Talks: The Language of Food
RELIGST 55	Exploring Zen Buddhism
HISTORY 92A	The Historical Roots of Modern East Asia

EASTASN 97	The International Relations of Asia since World War II
ECON 124	Economic Development and Challenges of East Asia
SOC 167A	Asia-Pacific Transformation
POLISCI 211	
EASTASN 153	Japan & the World: Innovation, Economic Growth, Globalization, and Int'l Security Challenges
JAPAN 82N	Joys and Pains of Growing Up and Older in Japan
JAPAN 110	Romance, Desire, and Sexuality in Modern Japanese Literature
JAPAN 122	Translating Cool: Globalized Popular Culture in Asia
JAPAN 148	
JAPAN 151	Japanese Business Culture and Systems
JAPAN 160	
JAPAN 184	
JAPAN 186	
HISTORY 94B	Japan in the Age of the Samurai
HISTORY 95C	Modern Japanese History: From Samurai to Pokemon

Units  
9-15

### III. Three Japanese content courses

Choose 3 courses selected from among the department's other offerings in the literature, linguistics, and civilization of the relevant minor area. All courses for the minor must be taken for a letter grade and completed with a GPA of 2.0 or better. Consult with the Undergraduate Studies Adviser to potentially count one of the OSPKYOTO courses taught by a Stanford home campus faculty member toward the minor.

JAPAN 110/ FEMGEN 110J	Romance, Desire, and Sexuality in Modern Japanese Literature
JAPAN 164	Introduction to Premodern Japanese
JAPAN 197	Points in Japanese Grammar
JAPAN 121	Translating Japan, Translating the West
JAPAN 151	Japanese Business Culture and Systems
JAPAN 138/ COMPLIT 138A	Introduction to Modern Japanese Literature and Culture
JAPAN 287	Pictures of the Floating World: Images from Japanese Popular Culture
JAPAN/ KOREA/CHINA 157	

## Minor in East Asian Studies, Japanese Language Subplan

The undergraduate minor in East Asian Studies, Japanese Language Subplan, has been designed to give students majoring in other departments and opportunity to gain a substantial introduction to the Japanese language, as well as an introduction to the culture and civilization of East Asia. University policy requires that minor degrees must consist of a minimum of 20 units. Students must complete the from the following requirements:

### I. Proficiency of Modern Japanese, at the Fourth-Year level

Proficiency of modern Japanese language through the fourth-year level.

First-Year Modern Japanese:

JAPANLNG 1	First-Year Japanese Language, Culture, and Communication, First Quarter
JAPANLNG 2	First-Year Japanese Language, Culture, and Communication, Second Quarter

JAPANLNG 3 First-Year Japanese Language, Culture, and Communication, Third Quarter

Second-Year Modern Japanese:

JAPANLNG 21 Second-Year Japanese Language, Culture, and Communication, First Quarter

JAPANLNG 22 Second-Year Japanese Language, Culture, and Communication, Second Quarter

JAPANLNG 23 Second-Year Japanese Language, Culture, and Communication, Third Quarter

Third-Year Modern Japanese:

JAPANLNG 101 Third-Year Japanese Language, Culture, and Communication, First Quarter

JAPANLNG 102 Third-Year Japanese Language, Culture, and Communication, Second Quarter

JAPANLNG 103 Third-Year Japanese Language, Culture, and Communication, Third Quarter

Fourth-Year Modern Japanese:

JAPANLNG 211 Fourth-Year Japanese, First Quarter

JAPANLNG 212 Fourth-Year Japanese, Second Quarter

JAPANLNG 213 Fourth-Year Japanese, Third Quarter

## II. Additional Courses

A. Students must take 2 JAPAN additional courses with materials in Japanese.

B. Students who place out of fourth-year Japanese (JAPAN 213: Fourth-Year Japanese, Third Quarter) are required to take 3 courses in addition to JAPAN 235: Academic Readings in Japanese.

The following courses will be offered in 2017-18 academic year:

JAPAN 117 Humanities Core: Love and Betrayal in Asia

JAPAN 118 Humanities Core: Everybody Eats: The Language, Culture, and Ethics of Food in East Asia

JAPAN 138 Introduction to Modern Japanese Literature and Culture

JAPAN 157

JAPAN 164 Introduction to Premodern Japanese

JAPAN 191

JAPAN 192 Analyzing Japanese Text and Talk

JAPAN 197 Points in Japanese Grammar

JAPAN 235 Academic Readings in Japanese I

JAPAN 265 Readings in Premodern Japanese

JAPAN 279 Research in Japanese Linguistics

JAPAN 296

## Minor in East Asian Studies, Korea Subplan

The undergraduate minor in Korean has been designed to give students majoring in other departments an opportunity to gain a substantial introduction to the Korean language, as well as an introduction to the culture and civilizations of East Asia. All courses for the minor must be taken for a letter grade and completed with a GPA of 2.0 or better.

The minor consists of a minimum of 20 units from the following requirements:

### I. Complete two years of Korean

Completion of the second-year Korean Language, Culture and Communication for student with no previous training in Korean.

KORLANG 21 Second-Year Korean, First Quarter

KORLANG 22 Second-Year Korean, Second Quarter

KORLANG 23 Second-Year Korean, Third Quarter

Students who already have first-year competence in Korean must complete the third-year Korean language

KORLANG 101 Third-Year Korean, First Quarter

KORLANG 102 Third-Year Korean, Second Quarter

KORLANG 103 Third-Year Korean, Third Quarter

Students who already have a competence at the second-year level may fulfill the language component of the minor by taking language courses such as the third-year sequence mentioned above, the fourth-year language sequence, or they may be advanced literature courses, depending on the capabilities and interests of the student.

### II. Complete two gateway courses 6-10

Complete two gateway courses offered by the EALC department; students make take courses from the "East Asian Gateway Course Cluster" and/or the "Gateway Course Cluster for Korea Subplan."

East Asian Gateway Course Cluster:

THINK 53 Food Talks: The Language of Food

RELIGST 55 Exploring Zen Buddhism

HISTORY 92A The Historical Roots of Modern East Asia

EASTASN 97 The International Relations of Asia since World War II

ECON 124 Economic Development and Challenges of East Asia

SOC 167A Asia-Pacific Transformation

POLISCI 211

Gateway Course Cluster for KOREA Subplan:

KOREA 122 Translating Cool: Globalized Popular Culture in Asia

KOREA 101N Kangnam Style: Korean Soft Power in the Global Economy

or KOREA 101

### III. Three content courses

3 courses selected from among the department's offerings in Korean literature, film, and popular culture. Up to one course can be approved from outside the department with the undergraduate adviser's approval.

KOREA 156 Sino-Korean Relations, Past and Present

KOREA 157

## Minors in Other Departments Minor in Translation Studies

Faculty Director: Dan Edelstein

The Division of Literatures, Cultures, and Languages, in cooperation with East Asian Languages and Cultures and the English Department, teaches undergraduates to develop and apply their foreign language knowledge to the production and analysis of translations. The minor is designed to give students majoring in a variety of fields the tools to consider the practical and theoretical issues brought up by translation as an aesthetic, cultural, and ethical practice.

Course work in this minor may not duplicate work counted toward other majors or minors. Course selection must be approved by the minor adviser. For further information, contact the minor adviser, Cintia Santana (csantana@stanford.edu).

### Units

Students must take a minimum of 23 units for a letter grade, in fulfillment of the following requirements:

1. Prerequisite: Complete or test out of a first-year course in the language of interest.

Units

2. Core course: At least 4 units in a Translation Studies core course: ENGLISH/DLCL 293 or DLCL 113Q.*	4
3. Language study: At least 8 units, second year or beyond (not including conversation/oral communication) and/or relevant literature courses taught in the target language. OSP and transfer units may be considered in consultation with the minor adviser.	8
4. Literature study: At least 7 units in relevant literature courses at the 100-level or above, taught in a DLCL department, East Asian Languages and Cultures, or Classics, and determined in consultation with the minor adviser. For students interested in translation from English into another language, appropriate literature courses in the English department may be substituted.	7
5. Electives: At least 4 units in a creative writing course, or a course that foregrounds translation in departments such as Anthropology, any DLCL department, English, East Asian Languages and Cultures, Classics, Linguistics (e.g., LINGUIST 130A), or Computer Science (e.g., CS 124), determined in consultation with the minor adviser.	4
6. Final Project: Students must also complete a capstone project: a significant translation and/or translation studies project (e.g. 20 pages of prose, 10 poems, or similar appropriate amount to be determined in consultation with the minor adviser). This work may be carried out under the supervision of an instructor in a required course or as an independent study.	
<b>Total Units</b>	<b>23</b>

## Master of Arts Programs in East Asian Languages and Cultures

- The M.A. is granted in Chinese and in Japanese. The normal length of study for the degree is two years.
- No financial aid is available for those applicants who wish to obtain the M.A. only.
- Students who wish to spend the first year of graduate study at the Beijing or Yokohama centers must obtain department approval first.
- Candidates for the degree must be in residence at Stanford in California during the final quarter of registration.
- A thesis or an annotated translation of a text of suitable literary or historical worth is required for the M.A. degree. Under special circumstances, a paper approved by the graduate adviser may be substituted.
- The University's basic requirements for the master's degree, including a 45-unit minimum requirement, are given in the "Graduate Degrees (p. 50)" section of this Bulletin. Department requirements are set forth below.

### Master of Arts in Chinese

The M.A. program in Chinese is designed for students with strong academic records and an interest in pursuing postgraduate research in Chinese literature, philosophy, or linguistics, but who have not yet acquired the language skills or disciplinary foundation necessary to enter a Ph.D. program. (Note: Students who wish to pursue advanced language training in preparation for post-graduate research in other fields of Chinese studies are referred to the interdisciplinary M.A. program in the Center for East Asian Studies.)

The candidate must finish third-year Chinese, and one course in advanced classical Chinese with a letter grade of 'B' or higher. Placement tests in modern and in classical Chinese will be given for incoming students during orientation week, Autumn Quarter. Those who fail to place into advanced level classical must take beginning classical Chinese. Qualified students may, upon consultation with the graduate adviser, be permitted to certify that they have attained the equivalent level of proficiency by passing examinations.

- Demonstrate proficiency in both modern and classical Chinese through completion of one of the tracks of third-year Chinese with a letter grade of 'B' or higher :

		Units
CHINLANG 103	Third-Year Modern Chinese, Third Quarter	5
CHINLANG 103B	Third-Year Modern Chinese for Bilingual Students, Third Quarter	3

- One of three advanced classical Chinese courses:

		Units
CHINA 208	Advanced Classical Chinese: Philosophical Texts	3-5
CHINA 209	Advanced Classical Chinese: Historical Narration	2-5
CHINA 210		2-5

- Complete the following for a letter grade of 'B' or higher:

		Units
CHINA 201	Proseminar: Bibliographic and Research Methods in Chinese Studies	3-5

- Four CHINA courses numbered above 200:

		Units
The following courses are offered this year:		
CHINA 201	Proseminar: Bibliographic and Research Methods in Chinese Studies	3-5
CHINA 205	Beginning Classical Chinese, First Quarter	2-5
CHINA 206	Beginning Classical Chinese, Second Quarter	2-5
CHINA 207	Beginning Classical Chinese, Third Quarter	2-5
CHINA 208	Advanced Classical Chinese: Philosophical Texts	3-5
CHINA 209	Advanced Classical Chinese: Historical Narration	2-5
CHINA 211	Literature in 20th-Century China	4-5
CHINA 215	Sex, Gender, and Power in Modern China	3-5
CHINA 251	Popular Culture and Casino Capitalism in China	3-4
CHINA 253	Chinese Bodies, Chinese Selves	3-5
CHINA 263	Chinese Biographies of Women	3-5
CHINA 274	New Directions in the Study of Poetry and Literati Culture	3-4, 4
CHINA 275	Constructing National History in East Asian Archaeology	3-5
CHINA 280		3-4
CHINA 295J		5
CHINA 340	Chinese Justice: Law, Morality, and Literature	2-5
CHINA 371	Aesthetics, Politics, and Modernity: Critical Theory and China	2-5
CHINA 390	Practicum Internship	1
CHINA 391	Seminar in Chinese Syntax	4
HISTORY 392B		4-5

- Two upper-division or graduate-level courses in fields such as Chinese anthropology, art history, history, philosophy, politics, religious studies, or another relevant field, as approved by the graduate adviser in consultation with the student's individual adviser

- A master's thesis

		Units
CHINA 299	Master's Thesis or Translation	1-5

## Master of Arts in Chinese, Archaeology Subplan

The M.A. in Chinese, Archaeology subplan, is designed for students with an interest in pursuing postgraduate research in Chinese archaeology who have not yet acquired the language skills or disciplinary foundation necessary to enter a Ph.D. program. The subplan is declared on Axxess. Subplans are printed on the transcript and the diploma and are elected via the Declaration or Change to a Field of Study (<https://studentaffairs.stanford.edu/sites/default/files/registrar/files/grad-subplan-change.pdf>) form.

### Degree Requirements

A candidate must:

1. Demonstrate proficiency in both modern and classical Chinese by completing:
  - a. third-year Chinese through with a minimum grade of 'B+'.
  - b. one of three advanced classical Chinese courses:

CHINA 275	Constructing National History in East Asian Archaeology	3-5
CHINA 276	Emergence of Chinese Civilization from Caves to Palaces	3-4
CHINA 280		3-4

- c. Qualified students may, upon consultation with the graduate adviser, be permitted to certify that they have attained the equivalent level of proficiency by passing examinations or presenting documentary evidence of attendance at a bachelor's institution in which Chinese is the language of instruction. Exemptions may also be granted to students who study prehistoric archaeology. Instead, these students should take required course work relating to archaeology which is offered in the Stanford Archaeology Center. For details students should consult with the supervisor or the graduate adviser.

2. Complete 45 units, including the following four graduate level CHINGEN or ANTHRO subject code courses appropriate to the Chinese Archaeology track. All courses must be passed with a minimum grade of 'B+'.

a.		
ANTHRO 303	Introduction to Archaeological Theory	5
ANTHRO 307	Archaeological Methods	5
CHINA 280		3-4
CHINA 275	Constructing National History in East Asian Archaeology	3-5

3. Two upper-division or graduate-level courses in fields such as Chinese anthropology, archaeology, art history, history, philosophy, political science and religious studies, as approved by the graduate adviser in consultation with the student's individual adviser.
4. Master's thesis.

## Master of Arts in Japanese

The M.A. program in Japanese is designed for students with strong academic records and an interest in pursuing postgraduate research in Japanese literature, cultural history, or linguistics, but who have not yet acquired the language skills or disciplinary foundation necessary to enter a Ph.D. program. *Note:* Students who wish to pursue advanced language training in preparation for postgraduate research in other fields of Japanese studies are referred to the interdisciplinary M.A. program in the Center for East Asian Studies.

The candidate must:

1. Complete third-year:

		Units
JAPANLNG 101	Third-Year Japanese Language, Culture, and Communication, First Quarter	5
JAPANLNG 102	Third-Year Japanese Language, Culture, and Communication, Second Quarter	5
JAPANLNG 103	Third-Year Japanese Language, Culture, and Communication, Third Quarter	5

2. Complete fourth-year Japanese and classical Japanese with a letter grade of 'B' or higher:

		Units
Fourth-year Japanese		9-15
JAPANLNG 21	Fourth-Year Japanese, First Quarter	
JAPANLNG 21	Fourth-Year Japanese, Second Quarter	
JAPANLNG 21	Fourth-Year Japanese, Third Quarter	
Classical Japanese		5-10
JAPAN 265	Readings in Premodern Japanese	2-5
JAPAN 264	Introduction to Premodern Japanese	3-5

- *Note:* qualified students may, upon consultation with the graduate adviser, be permitted to certify that they have attained the equivalent level of proficiency by passing examinations.

3. Complete the following with a letter grade of 'B' or higher:
  - a. four adviser-approved courses in Japanese literature, culture, or linguistics from among the offerings of the Department of East Asian Languages and Cultures, not including courses taken to fulfill the language requirement.

JAPAN 201	Proseminar: Introduction to Graduate Study in Japanese	2-5
JAPAN 221	Translating Japan, Translating the West	3-4
JAPAN 235	Academic Readings in Japanese I	2-4
JAPAN 238	Introduction to Modern Japanese Literature and Culture	3-5
JAPAN 252		2-4
JAPAN 257		3-5
JAPAN 265	Readings in Premodern Japanese	2-5
JAPAN 287A		
JAPAN 292	Analyzing Japanese Text and Talk	2-4
JAPAN 210	Romance, Desire, and Sexuality in Modern Japanese Literature	3-4
JAPAN 204		
JAPAN 297	Points in Japanese Grammar	2-4

- b. Complete JAPAN 201 Proseminar: Introduction to Graduate Study in Japanese (2-5 units).
- c. Two upper-division or graduate-level courses in fields such as Japanese anthropology, art history, history, philosophy, politics, and religion, as approved by the graduate adviser in consultation with the student's individual adviser.
- d. A master's thesis; enroll in JAPAN 299 Master's Thesis or Translation (1-5 units).

## Coterminal Master of Arts Programs in East Asian Languages and Cultures

With department approval, students may apply to combine programs for the B.A. and M.A. degrees in Chinese or Japanese. Prospective applicants must consult with the graduate adviser.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

Those interested in a coterminal program with an M.A. in East Asian Studies should contact the Center for East Asian Studies (p. 504) for application procedures and deadlines.

## Doctor of Philosophy Programs in East Asian Languages and Cultures

The Ph.D. degree is granted in Chinese and Japanese. Candidates for the degree are expected to acquire a thorough familiarity with Chinese or Japanese literature and linguistics, an adequate command of relevant languages, and a comprehensive knowledge of East Asian history, social institutions, and thought. The University's basic requirements for the Ph.D. are given in the "Graduate Degrees (p. 50)" section of this bulletin. Department requirements are set forth below.

### Admission to Candidacy

Students are evaluated by the graduate faculty during their second year at Stanford. The evaluation is based on a research paper of 25-30 pages documented and with a bibliography, written for an EALC major seminar above the 200 level. Students are also expected to have a GPA of at least 'A-' and demonstrate satisfactory work as a teaching assistant. If the faculty have serious doubts about a student's ability to work for the Ph.D., they convey this to the student. During the subsequent Spring Quarter, the faculty formally decide by vote whether a student should be admitted to candidacy for the Ph.D. or offered an extension. In cases of extension of pre-candidacy, a clear plan is developed for the student, and a reassessment completed within two academic quarters.

If a student goes to the Inter-University Program for Chinese Language Studies (IUP) at Tsinghua University or the Inter-University Center (IUC) for Japanese Language Studies in Yokohama during the first two years of study, the department may consider an extension for admission to

candidacy. The timing of the evaluation of a student admitted with an M.A. in East Asian Studies is decided on an individual basis.

Candidacy is a milestone different from the comprehensive exams, which are regularly held in the third year. Mastery of the field exams is not to be equated with the potential for doing research. Admission to candidacy indicates that the department faculty consider the student qualified to pursue a program of study leading to the Ph.D.

## Doctor of Philosophy in Chinese

The Ph.D. program in Chinese is designed to prepare students for a doctoral degree in Chinese literature, philosophy, or linguistics. Applicants must have a minimum of three years of Chinese language study at Stanford or the equivalent to be considered for admission. Ph.D. students will complete the M.A. as described above on the way to advancing to Ph.D. candidacy (see department guidelines for admission to candidacy above). The majority of required course work for Ph.D. students demands the ability to read primary and secondary materials in Chinese. Advanced standing may be considered for students entering the Ph.D. program who have already completed an M.A. in Chinese literature or linguistics elsewhere only in cases when the level of prior course work and research is deemed equivalent to departmental requirements for the Ph.D. All courses must be taken for a letter grade.

A candidate must fulfill the following requirements:

1. Complete the department's requirements for the M.A. in Chinese and two of three advanced classical Chinese Courses CHINA 208 Advanced Classical Chinese: Philosophical Texts.CHINA 209 Advanced Classical Chinese: Historical NarrationCHINA 210 . All incoming Ph.D. students must take a placement test in classical Chinese held during Orientation Week of fall quarter. Those who fail to place into the advanced level must take Beginning Classical Chinese.
2. Demonstrate proficiency in at least one supporting language, to be chosen in consultation with the primary adviser according to the candidate's specific research goals. Reading proficiency must be certified through a written examination or an appropriate amount of course work, to be determined on a case-by-case basis. When deemed necessary by the student's adviser(s), working knowledge of a third language may also be required.
3. Students in Chinese literature must take at least one Chinese linguistic course, and linguistics students must take at least one literature course.
4. Complete two relevant seminars at the 300 level. These seminars must be in different subjects.

Units

The following course is offered this year:

CHINA 371	Aesthetics, Politics, and Modernity: Critical Theory and China	2-5
CHINA 391	Seminar in Chinese Syntax	4
CHINA 340	Chinese Justice: Law, Morality, and Literature	2-5
CHINA 395J		
CHINA 495A		

5. Pass a set of three comprehensive written examinations, one of which tests the candidate's methodological competence in the relevant discipline. The remaining two fields are chosen, with the approval of the graduate adviser in consultation with the student's individual adviser, from the following: archaeology, anthropology, art, Chinese literature, history, Japanese literature, linguistics, philosophy, and religion. With the adviser's approval, a Ph.D. minor in a supporting field may be deemed equivalent to the completion of one of these three examinations.

- Demonstrate pedagogical proficiency by serving as a teaching assistant for a minimum of one quarter, and taking DLCL 301 The Learning and Teaching of Second Languages.
- Pass the University Oral Examination—General regulations governing the oral examination are found in the "Graduate Degrees (p. 50)" section of this Bulletin. The candidate is examined on questions related to the dissertation after acceptable parts of it have been completed in draft form.
- Submit a dissertation demonstrating ability to undertake original research based on primary and secondary materials in Chinese.

- Pass University oral examination. The candidate is examined on questions related to the dissertation after acceptable parts of it have been completed in draft form.
- Submit a dissertation demonstrating ability to undertake original research based on primary materials in Chinese or data related to China.

## Doctor of Philosophy in Chinese, Archaeology Subplan

Subplans are printed on the transcript and diploma and are elected via the "Declaration or Change to a Field of Study (<https://studentaffairs.stanford.edu/sites/default/files/registrar/files/grad-subplan-change.pdf>)" form.

- Complete one of three advanced classical Chinese courses and the requirements for the M.A. Qualified students may, upon consultation with the graduate adviser, be permitted to certify that they have attained the equivalent level of proficiency by passing examinations or presenting documentary evidence. Exemptions may be granted to students who study prehistoric archaeology. Instead, these students should take coursework offered in the Stanford Archaeology Center. Consult with graduate adviser.

		Units
CHINA 208	Advanced Classical Chinese: Philosophical Texts	3-5
CHINA 209	Advanced Classical Chinese: Historical Narration	2-5
CHINA 210		2-5

- Demonstrate proficiency in at least one supporting foreign language (in addition to Chinese and English), or in a laboratory skill, to be chosen in consultation with the primary adviser according to the candidate's specific research goals. Proficiency (in language(s) and/or laboratory skill must be certified through a written examination or an appropriate amount of coursework, to be determined on a case-by-case basis.

- Six graduate level CHINGEN or ANTHRO courses appropriate to the Chinese Archaeology track, as approved by the adviser:

		Units
The following courses are offered this year:		
ANTHRO 303	Introduction to Archaeological Theory	5
ANTHRO 307	Archaeological Methods	5
ANTHRO 308	Proposal Writing Seminar in Cultural and Social Anthropology	5
ANTHRO 311G	Introduction to Culture and Society Graduate Studies in Anthropology	2
ANTHRO 310G	Introduction to Graduate Studies	2
CHINA 275	Constructing National History in East Asian Archaeology	3-5
CHINA 276	Emergence of Chinese Civilization from Caves to Palaces	3-4

- Serve as a teaching assistant for two quarters and research assistant in an archaeology laboratory for two quarters.
- Pass qualifying examinations in Chinese archaeology.
- Carry out fieldwork related to dissertation research.

## Doctor of Philosophy in Japanese

The Ph.D. program in Japanese is designed to prepare students for a doctoral degree in Japanese literature, cultural history, or linguistics. Applicants must have a minimum of three years of Japanese language study at Stanford or the equivalent to be considered for admission. Ph.D. students will complete M.A. requirements on the way to advancing to Ph.D. candidacy (see department guidelines for admission to candidacy above). The majority of required course work for Ph.D. students demands the ability to read primary and secondary materials in Japanese. Advanced standing may be considered for students entering the Ph.D. program who have already completed an M.A. in Japanese literature or linguistics elsewhere only in cases when the level of prior course work and research is deemed equivalent to departmental requirements for the Ph.D. All courses must be taken for a letter grade.

A candidate must fulfill the following requirements:

- Demonstrate proficiency in both modern and classical Japanese language by completing the following courses, or by demonstrating an equivalent level of linguistic attainment by passing the appropriate certifying examinations:

Fourth-Year Japanese:

JAPANLNG 213 Fourth-Year Japanese, Third Quarter 3-5

Premodern Japanese:

JAPAN 253 Japanese Graduate Seminar: Translation Theory & Premodern Literature 2-5

JAPAN 264 Introduction to Premodern Japanese 3-5

JAPAN 265 Readings in Premodern Japanese 2-5

- Demonstrate proficiency in at least one supporting language, to be chosen in consultation with the primary adviser according to the candidate's specific research goals. Reading proficiency must be certified through a written examination or an appropriate amount of course work, to be determined on a case-by-case basis. When deemed necessary by the student's adviser(s), working knowledge of a third language may also be required. Students concentrating in classical Japanese literature are normally expected to fulfill this requirement by completing *kanbun*:

Classical Japanese

JAPAN 265 Readings in Premodern Japanese 2-5

Or, First-year Classical Chinese; take the following three courses:

CHINA 205 Beginning Classical Chinese, First Quarter 2-5

CHINA 206 Beginning Classical Chinese, Second Quarter 2-5

CHINA 207 Beginning Classical Chinese, Third Quarter 2-5

- Complete eight adviser-approved courses numbered above 200 from among the offerings of the Department of East Asian Languages and Cultures. At least four of these eight courses must be advanced seminars numbered above 300. At least one of these eight courses must deal with Japanese linguistics. For students focusing on modern literature, at least two of these eight courses must deal with premodern material, and for students focusing on premodern literature, at least two of the eight courses must deal with modern material.

JAPAN 201	Proseminar: Introduction to Graduate Study in Japanese	2-5
JAPAN 210	Romance, Desire, and Sexuality in Modern Japanese Literature	3-4
JAPAN 221	Translating Japan, Translating the West	3-4
JAPAN 235	Academic Readings in Japanese I	2-4
JAPAN 238	Introduction to Modern Japanese Literature and Culture	3-4
JAPAN 252		2-4
JAPAN 257		3-5
JAPAN 265	Readings in Premodern Japanese	2-5
JAPAN 292	Analyzing Japanese Text and Talk	2-4
JAPAN 287A		
JAPAN 297	Points in Japanese Grammar	2-4
JAPAN 350	Japanese Historical Fiction	3-5

4. Complete two upper-division or graduate-level courses in two supporting fields, for a total of four courses outside of Japanese literature or linguistics. Supporting fields, to be determined in consultation with the student's primary adviser, may include Japanese anthropology, art, history, philosophy, politics, and religion, Chinese literature, comparative literature, etc.

JAPAN 201	Proseminar: Introduction to Graduate Study in Japanese	2-5
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6. Pass a comprehensive qualifying examination that tests the candidate's breadth and depth in the primary field of research and methodological competence in the relevant discipline.
7. Demonstrate pedagogical proficiency by serving as a teaching assistant for a minimum of one quarter and taking DLCL 301 The Learning and Teaching of Second Languages (3 units).
8. Pass the University Oral Examination. General regulations governing the oral examination are found in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this Bulletin. The candidate is examined on questions related to the dissertation after acceptable parts of it have been completed in draft form.
9. Submit a dissertation demonstrating ability to undertake original research based on primary and secondary materials in Japanese.

### Doctor of Philosophy in Japanese, Linguistics Track

1. Demonstrate proficiency in both modern and classical Japanese language by completing the following courses, or by demonstrating an equivalent level of linguistic attainment by passing the appropriate certifying examinations:

JAPANLNG 213	Fourth-Year Japanese, Third Quarter	3-5
JAPAN 265	Readings in Premodern Japanese	2-5

2. Demonstrate proficiency in at least one supporting language, to be chosen in consultation with the primary adviser according to the candidate's specific research goals. Reading proficiency must be certified through a written examination or an appropriate amount of course work, to be determined on a case-by-case basis. When deemed necessary by the student's adviser(s), working knowledge of a third language may also be required.

3. Complete six adviser-approved courses numbered above 200 from among the offerings of the Department of East Asian Languages and Cultures. At least one of these six courses must be an advanced seminar

Units numbered above 300. At least one of these six courses must deal with Japanese literature.

4. Complete five upper-division or graduate-level courses in linguistics and other supporting fields. To be determined in consultation with the student's primary adviser, these may include applied linguistics, Chinese linguistics, psychology, education, anthropology, sociology, etc.

5. Complete JAPAN 292 Analyzing Japanese Text and Talk

6. Submit two qualifying papers presenting substantial research in two different subfields of Japanese linguistics.

7. Submit an annotated bibliography pertaining to the topic of dissertation.

8. Demonstrate pedagogical proficiency by serving as a teaching assistant for a minimum of one quarter and taking DLCL 301 The Learning and Teaching of Second Languages

9. Pass the University Oral Examination. The candidate is examined on questions related to the dissertation after acceptable parts of it have been completed in draft form.

10. Submit a dissertation demonstrating ability to undertake original research based on primary and secondary materials in Japanese.

### Ph.D. Minor in East Asian Languages and Cultures

A student taking a Ph.D. minor in Chinese or Japanese must complete at least 30 units of work within the department at the 200 and 300 level, chosen in consultation with a department adviser. The student must take either CHINA 201 Proseminar: Bibliographic and Research Methods in Chinese Studies or JAPAN 201 Proseminar: Introduction to Graduate Study in Japanese unless the department is satisfied that work done elsewhere has provided similar training. The student must also pass a written examination in the Chinese or Japanese language.

*Emeriti:* (Professors) Albert E. Dien, Makoto Ueda, John Wang, Steven D. Carter; (Associate Professor) Susan Matisoff; (Senior Lecturer) Yin Chuang

*Chair:* Ronald Egan

*Directors of Graduate Studies:* James Reichert (Japanese), Ban Wang (Chinese)

*Directors of Undergraduate Studies:* Yiqun Zhou

*Professors:* Ronald Egan, Haiyan Lee, Li Liu, Yoshiko Matsumoto, Chao Fen Sun, Melinda Takeuchi (on leave 2016-17; East Asian Languages and Cultures, Art and Art History), Ban Wang (East Asian Languages and Cultures, Comparative Literature)

*Acting Professors:* Thomas Bartlett

*Associate Professors:* Indra Levy, James Reichert, Yiqun Zhou

*Assistant Professors:* Dafna Zur

*Consulting Professor:* Richard Dasher

*Lecturers:* Paul Festa, LeRon Harrison

*Postdoctoral Fellows:* Jesse Chapman, Sixiang Wang

Chinese-Japanese Area Studies Faculty:

*Professors:* Gordon Chang (History), Richard Dasher (Center for Integrated Systems), Mark E. Lewis (History), Paul Harrison (Religious Studies),

John Kieschnick (Religious Studies), Jean Oi (Political Science), David Palumbo-Liu (Comparative Literature), Gi-Wook Shin (Sociology), Matthew Sommer (History), Richard Vinograd (Art and Art History), Andrew Walder (Sociology), Kären Wigen (History), Lee H. Yearley (Religious Studies), Xueguang Zhou (Sociology)

*Associate Professors:* Miyako Inoue (Anthropology), Matthew Kohrman (Anthropology), Yumi Moon (History), Thomas Mullaney (History), Jun Uchida (History), Jean Ma (Art and Art History)

*Assistant Professors:* Phillip Lipsky (Political Science)



# EAST ASIAN STUDIES

Courses offered by the Center for East Asian Studies are listed under the subject code EASTASN on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site. The EASTASN courses listed on ExploreCourses deal primarily with China, Japan, and Korea. Literature courses are listed with the subject codes of CHINA (<http://explorecourses.stanford.edu/search?q=CHINA&view=catalog&page=0&academicYear=&collapse=&filter-departmentcode-CHINA=on&filter-coursestatus-Active=on&filter-catalognumber-CHINA=on>), JAPAN (<http://explorecourses.stanford.edu/search?q=JAPAN&view=catalog&page=0&academicYear=&collapse=&filter-departmentcode-JAPAN=on&filter-coursestatus-Active=on&filter-catalognumber-JAPAN=on>), KOREA (<http://explorecourses.stanford.edu/search?q=KOREA&view=catalog&page=0&academicYear=&collapse=&filter-coursestatus-Active=on&filter-departmentcode-KOREA=on&filter-catalognumber-KOREA=on>), and EALC (<http://explorecourses.stanford.edu/search?q=EALC&view=catalog&page=0&academicYear=&collapse=&filter-departmentcode-EALC=on&filter-coursestatus-Active=on&filter-catalognumber-EALC=on>) in ExploreCourses.

Courses in Chinese, Japanese, and Korean language instruction use the subject codes CHINLANG ([http://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=CHINLANG&collapse="](http://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=CHINLANG&collapse=)), JAPANLNG ([http://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=JAPANLNG&collapse="](http://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=JAPANLNG&collapse=)), and KORLANG ([http://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=KORLANG&collapse="](http://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=KORLANG&collapse=)).

## Mission

The Center for East Asian Studies (CEAS) supports teaching and research on East Asia-related topics across all disciplines; disseminates knowledge about East Asia through projects of local, regional, national, and international scope; and serves as the intellectual gathering point for a collaborative and innovative community of scholars and students of East Asia. CEAS works with all schools, departments, research centers, and student groups to facilitate and enhance all aspects of East Asia-related research, teaching, outreach and exchange across the Stanford campus.

CEAS is part of Stanford Global Studies (<http://sgs.stanford.edu>) in the School of Humanities and Sciences (<http://humsci.stanford.edu>). As an East Asia National Resource Center (NRC), supported by the U.S. Department of Education, CEAS serves to strengthen access to and training in the major languages of East Asia, and to broaden East Asia area studies training across all disciplines.

Many other theoretical and methodological courses within various departments at Stanford are taught by faculty who are East Asian specialists; these courses often have a substantial East Asian component and a list of current applicable courses from outside departments may be found on the "Approved Courses" tab of this bulletin.

## Undergraduate Programs in East Asian Studies

Undergraduates interested in East Asia can become involved by attending CEAS events, taking courses in the subject codes listed above, or earning a Minor or Bachelor of Arts degree in East Asian Studies. These undergraduate degrees in East Asian Studies are administered by

the Department of East Asian Cultures and Languages (p. 487). Stanford Global Studies (p. 562) offers internship opportunities in East Asia, and the Bing Overseas Study Program (<http://bosp.stanford.edu>) offers study abroad opportunities in East Asia.

For language study, CEAS provides undergraduate fellowships for language study in China, Japan, or Korea; students must simultaneously apply to a pre-approved language program abroad. Applications are due in February each year. Deadlines and application information can be found on the CEAS website (<https://ceas.stanford.edu>). In addition, undergraduates can obtain a coterminal M.A. degree in East Asian Studies (<https://ceas.stanford.edu/academics/how-apply>) while concurrently working on their undergraduate major by applying during the regular admissions cycle no later than their senior year.

## Graduate Programs in East Asian Studies

### Master's Program

Stanford's interdisciplinary M.A. program in East Asian Studies is designed both for students who plan to complete a Ph.D. but who have not yet decided on the particular discipline in which they prefer to work, and for students who wish to gain a background in East Asian Studies in connection with a career in nonacademic fields such as business, law, education, journalism, or government service. The program permits the student to construct a course of study suited to individual intellectual interests and career needs, and is typically completed in two years; the program may be completed within one year, depending on the course load taken and the amount of foreign language training required. Advanced language students or students who are native speakers of Chinese, Japanese, or Korean can potentially complete the program within one year. Students interested in pursuing professional careers are encouraged to plan for additional training through internships or additional graduate professional programs, in conjunction with obtaining an M.A. in East Asian Studies.

The M.A. program allows students a great deal of flexibility in combining language training, interdisciplinary area studies, and a disciplinary concentration. Students are required to demonstrate third year level proficiency in Chinese, Korean or Japanese, according to their research-area focus (either through coursework at Stanford or testing at the 4th year or higher in Stanford language-placement exams), to enroll in a 1 unit core course in East Asian Studies in autumn quarter of the first year, and to complete at least nine additional graduate-level area studies courses, one of which must be chosen from a prescribed list of courses offered in winter quarter of the first year. Of the nine required content courses, three must be in a single department or in the same thematic focus. An M.A. thesis, usually an expansion of a paper written for a graduate seminar or colloquium, is required.

### Learning Outcomes

The purpose of the master's program is to further develop specialized knowledge and skills in East Asian Studies, and to prepare students for a professional career or doctoral studies. This is achieved through the completion of East Asia content courses, language training as necessary, and experience with independent research.

### Postdoctoral Programs

The Center for East Asian Studies offers a postdoctoral fellowship in Chinese Studies (<https://ceas.stanford.edu/opportunities/chinese-studies-postdoctoral-fellowship>) each year. Postdoctoral fellowships in other areas are available from campus units including but not limited to the Freeman-Spogli Institute for International Studies (<http://fsi.stanford.edu/fellowships>), the Walter H. Shorenstein Asia-Pacific Research Center (<http://aparcs.fsi.stanford.edu/fellowships>), and the Stanford Humanities Center (<http://shc.stanford.edu/fellowships>).

### Financial Aid

CEAS offers various types of funding for new and continuing students. See the fellowships page (<https://ceas.stanford.edu/opportunities/>)

student-prizes-and-fellowships) of the CEAS web site for the most up-to-date offerings.

## Master of Arts in East Asian Studies

University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The East Asian Studies master's degree program allows a great deal of flexibility in combining language training, interdisciplinary area studies, and a disciplinary concentration. The Director of the Center assigns preliminary faculty advisers to all students. Members of the staff and faculty are available for academic and career planning. The M.A. program is typically completed in two years, but students who meet the language requirement upon entry and who complete a rigorous selection of courses may be able to graduate in as little as three quarters. Students are urged to complete the degree requirements within that first year (3 quarters) unless their goals and background dictate otherwise.

Applicants must submit scores for the General Test of the Graduate Record Examination, official transcripts and a writing sample along with their online application. Foreign applicants are also required to take the Test of English as a Foreign Language (TOEFL). Applications for admission and financial aid should be made online; see the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site. The deadline for submitting applications for the 2018-19 academic year is December 5, 2017.

### Coterminal Master's Program in East Asian Studies

The center admits a limited number of Stanford undergraduates to work toward a coterminal M.A. degree in East Asian Studies. Applications are accepted once a year during the regular CEAS M.A. application cycle. The deadline for the 2018-19 academic year is December 5, 2017. Students may apply after completing 120 units, but no later than the quarter prior to the expected completion of the undergraduate degree. Applicants are expected to meet the same standards as those seeking admission to the M.A. program, and they must submit the following via the online coterminal application:

- a completed Application for Admission to Coterminal Masters' Program (<https://www.applyweb.com/stanterm>)
- a written statement of purpose (<https://gradadmissions.stanford.edu/applying/starting-your-application/required-application-documents/statement-purpose>)
- an unofficial Stanford transcript
- three letters of recommendation, at least two of which should be from members of the department of concentration
- first 15 pages of a representative writing sample (such as a seminar paper, term paper, honors thesis, or journal article.)
- copy of scores from the General Test of the Graduate Record Exam (official score should be sent to Stanford's school code 4704)
- a list of courses the applicant intends to take to fulfill degree requirements.

Coterm applications are reviewed along with peer applications by the M.A. Admissions Committee of the Center for East Asian Studies (CEAS).

Students must meet all requirements for both B.A. and M.A. degrees. They must complete a total of 15 full-time quarters or the equivalent, or three full quarters after completing 180 units for a total of 226 units. Coterminals are not eligible for University financial aid, but are eligible to apply for Foreign Language and Area Studies (FLAS) (<https://ceas.stanford.edu/opportunities/student-prizes-and-fellowships>) and other fellowships administered by CEAS.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University

requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Degree Requirements

### Language Requirement

Students must complete the equivalent of Stanford's first three full years of language training in Chinese, Japanese, or Korean. Other East Asian languages may be accepted by petition. Students entering the program without any language preparation should complete first- and second-year Chinese, Japanese, or Korean within the first year of residence at Stanford if they intend to graduate within two years (this would necessitate completing a summer language program). All language courses taken at Stanford used toward fulfilling the language requirement must be for letter grades and completed with a grade of 'B' or higher. Conversation classes cannot be used for meeting this requirement, and units from the language courses numbered 1-99 do not count toward the 46 units required for the degree. Language courses numbered 100 and above can be used toward meeting the 46 units minimum for the degree, but cannot be used toward fulfilling the content courses requirement unless the language course is at the fourth-year level or above, and the student is specializing in literature.

The language requirement may be satisfied in part or in full by placing into an appropriate Stanford language class through the language proficiency exam given by the Language Center. Students who fulfill this minimum three-year language requirement before completing other requirements are encouraged to continue language study, or take courses in which Chinese, Japanese, or Korean are used, for the duration of the program.

The language used to meet the language proficiency requirement should match the student's country/region of focus.

Students in the M.A. program are also eligible to apply for the Inter-University language programs in Beijing and Yokohama. Work completed in one of these programs may be counted toward the M.A. degree's language requirement if students take and pass the corresponding Stanford language proficiency exam following the program.

Language courses are listed under the following subject codes on the Stanford Bulletin's ExploreCourses web site: CHINLANG, JAPANLNG, and KORLANG.

### M.A. Thesis Requirement

A master's thesis, representing a substantial piece of original research, should be filed with the center's program office as part of the graduation

requirements. With the adviser's approval, the master's thesis requirement may be satisfied by expanding a research paper written for an advanced course, and should have a minimum of 10,000 words in the main body of the thesis (excluding references, citations, appendices, etc.). The M.A. thesis is due at noon on the last day of classes, of the quarter in which the student applies to graduate; see the Academic Calendar (p. ) for specific dates.

Students are also required to attend, at a minimum, one CEAS Thesis Workshop at least one quarter prior to the quarter in which the student applies to graduate. CEAS Thesis Workshops are offered biannually.

## Area Studies and Unit Requirements

Students must complete a minimum total of 46 units for the degree at Stanford, comprised of:

1. 1-unit core course, EASTASN 330 Core Seminar: Issues and Approaches in East Asian Studies
2. At least 9 approved content courses, at least 30 units of which must be at or above the 200 level (at or above 300 level for HISTORY courses) and meeting the following criteria:
  - a. Are on the approved East Asian Studies course list (see Approved Courses tab (p. 507)), or have been approved by petition (maximum 3 petitions)
  - b. Taken for a letter grade and completed with a 'B' or higher ('P' or higher in GSB courses and Law courses)
  - c. Taken for 3 units or more
  - d. Do not count as part of the language requirement (language courses beyond third-year level are accepted for students specializing in literature)
  - e. At least 3 of the 9 courses must be either in the same department or within the same thematic focus across several departments (see sample themes below).
  - f. 1 of the 9 required courses must be selected from a prescribed list of courses in winter quarter of the first year.
3. Additional courses as necessary to reach the minimum 46 units for the degree meeting the following criteria:
  - a. Taken for a letter grade
  - b. At least level 100 or above (above 200 for HISTORY courses)
  - c. Must be an academic content course - such as a lecture, seminar, or colloquium (no activity courses, EFS language classes, etc.). Language classes are okay if the course number is above level 100 and it is taken for a letter grade.
4. The cumulative grade point average (GPA) for all courses must be 3.0 or higher; grades for the 9 content courses must be a 'B' or higher.

### Sample Theme 1

		Units
EASTASN 253	Japan & the World: Innovation, Economic Growth, Globalization, and Int'l Security Challenges	3-5
JAPAN 251	Japanese Business Culture and Systems	3-5
LAW 5016	Japanese Law, Society and Economy	3

### Sample Theme 2

		Units
EASTASN 289K	The Diplomatic and Security Challenges for Korea	3
EASTASN 295	Korean Economy and Business: Theory, Practice, and Strategic Implications	3
HISTORY 395	Modern Korean History	5

### Sample Theme 3

		Units
EASTASN 262	Seminar on the Evolution of the Modern Chinese State, 1550-Present	3-5

IPS 246	China on the World Stage	4
POLISCI 348	Chinese Politics	5

## Course Petitions and Directed Reading

Some theory-oriented or methodological courses may be used to meet part of the 9 courses requirements, provided that they are demonstrably useful for understanding East Asian problems. A course petition (<https://ceas.stanford.edu/academics/undergraduate-program/forms>) and syllabus must be submitted no later than the end of the second week of the quarter in which the course is offered. Students are limited to 3 petitions total. Credit toward the course requirements is not given for courses taken before entering the M.A. program, however students may take courses for exchange credit at the University of California, Berkeley, with the approval of their adviser and the Office of the University Registrar.

Students may choose to enroll in a directed reading course with a faculty member if the current course offerings do not meet a particular research or study need. Directed reading courses are independent study projects a student may undertake with a relevant Stanford faculty member. Once the student has found a faculty member to support his or her studies, the student must inform the Student Services Coordinator immediately so that the appropriate section can be added for EASTASN 300 Graduate Directed Reading. The limitations for directed reading units are:

1. A maximum of 5 units may apply towards the 46-unit degree requirement.
2. If applying the units to the 9 courses requirement, the student must submit a detailed syllabus approved by their directed reading instructor prior to enrolling in the course and the course must be taken for at least 3 units.
3. It must be taken for a letter grade.

## Joint and Dual Degree Programs in East Asian Studies

### East Asian Studies and Law

This joint degree program grants an M.A. degree in East Asian Studies and a Doctor of Jurisprudence (J.D.) degree. It is designed to train students interested in a career in teaching, research, or the practice of law related to East Asian legal affairs. Students must apply separately to the East Asian Studies M.A. program and to the Stanford School of Law and be accepted by both. Completing this combined course of study requires approximately four academic years, depending on the student's background and level of training in Chinese, Japanese, or Korean. Up to 45 units of approved courses may be counted towards both degrees. For more information, see the "Joint Degree Programs (<http://exploreddegrees.stanford.edu/graduatedegrees/#jointdegreestext>)" section of this bulletin and the Stanford Law School's web site (<http://www.law.stanford.edu/degrees/joint>). Students who have been accepted by both programs should consult with the departments to determine which courses can be double-counted.

### East Asian Studies and Education

This dual degree program grants an M.A. degree in East Asian Studies and a secondary school teaching credential in social studies. To be eligible for this program, students should apply to the M.A. program in East Asian Studies and then apply to the Stanford Teacher Education Program during the first year at Stanford. Completing the dual program requires at least two years, including one summer session when beginning the education component of the program. Admissions processes for both programs are completely independent of one another and units from courses can only be applied to one degree or the other, not both.

## East Asian Studies and Business

This dual degree program grants an M.A. degree in East Asian Studies and a Master of Business Administration degree. Students must apply separately to the East Asian Studies M.A. program and the Graduate School of Business and be accepted by both. Completing this combined course of study requires approximately three academic years (perhaps including summer sessions), depending on the student's background and level of training in Chinese, Japanese, or Korean language. Admissions processes for both programs are completely independent of each other and units from courses can only be applied to one degree or the other, not both.

*Director:* Jun Uchida

*Affiliated Faculty and Staff:*

*Anthropology:* Lisa M. Curran, Miyako Inoue, James Holland Jones, Matthew Kohrman, Stephen Murphy-Shigematsu, Barbara Voss, Sylvia J. Yanagisako

*Art and Art History:* Jean Ma, Melinda Takeuchi, Richard Vinograd, Xiaozhe Xie

*Biology:* Marcus W. Feldman, Peter Vitousek

*Business:* William Barnett, Charles M. Lee, Hau Lee, Joseph Piotroski, Kenneth Singleton, David W. Brady, Condoleezza Rice

*Center for International Security and Cooperation:* Chaim Braun

*Civil and Environmental Engineering:* David Freyberg, Renate Fruchter, Leonard Ortolano

*Communication:* James Fishkin, Jennifer Pan

*Comparative Literature:* David Palumbo-Liu

*Earth System Science:* Page Chamberlain, Eric F. B. Lambin, Rosamond L. Naylor

*East Asian Languages and Cultures:* Ronald Egan, Haiyan Lee, Indra Levy, Li Liu, Yoshiko Matsumoto, James Reichert, Chao Fen Sun, Melinda Takeuchi, Ban Wang, John C. Y. Wang (emeritus), Yiqun Zhou, Dafna Zur

*East Asian Studies:* Alice L. Miller

*Education:* Anthony L. Antonio, Martin Carnoy, Francisco O. Ramirez, Christine M. Wotipka

*Freeman Spogli Institute for International Studies:* Michael H. Armacost, Karl W. Eikenberry, Donald K. Emmerson (emeritus), Thomas Fingar, Francis Fukuyama, Takeo Hoshi, Charlotte Lee, Yong Suk Lee, Scott D. Rozelle, Daniel C. Sneider, Mark Thurber, Li-Tai Xue

*Geological Sciences:* Stephan A. Graham, Jonathan Payne

*Geophysics:* Simon L. Klemperer

*History:* Gordon Chang, Mark E. Lewis, Martin Lewis, Yumi Moon, Thomas Mullaney, Matthew Sommer, Jun Uchida, Kären Wigen, Mikael D. Wolfe

*Ho Center for Buddhist Studies:* John Kieschnick, Irene H. Lin

*Hoover Institution:* Jeremy Carl, Larry Diamond, Tai-Chun Kuo, Hsiao-ting Lin, Toshio Nishi, William J. Perry, Charles Wolf Jr.

*Law:* Jeffrey Ball, Thomas Heller, Erik Jenson, Mei Gechlik

*Linguistics:* Daniel Jurafsky

*Management Science and Engineering:* Siegfried S. Hecker, Pamela Hinds, William J. Perry, Edison Tse, Yinyu Ye

*Music:* Jaroslaw Kapuscinski, Joo-Mee Lee, Stephen Sano, Linda Uyechi, Hui Daisy You

*Political Science:* Phillip Lipsky, Terry M. Moe, Jean C. Oi, Barry R. Weingast

*Religious Studies:* Carl W. Bielefeldt (emeritus), Paul M. Harrison, Michaela Moss, Lee H. Yearley

*Sociology:* Gi-Wook Shin, Andrew Walder, Xueguang Zhou

*Stanford Institute for Economic Policy Research (SIEPR):* Nicholas Charles Hope

*Stanford Language Center:* Marina Chung, Robert Clark, Sik Lee Dennig, Michelle DiBello, Hee-sun Kim, Nina Yushin Lin, Momoyo Kubo Lowdermilk, Emiko Yasumoto Magnani, Emi Mukai, Chie Muramatsu, Michelle Rogoyski, Yu-hwa Liao Rozelle, Momoe Saito Fu, Le Tang, Yoshiko Tomiyama, Huazhi Wang, Hannah Yoon, Hong Zeng, Youping Zhang, Xiaofang Zhou

## Approved Content Courses

Because East Asian Studies is an interdisciplinary major, the majority of the courses that apply toward the degree are listed under other departments. In addition to courses listed under the EASTASN subject code, students should check the list below, as well as on the Stanford Bulletin's ExploreCourses site (<http://explorecourses.stanford.edu>) for courses in other departments that will meet the degree requirements for East Asian Studies; such departments include (but are not limited to) Anthropology, East Asian Languages and Cultures, History, Political Science, Religious Studies, and Sociology. Not all courses offered by other departments that have East Asia content may be listed below or on the CEAS web site. If there is a course not listed below that has East Asia content, check with the Center for East Asian Studies staff to verify whether or not it can be used to fulfill the degree requirements.

The following course list represents courses that may, with the adviser's approval, be used to fulfill degree requirements (please see the Law School (<http://www.law.stanford.edu/organizations/offices/office-of-the-registrar/stanford-non-law-student-course-registration>) or GSB (<http://www.gsb.stanford.edu/nongsbreg>) web sites for instructions on how to enroll in their courses):

### China

		Units
ANTHRO 248	Health, Politics, and Culture of Modern China	4-5
ANTHRO 251A	Contemporary Chinese Society Through Independent Documentary Film	3-5
ARCHLGY 304C	The Archaeology of Ancient China	5
ARTHIST 288B	The Enduring Passion for Ink: Contemporary Chinese Ink Painting	5
ARTHIST 289A	Making the Masterpiece in Song Dynasty China	5
ARTHIST 382B	Cultures in Competition: Arts of Song-Era China	4
ARTHIST 385	Arts of China in the Early Modern World, 1550-1800	4
ARTHIST 388A	The History of Modern and Contemporary Japanese and Chinese Architecture and Urbanism	4
ARTHIST 388B	From Shanghai Modern to Global Contemporary: Frontiers of Modern Chinese Art	4
ARTHIST 468	Encountering Contemporary Chinese Painting: Media and Themes	5
ARTHIST 480B	The World of Chen Hongshou (1598-1652)	5
ARTHIST 482A	Approaching Dunhuang: Methods and Debates	5

ARTHIST 486A	Exhibition Seminar: Contemporary Chinese Calligraphy and Painting	5	HISTORY 394C	First Encounters: China and the West, 1500-1860	4-5
ARTHIST 489	Connoisseurship Studies of Chinese Painting, Calligraphy, and Seals	5	HISTORY 395J	Gender and Sexuality in Chinese History	4-5
ARTHIST 489A	Making the Masterpiece in Song Dynasty China	5	HISTORY 398G	Death and Death Culture in Modern China	4-5
CHINA 201	Proseminar: Bibliographic and Research Methods in Chinese Studies	3-5	HISTORY 492B	Origins of Technical Medicine in the Han Dynasty	4-5
CHINA 205	Beginning Classical Chinese, First Quarter	2-5	HISTORY 496A	Research Seminar in Chinese History	4-5
CHINA 206	Beginning Classical Chinese, Second Quarter	2-5	HISTORY 496B	Research Seminar in Chinese History	4-5
CHINA 207	Beginning Classical Chinese, Third Quarter	2-5	IPS 246	China on the World Stage	4
CHINA 211	Literature in 20th-Century China	4-5	IPS 274	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
CHINA 215	Sex, Gender, and Power in Modern China	3-5	KOREA 256	Sino-Korean Relations, Past and Present	3-5
CHINA 251	Popular Culture and Casino Capitalism in China	3-4	LAW 5001	China Law and Business	3
CHINA 253	Chinese Bodies, Chinese Selves	3-5	LAW 5031	Law and Society in Late Imperial China	3
CHINA 255	The Culture of Entertainment in China	3-4	MS&E 244	Economic Growth and Development	3
CHINA 256	Sino-Korean Relations, Past and Present	3-5	POLISCI 243D	Special Topics: Taiwan's Democratic Evolution	5
CHINA 259	Beijing and Shanghai: Twin Cities in Chinese History	3-5	POLISCI 314D	Democracy, Development, and the Rule of Law	5
CHINA 260	Classical Poetry: Reading, Theory, Interpretation	4	POLISCI 334P	Deliberative Democracy and its Critics	3-5
CHINA 263	Chinese Biographies of Women	3-5	POLISCI 340L	China in World Politics	5
CHINA 266	Chinese Ci Poetry (Song Lyrics)	3-4	POLISCI 348	Chinese Politics	3-5
CHINA 268	The Chinese Family	3-5	POLISCI 443S	Political Economy of Reform in China	3-5
CHINA 276	Emergence of Chinese Civilization from Caves to Palaces	3-4	POLISCI 443T	Approaches to Chinese Politics	3-5
CHINA 277	Painting, Poetry, and Calligraphy: Word and Image Studies	2-5	RELIGST 150	The Lotus Sutra: Story of a Buddhist Book	4
CHINA 278	Lives of Confucius	3-5	RELIGST 212	Chuang Tzu	5
CHINA 340	Chinese Justice: Law, Morality, and Literature	2-5	RELIGST 315	Third Bhavanakrama & the Writings of Héshang Moheyan: Scripture in Buddhist Scholastic Polemics	3-5
CHINA 354A	Shaping the Theater: Two Foundational Plays of Early Chinese Drama	2-5	RELIGST 315A	Chinese Buddhism	3-5
CHINA 365	Major Figures in Classical Chinese Poetry	2-5	RELIGST 352A	The Story of a Buddhist Megascripture: Readings in the Avatamsaka	3-5
CHINA 369	Late Imperial Chinese Fiction	2-5	RELIGST 356	The Brahma Net Sutra (Fanwang Jing)	4
CHINA 371	Aesthetics, Politics, and Modernity: Critical Theory and China	2-5	RELIGST 357X	Female Divinities in China	4-5
CHINA 379	For Love of Country: National Narratives in Chinese Literature and Film	3-5	SOC 207	China After Mao	5
CHINA 383C	The Chinese Empire from the Mongol Invasion to the Boxer Uprising	4-5	SOC 216	Chinese Organizations and Management	5
COMM 257	Information Control in Authoritarian Regimes	4-5	SOC 217A	China Under Mao	5
COMPLIT 371	Aesthetics, Politics, and Modernity: Critical Theory and China	2-5	SOC 217B	Chinese Politics and Society	3-5
EASTASN 256	350 Years of America-China Relations	4-5	SOC 313A	Transformation of Socialist Societies	3-5
EASTASN 262	Seminar on the Evolution of the Modern Chinese State, 1550-Present	3-5	STRAMGT 579	The Political Economy of China	2
EASTASN 285	The United States, China, & Global Security	2	STRAMGT 583	The Challenges in/with China	2
EASTASN 294	The Rise of China in World Affairs	3-5	<b>Japan</b>		
ECON 268	International Finance and Exchange Rates	2-5			
FEMGEN 250	Sex, Gender, and Power in Modern China	3-5			
FEMGEN 293E	Female Divinities in China	4-5			
FILMSTUD 333	Contemporary Chinese Auteurs	4			
FILMSTUD 336	Gender and Sexuality in Chinese Cinema	4			
FILMSTUD 436	Chinese Cinema	5			
FINANCE 377	China's Financial System	3			
HISTORY 356	350 Years of America-China Relations	4-5			
HISTORY 391B	The City in Imperial China	4-5			
HISTORY 393A	State, Society, and Economy in Qing Dynasty China	4-5			
HISTORY 393C	The Chinese Empire from the Mongol Invasion to the Boxer Uprising	4-5			
HISTORY 393E	Female Divinities in China	4-5			
					<b>Units</b>
			ANTHRO 253A	Population and social trends in Japan	3-5
			ANTHRO 256	Japanese Anthropology	5
			ARTHIST 287	Pictures of the Floating World: Images from Japanese Popular Culture	5
			ARTHIST 287A	The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime	5
			ARTHIST 384	Aristocrats, Warriors, Sex Workers, and Barbarians: Lived Life in Early Modern Japanese Painting	4
			ARTHIST 386	Theme and Style in Japanese Art	4
			ARTHIST 387	Arts of War and Peace: Late Medieval and Early Modern Japan, 1500-1868	4
			ARTHIST 388A	The History of Modern and Contemporary Japanese and Chinese Architecture and Urbanism	4
			ARTHIST 485	The Situation of the Artist in Traditional Japan	5
			EASTASN 224	Traditional Japan through Ordinary Eyes: The Social and Cultural History of Early Modern Japan	3-5
			EASTASN 251	Innovation-Based Economic Growth: Silicon Valley and Japan	4

EASTASN 253	Japan & the World: Innovation, Economic Growth, Globalization, and Int'l Security Challenges	3-5
ECON 268	International Finance and Exchange Rates	2-5
HISTORY 195C	Modern Japanese History: From Samurai to Pokemon	5
HISTORY 302G	Peoples, Armies and Governments of the Second World War	4-5
HISTORY 392D	Japan in Asia, Asia in Japan	4-5
HISTORY 498D	Japanese Imperial Archives, Part 2	4-5
IPS 225	Innovation-Based Economic Growth: Silicon Valley and Japan	4
JAPAN 119	Humanities Core: Technology and Media in Modern Japan	3-5
JAPAN 201	Proseminar: Introduction to Graduate Study in Japanese	2-5
JAPAN 210	Romance, Desire, and Sexuality in Modern Japanese Literature	3-4
JAPAN 238	Introduction to Modern Japanese Literature and Culture	3-5
JAPAN 251	Japanese Business Culture and Systems	3-5
JAPAN 252A	Special Topics in Japanese Literature	2-5
JAPAN 255	The Vampire in Anime	3-4
JAPAN 258	Premodern in Modern Japanese Literature	2-5
JAPAN 259	The Paranormal in Premodern Japan	4
JAPAN 262	Japanese Poetry and Poetics	2-4
JAPAN 263	Japanese Performance Traditions	3-4
JAPAN 264	Introduction to Premodern Japanese	3-5
JAPAN 265	Readings in Premodern Japanese	2-5
JAPAN 270	The Tale of Genji and Its Historical Reception	2-5
JAPAN 287	Pictures of the Floating World: Images from Japanese Popular Culture	5
JAPAN 288	The Japanese Tea Ceremony: The History, Aesthetics, and Politics Behind a National Pastime	5
JAPAN 292	Analyzing Japanese Text and Talk	2-4
JAPAN 297	Points in Japanese Grammar	2-4
JAPAN 350	Japanese Historical Fiction	1-5
JAPAN 396	Modern Japanese Literature Seminar	2-5
LAW 5016	Japanese Law, Society and Economy	3
MATSCI 159Q	Japanese Companies and Japanese Society	3
POLISCI 218J	Japanese Politics and International Relations	5
RELIGST 150	The Lotus Sutra: Story of a Buddhist Book	4
RELIGST 202A		
RELIGST 253	Recent Research on Japanese Buddhism	3-5
RELIGST 358	Japanese Buddhist Texts	3-5

## Korea

CHINA 256	Sino-Korean Relations, Past and Present	3-5
EASTASN 289K	The Diplomatic and Security Challenges for Korea	3
EASTASN 295	Korean Economy and Business: Theory, Practice, and Strategic Implications	3
HISTORY 390	North Korea in Historical Perspective	4-5
HISTORY 392D	Japan in Asia, Asia in Japan	4-5
HISTORY 392F	Culture and Religions in Korean History	4-5
HISTORY 392G	Modern Korea	4-5
HISTORY 395	Modern Korean History	4-5
HISTORY 498D	Japanese Imperial Archives, Part 2	4-5
IPS 243	U.S. Policy Options in North Korea	3-4

KOREA 250	More Real than Fiction: Perspectives of History and Theory in Modern Korean Literature	2-5
KOREA 256	Sino-Korean Relations, Past and Present	3-5
KOREA 258	Korean History and Culture before 1900	3-5

## East Asia

		Units
ANTHRO 244B	The Buddhist Body in East Asia: Charisma, Gender, and the Gift of the Body	5
ARCHLGY 235	Constructing National History in East Asian Archaeology	3-5
ARTHIST 485A	Exhibiting East Asian Art	1-5
ASNAMST 295F	Race and Ethnicity in East Asia	4-5
CHINA 117	Humanities Core: Love and Betrayal in Asia	3-5
CHINA 275	Constructing National History in East Asian Archaeology	3-5
CSRE 295F	Race and Ethnicity in East Asia	4-5
EASTASN 217	Health and Healthcare Systems in East Asia	3-5
EASTASN 220E	East Asian Internets	4
EASTASN 243	Taiwan's Democratic Evolution	3-5
EASTASN 297	The International Relations of Asia since World War II	3-5
EDUC 202	Introduction to Comparative and International Education	4
EDUC 306D	World, Societal, and Educational Change: Comparative Perspectives	4-5
FILMSTUD 316	International Documentary	4
HISTORY 390E	Movies and Empire in East Asia	4-5
HISTORY 391	East Asia in the Early Buddhist Age	4-5
HISTORY 391J	East Asian Environmental History	4-5
HISTORY 392D	Japan in Asia, Asia in Japan	4-5
HISTORY 394D	Manchuria: Cradle of Conflict, Cockpit of Asia	4-5
HISTORY 395F	Race and Ethnicity in East Asia	4-5
HISTORY 397	The Cold War and East Asia	5
IPS 224	Economic Development and Challenges of East Asia	3-5
IPS 230	Democracy, Development, and the Rule of Law	5
IPS 244	U.S. Policy toward Northeast Asia	5
IPS 264	Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia	3-5
JAPAN 117	Humanities Core: Love and Betrayal in Asia	3-5
KOREA 117	Humanities Core: Love and Betrayal in Asia	3-5
LINGUIST 284A	Writing Systems in a Digital Age	2-3
MS&E 293	Technology and National Security	3
POLISCI 313R	Political Economy of Financial Crisis	5
POLISCI 315A	The Rise of Asia	3-5
RELIGST 139	Religion along the Silk Road	4
RELIGST 314	Seminar in Buddhist Historiography	3-5
RELIGST 328	The Buddha's Word at Stanford	3-5
RELIGST 352A	The Story of a Buddhist Megascripture: Readings in the Avatamsaka	3-5
RELIGST 381	Asian Religions in America; Asian American Religions	4
SOC 267A	Asia-Pacific Transformation	4
SOC 309	Nations and Nationalism	4-5
SOC 317B	Chinese Politics and Society	3-5

# ECONOMICS

Courses offered by the Department of Economics (<http://economics.stanford.edu>) are listed under the subject code ECON on the Stanford Bulletin's ExploreCourses web site.

The department's purpose is to acquaint students with the economic aspects of modern society, to familiarize them with techniques for the analysis of contemporary economic problems, and to develop in them an ability to exercise judgment in evaluating public policy. There is training for the general student as well as for those who plan careers as economists in civil service, private enterprise, teaching, or research.

The department's curriculum is an integral part of Stanford's programs in International Relations, Public Policy, and Urban Studies.

The faculty interests and research cover a wide spectrum of topics in most fields of economics, including behavioral economics, comparative institutional analysis, econometrics, economic development, economic history, experimental economics, industrial organization, international trade, labor, macro- and microeconomic theory, mathematical economics, environmental economics, and public finance.

## Mission of the Undergraduate Program in Economics

The mission of the undergraduate program in Economics is to acquaint students with the economic aspects of modern society, to familiarize them with techniques for the analysis of contemporary economic problems, and to develop in them an ability to exercise judgment in evaluating public policy. The program introduces students to macro- and microeconomic theory, teaches them to think and write clearly about economic problems and policy issues and to apply the basic tools of economic analysis. The undergraduate major provides an excellent background for those who plan careers in government and private enterprise as well as those pursuing graduate degrees in professional schools or in the field of economics.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. understanding of core knowledge within Economics.
2. ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
3. ability to write clearly and persuasively and communicate ideas clearly.
4. ability to evaluate theory and critique research within the discipline.

## Graduate Programs in Economics

The primary objective of the graduate program is to educate students as research economists. In the process, students also acquire the background and skills necessary for careers as university teachers and as practitioners of economics. The curriculum includes a comprehensive treatment of modern theory and empirical techniques. Currently, 20 to 25 students are admitted each year.

Graduate programs in economics are designed to ensure that students receive a thorough grounding in the methodology of theoretical and empirical economics, while at the same time providing specialized training in a wide variety of subfields and a broad understanding of associated institutional structures. Toward these ends, the program is

arranged so that the student has little choice in the curriculum at the outset but considerable latitude later on.

Students admitted to graduate standing in the department are expected to have a strong background in college-level economics, mathematics, and statistics. Preparation ordinarily consists of a college major in economics, a year-long calculus sequence that includes multivariate analysis, a course in linear algebra, and a rigorous course in probability and statistics.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Economics and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Economics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Economics and to interpret and present the results of such research.

## Fellowships and Assistantships

The department awards a number of fellowships for graduate study. Many first-year and a few second- or third-year students are typically awarded full fellowships, including a stipend and tuition. Students in their final job market year are encouraged to apply for SIEPR dissertation research fellowships. All students whose records justify continuation in the program may be assured support for the second through fifth years in the form of employment as a teaching or research assistant. These half-time appointments provide a stipend and tuition allowance. Entering students are not normally eligible for research or teaching assistantships.

## Bachelor of Arts in Economics

The total number of units required for the major is 80. Students are encouraged to complete the core courses 1-6 below, as early as possible. Ideally, students should complete the core during the sophomore year, before taking upper division courses. Courses may not be taken before the prerequisites are completed. The required number of field courses is five. There is great flexibility in the choice of electives, including some upper-division math, statistics, and computer science.

Of the 80 units required for the major, at least 55 must be taken at Stanford in California. Students cannot declare Economics as their major or minor until they have completed ECON 50 Economic Analysis I with a grade of 'B' or better or received approval from the Director of Undergraduate Study.

All courses counting toward the economics major must be taken for a letter grade and a GPA in the major of 2.0 (C) or better must be achieved.

## Requirements for the Economics Major (80 Units)

### Core Courses; 30 units

		Units
ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I (Prerequisites: ECON 1 and MATH 51 (or CME 100 or CME 100A))	5
ECON 51	Economic Analysis II (Prerequisite: ECON 50)	5
ECON 52	Economic Analysis III (Prerequisite: ECON 50)	5
ECON 102A	Introduction to Statistical Methods (Postcalculus for Social Scientists (Prerequisite: MATH 41 or equivalent)) <sup>1</sup>	5

ECON 102B Applied Econometrics (Prerequisite: ECON 102A) <sup>2</sup> 5

<sup>1</sup> It is recommended that students satisfy this basic statistics requirement early in their program.

<sup>2</sup> Material in ECON 102B Applied Econometrics is used in a number of field courses. Students are advised to take ECON 102B Applied Econometrics early in their program.

### Field Courses; 25 units

Must be taken at Stanford in California.

Select five of the following: 25

ECON 102C	Advanced Topics in Econometrics
ECON 111	Money and Banking (not offered this year)
ECON 112	Financial Markets and Institutions: Recent Developments
ECON 113	Economics of Innovation (not offered this year)
ECON 118	Development Economics
ECON 125	Economic Development, Microfinance, and Social Networks
ECON 126	Economics of Health and Medical Care
ECON 128	Economic Development: A Historical Perspective (not offered this year)
ECON 129	Credit markets and development: Some evidence from Latin America and the World
ECON 135	Finance for Non-MBAs <sup>1</sup>
ECON 136	Market Design <sup>2</sup>
ECON 137	Decision Modeling and Information <sup>4</sup>
ECON 140	Introduction to Financial Economics <sup>1</sup>
ECON 141	Public Finance and Fiscal Policy
ECON 145	Labor Economics
ECON 146	Economics of Education
ECON 147	The Economics of Labor Markets
ECON 149	The Modern Firm in Theory and Practice
ECON 155	Environmental Economics and Policy
ECON 157	Imperfect Competition
ECON 160	Game Theory and Economic Applications <sup>3</sup>
ECON 164	The Law and Economics of the World Trading System (not offered this year)
ECON 165	International Finance
ECON 166	International Trade
ECON 178	Behavioral Economics
ECON 179	Experimental Economics (not offered this year)
ECON 180	Honors Game Theory <sup>3</sup>
ECON 181	Honors Information and Incentives (not offered this year) <sup>4</sup>
ECON 182	Honors Market Design <sup>2</sup>
ECON 198	Junior Honors Seminar
ECON 199D	Honors Thesis Research

<sup>1</sup> Students may not count units from both ECON 135 Finance for Non-MBAs and ECON 140 Introduction to Financial Economics towards their major as the courses are too similar in content.

<sup>2</sup> Students may not count units from both ECON 136 Market Design and ECON 182 Honors Market Design towards their field course requirements as the courses cover similar subject matter.

<sup>3</sup> Students may not count units from both ECON 160 Game Theory and Economic Applications and ECON 180 Honors Game Theory towards their field course requirements as the courses cover similar subject matter.

<sup>4</sup> Students may not count units from both ECON 137 and ECON 181 towards their field course requirements as the courses cover similar subject matter.

### Writing in the Major Course; 5 units

Must be taken at Stanford in California. This course should be taken only after completing ECON 51 Economic Analysis II and ECON 52 Economic Analysis III, ECON 102B Applied Econometrics, and at least two field courses.

		Units
ECON 101	Economic Policy Seminar	5

### Electives: 20 units

20 units in addition to the field courses taken; choose from any ECON courses offered for a letter grade.

Up to 10 units of this requirement may be fulfilled by upper-division math, statistics, or computer science with the approval of the Director of Undergraduate Studies.

A maximum of 10 units of transfer credit or of ECON 139D Directed Reading, may be taken under this section. Suitable transfer credit must be approved in writing by the Director of Undergraduate Studies. Advanced undergraduate majors with strong quantitative preparation may enroll in graduate (200-level) courses with permission of the Director of Undergraduate Studies and the course instructor. Some courses offered by Overseas Studies may be counted towards this requirement. The department does not give credit for internships.

### Other Requirements

No courses receiving Department of Economics credit under the preceding requirements may be taken credit/no credit, and 55 of the 80 units required for the major must be taken at Stanford in California.

Students scoring a 5 on both the advanced placement microeconomics and advanced placement macroeconomics exam may petition the Director of Undergraduate Studies to have the ECON 1 Principles of Economics course requirement waived. Students do not receive units credit for placing out of ECON 1 Principles of Economics.

To use transfer credit in partial satisfaction of the requirements, the student must obtain written consent from the department's Director of Undergraduate Study, who establishes the amount of credit to be granted toward the department requirements (see the Information Book for Undergraduate Economics Majors). Students must have completed all Stanford prerequisites for approved transfer credit courses in order to use those courses towards the Economics major.

Course prerequisites are enforced. Students taking courses to satisfy prerequisites in another department or institution must petition for Stanford course substitution or transfer credit approval in order to satisfy course prerequisites.

The time limit for satisfactory completion of a course is one year from the date an incomplete is given, although instructors may set a shorter time limit. Students are responsible for seeing that all grades of 'incomplete' are cleared within the time limit.

### Flexible Tracks

Flexible Tracks listings of upper-division economics courses are provided to emphasize the diverse interests of Economics majors. Flexible Tracks do not add major requirements. Flexible Tracks may be examined in the department's Information Book for Economics Majors (<http://economics.stanford.edu/undergraduate>). Flexible Tracks are provided for the following areas of emphasis (field courses are in bold):

- Behavioral & Experimental (Econ 13N, **136 (or 182)**, **137 (or 181)**, **160 (or 180)**, **178**, **179**)



- Finance (Econ 110, **111, 112, 129, 140 (or 135), 141, 143, 152, 165, 184**)
- International & Development (Econ 15Q, 106, 116, **118, 120, 121, 124, 125, 127, 128, 162, 164, 165, 166**)
- Policy (ESF 1, Econ 11N, 15Q, 17N, 19Q, 22N, 23N, 27N, 45, 47, **111, 113, 118, 126, 141, 145, 146, 147, 150, 152, 154, 155, 159**)
- Research (Econ **102C, 136 (or 182), 137 (or 181), 160 (or 180), 198, 199D, 202, 210**)
- Strategy (Econ 19Q, **113, 136 (or 182), 137 (or 181), 149, 157, 160 (or 180)**)

### Honors Program

The honors program offers an opportunity for independent research, creativity, and achievement. It is designed to encourage a more intensive study of economics than is required for the normal major, with course and research work of exceptional quality. Honors students submit their theses in writing and present them during the Honors Research Symposium during Spring Quarter. The honors program requires:

1. Completing all requirements for the major; plus five additional units, bringing the total to 85 units.
2. Achieving a grade point average (GPA) of at least 3.5 for the required courses of the Economics major (excluding ECON 139D Directed Reading and ECON 199D Honors Thesis Research). See details in the Information Book for Economics Majors.
3. Complete ECON 102B Applied Econometrics and at least two Econ upper division courses most relevant for the proposed topic of the honors thesis by the end of the junior year. (These can be included in the basic 80 units.)
4. Candidates must write an honors thesis in their senior year for at least one unit and up to nine units of credit in their thesis adviser's section of ECON 199D (ECON 199D Honors Thesis Research). Additionally, winter registration for one unit of Honors Thesis Research, under the Director of the Honors Program section number (ECON 199D-20) is mandatory for all honors students. The thesis must be of very high quality and written under the direction of a member of the department or its affiliated faculty. Units of ECON 199D Honors Thesis Research do not count toward the course work requirements for the basic economics major, or in the computation of the GPA requirement for honors.

Juniors interested in the honors program should contact the honors program director for more information. Prospective candidates for the honors program should submit an application to the director no later than October 20 for Spring Quarter degree conferral. Also required, in the same quarter, is a three-page thesis proposal that must be approved by the thesis adviser.

### Minor in Economics (35 Units)

The minor in Economics has two main goals: to acquaint students with the rudiments of micro- and macroeconomic theory that are required of all majors; and to allow students to build competence in the application of this theory to two fields of economics of their choosing, and the opportunity to specialize further in any one of these fields by taking one additional advanced course in the Department of Economics.

#### Core Courses: 20 units

ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I (Prerequisites: ECON 1 and MATH 51 or CME 100 or CME 100A)	5
ECON 51	Economic Analysis II (Prerequisite: ECON 50)	5
ECON 52	Economic Analysis III (Prerequisite: ECON 50)	5

#### Minor Field Courses: 10 units

Must be taken at Stanford in California

ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
ECON 102B	Applied Econometrics	5
ECON 102C	Advanced Topics in Econometrics	5
ECON 111	Money and Banking (not offered this year)	5
ECON 112	Financial Markets and Institutions: Recent Developments	5
ECON 113	Economics of Innovation	5
ECON 118	Development Economics	5
ECON 125	Economic Development, Microfinance, and Social Networks	5
ECON 126	Economics of Health and Medical Care	5
ECON 128	Economic Development: A Historical Perspective (not offered this year)	5
ECON 129	Credit markets and development: Some evidence from Latin America and the World	5
ECON 135	Finance for Non-MBAs <sup>1</sup>	3
ECON 136	Market Design <sup>2</sup>	5
ECON 137	Decision Modeling and Information <sup>4</sup>	5
ECON 140	Introduction to Financial Economics <sup>1</sup>	5
ECON 141	Public Finance and Fiscal Policy	5
ECON 145	Labor Economics	5
ECON 146	Economics of Education	5
ECON 147	The Economics of Labor Markets	5
ECON 149	The Modern Firm in Theory and Practice	5
ECON 155	Environmental Economics and Policy	5
ECON 157	Imperfect Competition	5
ECON 160	Game Theory and Economic Applications <sup>3</sup>	5
ECON 164	The Law and Economics of the World Trading System (not offered this year)	5
ECON 165	International Finance	5
ECON 166	International Trade	5
ECON 178	Behavioral Economics	5
ECON 179	Experimental Economics ((not offered this year))	5
ECON 180	Honors Game Theory <sup>3</sup>	5
ECON 181	Honors Information and Incentives (not offered this year) <sup>4</sup>	5
ECON 182	Honors Market Design <sup>2</sup>	5
ECON 198	Junior Honors Seminar	5
ECON 202	Microeconomics I <sup>5</sup>	2-5
ECON 210	Macroeconomics I <sup>5</sup>	2-5

<sup>1</sup> Students may not count units from both ECON 135 Finance for Non-MBAs and ECON 140 Introduction to Financial Economics towards their minor as the courses are too similar in content.

<sup>2</sup> Students may not count units from both ECON 136 Market Design and ECON 182 Honors Market Design towards their minor as the courses cover similar subject matter.

<sup>3</sup> Students may not count units from both ECON 160 Game Theory and Economic Applications and ECON 180 Honors Game Theory towards their minor as the courses cover similar subject matter.

<sup>4</sup> Students may not count units from both ECON 137 Decision Modeling and Information and ECON 181 Honors Information and Incentives towards their minor as the courses cover similar subject matter.

<sup>5</sup> Students may enroll with permission of the Director of Undergraduate Studies and the course instructor.

#### Electives: 5 units

Select from: Any ECON courses offered for letter grades

## Other Requirements

Students cannot declare Economics as their minor until they have completed ECON 50 Economic Analysis I with a grade of 'B' or better or received approval from the Director of Undergraduate Study.

At least 20 out of the 35 units for the minor must be taken at Stanford. Students must have completed all Stanford prerequisites for approved transfer credit courses in order to use those courses towards the Economics minor.

No courses receiving Department of Economics credit under the preceding requirements may be taken credit/no credit. The combined total of all units for the minor must equate to the grade point average (GPA) of 2.0 (C) or better.

Students must complete their declaration of the minor no later than the last day of the preceding quarter before their degree conferral.

## Master of Arts in Economics

University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The department does not admit students who plan to terminate their graduate study with the M.A. degree. Students must be currently enrolled in a Ph.D. program at Stanford before adding the Economics M.A. degree. Economics students may, but need not, elect to add this degree in addition to their current Ph.D. degree after they have been enrolled at Stanford for at least one quarter. A master's option is also available to currently enrolled Ph.D. candidates from other departments.

## Adding the M.A. Degree

In order to add this degree to their program plan, current Ph.D. students should submit a Graduate Authorization Petition via AxBSS and submit an M.A. program proposal form to the Student Services Manager for approval. Students must have completed the Stanford requirements for a B.A. in Economics or approximately equivalent training. Since students are required to take some of the same courses as Ph.D. candidates, similar preparation in mathematics and statistics generally is expected before the petition to add the M.A. will be approved.

## Degree Requirements

A master's program must satisfy these criteria:

1. Completing, at Stanford, at least 45 units of credit beyond those required for the bachelor's degree, of which at least 40 units must be in the Department of Economics. Students must complete ECON 202 Microeconomics I or ECON 202N Microeconomics I For Non-Economics PhDs and at least three other 200-level lecture courses. They must receive a grade of 'B-' or better in ECON 202 Microeconomics I or ECON 202N Microeconomics I For Non-Economics PhDs. Undergraduate courses must be numbered 105 or higher (with the exception of the ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists, ECON 102B Applied Econometrics, ECON 102C Advanced Topics in Econometrics sequence listed below). No seminar courses numbered 300 or above can be counted.
2. Demonstrating competence in empirical methodology by receiving a grade of 'B-' or better in both ECON 270 Intermediate Econometrics I and ECON 271 Intermediate Econometrics II, or by receiving a grade of 'B-' or above in each of ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists, ECON 102B Applied Econometrics, and ECON 102C Advanced Topics in Econometrics.
3. Submitting two term papers (or a thesis of sufficient quality). At least one of these papers must be deemed to represent graduate-level work. Normally, this means that it is written in connection with a 200-level course. A maximum of 5 units of credit can be earned for a directed reading/thesis (Econ 239D, Econ 400 or comparable thesis

course in home department) toward the 45-unit degree requirement. In lieu of this paper requirement, students may elect to take two additional 200+ level Economics courses.

4. A grade point average (GPA) of 3.0 must be maintained for all master's level work. All courses must be taken for a letter grade.

## Doctor of Philosophy in Economics

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

Students admitted to graduate standing in the department are expected to have a strong background in college-level economics, mathematics, and statistics. Preparation ordinarily consists of a college major in economics, a year-long calculus sequence that includes multivariate analysis, a course in linear algebra, and a rigorous course in probability and statistics. When deemed appropriate, a student may be required to complete the necessary background preparation at Stanford. All students take a common core curriculum at the outset and later branch out into the desired fields of specialization.

Well-prepared students should anticipate spending, with some overlap, approximately two years in course work and another two years in seminars, independent study, and dissertation research. A minimum of 135 completed units is required for the degree. The goal is to complete the program in four years, although some types of research programs may require at least five years to complete. The department has a strong commitment to guiding students through the program expeditiously.

Questions and petitions concerning the program and the admissions process should be addressed to the Director of Graduate Study, who has responsibility for administering the graduate program.

Specific requirements are best discussed in two stages, the first consisting of requirements for admission to candidacy and the second involving further requirements for earning the degree.

## Admission to Candidacy for Ph.D.

A student may apply for admission to candidacy when the following minimal requirements are met:

## Graduate Core

1. Successful completion of core sequences in microeconomics, macroeconomics, and econometrics:

### A. Microeconomics

ECON 202	Microeconomics I	2-5
ECON 203	Microeconomics II	2-5
ECON 204	Microeconomics III	2-5

### B. Macroeconomics

ECON 210	Macroeconomics I	2-5
ECON 211	Macroeconomics II	2-5
ECON 212	Macroeconomics III	2-5

### C. Econometrics

ECON 270	Intermediate Econometrics I	2-5
ECON 271	Intermediate Econometrics II	2-5
ECON 272	Intermediate Econometrics III	2-5

To pass a sequence, an overall grade of 'B' is required for the sequence, and individual course grades must be 'B-' or better. Petitions to substitute courses or waive out of any core course must be submitted to the Director of Graduate Study at least two weeks before the start of the term.

2. Completing the requirements in two additional advanced fields of specialization from the list below or, if approved in advance by the Director of Graduate Study, in one such field together with a

substantial amount of work toward a second field taught in a related department (e.g. GSB Finance). Students may request permission from the Director of Graduate Study to create a field not listed as an advanced field below, such as International Finance or Law & Economics. Requirements for completing a field can usually be satisfied by completing two courses and a paper, although students in some fields may be advised to add a third course, which can then be counted toward the distribution requirement discussed later. A minimum grade average of B is required to pass a field sequence. Individual course grades cannot be less than a B- in order to count for field course credit. Specific requirements for completing each field can be found on the Economics department website (<http://economics.stanford.edu>).

3. Completing a candidacy paper, normally written in conjunction with one of the advanced specialty fields selected above. Submission of this paper or another research paper is required by the first day of Autumn Quarter of the third year. Satisfactory presentation of this paper is required in the Autumn quarter third year seminar. It is expected that the student meet, and indeed exceed, the above standards by the end of the first quarter in the third year of residency. When this is not possible for any reason, the Director of Graduate Study should be consulted as early as possible during the third year.

Once it is deemed that the above standards have been met, the student should complete the Application for Candidacy for Degree of Doctor of Philosophy. After a student fulfills the department prerequisites for applying for candidacy and submits their candidacy application form, the faculty votes to determine whether the student has the potential to successfully complete the requirements of the degree program. If approved, candidacy remains valid for five years (although it can be terminated earlier by the department if progress is deficient); it can be renewed or extended beyond this period only under unusual circumstances. Failure to advance to candidacy results in dismissal from the program.

## Further Requirements for the Ph.D. Degree

1. *Third Year Seminar*: presentation of an expanded research paper in Spring Quarter of the third year.
2. *Distribution Requirement*: Students must complete four other graduate-level courses meeting the following requirements:
  - a. at least one course from the area of economic history, unless history is one of the two fields of specialization.
  - b. courses in at least two fields other than the two fields of specialization. Distribution courses cannot be crosslisted in those fields.
  - c. with advance approval of the Director of Graduate Study, some of these distribution courses may be drawn from related fields taught in other departments. However, including courses taken to meet either the specialization or distribution requirements, no more than two courses in total may be taken outside the Economics department.
  - d. all courses used to fulfill distribution requirements must be passed with a grade of B or better.
3. *Teaching Experience*: Each student must serve as a teaching assistant for at least one quarter. It is strongly recommended that this requirement be satisfied before the fourth year of residence.
4. *Seminar Participation*: Each student is expected to participate in at least two all-year research seminars by the end of the fourth year of residence. Normally, participation in a seminar requires one or more oral presentations and the submission of a research paper (which, however, need not be completely separate from dissertation research). Detailed information on fulfilling the seminar requirements can be found on the Economics department website (<http://economics.stanford.edu>).
5. *Ph.D. Dissertation*: The process involves selecting a topic, choosing an appropriate adviser, submitting a prospectus (signed by the adviser)

outlining the proposed research, selecting a three-member reading committee (usually all from the Department of Economics, although exceptions can be made under certain circumstances), passing the University oral examination at which these three faculty (and two other members of the Academic Council) ask questions about the completed research, and submitting a final draft of the work signed by all members of the reading committee. The student is advised to initiate this process as early as possible.

## Graduate Fields

### A. Behavioral and Experimental Economics

To receive credit for this field, students must take the following three courses. Research papers and presentations are requirements of these courses.

		Units
ECON 278	Behavioral and Experimental Economics I	2-5
ECON 279	Behavioral and Experimental Economics II	2-5
ECON 277	Behavioral and Experimental Economics III	2-5

### B. Econometric Methods For Causal Inference

To receive credit for the Econometric Methods field, students must complete the two courses listed below.

		Units
ECON 292	Quantitative Methods for Empirical Research	2-5
ECON 293	Machine Learning and Causal Inference	3

### C. Econometrics

A student may satisfy the requirements for the econometrics field by completing the requirements of one of two subfields:

#### • C-A: Theoretical Econometrics:

To receive credit in the theoretical econometrics subfield, students must complete two courses from:

		Units
ECON 273	Advanced Econometrics I	2-5
ECON 274	Advanced Econometrics II	2-5
ECON 292	Quantitative Methods for Empirical Research <sup>Econ</sup> 292 is also known as GSB MGTECON 640	2-5

#### • C-B: Applied Econometrics:

To receive credit in the applied econometrics subfield, students must complete ECON 273 and either ECON 275 or ECON 276. Students must also complete a course or set of courses that is empirically oriented. The last requirements must be approved by the Director of Graduate Study in consultation with the instructor of 275 or 276.

		Units
ECON 273	Advanced Econometrics I	2-5
ECON 275	(not offered this year)	2-5
ECON 276	Computational Econometrics	2-5

### D. Economic Development

To receive credit for this field, students must complete two courses from the following list and present a research proposal in each course. Students are required to develop and present a series of research ideas throughout each course. Students must pass an oral exam at the end of the second year (summer). Regular attendance at the Development Economics workshop and the Development student workshop is required.

		Units
ECON 214	Development Economics I	2-5

ECON 215	Development Economics II	2-5
ECON 216	Development Economics III	2-5

Each course requires completion of a term paper. Each course must be passed with a grade of B or better.

### E. Economic History/Institutions

Students must complete two courses from the following list and develop a research proposal in each course. Presentation of a research proposal is required at the end of the second year. Regular attendance (at least four quarters) at the economic history workshop is required.

		Units
ECON 225	Economics of Technology and Innovation (not offered this year)	2-5
ECON 226	U.S. Economic History	2-5
ECON 227	European Economic History	2-5
ECON 228	Institutions and Organizations in Historical Perspective	2-5

### K. Macroeconomics

Requirements for this field are completion of two courses from the list below. Presentation of a research proposal in each course is required. ECON 236 and 237 may not be double-counted towards both the macroeconomics and the finance field.

		Units
ECON 233	Advanced Macroeconomics I	2-5
ECON 235	Advanced Macroeconomics III (not offered this year)	2-5
ECON 236	Financial Economics I	2-5
ECON 237	Financial Economics II	2-5

### F. Environmental, Resource and Energy Economics

To receive credit for this field, students must complete:

		Units
ECON 250	Environmental Economics	2-5
ECON 251	Natural Resource and Energy Economics	2-5

### L. Market Design

To receive credit for this field, students must take two from the following and give a research presentation:

		Units
ECON 283	Theory and Practice of Auction Market Design	2-5
ECON 285	Matching and Market Design	2-5
ECON 289	Advanced Topics in Game Theory and Information Economics	2-5

### G. Finance

To receive credit for the field, students must complete two courses from list below. A 20-minute research project proposal is required.

		Units
ECON 236	Financial Economics I	2-5
ECON 237	Financial Economics II	2-5
FINANCE 622	Dynamic Asset Pricing Theory	4
FINANCE 624	Corporate Finance Theory	4
FINANCE 625	Empirical Asset Pricing	3

### M. Microeconomic Theory

To receive credit for this field, students must complete two courses from the following and give a research presentation:

		Units
ECON 282	Contracts, Information, and Incentives	2-5
ECON 286	Game Theory and Economic Applications	2-5
ECON 291	Social and Economic Networks	2-5

### H. Industrial Organization

To receive credit for the field, students must complete:

		Units
ECON 257	Industrial Organization I	2-5
ECON 258	Industrial Organization IIA <sup>1</sup>	2-5

### N. Public Economics

To receive credit for the field, students must complete the two courses below. Regular attendance at the Public Economics workshop is required.

		Units
ECON 241	Public Economics I	2-5
ECON 242	Public Economics II	2-5

<sup>1</sup> ECON 251 can substitute for ECON 258 only, as long as the student is not also using ECON 251 to fulfill requirements for the Environmental field.

<sup>2</sup> Students who select Industry as a primary focus are expected to also take ECON 260.

### I. International Trade

To receive credit for this field, students must complete two courses and research papers from:

		Units
ECON 266	International Trade I	2-5
ECON 267	International Trade II (recommended)	2-5

Students must pass both courses with a grade of B or better.

### J. Labor Economics

To receive credit for this field, students must complete two courses from:

		Units
ECON 246	Labor Economics I	2-5
ECON 247	Labor Economics II	2-5
ECON 248	Labor Economics III	2-5

## Ph.D. Minor in Economics

To be recommended for the Ph.D. degree with Economics as a minor subject, a student must qualify in three fields of economics, at least one of which must be in the core economics sequence (Microeconomics, Macroeconomics, Econometrics). The standard of achievement in these fields is the same for minor as for major candidates, including minimum grade requirements, paper submissions and research presentations where appropriate. All courses used for the Ph.D. minor must be taken for a letter grade.

## Joint Degree Programs in Economics with the School of Law

### J.D./M.A. and J.D./PH.D.

The Department of Economics and the School of Law offer a joint program leading to either a J.D. degree combined with an M.A. degree in Economics, or to a J.D. degree combined with a Ph.D. in Economics.

The J.D./M.A. and J.D./Ph.D. degree programs are designed for students who wish to prepare themselves for careers in areas relating to both law and economics. Students interested in either joint degree program

must apply and gain entrance separately to the School of Law and the Department of Economics and, as an additional step, must secure permission from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or the Economics department may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or the Department of Economics. Faculty advisers from each academic unit participate in the planning and supervising of the student's joint program. Students must be enrolled full time in the Law School for the first year of law school, and, at some point during the joint program, may be required to devote one or more quarters largely or exclusively to studies in the Economics program regardless of whether enrollment at that time is in the Law School or in the Department of Economics. At all other times, enrollment may be in the graduate school or the Law School, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the M.A. or Ph.D. degrees as specified in this bulletin or by the School of Law.

The Law School approves courses from the Economics Department that may count toward the J.D. degree, and the Economics department approves courses from the Law School that may count toward the M.A. or Ph.D. degree in Economics. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The list may differ depending on whether the student is pursuing an M.A. or a Ph.D. in Economics.

In the case of a J.D./M.A. program, no more than 45 quarter hours of approved courses may be counted toward both degrees. In the case of a J.D./Ph.D. program, no more than 54 quarter hours of approved courses may be counted toward both degrees. In either case, no more than 36 quarter hours of courses that originate outside the Law School may count toward the Law degree. To the extent that courses under this joint degree program originate outside the Law School but count toward the Law degree, the Law School credits permitted under Section 17(1) of the Law School Regulations shall be reduced on a unit-per-unit basis, but not below zero. The maximum number of Law School credits that may be counted toward the M.A. or the Ph.D. in Economics is the greater of: (a) 5 quarter hours in the case of the M.A. and 10 quarter hours in the case of the Ph.D.; or (b) the maximum number of hours from courses outside of the department that M.A. or Ph.D. candidates in Economics are permitted to count toward the applicable degree under general departmental guidelines or in the case of a particular student's individual program.

Tuition and financial aid arrangements are normally made through the school in which the student is then enrolled.

For more information, see the Law School's Degrees and Joint Degrees (<http://www.law.stanford.edu/program/degrees>) web site.

## Joint Degree Program in Ph.D. in Economics and Master of Public Policy

The Ph.D./M.P.P. joint degree is designed for students who wish to prepare themselves for careers in areas relating to both policy and economics. Students interested in this degree first apply to the Economics Department, indicating an interest in the joint program. There is one admissions application and one fee. If the decision is made by the department to admit the applicant, the file is then forwarded to the M.P.P. program. An admission decision, based on the information in the Ph.D. application, is made promptly, and the department informs the student of the decision.

Students may also apply to the M.P.P. after having commenced study in the Economics Department at Stanford, by first receiving the consent of the Director of Graduate Studies in Economics and then applying to the Public Policy program.

Students must have a faculty adviser from the Economics Department to assist with the planning and supervising of the joint program. The adviser is usually chosen from among the department's Public Policy-affiliated faculty.

Tuition and financial aid arrangements are made through the Economics Department.

## Requirements for the M.P.P./Ph.D. in Economics

### Core M.P.P. curriculum of 45 units

		Units
PUBLPOL 301B	Economic Policy Analysis for Policymakers	4-5
PUBLPOL 302A	Introduction to American Law	3-5
PUBLPOL 302B	Economic Analysis of Law	3
PUBLPOL 304A	The Ethics and Politics of Collective Action	3-4
PUBLPOL 305B	Public Policy and Social Psychology: Implications and Applications	4
PUBLPOL 306	Writing and Rhetoric for Policy Audiences	4
PUBLPOL 307	Justice	4-5
PUBLPOL 309	Practicum	1-10
PUBLPOL 311	Public Policy Colloquium	1
LAW 7508	Problem Solving and Decision Making for Public Policy and Social Change	4
Total Units		31-45

## Other Programs

Other programs leading to dual degrees may be arranged. For example, the Ph.D. in Economics combines with one or two years of study in the School of Law, leading to the nonprofessional Master of Legal Studies (M.L.S.) degree. A dual degree program does not permit counting any courses toward both the Economics and the Law degrees. For more information, see the Law School's Degrees and Joint Degrees (<http://www.law.stanford.edu/program/degrees>) web site.

*Emeriti:* (Professors) Takeshi Amemiya, Paul A. David, Victor R. Fuchs, John G. Gurley, Peter J. Hammond, Donald Harris, Bert G. Hickman, Mordecai Kurz, Lawrence J. Lau, Roger G. Noll, John H. Pencavel, Thomas Sargent, David A. Starrett, Joseph E. Stiglitz, Gavin Wright

*Honorary Emerita:* (Professor) Anne O. Krueger

*Chair:* B. Douglas Bernheim

*Professors:* Kyle Bagwell, B. Douglas Bernheim, Nicholas A. Bloom, Michael J. Boskin, Timothy F. Bresnahan, Nadarajan (Raj) Chetty, Mark Duggan, Liran Einav, Matthew Gentzkow, Lawrence Goulder, Avner Greif, Robert E. Hall, Han Hong, Caroline Hoxby, Guido Imbens, Matthew O. Jackson, Peter Klenow, Jonathan Levin, Thomas E. MaCurdy, Paul R. Milgrom, Muriel Niederle, Monika Piazzesi, Luigi Pistaferri, Joseph Romano, Alvin Roth, K. Martin Schneider, Ilya Segal, John B. Shoven, John B. Taylor, Frank Wolak

*Associate Professors:* Ran Abramitzky, Pascaline Dupas, Fuhito Kojima

*Assistant Professors:* Adrien Auclert, Gabriel Carroll, Arun Chandrasekhar, Pablo Kurlat, Bradley Larsen, Melanie Morten, Petra Persson, Isaac Sorkin

*Lecturers:* Steve Ballmer, Marcelo Clerici-Arias, Gopi Shah Goda, Alexander Gould, Ward Hanson, Hamilton Helmer, Chris Makler, Lilia Maliar, Scott

M. McKeon, Igor Popov, Cristian Santesteban, Brett Saraniti, Thomas Shanahan, F. Victor Stanton, Mark Tendall, Ramin Toloui

*Courtesy Professors:* Anat Admati, Susan Athey, Jay Bhattacharya, Jeremy Bulow, Steve Callander, Darrell Duffie, Marcel Fafchamps, James Fearon, Stephen Haber, Charles Kolstad, David Kreps, Edward Lazear, Rosamond Naylor, Peter C. Reiss, D., Gregory Rosston, Kenneth Singleton, Andrzej Skrzypacz

*Courtesy Associate Professor:* Saumitra Jha, N. Grant Miller

*Courtesy Assistant Professor:* Rebecca Diamond, Jacob Goldin, Peter Koudijs, Mar Reguant

*Visiting Professors:* Patrick Kehoe, Francisco Trebbi

*Visiting Associate Professor:* Matilde Bombardini

## Overseas Studies Courses in Economics

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 161X	The German Economy in the Age of Globalization	4-5
OSPMADRD 32	Economics of Development	3-5
OSPMADRD 54	Contemporary Spanish Economy and the European Union	4
OSPOXFRD 45	British Economic Policy since World War II	5
OSPPARIS 86	Measuring Well-Being and Sustainability in Today's World	5
OSPPARIS 91	Globalization and Its Effect on France and the European Union	5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5

# ENGLISH

Courses offered by the Department of English are listed under the subject code ENGLISH on the Stanford Bulletin's ExploreCourses web site.

## Mission of the Department of English

To study English at Stanford is to explore, deeply and rewardingly, the rich legacy of literature written in English, past and present. The department offers a wealth of courses on individual authors, the history of literary genres, literary theory, new media, and creative writing. Given the emphasis on critical thinking and interpretation, the English major is in turn an excellent preparation for many professional fields, including teaching, journalism, law, publishing, medicine, and business. The graduate program features rigorous training in the research and analysis of British, American, and Anglophone literary histories and texts, preparing students to produce scholarship of originality and importance, and to teach literature at the highest levels.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of major theories, methods, and concepts of literary study and critical analysis.
2. an awareness of how authors and texts develop in relation to their historical contexts.
3. a comprehension of the formal qualities of key literary genres, forms, and styles.
4. an effective style of writing and a powerful use of language.

## Bachelor of Arts in English

In the undergraduate program, students explore the traditions of literature in English. Courses emphasize interpretive thinking and creative writing, examining the dynamics of literary and cultural history, the structures of literary form and genre, and the practices of reading, writing, and critical analysis.

## Graduate Program in English

The graduate program features rigorous training in the research and analysis of British, American and Anglophone literary histories and texts, preparing students to produce scholarship of originality and importance, and to teach literature at advanced levels.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in British, American and Anglophone literary histories and texts and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in English. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of English and to interpret and present the results of such research.

## Other Programs in English

### Ph.D. in Modern Thought and Literature

Stanford also offers a Ph.D. degree in Modern Thought and Literature. Under this program, students devote approximately half of their time to a modern literature from the Enlightenment to the present, and the other half to interdisciplinary studies. Interested students should see the "Modern Thought and Literature" section of this bulletin and consult the director of the program.

### Creative Writing Fellowships

The Creative Writing Program each year offers five two-year fellowships in poetry and five two-year fellowships in fiction. These are not degree-granting fellowships. Information is available in the Creative Writing office, (650) 725-1208.

## Bachelor of Arts in English

The English major is designed to provide students with both an understanding of the development of literatures in English and an appreciation of the variety and richness of literary texts. It offers a rigorous training in interpretive thinking and precise expression.

### Suggested Preparation for the Major

Prospective English majors are advised to consider Thinking Matters courses that relate to literature to satisfy a major requirement. Also recommended is any introductory seminar taught by English department faculty through Stanford Introductory Studies.

Units

#### Thinking Matters Courses

ESF 1	Education as Self-Fashioning: The Active, Inquiring, Beautiful Life	7
THINK 31	Race and American Memory	4
THINK 49	Stories Everywhere	4

#### Introductory Seminars

ENGLISH 48N	The American Songbook and Love Poetry	3
ENGLISH 51N	The Sisters: Poetry & Painting	3
ENGLISH 68N	Mark Twain and American Culture	4
ENGLISH 70N	Shakespeare Unbound	3
ENGLISH 75N	American Short Stories	3
ENGLISH 90Q	Sports Writing	3
ENGLISH 93Q	The American Road Trip	3

## Degree Requirements

Students interested in majoring in English are encouraged to declare during their sophomore year, but no later than the beginning of their junior year. They are urged to discuss their plans with the undergraduate student services specialist as early as possible, and to take recommended preparatory courses for the major in their freshman and sophomore years. To declare the major, a student must fill out the Declaration of Major in Axxess; choose a faculty advisor; and submit a completed program proposal form approved by the adviser. It is recommended that a student meet with the adviser at least once per quarter to discuss progress towards degree completion. Students who declared prior to September 2015 should refer to previous guidelines and requirements for the major.

With the exception of the required courses listed below, which must be taken for a letter grade, any two of the elective courses may be taken on a credit/no credit basis at the discretion of the instructor. Transfer students only may apply as many as four literature courses taken at approved universities toward the English major electives. Approval of such courses toward the major is at the discretion of the Director of Undergraduate Studies. Request for transfer credit, including course

syllabi and official transcripts, should be submitted to the undergraduate student services specialist, and to the Office of the Registrar's external credit evaluation section. In the case of all other students, literature courses taken outside the department will not normally be accepted for credit unless they are taken as part of the Bing Overseas Study Program.

No petitions for courses taken outside the department will be granted retrospectively.

The total number of units required to graduate for each degree option is specified in the relevant section following. All courses should be taken for 5 units. Irrespective of field of study or degree option, all English majors must complete the following requirements:

## Required Courses (35 units)

### Historical courses

One course in the 10 series<sup>1</sup>

ENGLISH 10A Introduction to English I: Mapping Monsters in British Literature 650-1650 5

or ENGLISH 10B Introduction to English I: What is Literary History?

One course in the 11 series<sup>2</sup>

ENGLISH 11A Introduction to English II: From Milton to the Romantics 5

or ENGLISH 11B Introduction to English II: American Literature and Culture to 1855

One course in the 12 series<sup>3</sup>

ENGLISH 12A Introduction to English III: Introduction to African American Literature 5

or ENGLISH 12C Introduction to English III: Modern Literature

### Methodology courses

ENGLISH 160 Poetry and Poetics 5

ENGLISH 161 Narrative and Narrative Theory 5

ENGLISH 162W Writing Intensive Seminar in English (WIM) 5

### Also Required

One pre-1800 historical course<sup>4 5</sup> 5

Total Units 35

<sup>1</sup> For students who declared prior to the 2015-16 academic year this requirement may be satisfied by the following course:  
• ENGLISH 100A. Literary History I (no longer offered)

<sup>2</sup> For students who declared prior to the 2015-16 academic year this requirement may be satisfied by the following course:  
• ENGLISH 100B. Literary History II (no longer offered)

<sup>3</sup> For students who declared prior to the 2015-16 academic year this requirement may be satisfied by the following course:  
• ENGLISH 100C. Literary History III (no longer offered)

<sup>4</sup> In 2017-18 the following courses satisfy the pre-1800 historical requirement:  
• ENGLISH 101A How to Read Beowulf  
• ENGLISH 103B Introduction to Old English Language and Literature  
• ENGLISH 112A Humanities Core: Great Books, Big Ideas -- Europe, Middle Ages and Renaissance  
• ENGLISH 115D Shakespeare, Language, Contexts  
• ENGLISH 163F Shakespeare Now and Then  
• ENGLISH 201 The Bible and Literature  
• ENGLISH 233 Baroque and Neobaroque  
• ENGLISH 240A Crooks, Quacks, and Courtesans: Jacobean City Comedy

<sup>5</sup> This requirement may also be fulfilled with the following Thinking Matters or SLE courses:

- ESF 1 Education as Self-Fashioning: The Active, Inquiring, Beautiful Life
- THINK 7 Journeys
- THINK 49 Stories Everywhere
- SLE 91 Structured Liberal Education, SLE 92 Structured Liberal Education, and SLE 93 Structured Liberal Education.

Rules that apply to all English majors irrespective of field of study or degree option

1. Courses can only be counted once, i.e., can only satisfy one requirement.
2. Two of the elective courses may be taken on a credit/no credit basis at the discretion of the instructor.

### Units

## Fields of Study

Because the Department of English recognizes that the needs and interests of literature students vary, it has approved several major programs of study. Each of these has different objectives and requirements; students should consider carefully which program of study corresponds most closely to their personal and intellectual objectives.

The department offers the following fields of study for degrees in English:

- Literature
- Literature with Creative Writing Emphasis
- Literature and Interdisciplinary Studies
- Literature and Foreign Language Literature
- Literature and Philosophy

### I. Literature (35 units)

This field of study is not declared in Axess. It does not appear on either the official transcript or the diploma. This program provides for the interests of students who wish to understand the range and historical development of British, American and Anglophone literatures and a variety of critical methods by which their texts can be interpreted. The major emphasizes the study of literary forms and genres and theories of textual analysis. In addition to the degree requirements required of all majors and listed above, students must complete at least 35 additional units of courses consisting of:

1. Seven additional approved elective courses, only one of which may be a creative writing course, chosen from among those offered by the Department of English. In place of one of these seven elective courses, students may choose one upper-division course in a foreign literature read in the original language.

### II. Literature with Creative Writing Emphasis (40 units)

This subplan is printed on the transcript and diploma and is elected in Axess. This program is designed for students who want a sound basic knowledge of the English literary tradition as a whole and at the same time want to develop skills in writing poetry or prose. In addition to the degree requirements required of all majors and listed above, students must complete at least 40 additional units of approved courses, in either the prose or poetry concentration:

#### Prose Concentration

		Units
ENGLISH 90	Fiction Writing	5
or ENGLISH 91	Creative Nonfiction	
ENGLISH 92	Reading and Writing Poetry (Can be fulfilled with a poetry literature seminar)	5
ENGLISH 146 <sup>1</sup>		5
ENGLISH 190	Intermediate Fiction Writing (or any 190 series or 191 series)	5
or ENGLISH 191	Intermediate Creative Nonfiction	



4 elective literature courses (One of the courses may be fulfilled with a creative writing workshop). 20

Total Units 40

<sup>1</sup> In the 2017-18 academic year ENGLISH 146 is not offered. Students may substitute one of the following courses:

- ENGLISH 143A American Indian Mythology, Legend, and Lore
- ENGLISH 144 Major Modernists: Virginia Woolf, James Joyce, Katherine Mansfield, T. S. Eliot
- ENGLISH 145H
- ENGLISH 151F Angelheaded Hipsters: Beat Writers of San Francisco and New York
- ENGLISH 153F Transatlantic Female Modernists: Making it New with a Difference
- ENGLISH 154E Twentieth-Century Irish Literature

### Poetry Concentration

	Units
ENGLISH 90 Fiction Writing (Can be fulfilled with a prose literature seminar)	5
or ENGLISH 91 Creative Nonfiction	
ENGLISH 92 Reading and Writing Poetry	5
ENGLISH 192 Intermediate Poetry Writing (or any 192 series)	5
One literature course in poetry approved by a Creative Writing Professor	5
4 elective literature courses (One of the courses may be fulfilled with a creative writing workshop)	20
Total Units	40

### III. Literature and Interdisciplinary Studies (40 units)

This emphasis is printed on the transcript and diploma and is elected in Axxess. This program is intended for students who wish to combine the study of one broadly defined literary topic, period, genre, theme or problem with an interdisciplinary program of courses (generally chosen from one other discipline) relevant to that inquiry. In addition to the degree requirements required of all majors and listed above, students must complete at least 40 additional units of approved courses including:

1. Five elective literature courses chosen from among those offered by the Department of English. Students must select two of these courses in relation to their interdisciplinary focus.
2. Three courses related to the area of inquiry. These courses may be chosen from another department or interdisciplinary program within the School of Humanities and Sciences including (but not limited to) such as African American Studies (<http://www.stanford.edu/dept/AAAS>), Anthropology (<https://www.stanford.edu/dept/anthropology/cgi-bin/web>), Art and Art History (<http://art.stanford.edu>), Classics (<http://www.stanford.edu/dept/classics/cgi-bin/web>), Comparative Literature (<http://www.stanford.edu/dept/DLCL/cgi-bin/web/dept/complit>), Comparative Studies in Race and Ethnicity (<http://ccsre.stanford.edu>), Feminist Studies (<http://www.stanford.edu/dept/femstudies>), Human Biology (<https://hum.bio.stanford.edu>), Music (<http://music.stanford.edu/Home>), Philosophy (<http://philosophy.stanford.edu>), Political Science (<http://politicalscience.stanford.edu>), Psychology (<http://psychology.stanford.edu>), Religious Studies (<http://www.stanford.edu/dept/relstud>), Science, Technology, and Society (<http://sts.stanford.edu>), and Sociology (<http://sociology.stanford.edu>). These courses should form a coherent program and must be relevant to the focus of the courses chosen by the student to meet the requirement. Each of these courses must be approved in advance by the interdisciplinary program director.
3. In addition, students in this program must complete an interdisciplinary project, in the form of a 15-20 page interdisciplinary paper or its equivalent. This may be completed with ENGLISH 194 Individual Research, ENGLISH 197 Seniors Honors Essay,

ENGLISH 198 Individual Work, ENGLISH 199 Senior Independent Essay, or a paper integrating the material in two courses the student is taking in two different disciplines.

The final course plan and interdisciplinary project must be approved by the faculty adviser and the interdisciplinary adviser by the time the student applies to graduate.

### IV. Literature and Foreign Language Literature (40 units)

This subplan is printed on the transcript and diploma and is elected in Axxess. This track provides a focus in British and American literature with additional work in French literature; German literature; Italian literature; or Spanish literature. These subplans appear on the diploma as follows: English & French Literature, English & German Literature, English & Italian Literature, and English & Spanish Literature. In addition to the degree requirements required of all majors and listed above, students must complete at least 40 additional units of approved courses including:

1. Four elective courses chosen from among those offered by the Department of English, one of which may be a creative writing course.
2. A coherent program of four courses in the foreign language literature, read in the original language, approved by the Director of Undergraduate Studies in English and by the relevant foreign language department.

### V. Literature and Philosophy (40-50 units)

This subplan is printed on the transcript and diploma and is elected in Axxess. Students should meet with the undergraduate director concerning the Literature and Philosophy focus. This track is for students who wish to explore interdisciplinary studies at the intersection of literature and philosophy while acquiring knowledge of the English language literary tradition as a whole. In addition to the degree requirements required of all majors and listed above, students must complete at least 40-50 additional units of approved courses including:

1. PHIL 80 Mind, Matter, and Meaning (WIM): Prerequisite: introductory philosophy course.
2. Gateway course: ENGLISH 81 Philosophy and Literature. This course should be taken as early as possible in the student's career, normally in the sophomore year.
3. Aesthetics, Ethics, Political Philosophy: one course from PHIL 170 Ethical Theory series.
4. Language, Mind, Metaphysics, and Epistemology: one course from PHIL 180 Metaphysics series.
5. History of Philosophy: one course in the history of Philosophy, numbered above PHIL 100 Greek Philosophy.
6. Two upper division courses of special relevance to the study of Philosophy and Literature. Both of these courses must be in the English department. A list of approved courses (<http://philit.stanford.edu/programs/relevance.html>) is available on the Philosophy and Literature web site.
7. Two additional elective courses in the English department.
8. One capstone seminar (<http://philit.stanford.edu/programs/capstone.html>) of relevance to the study of Philosophy and Literature.

## Honors Program

Students wishing to undertake a formal program of advanced literary criticism and scholarship, including the honors seminar and independent research, are invited to apply for the honors program in the Winter Quarter of the junior year. Any outstanding student is encouraged to engage in an honors thesis project.

Admission is selective. Provisional admission is announced in March. Permission to continue in the program is contingent upon submission, by May 15 of the junior year, of a senior honors essay proposal with a bibliography. Honors students are encouraged to complete before the

start of their senior year the three methodology courses that are English major requirements:

ENGLISH 160	Poetry and Poetics	5
ENGLISH 161	Narrative and Narrative Theory	5
ENGLISH 162W	Writing Intensive Seminar in English	5

In September before the senior year, students are encouraged to participate in the Bing Honors College. In Autumn Quarter of the senior year, students take a 5-unit honors seminar on critical approaches to literature. The senior-year seminar is designed to introduce students to the analysis and production of advanced literary scholarship. Students who are studying at Oxford or at other institutions may be exempted from this requirement on request and with the approval of the director of the honors program.

In Winter and Spring quarters of the senior year, honors students complete the senior honors essay for a total of 10 units under supervision of a faculty adviser.

The deadline for submitting the honors essay is May 10. Essays that receive a grade of 'A-' or above are awarded honors.

In addition to fulfilling the requirements of the major, students in the honors program must complete 15 units of the following:

ENGLISH 196A	Honors Seminar: Critical Approaches to Literature	5
ENGLISH 197	Seniors Honors Essay	10

## Advanced Research Options

### Individual Research

Students taking 100- or 200-level courses may, with the consent of the instructor, write a follow-up 5-unit paper based on the course material and due no later than the end of the succeeding quarter (register for ENGLISH 194 Individual Research). The research paper is written under the direct supervision of the professor; it must be submitted first in a preliminary draft and subsequently in a final version.

### Senior Independent Essay

The senior independent essay gives senior English majors the opportunity to work throughout the year on a sustained piece of critical or scholarly work of around 10,000 words on a topic of their choice, with the close guidance of a faculty adviser. Each student is responsible for finding an adviser, who must approve the proposed topic before the end of the third quarter prior to expected graduation. The senior essay is read and graded by the adviser and one other member of the English faculty. Senior independent essay students register for ENGLISH 199 Senior Independent Essay.

## Overseas Studies or Study Abroad

The flexibility of the English major permits students to attend an overseas campus in any quarter, but it is advisable, and in some cases essential, that students spend their senior year at Stanford if they wish to participate in the honors program or in a special in-depth reading course. For more information on Stanford overseas programs, see the "Overseas Studies (p. 124)" section of this bulletin.

Students should consult their advisers and the undergraduate program officer to make sure that they can fulfill the requirements before graduation. The Stanford Program in Oxford usually offers courses which apply toward both University requirements and area requirements for the English major. In either case, students should save the syllabi from

their courses if they wish to apply to use them to fulfill an English major requirement.

### Units Overseas Studies Courses in English

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

## Joint Major Program: English and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

## English Major Requirements in the Joint Major Program

The joint major is structured to let students thoughtfully explore the intersection of Computer Science and literary studies. Students would ideally declare the program during the sophomore year. Students are required to complete requirements in English and Computer Science. See the "Computer Science Joint Major Progra (p. 278)m (p. 278)" section of this bulletin for details on Computer Science requirements.

The requirements for English are adapted from the English major and are stated in full below. Students in the CS+English JMP are required to complete 58 total units in English compared to 68-80 units which is typically required by the English major. Students in CS+English are not required to take the Writing Intensive Seminar in English (WISE) course. Additionally, students in CS+English only have to fulfill five electives. The University Writing in the Major requirement for students in the CS+English JMP is fulfilled by the Computer Science Writing in the Major requirement. To declare the CS+English JMP, students must complete a program proposal. (<https://stanford.box.com/shared/static/h6erjrj75rercs2gua9z8dm4mgnsqwqr.pdf>)

Students are encouraged to compile an ePortfolio of reflections, ideas, and work on the interplay between humanities and computer science.

### Integrative Experience

In the senior year, students are required to undertake a capstone project which involves both programming and literary research, and could include work on digital editions, analyses of corpora, the creation of electronic literature, digital representations of literary venues, studies of natural language processing as applied to literary analysis, or any other project that draws integrally on both disciplines. All capstone projects must be approved by both the student's Computer Science adviser and English adviser. This project normally takes one quarter, and should be

taken concurrently with the Computer Science capstone requirement. In English, students are required to complete 3 units of ENGLISH 198 Individual Work with a faculty adviser in English as part of the integrative project. In preparation for the Independent Study in English, students must secure an adviser, complete the CS+English Capstone form (<https://stanford.box.com/shared/static/hl0zna48liez8u10ulqs.pdf>), and submit a written proposal of the project.

## Required Core Courses (30 Units)

### Historical courses

One course in the 10 series <sup>1</sup>

ENGLISH 10A Introduction to English I: Mapping Monsters in British Literature 650-1650 5

or ENGLISH 10B Introduction to English I: What is Literary History?

One course in the 11 series <sup>2</sup>

ENGLISH 11A Introduction to English II: From Milton to the Romantics 5

or ENGLISH 11B Introduction to English II: American Literature and Culture to 1855

One course in the 12 series <sup>3</sup>

ENGLISH 12A Introduction to English III: Introduction to African American Literature 5

or ENGLISH 12C Introduction to English III: Modern Literature

One additional history of literature course <sup>4,5</sup> 5

### Methodology courses

ENGLISH 160 Poetry and Poetics 5

ENGLISH 161 Narrative and Narrative Theory 5

Total Units 30

<sup>1</sup> For students who declared prior to the 2015-16 academic year this requirement may be satisfied by the following course:

ENGLISH 100A. Literary History I (no longer offered)

<sup>2</sup> For students who declared prior to the 2015-16 academic year this requirement may be satisfied by the following course:

ENGLISH 100B. Literary History II (no longer offered)

<sup>3</sup> For students who declared prior to the 2015-16 academic year this requirement may be satisfied by the following course:

ENGLISH 100C. Literary History III (no longer offered)

<sup>4</sup> In 2017-18 the following courses satisfy the history of literature requirement

- ENGLISH 10A Introduction to English I: Mapping Monsters in British Literature 650-1650
- ENGLISH 10B Introduction to English I: What is Literary History?
- ENGLISH 11A Introduction to English II: From Milton to the Romantics
- ENGLISH 11B Introduction to English II: American Literature and Culture to 1855
- ENGLISH 101A How to Read Beowulf
- ENGLISH 103B Introduction to Old English Language and Literature
- ENGLISH 112A Humanities Core: Great Books, Big Ideas -- Europe, Middle Ages and Renaissance
- ENGLISH 115D Shakespeare, Language, Contexts
- ENGLISH 163F Shakespeare Now and Then
- ENGLISH 201 The Bible and Literature
- ENGLISH 233 Baroque and Neobaroque
- ENGLISH 240A Crooks, Quacks, and Courtesans: Jacobean City Comedy

<sup>5</sup> This requirement may also be fulfilled with the following Thinking Matters or SLE courses:

- ESF 1 Education as Self-Fashioning: The Active, Inquiring, Beautiful Life
- THINK 7 Journeys
- THINK 49 Stories Everywhere
- SLE 91 Structured Liberal Education, SLE 92 Structured Liberal Education, and SLE 93 Structured Liberal Education.

Rules that apply to all English majors irrespective of field of study or degree option:

1. Courses can only be counted once, i.e. can only satisfy one requirement.
2. Two of the elective courses may be taken on a credit/no credit basis at the discretion of the instructor.

## Field of Study Electives (25 Units)

**Units** Because the Department of English recognizes that the needs and interests of CS+English students vary, it has approved two major programs of study: Literature and Literature with Creative Writing. Each of these has different objectives and requirements; students should consider carefully which program of study corresponds most closely to their personal and intellectual objectives.

### I. Literature

This field of study is not declared in Axess. It does not appear on either the official transcript or the diploma. This program provides for the interests of students who wish to understand the range and historical development of British, American and Anglophone literatures and a variety of critical methods by which their texts can be interpreted. The major emphasizes the study of literary forms and genres and theories of textual analysis. In addition to the degree requirements required of all joint majors and listed above, students must complete at least 25 additional units of courses consisting of five additional approved elective courses, only one of which may be a creative writing course, chosen from among those offered by the Department of English. In place of one of these five elective courses, students may choose one upper-division course in a foreign literature read in the original language.

### II. Literature with Creative Writing Emphasis

This subplan is printed on the transcript and diploma and is elected in Axess. This program is designed for students who want a sound basic knowledge of the English literary tradition as a whole and at the same time want to develop skills in writing poetry or prose. In addition to the degree requirements required of all joint majors and listed above, students must complete at least 25 additional units of approved courses, in either the prose or poetry concentration:

#### Prose Concentration –

	<b>Units</b>
ENGLISH 90 Fiction Writing	5
or ENGLISH 91 Creative Nonfiction	
ENGLISH 92 Reading and Writing Poetry	5
ENGLISH 146 <sup>1</sup>	5
ENGLISH 190 Intermediate Fiction Writing (or any 190 series or 191 series)	5
or ENGLISH 191 Intermediate Creative Nonfiction	
One elective literature course	5
<b>Total Units</b>	<b>25</b>

<sup>1</sup> In the 2017-18 academic year ENGLISH 146 is not offered. Students may substitute one of the following courses:

- ENGLISH 143A American Indian Mythology, Legend, and Lore
- ENGLISH 144 Major Modernists: Virginia Woolf, James Joyce, Katherine Mansfield, T. S. Eliot
- ENGLISH 145H
- ENGLISH 151F Angelheaded Hipsters: Beat Writers of San Francisco and New York
- ENGLISH 153F Transatlantic Female Modernists: Making it New with a Difference
- ENGLISH 154E Twentieth-Century Irish Literature
- ENGLISH 161 Narrative and Narrative Theory

**Poetry Concentration –**

	Units
ENGLISH 92 Reading and Writing Poetry	5
ENGLISH 90 Fiction Writing	5
or ENGLISH 91 Creative Nonfiction	
ENGLISH 192 Intermediate Poetry Writing (or any 192 series)	5
One literature course in poetry	5
One elective literature course	5
<b>Total Units</b>	<b>25</b>

**Integrative Experience (3 Units)**

	Units
ENGLISH 198 Individual Work <sup>1</sup>	3

<sup>1</sup> Students in the CS+English JMP are required to enroll for three units of ENGLISH 198 Individual Work with a faculty adviser in English as part of the integrative project. These units should be completed concurrently with the Computer Science capstone requirement.

**Declaring a Joint Major Program**

To declare the joint major, students must first declare each major through ACESS, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

**Dropping a Joint Major Program**

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>). Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

**Transcript and Diploma**

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

**Minor in English Literature**

The minor in English Literature offers some flexibility for those students who want to pursue specific interests within British and American literature, while still requiring certain courses that ensure coverage of a variety of periods, genres, and methods of studying literature.

**Degree Requirements**

In order to graduate with a minor in English, students must complete the following program of seven 5-unit courses, at least one of which must be a seminar, for a total of 35 units:

**Required Courses for the Minor**

	Units
<b>Historical courses</b>	
Select two of the following historical courses:	10
One course in the 10 series <sup>1</sup>	
ENGLISH 10A Introduction to English I: Mapping Monsters in British Literature 650-1650	5
or ENGLISH 10B Introduction to English I: What is Literary History?	
One course in the 11 series <sup>2</sup>	

ENGLISH 11A Introduction to English II: From Milton to the Romantics	5
or ENGLISH 11B Introduction to English II: American Literature and Culture to 1855	

One course in the 12 series <sup>3</sup>

ENGLISH 12A Introduction to English III: Introduction to African American Literature	5
or ENGLISH 12C Introduction to English III: Modern Literature	

**Methodology courses**

Select two of the following:	10
ENGLISH 160 Poetry and Poetics	
ENGLISH 161 Narrative and Narrative Theory	
ENGLISH 162W Writing Intensive Seminar in English	

**Elective courses**

Three elective courses from those offered in the English department (only one of which may be a course in Creative Writing). 15

- <sup>1</sup> For students who declared prior to the 2015-16 academic year this requirement may be satisfied by the following course:
  - English 100A. Literary History I (no longer offered)
- <sup>2</sup> For students who declared prior to the 2015-16 academic year this requirement may be satisfied by the following course:
  - ENGLISH 100B. Literary History II (no longer offered)
- <sup>3</sup> For students who declared prior to the 2015-16 academic year this requirement may be satisfied by the following course:
  - ENGLISH 100C. Literary History III (no longer offered)

**Minor in Creative Writing (30 units)**

The minor in Creative Writing offers a structured environment in which students interested in writing prose or poetry develop their skills while receiving an introduction to literary forms. Students choose a concentration in prose, poetry, or fiction into film.

**Degree Requirements**

In order to graduate with a minor in Creative Writing, students must complete the following program of six 5-unit courses for a total of 30 units. All courses must be taken for a letter grade. Courses taken abroad or at other institutions may not be counted towards the minor.

**Required Courses for the Minor**

Students must complete at least 30 units of approved courses, in the prose, poetry or fiction into film concentration:

**Prose concentration**

	Units
ENGLISH 90 Fiction Writing	5
or ENGLISH 91 Creative Nonfiction	
ENGLISH 92 Reading and Writing Poetry	5
ENGLISH 146 <sup>1</sup>	5
Select two of the following intermediate or advanced prose classes:	10
any ENGLISH 190 series	
any ENGLISH 191 series	
ENGLISH 198L Individual Work: Levinthal Tutorial	
ENGLISH 290 Advanced Fiction Writing	
One course in pre-1800 literature <sup>2</sup>	5
<b>Total Units</b>	<b>30</b>

<sup>1</sup> In the 2017-18 academic year ENGLISH 146 is not offered. Students may substitute one of the following courses:

- ENGLISH 143A American Indian Mythology, Legend, and Lore
- ENGLISH 144 Major Modernists: Virginia Woolf, James Joyce, Katherine Mansfield, T. S. Eliot
- ENGLISH 145H
- ENGLISH 151F Angelheaded Hipsters: Beat Writers of San Francisco and New York
- ENGLISH 153F Transatlantic Female Modernists: Making it New with a Difference
- ENGLISH 154E Twentieth-Century Irish Literature
- ENGLISH 161 Narrative and Narrative Theory

<sup>2</sup> In 2017-18, pre-1800 courses include:

- ENGLISH 10A Introduction to English I: Mapping Monsters in British Literature 650-1650
- ENGLISH 10B Introduction to English I: What is Literary History?
- ENGLISH 11A Introduction to English II: From Milton to the Romantics
- ENGLISH 11B Introduction to English II: American Literature and Culture to 1855
- ENGLISH 101A How to Read Beowulf
- ENGLISH 103B Introduction to Old English Language and Literature
- ENGLISH 112A Humanities Core: Great Books, Big Ideas -- Europe, Middle Ages and Renaissance
- ENGLISH 115D Shakespeare, Language, Contexts
- ENGLISH 163F Shakespeare Now and Then
- ENGLISH 201 The Bible and Literature
- ENGLISH 233 Baroque and Neobaroque
- ENGLISH 240A Crooks, Quacks, and Courtesans: Jacobean City Comedy

### Poetry concentration

	Units
ENGLISH 90 Fiction Writing	5
or ENGLISH 91 Creative Nonfiction	
ENGLISH 92 Reading and Writing Poetry	5
ENGLISH 160 Poetry and Poetics	5
Select two of the following intermediate or advanced poetry classes: any ENGLISH 192 series	10
ENGLISH 198L Individual Work: Levinthal Tutorial	
One course in pre-1800 literature <sup>1</sup>	5
<b>Total Units</b>	<b>30</b>

<sup>1</sup> In 2017-18, pre-1800 courses include:

- ENGLISH 10A Introduction to English I: Mapping Monsters in British Literature 650-1650
- ENGLISH 10B Introduction to English I: What is Literary History?
- ENGLISH 11A Introduction to English II: From Milton to the Romantics
- ENGLISH 11B Introduction to English II: American Literature and Culture to 1855
- ENGLISH 101A How to Read Beowulf
- ENGLISH 103B Introduction to Old English Language and Literature
- ENGLISH 112A Humanities Core: Great Books, Big Ideas -- Europe, Middle Ages and Renaissance
- ENGLISH 115D Shakespeare, Language, Contexts
- ENGLISH 163F Shakespeare Now and Then
- ENGLISH 201 The Bible and Literature
- ENGLISH 233 Baroque and Neobaroque
- ENGLISH 240A Crooks, Quacks, and Courtesans: Jacobean City Comedy

### Fiction into Film concentration

	Units
ENGLISH 90 Fiction Writing	5
ENGLISH 92 Reading and Writing Poetry	5
ENGLISH 190F Fiction into Film	5
ENGLISH 146 <sup>1</sup>	5

ENGLISH 198F Hoffs-Roach Fiction into Film Tutorial	5
One course in pre-1800 literature <sup>2</sup>	5
<b>Total Units</b>	<b>30</b>

<sup>1</sup> In the 2017-18 academic year ENGLISH 146 is not offered. Students may substitute one of the following courses:

- ENGLISH 143A American Indian Mythology, Legend, and Lore
- ENGLISH 144 Major Modernists: Virginia Woolf, James Joyce, Katherine Mansfield, T. S. Eliot
- ENGLISH 145H
- ENGLISH 151F Angelheaded Hipsters: Beat Writers of San Francisco and New York
- ENGLISH 153F Transatlantic Female Modernists: Making it New with a Difference
- ENGLISH 154E Twentieth-Century Irish Literature
- ENGLISH 161 Narrative and Narrative Theory

<sup>2</sup> In 2017-18, pre-1800 courses include:

- ENGLISH 10A Introduction to English I: Mapping Monsters in British Literature 650-1650
- ENGLISH 10B Introduction to English I: What is Literary History?
- ENGLISH 11A Introduction to English II: From Milton to the Romantics
- ENGLISH 11B Introduction to English II: American Literature and Culture to 1855
- ENGLISH 101A How to Read Beowulf
- ENGLISH 103B Introduction to Old English Language and Literature
- ENGLISH 112A Humanities Core: Great Books, Big Ideas -- Europe, Middle Ages and Renaissance
- ENGLISH 115D Shakespeare, Language, Contexts
- ENGLISH 163F Shakespeare Now and Then
- ENGLISH 201 The Bible and Literature
- ENGLISH 233 Baroque and Neobaroque
- ENGLISH 240A Crooks, Quacks, and Courtesans: Jacobean City Comedy

## Minor in Digital Humanities

The minor in Digital Humanities combines humanistic inquiry with digital methods and tools to generate new questions and to foster innovative research. Students will develop critical skills that are applicable within and beyond an academic setting. The minor consists of three clusters: Spatial Humanities, Quantitative Textual Analysis, and Text Technologies. Students may choose to specialize in one of these areas.

- Spatial Humanities ranges from theory (space as a category of analysis) to technical representation/analysis of spatial distribution through algorithms. It can draw upon anthropology, geography, and other disciplines with a tradition of interest in space; meanwhile, it can feed into (for instance) literary studies.
- Quantitative Textual Analysis includes anything that uses computers to quantify formal properties of texts, ranging from word frequencies to chapter divisions to character networks. Genre, authorship, sentiment analysis, "opinion mining" -- all of these can play a role. It intersects with linguistics/NLP; Classics and Cognitive Psychology can also be allies.
- Text Technologies encompasses technologies of communication; social media analysis; database creation, coding, TEI; technologies of publishing and text access; digital curation of virtual exhibitions (which allows us to bring in the arts, digital imaging, etc.).

## Degree Requirements

Students must take a minimum of twenty units: at least one core course (5 units), and at least five other courses of at least three credits each. Students complete twenty or more units in courses relevant to the major in departments across the university including Anthropology, Art, Communications, Computer Science, East Asian Languages and Cultures, Engineering, English, French, History, Italian, Linguistics, Music,

Philosophy, Religious Studies, and Theatre and Performance. These electives are to be determined in consultation with the advisor to the minor (a faculty member in English).

Not all courses are offered every year. For current info please see Explore Courses or contact the student services team.

## Required Courses for the Minor

	Units
<b>Required Introductory Course</b>	
Select one of the following:	5
HISTORY 104 Introduction to Geospatial Humanities (Spatial Humanities concentration)	
ENGLISH 184E Literary Text Mining (Quantitative Textual Analysis concentration)	
ENGLISH 184G <sup>1</sup>	
<b>Elective Courses</b>	
Five courses in the chosen concentration	15
<b>Total Units</b>	<b>20</b>

<sup>1</sup> In the 2017-18 academic year ENGLISH 184G is not offered. Students may contact the Student Services team for current substitutions.

## Coterminal Master of Arts in English

Current Stanford undergraduate majors in English who are interested in further postgraduate work may apply for the coterminal M.A. in English. The Admissions Committee also considers applicants from related fields, such as Modern Thought and Literature, Comparative Literature, and American Studies, if they have fulfilled the requirements for the B.A. in English. The committee does, however, give preference to English majors.

Candidates for a coterminal master's degree must fulfill all requirements for the M.A. in English (including the graduate language requirement), as well as general and major requirements for the B.A. in English. No courses used to satisfy the B.A. requirements (either as General Education Requirements or department requirements) may be applied toward the M.A. No courses taken more than two quarters prior to admission to the coterminal master's program may be used to meet the 45-unit University minimum requirement for the master's degree. A minimum GPA of 3.7 in the major is required of those applying for the coterminal master's degree. Students must also take the general GRE exam in the year in which they apply. The department accepts applications once a year; the application deadline is February 1 for admission in the Spring Quarter immediately following. There are no exceptions to this deadline. All application materials are submitted directly to the English Coterminal Online Application (<https://applyweb.com/stanterm>). The department does not fund coterminal M.A. students.

### Admission Requirements

To apply for admission to the English coterminal M.A. program, students must submit the Coterminal Online Application (<https://applyweb.com/stanterm>), which includes the following:

1. A statement of purpose giving the reasons the student wishes to pursue this program and its place in his or her future plans.
2. A writing sample of critical or analytical prose, about 12-25 pages in length.
3. An official undergraduate transcript.
4. GRE: General Section (verbal, quantitative, and analytical)—copy of ETS score report required.

5. Three letters of recommendation from members of the faculty who know the applicant well and who can speak directly to the question of his or her ability to do graduate-level work.
6. Preliminary Master's Program Proposal; this is a form in the application packet. Specify at least 45 units of course work relevant to the degree program.
7. Coterminal Course Approval Form (this form is required only if transferring courses from undergraduate to the graduate program at the time of application; students will be allowed to transfer courses between their undergraduate and graduate careers for a limited time). To be eligible for transfer, courses must have been taken in the two quarters preceding admission to the M.A. program (please note that no courses taken earlier than Autumn quarter of the senior year may count toward the M.A.).

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken two quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

### Degree Requirements

- M.A. candidates must complete with a 3.0 (B) grade point average (GPA) at least nine courses (a minimum of 45 units), at least two of which must be 300-level courses.
- Ordinarily, graduate students enroll in courses numbered 200 and above. They may take no more than two 100-level courses without the consent of the Director of Graduate Studies. No more than two courses may be taken outside the department and these must be pre-approved by the Director of Graduate Studies.
- The master's student may take no more than 5 units of ENGLISH 398 Research Course.
- No creative writing courses may be used to fulfill the requirements.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 46)" section of this bulletin. For University coterminal master's degree application forms, see the Registrar's Publications page (<https://studentaffairs.stanford.edu/registrar/publications/#Coterm>).

### Required Courses

	Units
<b>Historical Courses</b>	
Two courses in literature pre-1800	20
Two courses in literature post-1800	

<b>Elective Courses</b>	25
Five courses from those offered in the English department <sup>1 2</sup>	
<b>Additional Requirement</b>	
Reading knowledge of a foreign language <sup>3</sup>	
<b>Total Units</b>	<b>45</b>

- <sup>1</sup> Five elective courses should represent a mixture of survey and specialized courses chosen to guarantee familiarity with a majority of the works on the qualifying exam reading list for doctoral candidates
- <sup>2</sup> Candidates who can demonstrate unusually strong preparation in the history of English literature may undertake a 40 to 60 page master's thesis. Candidates register for 10 units of ENGLISH 399 Thesis and are required to take only three elective courses.
- <sup>3</sup> Reading knowledge of a foreign languages: may be fulfilled in any of the following ways:
  - A reading examination given each quarter by the various language departments, except for Latin and Greek.
  - For Latin and Greek, an examination given by one of the Department of English faculty.
  - Passage with a grade of 'B' or higher of a course in literature numbered 100 or higher in a foreign language department at Stanford.
  - Passage of the following, respectively, with a grade of 'B' or higher: FRENLANG 250 Reading French, GERLANG 250 Reading German, ITALLANG 250 Reading Italian, SPANLANG 250 Reading Spanish.

## Coterminal Program with School of Education

Students interested in becoming middle school and high school teachers of English may apply for admission to the coterminal teaching program (CTP) of the Stanford Teacher Education Program (STEP) in the School of Education.

CTP students complete a special curriculum in English language, composition, and literature that combines a full English major with supplemental course work in subjects commonly taught in California public schools and a core program of foundational courses in educational theory and practice. They are then admitted to STEP for a fifth year of pedagogical study and practice teaching. Students who complete the curriculum requirements are able to enter STEP without the necessity of taking either the GRE or the usual subject matter assessment tests.

At the end of five years, CTP students receive a B.A. in English, an M.A. in Education, and a California Secondary Teaching Credential.

Students normally apply to the coterminal teaching program at the end of their sophomore year or at the beginning of their junior year. For complete program details and for information on how to apply, consult the Director of Undergraduate Studies in English or the CTP coordinator in the School of Education.

## Doctor of Philosophy in English Admission

Students with a bachelor's degree in English or a closely related field may apply to pursue graduate work toward an advanced degree in English at Stanford. Applicants for admission to graduate work must take the General Test of the Graduate Record Examination and the Subject Test in Literature. International students whose first language is not English are also required to take the TOEFL examination (with certain exceptions: see the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site).

## University Degree Requirements

University requirements for the Ph.D. are described in the "Graduate Degrees (<http://stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

## Department Degree Requirements

The following department degree requirements, which apply to students entering the program in Autumn Quarter 2013 and thereafter, deal with such matters as residence, dissertation, and examinations, and are in addition to the University's basic requirements for the doctorate. Students should also consult the most recent edition of the English Ph.D. Handbook.

A candidate for the Ph.D. degree must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the bachelor's degree. Candidates are required to complete at least 135 units of graduate work in addition to the doctoral dissertation. At least three consecutive quarters of graduate work, and the final course work in the doctoral program, must be taken at Stanford.

A student may count no more than 65 units of non-graded courses toward the 135 course units required for the Ph.D., without the written consent of the Director of Graduate Studies. A student takes at least 70 graded units (normally fourteen courses) of the 135 required total units. 5 of these 70 units may be fulfilled with ENGLISH 398 Research Course or ENGLISH 398R Revision and Development of a Paper. ENGLISH 396L Pedagogy Seminar I does not count toward the 70 graded units. No more than 10 units (normally two courses) may come from 100-level courses

This program is designed to be completed in five years.

One pedagogical seminar and four quarters of supervised teaching constitute the teaching requirement for the Ph.D. Typically a student teaches three times as a teaching assistant in a literature course. For the fourth course, students have the option of applying to design and teach ENGLISH 162W. Writing Intensive Seminar in English (WISE) for undergraduate English majors or teaching a fourth quarter as a TA.

- 1st year: One quarter as T.A. (leading 1-2 discussion sections of undergraduate literature)
- 2nd year: One quarter as T.A. (leading 1-2 discussion sections of undergraduate literature)
- 4th/5th years: Two quarters of teaching, including the possibility of TA'ing or teaching an undergraduate tutorial.

## I. English and American Literature

Students are expected to do course work across the full range of English and American literature. Students are required to fulfill the following requirements. Note: fulfillment of requirements 1, 2, and 3 must be through Stanford courses; students are not excused from these three requirements or granted credit for course work done elsewhere.

- | 1.  | Units |
|---|-------|
| Required Courses:   |       |
| ENGLISH 396 Introduction to Graduate Study for Ph.D. Students   | 5     |
| ENGLISH 396L Pedagogy Seminar I   | 2     |
| 2. Graduate-level (at least 200-level) course work in English literature before 1700, and English or American literature after 1700 (at least 5 units of each).   |       |
| 3. Graduate-level (at least 200-level) course work in some aspect of literary theory such as courses in literary theory itself, narrative theory, poetics, rhetoric, cultural studies, gender studies (at least 5 units). |       |
| 4. Students concentrating in British literature are expected to take at least one course (5 units) in American literature; students   |       |

concentrating in American literature are expected to take at least one course (5 units) in British literature.

5. Of all courses taken, a minimum of six courses for a letter grade must be graduate colloquia and seminars, of which at least three must be graduate seminars. The colloquia and seminars should be from different genres and periods, as approved by the adviser.
6. The remaining units of graded, graduate-level courses and seminars should be distributed according to the adviser's judgment and the candidate's needs. A student may receive graduate credit for no more than two 100-level courses in the Department of English.
7. Consent of the adviser if courses taken outside the Department of English are to count toward the requirement of 70 graded units of course work.
8. An oral qualifying examination based on a reading guide, to be taken at the end of the summer after the first year of graduate work. The final decision as to qualification is made by the graduate studies committee in consideration of the student's overall record for the first year's work in conjunction with performance on the examination. Note: A student coming to the doctoral program who has done graduate work at another university must petition in the first year at Stanford for transfer credit for course work completed elsewhere. The petition should list the courses and grades, and describe the nature and scope of course work, as well as the content, contact hours, and writing requirements. A syllabus must be included. The Director of Graduate Studies considers the petition in conjunction with the student's overall performance.
9. *University Oral Examination*—A University oral examination covering the field of concentration (as defined by the student and the student's adviser). Students take 10 units of an Orals Preparation workshop led by the Director of Graduate Studies in Spring quarter of the second year. The oral examination, based on a reading list established by the candidate in consultation with his or her adviser, is taken ideally by the end of Autumn Quarter of the third year of graduate study, but no later than the end of the Winter Quarter.
10. *Dissertation*—As early as possible during graduate study, a Ph.D. candidate is expected to find a topic requiring extensive original research and to seek out a member of the department as his or her adviser. The adviser works with the student to select a committee to supervise the dissertation. Candidates should take this crucial step as early in their graduate careers as possible. The committee may well advise extra preparation within or outside the department, and time should be allowed for such work. After the dissertation topic has been approved, the candidate should file a formal reading committee form as prescribed by the University. Once a first chapter has been drafted, the student meets with the full reading committee for a one hour colloquium. The dissertation must be submitted to the adviser as a rough draft, but in substantially final form, at least four weeks before the University deadline in the quarter during which the candidate expects to receive the Ph.D. degree.
11. *Closing Colloquium*—Prior to the submission of the dissertation the student and the dissertation committee holds a closing colloquium designed to look forward toward the next steps; identify the major accomplishments of the dissertation and the major questions/issues/problems that remain; consider possibilities for revision, book or article publication, etc. and to provide some intellectual closure to the dissertation.

## II. English and Comparative Literature

The Ph.D. program in English and Comparative Literature is designed for students wishing an extensive knowledge of the literature, thought, and history of England and of at least one foreign country, for one period. Approximately half of the student's course work and reading is devoted to this period, with the remainder of the time given to other periods of English and American literature since 1350.

This degree, administered by the Department of English, is to be distinguished from the Ph.D. in Comparative Literature. The latter program is intended for students unusually well prepared in foreign languages and involves advanced work in three literatures, one of which may be English. Interested students should consult a Department of English adviser, but faculty from Comparative Literature may also provide useful supplementary information.

The requirements are as follows:

1. Knowledge of the basic structure of the English language and of Chaucer. This requirement may be met by examination, or by taking 10 units of courses chosen from among those offered in linguistics, English philology, and early and middle English literature including Chaucer. No particular courses are required of all students.
2. **Units**  
Required Courses:
 

ENGLISH 396	Introduction to Graduate Study for Ph.D. Students	5
ENGLISH 396L	Pedagogy Seminar I	2
3. A knowledge of one foreign language sufficient to take graduate-level literature courses in a foreign-language department and an advanced reading knowledge of a second language.
4. A minimum of 45 units in the history, thought, and literature of one period, in two or more languages, one of which must be English and one foreign. Students normally include at least two courses in a foreign literature read in the original language and two courses listed under Comparative Literature or Modern Thought and Literature. As many as 20 units of this requirement may be satisfied through courses in reading and research. A student may receive graduate credit for no more than two 100-level courses in the Department of English.
5. A minimum of six courses for a letter grade from graduate colloquia and graduate seminars, of which three must be graduate seminars and of which at least four must be in the Department of English. Among these courses, students should take one in literary theory or criticism. These colloquia and seminars should be in different genres and periods as approved by the adviser.
6. An oral qualifying examination: see item 8 under requirements of the Ph.D. program in English Literature. For qualifications in the doctoral program in English and Comparative Literature, candidates are not held responsible for literature before 1350, but instead include on their reading list a selection of works from a foreign literature read in the original language.
7. *University Oral Examination*—A University oral examination covering the field of concentration (as defined by the student and the student's adviser). Students take 10 units of an Orals Preparation workshop led by the Director of Graduate Studies in Spring quarter of the second year. The oral examination, based on a reading list established by the candidate in consultation with his or her adviser, is taken ideally by the end of Autumn Quarter of the third year of graduate study, but no later than the end of the Winter Quarter.
8. *Dissertation*—As early as possible during graduate study, a Ph.D. candidate is expected to find a topic requiring extensive original research and to seek out a member of the department as his or her adviser. The adviser works with the student to select a committee to supervise the dissertation. Candidates should take this crucial step as early in their graduate careers as possible. The committee may well advise extra preparation within or outside the department, and time should be allowed for such work. After the dissertation topic has been approved, the candidate should file a formal reading committee form as prescribed by the University. Once a first chapter has been drafted, the student meets with the full reading committee for a one hour colloquium. The dissertation must be submitted to the adviser as a rough draft, but in substantially final form, at least four



weeks before the University deadline in the quarter during which the candidate expects to receive the Ph.D. degree.

9. *Closing Colloquium*—Prior to the submission of the dissertation the student and the dissertation committee hold a closing colloquium designed to look forward toward the next steps; identify the major accomplishments of the dissertation and the major questions/issues/problems that remain; consider possibilities for revision, book or article publication, etc. and to provide some intellectual closure to the dissertation.

## Language Requirements

Candidates for the Ph.D. degree (except those in English and Comparative Literature, for whom special language requirements prevail) must demonstrate a reading knowledge of two foreign languages.

Candidates in the earlier periods must offer Latin and one of the following languages: French, German, Greek, Italian, or Spanish. In some instances, they may be required to offer a third language. Candidates in the later period (that is, after the Renaissance) must offer either French, German, or Latin as one language and may choose the second language from the following: Greek, Latin, French, German, Italian, Spanish, Russian, or another language relevant to the student's field of study. In all cases, the choice of languages offered must have the approval of the candidate's adviser. Any substitution of another language must be approved by the Director of Graduate Studies.

The graduate studies committee does not accept courses taken as an undergraduate in satisfaction of the language requirement for doctoral candidates. For students coming to doctoral work at Stanford from graduate work done elsewhere, satisfaction of a foreign language requirement is determined by the Director of Graduate Studies based on the contact hours, syllabus, reading list, etc. Transfer is not automatic.

The candidate must satisfy one language requirement by the end of the first year (that is, before the qualifying examination), and the other by the end of the third year.

Foreign language requirements for the Ph.D. may be fulfilled in any of the following ways:

1. A reading examination given each quarter by the various language departments, except for Latin and Greek.
2. For Latin and Greek, an examination given by one of the Department of English faculty.
3. Passage with a grade of 'B' or higher of a course in literature numbered 100 or higher in a foreign language department at Stanford. As an alternative for Latin, French, Italian, German, and Spanish, passage of the following, respectively, with a grade of 'B' or higher:

		Units
FRENLANG 250	Reading French	4
GERLANG 250	Reading German	4
ITALLANG 250	Reading Italian	4
SPANLANG 250	Reading Spanish	3

*Emeriti: (Professors)* George H. Brown, W. B. Carnochan, W. S. Di Piero, Albert J. Gelpi, Barbara C. Gelpi, Shirley Heath, John L'Heureux, Herbert Lindenberger, Andrea A. Lunsford, Franco Moretti, Stephen Orgel, Nancy H. Packer, Marjorie G. Perloff, Robert M. Polhemus, Arnold Rampersad, David R. Riggs, Lawrence V. Ryan, Elizabeth C. Traugott, Tobias Wolff; *(Associate Professor)* Sandra Drake; *(Professor, Teaching)* Larry Friedlander; *(Senior Lecturer)* Helen B. Brooks; *(Lecturer)* David MacDonald

*Chair:* Alex Woloch

*Director of Creative Writing Program:* Eavan Boland

*Professors:* John B. Bender (English, Comparative Literature, on leave autumn), Eavan Boland, Terry Castle, Margaret Cohen (English, Comparative Literature, on leave), Michele Elam, Kenneth W. Fields, Shelley Fisher Fishkin, Denise Gigante, Roland Greene (English, Comparative Literature), Blair Hoxby, Adam Johnson, Gavin Jones, Chang-rae Lee, Mark McGurl, Paula Moya, Patricia A. Parker (English, Comparative Literature), Peggy Phelan (English, Theater and Performance Studies), Nancy Ruttenburg, Ramón Saldivar (English, Comparative Literature), Elizabeth Tallent (on leave autumn), Elaine Treharne, Blakey Vermeule, Alex Woloch

*Associate Professors:* Nicholas Jenkins, G. Vaughn Rasberry

*Assistant Professors:* Mark Algee-Hewitt, Michaela Bronstein, Claire Jarvis (on leave autumn), Ivan Lupić (on leave)

*Senior Lecturer:* Judith Richardson (on leave winter)

*Courtesy Professors:* Joshua Landy, David Palumbo-Liu, Kathryn Starkey, Bryan Wolf

*Lecturers:* Heather Brink-Roby, Kai Carlson-Wee, Harriet Clark, Chris Drangle, Keith Ekiss, John Evans, Nicholas Friedman, Sarah Frisch, Scott Hutchins, Tom Kealey, Mark Labowskie, Brittany Perham, Ryan Perry, Kate Petersen, Edward Porter, Shannon Pufahl, Margaret Ross, Nina Schloesser, Solmaz Sharif, Michael Shewmaker, Austin Smith, Alice Staveley, Shimon Tanaka, Elizabeth Tshele

*Adjunct Professor:* Valerie Miner

*Visiting Professors:* Karen Britland, Ron Carlson, Laura Frost, Louise Glück,

## Overseas Studies Courses in English

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

# ETHICS IN SOCIETY PROGRAM

The Program in Ethics in Society consists of an interdisciplinary honors program and a minor that are open to undergraduates in all majors.

## Mission of the Program in Ethics in Society

The Program in Ethics in Society, which operates under the umbrella of the Bowen H. McCoy Family Center for Ethics in Society, is designed to foster scholarship, teaching, and moral reflection on fundamental issues in personal and public life. The program is grounded in moral and political philosophy, but it extends its concerns across a broad range of traditional disciplinary domains. The program is guided by the idea that ethical thought has application to current social questions and conflicts, and it seeks to encourage moral reflection and practice in areas such as business, technology, international relations, law, medicine, politics, science, and public service.

## Ethics in Society Courses

Courses offered by the Program in Ethics in Society are listed under the subject code ETHICSOC on the Stanford Bulletin's ExploreCourses (<https://explorecourses.stanford.edu/search?q=ETHICSOC&view=catalog&page=0&academicYear=&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&collapse=&filter-departmentcode=ETHICSOC=on&filter-catalognumber=ETHICSOC=on&filter-coursestatus=Active=on&filter-catalognumber=ETHICSOC=on>) web site. There are many course offerings at Stanford that address moral and political questions, only some of which are crosslisted by the Program in Ethics in Society.

## Honors in Ethics in Society

The honors program in Ethics in Society offers undergraduates the opportunity to write a senior honors thesis within a community of interdisciplinary scholars. The course of study combines the analytical rigor of moral and political philosophy with the subject matter of each student's self-chosen major to develop a sophisticated understanding of problems of social concern. Such problems include: the nature and implications of treating people with equal dignity and respect; the scope of liberty; the legitimacy of government; and the meaning of responsibility. The program poses these issues and others in the context of debates which arise in our common public life. It thus extends moral concern and reflection across disciplines such as medicine, law, economics, political science, sociology, computer science, international relations, and public policy.

Students in the program write honors theses on topics which use moral and political philosophy to address practical problems. Previous theses have considered questions such as the just distribution of health care, obligations to future generations, the role of moral values in education, the moral implications of genetic engineering, and the relationship between gender inequality and the structures of work and family. Students in the program have won scholarships to graduate study including Marshall, Rhodes, and Fulbright fellowships. Others have taken the step from moral analysis to moral commitment, pursuing careers of public service.

The honors program in Ethics in Society is open to majors in every field and must be taken in addition to a department major. Applicants must declare a major before applying to the program. Applicants should have a grade of B+ or higher in all courses taken to fulfill program requirement. Required courses must be taken for a letter grade.

Students interested in pursuing honors in Ethics in Society can apply for early acceptance in June of their sophomore year or the regular deadline

in mid October of their junior year. Students should contact the program coordinator for more information and to begin the application process.

## Requirements

	Units
<b>Core Courses</b>	
ETHICSOC 20 Introduction to Moral Philosophy or ETHICSOC 170 Ethical Theory	4-5
ETHICSOC 171 Justice	4-5
ETHICSOC 190 Ethics in Society Honors Seminar	4
<b>Electives</b>	
Two 4- or 5-unit undergraduate courses on a subject approved by the faculty director, designed to support research conducted for or connected to the honors thesis.	8-10
<b>Thesis units spread across Autumn, Winter, and Spring quarters</b>	
ETHICSOC 200/Ethics in Society Honors Thesis	10
ETHICSOC 200/Ethics in Society Honors Thesis	
ETHICSOC 200/Ethics in Society Honors Thesis	

Thesis subject must be approved by the honors adviser and students must receive a grade of 'B+' or higher on their thesis to receive honors in Ethics in Society.

Typically, ETHICSOC 20 or ETHICSOC 170 and ETHICSOC 171 are completed before the Winter Quarter of the junior year. The Ethics in Society Honors Seminar (ETHICSOC 190) is offered only in Winter Quarter and must be taken in the junior year. Specialization courses can be completed at any time and courses taken prior to acceptance in the Program can be used to fulfill this requirement.

The honors thesis is written during Autumn and Winter quarters of the senior year and is generally due the first Monday in May. Students also complete preliminary and final thesis presentations in the senior year and an oral examination after submission of the thesis. To receive honors in Ethics in Society, students must fulfill all requirements, maintain an overall 3.3 GPA or demonstrate academic excellence, and receive a grade of 'B+' or higher on their thesis. Courses taken to fulfill the Ethics in Society honors requirements may be double-counted for any major.

## Minor in Ethics in Society

The Ethics in Society minor is open to students in any department who wish to explore moral issues in personal and public life.

Students must declare the minor in Axess no later than the last day of Autumn Quarter of their senior year, although they are advised to declare sooner. The student should discuss the minor with the program's faculty director and prepare a proposal that includes a list of courses planned to fulfill the requirements, theme of minor study, and the name of their faculty adviser (to be determined in consultation with the faculty director). The faculty director approves this proposal. Students interested in pursuing a minor in Ethics in Society should contact the program coordinator (pgoodman@stanford.edu) for more information and to begin the planning process.

A minor in Ethics in Society requires six courses for a minimum of 25 and a maximum of 30 units. All courses must be taken for a letter grade.

## Requirements

	Units
<b>Gateway Courses</b>	
ETHICSOC 20 Introduction to Moral Philosophy or ETHICSOC 170 Ethical Theory	4-5
ETHICSOC/PHIL Justice 171	4-5
<b>ETHICSOC Electives</b>	

Three ETHICSOC courses at the 100-level or above relating to theme of minor (12-15 units) 12-15

#### University-Wide Electives

One or two courses at the 100-level or above that address moral or political problems, in either theory or practice, relating to the student's chosen theme of the minor. These may be further ETHICSOC offerings OR courses with substantial ethical content taken in other departments of the university. The latter require approval of the program's faculty director. (3-5 units) 3-5

The electives selected by the student should be focused around a central theme such as environmental ethics, ethics and politics, ethics and economics, biomedical ethics, ethics and technology, or a theme approved by the faculty director. Ethical Reasoning courses (<https://ethicsinsociety.stanford.edu/undergrad-grad/undergraduate-courses/ethical-reasoning-requirement>) that fit the student's thematic focus may be counted towards the minor. Electives are normally taken after completion of the Gateway Courses.

Courses credited to the Ethics in Society minor may not be double-counted toward major requirements.

*Faculty Director:* Brent Sockness

*Affiliated Faculty:*

Eamonn Callan (Education), Jorah Dannenberg (Philosophy), Barbara Fried (Law), Pam Karlan (Law), Alison McQueen (Political Science), Benoît Monin (Psychology, Graduate School of Business), Josiah Ober (Classics, Political Science), Rob Reich (Political Science, Philosophy), Debra Satz (Philosophy), Brent Sockness (Religious Studies), Emilee Chapman (Political Science), Juliana Bidadanure (Philosophy)

## Related Courses

There are many courses taught across the University that treat moral, political, and social issues pertinent to the Ethics in Society Honors Program and Minor. With the introduction of the Ethical Reasoning "Way" the number of these courses is growing. For a listing of current courses that fulfill the Ethical Reasoning requirement, see ExploreCourses ([https://explorecourses.stanford.edu/search?q=all%20courses&view=catalog&page=0&catalog=&filter-ger-WAYER=on&collapse=,5,&filter-coursestatus-Active=on&academicYear=](https://explorecourses.stanford.edu/search?q=all%20courses&view=catalog&page=0&catalog=&filter-ger-WAYER=on&collapse=,5,&filter-coursestatus-Active=on&academicYear=))).

	Units
HUMBIO 174 Foundations of Bioethics	3

Ethics in Society (ETHICSOC) courses given this year are listed here by quarter offered. Each quarter is linked to ExploreCourses where you can find times and locations.

## Autumn Quarter

ExploreCourses: ETHICSOC courses offered Autumn Quarter (<https://explorecourses.stanford.edu/search?q=ETHICSOC&view=catalog&page=0&academicYear=20162017&filter-term-Autumn=on&collapse=&filter-catalognumber-ETHICSOC=on&filter-coursestatus-Active=on&filter-catalognumber-ETHICSOC=on>)

	Units
ETHICSOC 171 Justice	4-5
ETHICSOC 200A Ethics in Society Honors Thesis	5
ETHICSOC 134R The Ethics of Elections	5

## Winter Quarter

ExploreCourses: ETHICSOC courses offered Winter Quarter (<https://explorecourses.stanford.edu/search?q=ETHICSOC&view=catalog&page=0&academicYear=20162017&filter-term-Winter=on&collapse=&filter-catalognumber-ETHICSOC=on&filter-coursestatus-Active=on&filter-catalognumber-ETHICSOC=on>)

	Units
ETHICSOC 20 Introduction to Moral Philosophy	5
ETHICSOC 136R Introduction to Global Justice	4
ETHICSOC 190 Ethics in Society Honors Seminar	4
ETHICSOC 200B Ethics in Society Honors Thesis	5
ETHICSOC 199 Independent Studies in Ethics in Society	1-15

## Spring Quarter

ExploreCourses: ETHICSOC courses offered Spring Quarter (<https://explorecourses.stanford.edu/search?q=ETHICSOC&view=catalog&page=0&academicYear=20162017&filter-term-Spring=on&collapse=&filter-catalognumber-ETHICSOC=on&filter-coursestatus-Active=on&filter-catalognumber-ETHICSOC=on>)

	Units
ETHICSOC 232T Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector	5
ETHICSOC 234R Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals	3
ETHICSOC 280 Transitional Justice, Human Rights, and International Criminal Tribunals	3-5
ETHICSOC 111 Leadership Challenges	4-5
ETHICSOC 131S Modern Political Thought: Machiavelli to Marx and Mill	5
ETHICSOC 133 Ethics and Politics of Public Service	3-5
ETHICSOC 170 Ethical Theory	4
ETHICSOC 181 Architecture, Space, and Politics	4-5
ETHICSOC 185M Contemporary Moral Problems	4-5
ETHICSOC 280 Transitional Justice, Human Rights, and International Criminal Tribunals	3-5
ETHICSOC 234R Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals	3

# FEMINIST, GENDER, AND SEXUALITY STUDIES

Courses offered by the Program in Feminist, Gender, and Sexuality Studies are listed under the subject code FEMGEN on the Stanford Bulletin's ExploreCourses web site.

The Program in Feminist, Gender, and Sexuality Studies offers an undergraduate major and minor, and an interdisciplinary honors program that is open to students in all majors. Each Feminist, Gender, and Sexuality Studies student builds an individual program of study around a self-defined thematic focus, integrating courses from multiple departments. The program encourages work in the arts and supports creative honors theses. Feminist, Gender, and Sexuality Studies majors may declare Arts & Culture, Global Studies, Health, or LGBT/Queer Studies as a subplan, or may design their own thematic focus. Subplans are printed on the diploma; individual thematic foci are not printed on the diploma. See the "Bachelor's" (p. 531) tab of this section of the bulletin for descriptions of the subplans.

Curriculum guidelines and forms for the undergraduate major, minor, and honors programs are available on the program web site (<https://feminist.stanford.edu/undergraduates>). See the program web site for additional contact information (<https://feminist.stanford.edu/about>).

The Program in Feminist, Gender, and Sexuality Studies offers the option of a Ph.D. minor to graduate students already enrolled in a Ph.D. program at Stanford University. The Ph.D. minor in Feminist, Gender, and Sexuality Studies provides graduate students pursuing Ph.D.s broad interdisciplinary knowledge in the field and prepares them to teach courses in the subject. The goal of the program is to bring together graduate students and faculty from different departments, programs, and schools who use feminist and queer perspectives in their research.

## Mission of the Undergraduate Program in Feminist, Gender, and Sexuality Studies

The interdepartmental Program in Feminist, Gender, and Sexuality Studies provides students with knowledge and skills to investigate the significance of gender and sexuality in all areas of human life. Feminist, Gender, and Sexuality Studies examines how societies structure gender roles, relations, and identities, and how these intersect with other hierarchies of power, such as class, race, nationality, ethnicity, sexuality, ability, and age. The program coordinates courses offered across the University in feminist and lesbian, gay, bisexual, transgender, and queer studies. Students learn to employ critical gender and sexuality studies methodologies to analyze the assumptions about gender and sexuality that inform the study of individuals, cultures, social institutions, policy, and areas of scholarly inquiry. The program prepares majors for graduate study in humanities and social sciences and for professional schools.

## Learning Outcomes (Undergraduate)

The program expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the undergraduate program. Students are expected to demonstrate:

1. understanding of how social hierarchies related to gender, sexuality, race and ethnicity have developed historically, cross-culturally, and transnationally.
2. knowledge of the histories of feminist, gender, sexuality, and/or LGBT/queer social movements and their intersections with other social movements.

3. knowledge and comprehension of feminist, gender, sexuality, and/or LGBT/queer theories and methods for social, historical, literary and cultural analysis.
4. skill in making and communicating feminist, gender, sexuality, and/or LGBT/queer analyses of data, texts, and arguments.
5. competence in applying theory to practical experience for social transformation and citizenship.

## Bachelor of Arts in Feminist, Gender, and Sexuality Studies

The major in Feminist, Gender, and Sexuality Studies requires 63 units and may be taken as a single major, as one of multiple majors, or as a secondary major. FEMGEN core courses must be taken for a letter grade. A student wishing to major in Feminist, Gender, and Sexuality Studies should declare the major via Axess, by Autumn Quarter of the junior year. The student then selects a subplan or develops an individualized proposal describing a thematic focus and outlining a course of study, approved by a prospective adviser from the list of affiliated faculty. The proposal is then submitted to the Program Office (Bldg. 460, Room 216) for approval by the Director.

A maximum of 10 of the 63 units for the major may be taken on a credit/no credit or satisfactory/no credit basis; a maximum of 10 units may be taken as independent study or directed reading.

If taken as one of multiple majors, none of the 63 units counted toward the major in Feminist, Gender, and Sexuality Studies may overlap with units counted toward the major in another department or program. If taken as a secondary major, the units counted toward the Feminist, Gender, and Sexuality Studies major may also be counted as fulfilling the major requirements in another department or program if that department or program consents.

## Curriculum

The major in Feminist, Gender, and Sexuality Studies includes a total of at least 12 approved courses for a minimum of 63 units. The courses are divided among the core, the focus, and electives to reach the total course requirement. Not all courses are offered every year; consult ExploreCourses for current course offerings. Courses not listed below that relate to the themes of Feminist, Gender, and Sexuality Studies may potentially be counted towards the major as well; contact the academic services administrator, ([rmeisels@stanford.edu](mailto:rmeisels@stanford.edu)) for more information.

## The Core

The Core		Units
<b>1. Introductory Course</b>		
FEMGEN 101	Introduction to Feminist, Gender, and Sexuality Studies	5
<b>2. Feminist Theories and Method</b>		
FEMGEN 103	Feminist and Queer Theories and Methods Across the Disciplines	2-5
<b>3. Junior and Senior Seminars and Practica</b>		
FEMGEN 104A	Junior Seminar and Practicum	1
FEMGEN 104B	Senior Seminar and Practicum	2
<b>4. One feminist, gender, or sexuality theory course from approved course list below.</b>		
FEMGEN 63N	The Feminist Critique: The History and Politics of Gender Equality	3-5
FEMGEN 130S	Sex and the Novel	
FEMGEN 131	Introduction to Queer Theory	
FEMGEN 134	The Marriage Plot	
FEMGEN 138	Men's Violence Against Women in Literature: A Critical and Social Analysis	

FEMGEN 154	Black Feminist Theory	
FEMGEN 155	The Changing American Family	
FEMGEN 163	Queer America	
FEMGEN 297	Gender and Education in Global and Comparative Perspectives	
FEMGEN 313	Performance and Performativity	
FEMGEN 314	Performing Identities	
FEMGEN 363D	Feminist Theory: Thinking Through/With/About the Gendered Body	
ANTHRO 90B	Theory of Cultural and Social Anthropology	
<b>5. One Feminist, Gender, and Sexuality Studies or a related course in Global Perspectives</b>		
FEMGEN 17	Gender and Power in Ancient Greece	
FEMGEN 111	Reproductive Politics in the United States and Abroad	
FEMGEN 129	Critical Issues in International Women's Health	
FEMGEN 144F	Female Modernists: Women Writers in Paris Between the Wars	
FEMGEN 144X	Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class	
FEMGEN 150	Sex, Gender, and Power in Modern China	
FEMGEN 180	Gender Relations in Islam	
FEMGEN 181A	Gender in the Middle East: Iran, Turkey, and Egypt	
FEMGEN 193	The Chinese Empire from the Mongol Invasion to the Boxer Uprising	
FEMGEN 206	Global Medical Issues Affecting Women	
FEMGEN 250	Sex, Gender, and Power in Modern China	
FEMGEN 395J	Gender and Sexuality in Chinese History	
<b>6. One Feminist, Gender, and Sexuality Studies or a related course in Intersection Structures of Oppression (Race, Ethnicity, and/or Class)</b>		
FEMGEN 54N	African American Women's Lives	
FEMGEN 94H	Introduction to Disability Studies and Disability Rights	
FEMGEN 103S	Gender in Native American Societies	
FEMGEN 141	Intersectionality and Social Movements: Gender, Race, Sexuality and Collective Organizing	
FEMGEN 149	Gender Violence: Critical Race, Feminist, and Queer Perspectives	
FEMGEN 157P	Solidarity and Racial Justice	
FEMGEN 159	James Baldwin & Twentieth Century Literature	
<b>7. One Feminist, Gender, and Sexuality Studies or a related course in Lesbian, Gay, Bisexual, Transgender/Queer Studies</b>		
FEMGEN 3B	Transhistory: Gender Diversity from Medieval to Modern	
FEMGEN 36N	Gay Autobiography	
FEMGEN 109	Looking Back, Moving Forward: Raising Critical Awareness in Gender and Sports	
FEMGEN 110X	Introduction to Comparative Queer Literary Studies	
FEMGEN 115	Queer Reading and Queer Writing in Early Modern England	
FEMGEN 116	Narrating Queer Trauma	
FEMGEN 117Q	Queer Arts: Remembering and Imagining Social Change	
FEMGEN 118	Transgender Cultural Studies	
FEMGEN 121	Intro to Queer Studies	
FEMGEN 140D	LGBT/Queer Life in the United States	

Total Units

19-28

**Writing in the Major (WIM)**

Majors in Feminist, Gender, and Sexuality Studies may satisfy the Writing in the Major (WIM) requirement by taking one of the approved WIM courses in the list below. Honors students satisfy the WIM requirement through their honors work.

<b>WIM Courses for Majors</b>		<b>Units</b>
AMSTUD 160	Perspectives on American Identity	4-5
ANTHRO 90B	Theory of Cultural and Social Anthropology	
LINGUIST 150	Language and Society	
FEMGEN 157	Language as Political Tool: Feminist and LGBTQ Movements and Impacts	
Total Units		4-5

**Practicum**

The practicum courses (FEMGEN 104A Junior Seminar and Practicum, FEMGEN 104B Senior Seminar and Practicum) bring together theory and practical experience. The practicum involves field research, community service, or other relevant experience such as a public service internship. Students plan their practicum during Winter Quarter of the junior year in FEMGEN 104A Junior Seminar and Practicum (1 unit). The practicum is normally done over the summer between junior and senior year and may be taken for additional units. It is followed by FEMGEN 104B Senior Seminar and Practicum (2 units), in Autumn Quarter of the senior year.

**The Focus**

All Feminist, Gender, and Sexuality Studies majors must complete the Feminist, Gender, and Sexuality Studies major core requirements (7 courses) and an additional 5 courses constituting an area of focus. Those 5 courses should be chosen in consultation with the student's adviser and the Associate Director.

FGSS majors have the option of declaring a formal subplan *or* of designing an individualized thematic focus. Subplans are noted on student transcripts and diplomas; individually designed thematic foci are not noted on the transcript or diploma. The following are the four formal subplans:

**Arts & Culture Subplan**

The Arts & Culture subplan is appropriate for fields of study focusing on interpretation, production, and consumption of messages of feminism, gender, and sexuality through arts, media, literature and performance. Courses that may fulfill requirements include but are not limited to:

		<b>Units</b>
FEMGEN 14N		3
LINGUIST 52N	Spoken Sexuality: Language and the Social Construction of Sexuality	3
FEMGEN 102	Art and Social Criticism	5
FEMGEN 109	Looking Back, Moving Forward: Raising Critical Awareness in Gender and Sports	3-5
FEMGEN 117Q	Queer Arts: Remembering and Imagining Social Change	4-5
FEMGEN 130S	Sex and the Novel	5
FEMGEN 134	The Marriage Plot	5
FEMGEN 144F	Female Modernists: Women Writers in Paris Between the Wars	5
FEMGEN 145	Culture Wars: Art and Social Conflict in the USA, 1890-1950	4
FEMGEN 159	James Baldwin & Twentieth Century Literature	5
FEMGEN 183	Re- Imagining American Borders	5
FEMGEN 188Q	Imagining Women: Writers in Print and in Person	4-5
FEMGEN 205	Songs of Love and War: Gender, Crusade, Politics	3-5

FEMGEN 235A		2-5
FEMGEN 250J		4
FEMGEN 261	Personal Narratives in Feminist, Gender, and Sexuality Studies	4-5
FEMGEN 287G	A Woman's Life: 20th- (and 21st-) Century Memoirs by Women	5
FEMGEN 313	Performance and Performativity	1-4
FEMGEN 314	Performing Identities	4

### Health Subplan

The Health subplan is appropriate for fields of study focusing on feminist perspectives of science and technologies, gender justice and human rights, gender health and medicine, access/disparities/needs regarding health and sexuality, and women's roles as practitioners and researchers.

Courses that may fulfill requirements include but are not limited to:

		Units
FEMGEN 94H	Introduction to Disability Studies and Disability Rights	4
FEMGEN 114	Sexual Diversity and Health	1
FEMGEN 124	Challenging Sex and Gender Dichotomies in Medicine	1
FEMGEN 129	Critical Issues in International Women's Health	4
FEMGEN 138	Men's Violence Against Women in Literature: A Critical and Social Analysis	3-5
FEMGEN 143	One in Five: The Law, Politics, and Policy of Campus Sexual Assault	3-5
FEMGEN 156H	Women and Medicine in US History: Women as Patients, Healers and Doctors	5
FEMGEN 206	Global Medical Issues Affecting Women	1
FEMGEN 216X	Narrating Queer Trauma	4-5
FEMGEN 224	Challenging Sex and Gender Dichotomies in Medicine	1
FEMGEN 230	Sexual Function and Diversity in Medical Disciplines	1-3
FEMGEN 237	Health Impact of Sexual Assault and Relationship Abuse across the Lifecourse	1-3
FEMGEN 241	Sex and Gender in Human Physiology and Disease	2-3
FEMGEN 256	Current Topics and Controversies in Women's Health	2-3
FEMGEN 260	Disability, Gender, and Identity: Women's Personal Experiences	5

### Global Studies Subplan

The Global Studies subplan is appropriate for fields of study focusing cross-cultural perspectives on gender, gender justice and human rights, race/class/gender intersections, gender/spirituality/religion, geopolitical contexts of feminism and LGBTQ activism, and gender and education.

Courses that may fulfill requirements include but are not limited to:

		Units
FEMGEN 14N		3
FEMGEN 86Q	Love as a Force for Social Justice	3
FEMGEN 111	Reproductive Politics in the United States and Abroad	3-5
FEMGEN 115	Queer Reading and Queer Writing in Early Modern England	5
FEMGEN 129	Critical Issues in International Women's Health	4
FEMGEN 130	Sex and Gender in Judaism and Christianity	3
FEMGEN 144F	Female Modernists: Women Writers in Paris Between the Wars	5

FEMGEN 144X	Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class	5
FEMGEN 150	Sex, Gender, and Power in Modern China	3-5
FEMGEN 180	Gender Relations in Islam	4
FEMGEN 206	Global Medical Issues Affecting Women	1
FEMGEN 250	Sex, Gender, and Power in Modern China	3-5
FEMGEN 272E		4-5
FEMGEN 295J		5
FEMGEN 297	Gender and Education in Global and Comparative Perspectives	4
FEMGEN 395J	Gender and Sexuality in Chinese History	4-5

### LGBT/Queer Studies subplan

The LGBT/Queer Studies subplan is appropriate for fields of study focusing on history and theories of lesbian, gay, bisexual, transgender, and queer identities, communities, cultural practices, politics, and legal and medical issues. Courses that may fulfill requirements include but are not limited to:

		Units
FEMGEN 3B	Transhistory: Gender Diversity from Medieval to Modern	1
FEMGEN 36N	Gay Autobiography	4
LINGUIST 52N	Spoken Sexuality: Language and the Social Construction of Sexuality	3
FEMGEN 110X	Introduction to Comparative Queer Literary Studies	3-5
FEMGEN 113	Transgender Studies	3-4
FEMGEN 114	Sexual Diversity and Health	1
FEMGEN 115	Queer Reading and Queer Writing in Early Modern England	5
FEMGEN 116	Narrating Queer Trauma	4-5
FEMGEN 117Q	Queer Arts: Remembering and Imagining Social Change	4-5
FEMGEN 118	Transgender Cultural Studies	4-5
FEMGEN 121	Intro to Queer Studies	4-5
FEMGEN 124	Challenging Sex and Gender Dichotomies in Medicine	1
FEMGEN 131	Introduction to Queer Theory	3-5
FEMGEN 140D	LGBT/Queer Life in the United States	4-5
FEMGEN 159	James Baldwin & Twentieth Century Literature	5
FEMGEN 163	Queer America	4
FEMGEN 164L		4
FEMGEN 226A		3-5
FEMGEN 235A		2-5
FEMGEN 239		1-5
SOC 155	The Changing American Family	4

### Overseas Studies Courses in Feminist, Gender, and Sexuality Studies

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site or the Bing Overseas Studies (<http://bosp.stanford.edu>) web site. Students should consult the Associate Director for applicability of Overseas Studies courses to a major or minor program.

## Honors Program in Feminist, Gender, and Sexuality Studies

### For Majors in Feminist, Gender, and Sexuality Studies

**Admission**—The honors program offers an opportunity to do independent research for a senior thesis. It is open to students with a grade point average (GPA) of 3.5 or better in course work in Feminist, Gender, and Sexuality Studies, or demonstrated academic competence. Students should begin the application process by consulting with the Program Director or the Associate Director as early as possible in the junior year, preferably by the end of Winter Quarter.

During the application process, students design a project in consultation with their proposed thesis advisers and the Associate Director. A proposal describing the project and the number of units to be taken toward the honors directed project must be submitted to the program office for final approval. All projects must have a primary focus on gender or sexuality. See the honors section of the program web site (<https://feminist.stanford.edu/undergraduates/honors-program>) for additional details.

### Requirements

1. Students enroll for 2-3 units per quarter in FEMGEN 199A, FEMGEN 199B, and FEMGEN 199C Feminist, Gender, and Sexuality Studies Honors Workshop.
2. Students in the honors program also enroll for FEMGEN 105 Honors Work with their respective advisers, for an additional 2-3 units each quarter. The combined number of units in 199 and 105 must be 10-15 units over the course of senior year.
3. A semifinal draft of the thesis is due early in Spring Quarter of the senior year.
4. The final thesis must be submitted by May 15 (or the following Monday should May 15 fall on a weekend). The completed thesis must be submitted with the Thesis Completion Form, which requires the adviser's signature of approval. Creative projects must include a section of critical analysis. For guidelines, see the honors section of the program web site (<https://feminist.stanford.edu/undergraduates/honors-program>).

### For Majors in Other Departments

Interdisciplinary Honors in Feminist, Gender, and Sexuality Studies for majors in other departments or programs, as distinguished from honors for students pursuing a major in Feminist, Gender, and Sexuality Studies, is intended to complement study in any major. Feminist, Gender, and Sexuality Studies minors who wish to pursue honors in Feminist, Gender, and Sexuality Studies should apply through the process for non-majors.

### Admission

The Feminist, Gender, and Sexuality Studies honors program is open to students majoring in any field with an overall GPA of 3.5 or better or demonstrated academic competence.

Students must complete the following with a grade of 'B+' or better:

- Either FEMGEN 101 Introduction to Feminist, Gender, and Sexuality Studies or FEMGEN 103 Feminist and Queer Theories and Methods Across the Disciplines, and two other FGSS courses that relate to their research topic.

Students should begin the application process by consulting with the Program Director or the Associate Director as early as possible in the junior year, preferably by the end of Winter Quarter. During the application process, students design a project in consultation with their proposed thesis advisers and the Associate Director. A proposal describing the project and the number of units to be taken toward the honors directed project must be submitted to the program office for final approval. All projects must have a primary focus on gender or sexuality. See the

honors section of the program web site (<https://feminist.stanford.edu/undergraduates/honors-program>) for additional details.

### Requirements

1. Students enroll for 2-3 units per quarter in FEMGEN 199A, FEMGEN 199B, and FEMGEN 199C Feminist, Gender, and Sexuality Studies Honors Workshop.
2. Students in the honors program also enroll for FEMGEN 105 Honors Work with their respective advisers, for an additional 2-3 units each quarter. The combined number of units in 199 and 105 must be 10-15 units over the course of senior year.
3. A semifinal draft of the thesis is due early in Spring Quarter of the senior year.
4. The final thesis must be submitted by May 15 (or the following Monday should May 15 fall on a weekend). The completed thesis must be submitted with the Thesis Completion Form, which requires the adviser's signature of approval. Creative projects must include a section of critical analysis. For guidelines, see the honors section of the program web site (<https://feminist.stanford.edu/undergraduates/honors-program>).

## Minor in Feminist, Gender, and Sexuality Studies

1. A student wishing to minor in Feminist, Gender, and Sexuality Studies should apply to the minor via Axess, preferably by Winter Quarter of the junior year.
2. The student then develops an individualized proposal outlining a course of study to be approved by the Associate Director ([hanlon@stanford.edu](mailto:hanlon@stanford.edu)).
3. The approved proposal is then submitted to the program office (Bldg. 460, Room 216) or via email to [rmeisels@stanford.edu](mailto:rmeisels@stanford.edu).

The minor in Feminist, Gender, and Sexuality Studies consists of at least six courses for a minimum of 30 units. None of the units for the FGSS minor may count towards the student's major.

### Requirements

#### 1. Introductory Course

		Units
FEMGEN 101	Introduction to Feminist, Gender, and Sexuality Studies	4-5

2. One of the feminist, gender, or sexuality theory courses from the approved course list on the Bachelor's tab

#### 3. Focus Courses

At least 4 courses of 3 or more units each

### The Focus

At least 4 of the courses for the minor should relate to a thematic focus defined by the student and faculty adviser. See the suggested clusters listed in the "Bachelor of Arts in Feminist, Gender, and Sexuality Studies (p. 531)" section of this bulletin. At least one course within the thematic focus should address race/ethnicity and/or global perspectives on feminist, gender, and sexuality studies.

## Ph.D Minor in Feminist, Gender, and Sexuality Studies

The Ph.D. minor in Feminist, Gender, and Sexuality Studies provides graduate students pursuing Ph.D.s broad interdisciplinary knowledge in the field and prepares them to teach courses in the subject. The goal of the program is to bring together graduate students and faculty from different departments, programs, and schools who use feminist and queer perspectives in their research.

## Application and Acceptance

Prospective students submit a Ph.D. minor application form outlining an academic plan with courses and quarters to satisfy the minor requirements. The form must be signed by the student's home department faculty adviser.

An Application for Ph.D. Minor ([http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app\\_phd\\_minor.pdf](http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app_phd_minor.pdf)) outlining a program of study must be approved by the major and minor departments and submitted to the Student Services Center. This form is submitted at the time of admission to candidacy or at the appropriate time thereafter. Prior to that time, students are expected to have been working with an adviser from the affiliated faculty in Feminist, Gender, and Sexuality Studies to ensure that all the requirements can be met without delaying progress to degree or to TGR status. Students are encouraged to consult with the Director or Associate Director as soon as they have developed an interest in pursuing the minor. A student who is planning to apply for a master's degree on the way to the Ph.D. should plan out the course of study carefully, since units for the minor may not also be counted toward a Stanford master's degree.

An accepted student selects a Feminist, Gender, and Sexuality Studies faculty adviser with assistance from the program director. The adviser meets with the student to discuss and sign the academic plan outlined on the Application for Ph.D. Minor form. The plan represents a student's best estimate of courses planned to meet the minor requirements. Students who wish to enroll in the minor after the Winter Quarter of their first year must demonstrate that their participation will not delay their time to degree or their time to TGR.

Students must remain in good academic standing in their home departments.

## Requirements

To receive the Ph.D. Minor in Feminist, Gender, and Sexuality Studies, students fulfill the following requirements, for a minimum of 20 units at the graduate level (typically 200-level or higher).

Required Course	Units
FEMGEN 203 Feminist and Queer Theories and Methods Across the Disciplines (REQUIRED)	3-5
<b>A second feminist theory course such as:</b>	4-5
ANTHRO 201 Introduction to Cultural and Social Anthropology	
FEMGEN 238 Men's Violence Against Women in Literature: A Critical and Social Analysis	
FEMGEN 239	
FEMGEN 314 Performing Identities	
FEMGEN 363D Feminist Theory: Thinking Through/With/About the Gendered Body	
SOC 242 Sociology of Gender	
SOC 252 The Social Determinants of Health	
SOC 255 The Changing American Family	
10 units of elective graduate-level courses or related courses (a minimum of 2 courses, but 3 courses if necessary in order to achieve 10 units): graduate-level courses or related courses in Feminist, Gender, and Sexuality Studies, one of which may be from the student's home department. The following are examples of appropriate elective courses. Check ExploreCourses for scheduling information.	10
FEMGEN 205 Songs of Love and War: Gender, Crusade, Politics	3-5
FEMGEN 208B Women Activists' Response to War	4-5
FEMGEN 209 Looking Back, Moving Forward: Raising Critical Awareness in Gender and Sports	3

FEMGEN 213	Transgender Studies	3-4
FEMGEN 214	Sexual Diversity and Health	1
FEMGEN 216X	Narrating Queer Trauma	4-5
FEMGEN 223X	The Politics of Gender in the United States	5
FEMGEN 224	Challenging Sex and Gender Dichotomies in Medicine	1
FEMGEN 226A		3-5
FEMGEN 230	Sexual Function and Diversity in Medical Disciplines	2
FEMGEN 230X	Sexual Function and Diversity in Medical Disciplines	2
FEMGEN 235A		2-5
FEMGEN 236		3-5
FEMGEN 237	Health Impact of Sexual Assault and Relationship Abuse across the Lifecourse	1-3
FEMGEN 240D	LGBT/Queer Life in the United States	4-5
FEMGEN 241W	Eighteenth-Century Women Writers	5
FEMGEN 242	Sociology of Gender	5
FEMGEN 250	Sex, Gender, and Power in Modern China	3-5
FEMGEN 255	The Changing American Family	4
FEMGEN 256	Current Topics and Controversies in Women's Health	2-3
FEMGEN 257	Language as Political Tool: Feminist and LGBTQ Movements and Impacts	3-5
FEMGEN 260	Disability, Gender, and Identity: Women's Personal Experiences	5
FEMGEN 272E		4-5
FEMGEN 295J		5
FEMGEN 297	Gender and Education in Global and Comparative Perspectives	4
FEMGEN 310X	Introduction to Comparative Queer Literary Studies	3-5
FEMGEN 311C		1-2
FEMGEN 313	Performance and Performativity	1-4
FEMGEN 360	Disability, Gender, and Identity: Women's Personal Experiences	5
FEMGEN 395J	Gender and Sexuality in Chinese History	4-5

## Academic Progress

Students submit an annual progress report listing the courses completed towards the minor and courses planned in future quarters. This form is approved by both the main faculty adviser and the Feminist, Gender, and Sexuality Studies faculty adviser. Students meet with their Feminist, Gender, and Sexuality Studies faculty adviser to discuss their progress report.

## Notation

Students who complete all the requirements receive the following notation on their transcript and diploma: Ph.D. Minor in Feminist, Gender, and Sexuality Studies.

## Sponsorship

The Ph.D. minor in Feminist, Gender, and Sexuality Studies is sponsored by the Program in Modern Thought and Literature. The minor is administered by the Program in Feminist, Gender, and Sexuality Studies.

## Program Director

Adrian Daub (German Studies)



## Associate Director

Patti Hanlon-Baker

## Faculty Affiliates

*American Studies:* Shelley Fisher Fishkin

*Anthropology:* Paulla Ebron, Miyako Inoue, S. Lochlann Jain, Matthew Kohrman, Barbara Voss, Sylvia Yanagisako

*Art and Art History:* Terry Berlier, Pamela Lee, Jean Ma, Richard Meyer

*Comparative Literature:* Petra Dierkes-Thrun, Patricia Parker

*Developmental Biology:* Ellen Porzig

*East Asian Languages and Cultures:* Haiyan Lee, Yoshiko Matsumoto, James Reichert, Melinda Takeuchi

*Education:* Myra Strober (emerita), Christine Min Wotipka

*English:* Eavan Boland, Helen Brooks, Terry Castle, Michele Elam, Shelly Fisher Fishkin, Barbara Gelpi (emerita), Claire Jarvis, Andrea Lunsford, Paula Moya, Stephen Orgel, Ramón Saldivar, Elizabeth Tallent

*Feminist, Gender, and Sexuality Studies:* Andrea Rees Davies, Susan Krieger, Valerie Miner, Rabbi Patricia Karlin-Neumann

*French and Italian:* Cecile Alduy, Marisa Galvez, Carolyn Springer

*German Studies:* Russell Berman, Adrian Daub, Kathryn Strachota

*History:* Philippe Buc, Carolyn Lougee Chappell, Paula Findlen, Estelle Freedman, Fiona Griffiths, Allyson Hobbs, Katherine Jolluck, Nancy Kollmann, Ana Minian, Paul Robinson (emeritus), Londa Schiebinger, Matthew Sommer, Laura Stokes, Kären Wigen

*Human Biology:* Anne Firth Murray

*Iberian and Latin American Cultures:* Yvonne Yarbro-Bejarano

*Law:* Deborah Rhode, Jane Schacter

*Linguistics:* Penelope Eckert, Rob Podesva

*Medical School:* Ann Arvin, Helen Blau, Gabriel Garcia, Cheryl Gore-Felton, Roy King, Cheryl Koopman, Iris Litt (emerita), Leah Millheiser, Marcia Stefanick

*Music:* Heather Hadlock

*Philosophy:* Helen Longino, Debra Satz

*Political Science:* Lisa Blaydes, Terry Karl

*Psychology:* Laura Carstensen, Hazel Markus

*Religious Studies:* Charlotte Fonrobert, Hester Gelber, Linda Hess

*Slavic Languages and Literatures:* Monika Greenleaf

*Sociology:* Shelley Correll, Cecilia Ridgeway

*Theatre and Performance Studies:* Jennifer Brody, Harry J. Elam, Leslie Hill, Jisha Menon, Cherrie Moraga, Helen Paris, Peggy Phelan

## Overseas Studies Courses in Feminist, Gender, and Sexuality Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students

should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 174	Sports, Culture, and Gender in Comparative Perspective	5
OSPFLOR 34	The Virgin Mother, Goddess of Beauty, Grand Duchess, and the Lady: Women in Florentine Art	4
OSPFLOR 67	The Celluloid Gaze: Gender, Identity and Sexuality in Cinema	4
OSPMARD 45	Women in Art: Case Study in the Madrid Museums	4
OSPOXFRD 57	The Rise of the Woman Writer 1660-1860	5
OSPOXFRD 117W	Gender and Social Change in Modern Britain	4-5
OSPSANTG 14	Women Writers of Latin America in the 20th Century	4-5

### Related Courses

The following is a partial list of related courses for Feminist, Gender, and Sexuality Studies. See ExploreCourses for course descriptions and General Education Requirements (GER)/WAYS information. See degree requirements above or check with the program associate director for applicability of these courses toward specific major or minor program requirements.

		Units
AMSTUD 156H	Women and Medicine in US History: Women as Patients, Healers and Doctors	5
AMSTUD 183	Re- Imagining American Borders	5
AMSTUD 214	The American 1960s: Thought, Protest, and Culture	5
ANTHRO 201	Introduction to Cultural and Social Anthropology	3-5
ARTHIST 176	Feminism and Contemporary Art	4
COMPLIT 11Q	Shakespeare, Playing, Gender	3
CSRE 103S	Gender in Native American Societies	5
CSRE 162	The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History	3-5
CSRE 177	Dramatic Writing: The Fundamentals	4
CSRE 183	Re- Imagining American Borders	5
DANCE 160	Performance and History: Rethinking the Ballerina	4
EDUC 100A	EAST House Seminar: Current Issues and Debates in Education	1
EDUC 100B	EAST House Seminar: Current Issues and Debates in Education	1
EDUC 193G	Psychological Well-Being on Campus: A Focus on Gender and Sexual Identities	1
ENGLISH 160	Poetry and Poetics	5
FEMGEN 205	Songs of Love and War: Gender, Crusade, Politics	3-5
FILMSTUD 102	Theories of the Moving Image	4
HISTORY 36N	Gay Autobiography	4
HISTORY 44	Women and Gender in Science, Medicine and Engineering	3
HISTORY 161	The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History	3-5
HISTORY 166B	Immigration Debates in America, Past and Present	3-5
HISTORY 221B	The 'Woman Question' in Modern Russia	5

HUMBIO 129	Critical Issues in International Women's Health	4
HUMBIO 140	Sex and Gender in Human Physiology and Disease	2-3
HUMBIO 143	Adolescent Sexuality	4
HUMBIO 144	Boys' Psychosocial Development	4
ILAC 193	The Cinema of Pedro Almodovar	3-5
INDE 215	Queer Health & Medicine	1
LINGUIST 150	Language and Society	4
LINGUIST 156	Language and Gender	3-5
MED 242	Physicians and Human Rights	1
MUSIC 14N	Women Making Music	3
NATIVEAM 103S	Gender in Native American Societies	5
OBGYN 216	Current Issues in Reproductive Health	1
OSPOXFRD 57	The Rise of the Woman Writer 1660-1860	5
PEDS 223	Human Rights and Global Health	3
PSYCH 29N	Growing Up in America	3
RELIGST 24	Sexuality, Gender, and Religion	2
SOC 118	Social Movements and Collective Action	4
SOC 120	Interpersonal Relations	4
SOC 134	Gender and Education in Global and Comparative Perspectives	4
SOC 140	Introduction to Social Stratification	3
SOC 142	Sociology of Gender	3
SOC 152	The Social Determinants of Health	4
SOC 155	The Changing American Family	4
TAPS 314	Performing Identities	4

# FRENCH AND ITALIAN

Courses offered by the Department of French and Italian are listed on the Stanford Bulletin's ExploreCourses web site under the subject codes FRENCH (French General and Literature) and ITALIAN (Italian General and Literature). For courses in French or Italian language instruction with the subject code FRENLANG or ITALLANG, see the "Language Center (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/languagecenter/>)" section of this bulletin.

The department is a part of the Division of Literatures, Cultures, and Languages (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/divisionofliteraturesculturesandlanguages/>).

## French Section

The French section provides students with the opportunity to pursue course work at all levels in French language, literature, cultural and intellectual history, theory, film, and Francophone studies. It understands the domain of French Studies as encompassing the complex of cultural, political, social, scientific, commercial, and intellectual phenomena associated with French-speaking parts of the world, from France and Belgium to Canada, Africa, and the Caribbean.

Three degree programs are available in French: a B.A., a terminal M.A., and a Ph.D. A Ph.D. in French and Italian is also available.

Visiting faculty and instructors contribute regularly to the life of the French section. The section maintains contacts with the Ecole Normale Supérieure, the Institut d'Etudes Politiques, and the Ecole Polytechnique.

A curator for Romance languages oversees the extensive French collection at Green Library. The Hoover Institute on War, Revolution, and Peace also includes materials on 20th-century France and French social and political movements.

## Stanford Center for Interdisciplinary Studies

The center, founded in partnership with the French Ministry of Foreign Affairs, aims to bridge the disciplines of the humanities, social sciences, sciences, engineering, business, and law, to address historical and contemporary issues. Its programs bring faculty and students from across Stanford's departments and schools in contact with colleagues in France to explore issues of common intellectual concern. The center invites French-speaking scholars to offer courses or give lectures or seminars on campus. It facilitates internships for Stanford students in computer science and engineering in Sophia-Antipolis, France's new high-tech center near Nice.

## Stanford in Paris

The Bing Overseas Studies Program in Paris offers undergraduates the opportunity to study in France during Autumn, Winter, and Spring quarters. It provides a wide range of academic options, including course work at the Stanford center and at the University of Paris, independent study projects, and internships. In addition, the program promotes interaction with the local community through volunteer employment, homestays, and internships. The minimum language requirement for admission into Stanford in Paris is one year of French at the college level.

Courses offered in Paris may count toward fulfillment of the requirements of the French major or minor. Students should consult with the Chair of Undergraduate Studies before and after attending the program, in order to ensure that course work and skills acquired abroad can be coordinated appropriately with their degree program. Detailed information, including program requirements and curricular offerings, may be obtained from the "Overseas Studies" section of this bulletin, the Stanford in Paris (<http://>

[osp.stanford.edu/program/paris](http://osp.stanford.edu/program/paris)) web site, or the Overseas Studies Program Office in Sweet Hall.

## La Maison Française

La Maison Française, 610 Mayfield, is an undergraduate residence that serves as a campus French cultural center, hosting in-house seminars as well as social events, film series, readings, and lectures by distinguished representatives of French and Francophone intellectual, artistic, and political life. Assignment is made through the regular housing draw.

## Mission of the Undergraduate Program in French

The mission of the undergraduate in French is to expose students to a variety of perspectives in French language, culture, and history by providing majors and minors with training in writing and communication as well cultural, textual, and historical analysis. Through such skills, students develop into critical and global thinkers prepared for careers in business, social service, journalism, and government, or for graduate study in French.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. oral proficiency in French beyond the interpersonal level with presentational language abilities.
2. writing proficiency in French beyond the interpersonal level with presentational language abilities.
3. close reading skills of authentic texts in French.
4. the ability to develop effective and nuanced lines of interpretation.

## Italian Section

The Italian section offers graduate and undergraduate programs in Italian language, literature, culture, and intellectual history. Course offerings range from small, specialized graduate seminars to general courses open to all students on authors such as Dante, Boccaccio, and Machiavelli.

Two degree programs are available in Italian: a B.A., and a Ph.D. A Ph.D. in French and Italian is also available.

Collections in Green Research Library are strong in the medieval, Renaissance, and contemporary periods; the Italian section is one of the larger constituents of the western European collection at the Hoover Institution for the Study of War, Revolution, and Peace; and the Music Library has excellent holdings in Italian opera.

## La Casa Italiana

La Casa Italiana, 562 Mayfield, is an undergraduate residence devoted to developing an awareness of Italian language and culture. It works closely with the Italian Cultural Institute in San Francisco and with other local cultural organizations. It hosts visiting representatives of Italian intellectual, artistic, and political life. A number of departmental courses are taught at the Casa, which also offers in-house seminars. Assignment is made through the regular undergraduate housing draw.

## Stanford in Florence

The Bing Overseas Studies Program in Florence affords undergraduates with at least three quarters of Italian language the opportunity to take advantage of the unique intellectual and visual resources of the city and to focus on two areas: Renaissance history and art, and contemporary Italian and European studies. The program is structured to help integrate students into Italian culture through homestays, Florence University

courses, the Language Partners Program, research, internship and public service opportunities, and by conducting some of the program's classes in Italian. Many courses offered in Florence may count toward the fulfillment of requirements for the Italian major or minor. Students are encouraged to consult with the Italian undergraduate adviser before and after a sojourn in Florence to ensure that their course selections meet Italian section requirements. Information on the Florence program is available in the "Overseas Studies" section of this bulletin, the Stanford in Florence (<http://osp.stanford.edu/program/florence>) web site, or at the Overseas Studies office in Sweet Hall.

## Mission of the Undergraduate Program in Italian

The mission of the undergraduate program in Italian is to expose students to a variety of perspectives in Italian language, culture, and history by providing majors with training in writing and communication as well as cultural, textual, and historical analysis in order to develop students into critical and global thinkers prepared for careers in business, social service, and government, or for graduate study in Italian.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. oral proficiency in Italian beyond the interpersonal level with presentational language abilities.
2. writing proficiency in Italian beyond the interpersonal level with presentational language abilities.
3. close reading skills of authentic texts in Italian.
4. the ability to develop effective and nuanced lines of interpretation.

## Graduate Programs in French and Italian

The department offers a Ph.D. and terminal M.A. in French, a Ph.D. in Italian, and a Ph.D. in French and Italian.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in French or Italian and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in French, Italian, or French and Italian. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of French, Italian, or French and Italian and to interpret and present the results of such research.

## Bachelor of Arts in French

The French section offers a major and a minor in French. Students are encouraged to pursue a course of study tailored to their individual needs and interests. A degree in French serves as a stepping stone to entering international business, law, translation, and teaching, or as preparation for graduate studies in French, history, or comparative literature.

The French major allows students to combine their work in French with work from another field such as African studies, linguistics, art history, music, economics, history, education, medicine, international relations, political science, or other foreign languages and literatures. The literature and philosophy specialization offers students the opportunity to pursue

interdisciplinary studies at the intersection of literature and philosophy in a structured manner and alongside similarly interested students from a variety of humanistic disciplines.

To graduate with a major in French, students must complete a minimum of 56 units of course work in the major. These units may not be used towards any other major or minor. Courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. Relevant courses from other departments or programs may also earn credit toward the major as electives with the prior consent of the Chair of Undergraduate Studies. Up to 12 units of course work completed at another university may be counted toward the major, with approval by the Chair of Undergraduate Studies. No more than 12 units of course work for the major should be taken as independent study courses. To enroll in all French literature courses, students must have successfully completed FRENLANG 124 Advanced French: Composition, Writing, and Presentation, or successfully tested above this level through the Language Center.

### 1. Gateway Course.

		Units
FRENCH 129	Camus	4-5

2. *Introductory Culture and Literature Courses.* Students must take a minimum of three of the following courses. For 2017-18, FRENCH 131 Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France and FRENCH 133 Literature and Society in Africa and the Caribbean fulfill the Writing in the Major (WIM) requirement.

		Units
FRENCH 130	Introduction to Medieval and Renaissance French Literature	4
FRENCH 131	Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France	4
FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4
FRENCH 133	Literature and Society in Africa and the Caribbean	4

3. *Medieval/Early Modern Courses.* Students must take one course that concerns the period before 1800. Courses from the department offered 2017-18 that would qualify are:

		Units
FRENCH 12	Humanities Core: Great Books, Big Ideas – Europe, Middle Ages and Renaissance	3-4
FRENCH 205	Songs of Love and War: Gender, Crusade, Politics	3-5
FRENCH 239	The Afterlife of the Middle Ages	3-5

4. *Capstone Course.* Students must take at least one 200 level FRENCH culture or literature course.

Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the undergraduate student services officer for the major to begin the process.

5. *Electives.* Students must complete a total of 56 units towards the major. A maximum of 28 units can be elective courses. Elective courses can be taken within the following parameters:

- *Course work within the department.* Additional FRENCH courses taught by French faculty (may be taught in English or French) at the 100- or 200- level.
- *Language course work.* Up to three language courses in French at or above FRENLANG 21C for a maximum of 13 units.
- *Course work in other departments relevant to the degree,* with approval by the Chair of Undergraduate Studies.

- *Bing Overseas Program.* Courses taken at the Bing Overseas Studies in Paris program with prior approval of the Chair of Undergraduate Studies.
- *Thinking Matters or Education as Self-Fashioning* courses taught at least partially by a faculty member of the French and Italian Department. Students may count a maximum of 10 units.
- *Structured Liberal Education.* Students may count up to 10 units of SLE towards the major electives.
- *Digital Humanities course.* Student work must reflect French interests. Prior approval of the Chair of Undergraduate Studies. Maximum of 5 units.

## French and Philosophy Option

The French and Philosophy option requires a total of 65 units as described below. This option is not declared in Axxess and does not appear on the transcript nor the diploma. Substitutions and transfer credit are not normally permitted. Up to 10 units of courses taken in the Philosophy department may be taken 'CR/NC' or 'S/NC'; the remainder must be taken for a letter grade. Once a student has completed the SLE sequence (all three quarters) they may count up to 10 units towards this major. The SLE units can replace one history of philosophy, and one upper-division French course. Students interested in this option should review the Philosophy and Literature web site (<http://philil.stanford.edu>).

### Required French Coursework

1. *Advanced Language.* FRENLANG 124 Advanced French: Composition, Writing, and Presentation

2. *Introductory Culture and Literature Courses.* Students must take three of the following core courses.

		Units
FRENCH 130	Introduction to Medieval and Renaissance French Literature	4
FRENCH 131	Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France	4
FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4
FRENCH 133	Literature and Society in Africa and the Caribbean	4

3. *Upper division French Courses.* At least three courses numbered FRENCH 140 or higher.

Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

### Required Philosophy Course Work

1. *Philosophy Writing in the Major.*

		Units
PHIL 80	Mind, Matter, and Meaning	5

2. *Philosophy and Literature Gateway Course.* This course should be taken as early as possible in the student's career, normally in the sophomore year.

		Units
FRENCH 181	Philosophy and Literature	5

*Aesthetics, Ethics, Political Philosophy.* One course from the PHIL 170 Ethical Theory series.

*Language, Mind Metaphysics, and Epistemology.* One course from the PHIL 180 series.

*History of Philosophy.* Two courses in the history of Philosophy, numbered above PHIL 100.

Two additional elective courses of special relevance to the study of philosophy and literature. Students must consult with their advisers, the Chair of Undergraduate Studies, and the undergraduate adviser of the program in philosophical and literary thought.

3. *Capstone.* One capstone course, must be taken in the student's senior year. The following are this year's options:

		Units
ITALIAN 236E	Dante's "Purgatorio" and "Paradiso"	4-5
COMPLIT 223	Literature and Human Experimentation	3-5
PHIL 194W	Capstone Seminar: Literature and the Moral Imagination	4

## Honors Program

French majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) web site.

*Enrollment.* A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

1. Spring Quarter of the junior year (optional) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the Director of the department and will be approved or returned for submission.
2. Autumn Quarter of the senior year (required) DLCL 189A Honors Thesis Seminar (4 units S/NC) taught by a DLCL appointed faculty member. Course focuses on researching and writing the honors thesis.
3. Winter Quarter of the senior year (required) DLCL 189B Honors Thesis Seminar (2-4 units Letter grade) under the primary thesis adviser. Focus is on writing under guidance of primary adviser. The letter grade determines if honors is granted or not.

4. Spring Quarter of the senior year (option; mandatory if not taken during junior year) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Honors essays are due to the thesis adviser and student services officer no later than 5:00 p.m. on May 15th of the terminal year.
- Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation (1 unit S/NC). Enroll with primary thesis adviser.

## Bachelor of Arts in Italian

To graduate with a major in Italian, students must complete a minimum of 56 units of course work in the major. These 56 units may not be used towards any other major or minor. Courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. Relevant courses from other departments or programs may also earn credit toward the major as electives with the approval of the Chair of Undergraduate Studies. Up to 15 units of course work completed at another university or earned through AP credit may be counted toward the major, with approval by the Chair of Undergraduate Studies. No more than 15 units of course work for the major should be taken as independent study courses. To enroll in all ITALIAN or ITALLANG courses taught in Italian at or above the 100 level, students must have successfully completed ITALLANG 22A or the equivalent.

1. *Gateway Courses.* Students are recommended to take two courses in the Italian gateway series, taught in translation.

2. *Intermediate Language.* Students may earn up to 12 units in second-year language courses (maximum 12 units).

		Units
ITALLANG 21	Second Year Italian, First Quarter	4
ITALLANG 22	Second-Year Italian, Second Quarter	4
ITALLANG 23	Second-Year Italian, Third Quarter	3-4

or

		Units
ITALLANG 21A	Accelerated Second-Year Italian, Part 1	5
ITALLANG 22A	Accelerated Second-Year Italian, Part 2	5

3. *Bridge Courses.* Students must enroll in at least one bridge course taught in Italian, either in language or culture (minimum 3 units).

		Units
ITALLANG 114	Composition, Writing, and Presentation	3
ITALLANG 115	Academic and Creative Writing	3

4. *Core Culture Courses.* Students must take all three of the following core courses at Stanford (12 units). For 2017-18 ITALIAN 127 Inventing Italian Literature: Dante, Boccaccio, Petrarca, ITALIAN 128 The Italian Renaissance and the Path to Modernity and ITALIAN 129 Modern Italian Culture fulfill the Writing in the Major (WIM) requirement.

		Units
ITALIAN 127	Inventing Italian Literature: Dante, Boccaccio, Petrarca	4
ITALIAN 128	The Italian Renaissance and the Path to Modernity	4
ITALIAN 129	Modern Italian Culture	4

5. *Studies in Italian Culture.* Students must complete a minimum of 10 additional units (2-3 courses) in ITALIAN coursework (may be taught in English or Italian).

6. *Electives.* A maximum of 23 elective units in courses dealing with Italy may be applied to the major. Prior approval from the Chair of

Undergraduate Studies is required. The following courses have been pre-approved as electives:

- *Course work within the department.* Additional ITALIAN courses taught by Italian faculty (*may be taught in English or Italian*).
- *Bing Overseas Program.* Courses taken at the Bing Overseas Studies in Florence program with prior approval of the Chair of Undergraduate Studies.
- *Thinking Matters or Education as Self-Fashioning courses* taught at least partially by a faculty member of the French and Italian Department. Maximum of 10 units.
- *Structured Liberal Education.* Students may count 10 units of SLE towards the major electives. Maximum of 10 units.
- *Digital Humanities Course.* Student work must reflect Italian interests. Prior approval of the Chair of Undergraduate Studies. Maximum of 5 units.

7. *Additional Requirements* Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

## Italian and Philosophy Option

### Required Italian Course Work

The Italian and Philosophy option requires a total of 72 units as described below. This option is not declared in Axess and does not appear on the transcript or diploma. Substitutions and transfer credit are not normally permitted. Up to 10 units of courses taken in the Philosophy department may be taken 'CR/NC' or 'S/NC'; the remainder must be taken for a letter grade. Students interested in this option should review the Philosophy and Literature web site (<http://philit.stanford.edu>).

1. *Intermediate Language.* Students may earn up to 12 units in second-year language courses (maximum 12 units).

		Units
ITALLANG 21	Second Year Italian, First Quarter	4
ITALLANG 22	Second-Year Italian, Second Quarter	4
ITALLANG 23	Second-Year Italian, Third Quarter	3-4

or

		Units
ITALLANG 21A	Accelerated Second-Year Italian, Part 1	5
ITALLANG 22A	Accelerated Second-Year Italian, Part 2	5

2. *Bridge Courses.* Students must enroll in at least one bridge courses taught in Italian, either in language or culture (minimum 3 units).

		Units
ITALLANG 101	Advanced Oral Communication: Italian Opera	3
ITALLANG 103	Advanced Oral Communication: Italian Classic Cinema	3
ITALLANG 114	Composition, Writing, and Presentation	3
ITALLANG 115	Academic and Creative Writing	3

3. *Core Culture Courses.* Students must take all three of the following core courses at Stanford (12 units) Any one of these courses fulfills the Writing in the Major (WIM) requirement.

		Units
ITALIAN 127	Inventing Italian Literature: Dante, Boccaccio, Petrarca	4
ITALIAN 128	The Italian Renaissance and the Path to Modernity	4

## ITALIAN 129 Modern Italian Culture

4. *Studies in Italian Culture.* Students must complete a minimum of 10 additional units (2-3 courses) in ITALIAN coursework (taught in English or Italian).

5. *Additional Requirements.* Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

Required Philosophy Coursework

1. *Philosophy Writing in the Major.*

## PHIL 80 Mind, Matter, and Meaning

2. *Philosophy and Literature Gateway Course.* This course should be taken as early as possible in the student's career, normally in the sophomore year:

## ITALIAN 181 Philosophy and Literature

3. *Aesthetics, Ethics, Political Philosophy.* One course from the PHIL 170 Ethical Theory series.

4. *Language, Mind, Metaphysics, and Epistemology.* One course from the PHIL 180 Metaphysics series.

5. *History of Philosophy.* Two courses in the history of philosophy, numbered above PHIL 100.

6. Two additional elective courses of special relevance to the study of philosophy and literature. Students must consult with their advisers, the Chair of Undergraduate Studies, and the undergraduate adviser of the program in philosophical and literary thought.

7. *Capstone Seminar* (at least 4 units): One of these courses must be taken in the student's senior year.

ITALIAN 236E Dante's "Purgatorio" and "Paradiso" 4-5

COMPLIT 223 Literature and Human Experimentation 3-5

PHIL 194W Capstone Seminar: Literature and the Moral Imagination 4

## Honors Program

Italian majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

4 Honors students are encouraged to participate in the honors college hosted by Bing Honors College ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/00\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/00_honors_BingHonors.html)) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/00\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/00_honors_BingHonors.html)) website.

Units  
5

Enrollment: A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

Units

5 Spring Quarter of the junior year (optional) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the Director of the department and will be approved or returned for submission.

Winter Quarter of the senior year (required) DLCL 189B Honors Thesis Seminar (2-4 units Letter grade) under the primary thesis adviser. Focus will be on writing under guidance of primary adviser. The letter grade will determine if honors is granted or not.

Spring Quarter of the senior year (option; mandatory if not taken during junior year) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Honors essays are due to the thesis adviser and Student Service Officer no later than 5:00 p.m. on May 15th of the terminal year.

Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation (1 unit S/NC). Enroll with primary thesis adviser.

Units

## Joint Major Programs in French and Computer Science and in Italian and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

## French Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Progra (p. 278)m (p. 270)" section of this bulletin for details on Computer Science requirements.

To graduate with a joint major in Computer Science and French, students must complete a minimum of 46 units of coursework in French in addition to the Computer Science requirements for the joint major.

These 46 units may not be used towards any other major or minor. Courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. Relevant courses from other departments or programs may also earn credit toward the major as electives with the prior consent of the Chair of Undergraduate Studies. Up to 12 units of coursework completed at another university may be counted toward the major, with approval by the Chair of Undergraduate Studies. No more than 12 units of coursework for the major should be taken as independent study courses. To enroll in all FRENCH courses taught in French at or above the 130-level, students must have successfully completed FRENLANG 124, Mastering Advanced French Grammar: Grammar through Contemporary Literature and Culture, or successfully tested above this level through the Language Center.

1. *Gateway Courses.* Students are recommended to take two of the three courses listed below.

		Units
FRENCH 120		4-5
FRENCH 129	Camus	4-5

2. *Introductory Culture and Literature Courses.* Students must take a minimum of three of the following courses. Any one of these courses fulfills the Writing in the Major (WIM) requirement

		Units
FRENCH 130	Introduction to Medieval and Renaissance French Literature	4
FRENCH 131	Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France	4
FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4
FRENCH 133	Literature and Society in Africa and the Caribbean	4

3. *Medieval/Early Modern Courses.* Students must take one course that concerns the period before 1800. Courses from the department must be at or above the 140 level.

4. *Two Capstone Courses.* Students must take at least one 200 level FRENCH culture or literature course and a blended capstone project. Senior year the student enrolls in a 2 unit independent study FRENCH 199 with a DLCL faculty member. The faculty member advising this project must sign off on this description. In order to have it approved as their capstone French and Computer Science project, the student must submit a description of their project to the Chair of Undergraduate Studies in French.

Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the undergraduate student services officer for the major to begin the process.

5. *Electives.* Students must complete a total of 46 units towards the major. A maximum of 18 units can be elective courses. Elective courses can be taken within the following parameters.

- Course work within the department. Additional FRENCH courses taught by French faculty (may be taught in English or French) at the 100- or 200- level..
- Language Course work. Up to three language courses in French at or above FRENLANG 21C for a maximum of 13 units.
- Coursework in other departments relevant to the degree, with approval by the Chair of Undergraduate Studies.
- Bing Overseas Program. Courses taken at the Bing Overseas Studies in Paris program with prior approval of the Chair of Undergraduate Studies.

- Thinking Matters or Education as Self-Fashioning courses taught at least partially by a faculty member of the French and Italian Department. Students may count a maximum of 10 units.
- Structured Liberal Education. Students may count up to 10 units of SLE towards the major electives.
- Digital Humanities Course. Student work must reflect French interests. Prior approval of the Chair of Undergraduate Studies. Maximum of 5 units.

## Honors Program

Students have the option to complete the Honors Program for Computer Science and French, by completing an honors thesis that is partially or fully integrated with Computer Science; such a thesis would fulfill both the capstone and honors requirements for this degree. Students also have the option to complete the honors program for French only; such a thesis would not fulfill the capstone requirement for this degree.

French majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. See the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) web site.

Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

## Italian Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Progra (p. 278)m (p. 278)" section of this bulletin for details on Computer Science requirements.

To graduate with a joint major in Computer Science and Italian Studies, students must complete a minimum of 50 units of course work in Italian in addition to the Computer Science requirements for the dual major. These 50 units may not be used towards any other major or minor. Courses applied to the major must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. Relevant courses from other departments or programs may also earn credit toward the major as electives, with the approval of the Chair of Undergraduate Studies. Up to 15 units of coursework completed at another university or earned through AP credit may be



counted toward the major, with approval by the Chair of Undergraduate Studies. No more than 12 units of coursework for the major should be taken as independent study courses. To enroll in all ITALIAN or ITALLANG courses taught in Italian at or above the 100-level, students must have successfully completed ITALLANG 22A or the equivalent.

1. *Gateway Courses.* Students are recommended to take two courses in the Italian gateway series, taught in translation.

2. *Intermediate Language.* Students may earn up to 12 units in second-year language courses (maximum 12 units)

		Units
ITALLANG 21	Second Year Italian, First Quarter	4
ITALLANG 22	Second-Year Italian, Second Quarter	4
ITALLANG 23	Second-Year Italian, Third Quarter	3-4

or

		Units
ITALLANG 21A	Accelerated Second-Year Italian, Part 1	5
ITALLANG 22A	Accelerated Second-Year Italian, Part 2	5

3. *Bridge Courses.* Students must enroll in at least one bridge course taught in Italian, either in language or culture (minimum 3 units).

		Units
ITALLANG 101	Advanced Oral Communication: Italian Opera	3
ITALLANG 103	Advanced Oral Communication: Italian Classic Cinema	3
ITALLANG 114	Composition, Writing, and Presentation	3
ITALLANG 115	Academic and Creative Writing	3

4. *Core Culture Courses.* Students must take all three of the following core courses at Stanford (12 units). Any one of these courses fulfills the Writing in the Major (WIM) requirement

		Units
ITALIAN 127	Inventing Italian Literature: Dante, Boccaccio, Petrarca	4
ITALIAN 128	The Italian Renaissance and the Path to Modernity	4
ITALIAN 129	Modern Italian Culture	4

5. *Studies in Italian Culture.* Students must complete a minimum of 10 additional units (2-3 courses) in ITALIAN coursework (may be taught in English or Italian).

6. *Capstone Course.* Senior year the student will enroll in a 2 unit independent study ITALIAN 199 with a DLCL faculty member. The faculty member advising this project must sign off on this description. In order to have it approved as their capstone Italian and Computer Science project the student will need to submit a description of their project to the Chair of Undergraduate Studies in Italian.

7. *Electives.* A maximum of 15 elective units dealing with Italy may be applied to the major. Prior approval from the Chair of Undergraduate Studies is required. The following courses have been pre-approved as electives:

- Course work within the department. Additional ITALIAN courses at the 100- or 200-level taught by Italian faculty.
- Bing Overseas Program. Courses taken at the Bing Overseas Studies in Florence program with prior approval of the Chair of Undergraduate Studies.
- Thinking Matters or Education as Self-Fashioning courses taught at least partially by a faculty member of the French and Italian Department. Maximum of 10 units.

- Structured Liberal Education. Students may count 10 units of SLE towards the major electives. Maximum of 10 units.
- Digital Humanities Course. Student work must reflect Italian interests. Prior approval of the Chair of Undergraduate Studies. Maximum of 5 units.

8. *Additional Requirements.* Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

Honors Program

Students have the option to complete the honors program for Computer Science and Italian, by completing an honors thesis that is partially or fully integrated with Computer Science; such a thesis would fulfill both the capstone and Honors requirements for this degree. Students also have the option to complete the honors program for Italian only; such a thesis would not fulfill the capstone requirement for this degree.

Italian majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. See the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) website.

Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

## Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

## Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) . Students may also consult the

Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

## Transcript and Diploma

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

## Minor in French

To earn a minor in French, students must complete a minimum of 24 units of course work in the department. These 24 units may not be used towards any other major or minor. Courses applied to the minor must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. To enroll in all French literature courses, students must have successfully completed FRENLANG 124 Advanced French: Composition, Writing, and Presentation or successfully tested above this level through the Language Center.

1. *Introductory Culture and Literature Courses:* Students must take a minimum of three French Literature courses. Two must be from the FRENCH 130 sequence (8 units):

		Units
FRENCH 130	Introduction to Medieval and Renaissance French Literature	4
FRENCH 131	Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France	4
FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4
FRENCH 133	Literature and Society in Africa and the Caribbean	4

2. *Electives.* A maximum of 12 elective units may be applied to the minor. Prior approval from the Chair of Undergraduate Studies is required. The following courses have been pre-approved as electives:

		Units
FRENLANG 21C	Second-Year French: Cultural Emphasis, First Quarter	4
FRENLANG 22C	Second-Year French: Cultural Emphasis, Second Quarter	4
FRENLANG 23C	Second-Year French: Cultural Emphasis, Third Quarter	4
FRENLANG 120	Advanced French Oral Communication	3
FRENLANG 124	Advanced French: Composition, Writing, and Presentation	4-5

OSPPARIS courses. Courses taken at the Bing Overseas Studies in Paris program with prior approval of the Chair of Undergraduate Studies (language of instruction must be French)

Education as Self-Fashioning and, Thinking Matters courses taught at least partially by a faculty member in French. Maximum of 5 units.

Structured Liberal Education Students may count 5 units of SLE towards the major electives. Maximum of 5 units.

Digital Humanities Course. Student work must reflect French interests. Prior approval of the Chair of Undergraduate Studies. Maximum of 5 units.

## Minor in Italian

To earn a minor in Italian, students must complete a minimum of 24 units of coursework in Italian language and culture. These 24 units may not be used towards any other major or minor. Courses applied to the minor must be taken for a letter grade, and a grade point average (GPA) of 2.0 or better must be achieved in each course. To enroll in all ITALIAN or

ITALLANG courses taught in Italian at or above the 100 level, students must have successfully completed ITALLANG 22A or the equivalent.

1. *Intermediate Language.* Students may earn up to 12 units in second-year language courses (maximum 12 units)

		Units
ITALLANG 21	Second Year Italian, First Quarter	4
ITALLANG 22	Second-Year Italian, Second Quarter	4
ITALLANG 23	Second-Year Italian, Third Quarter	3-4

or

ITALLANG 21A	Accelerated Second-Year Italian, Part 1	5
ITALLANG 22A	Accelerated Second-Year Italian, Part 2	5

2. *Bridge Courses and Core Culture Courses.* Students must take at least two of the following courses taught in Italian at Stanford (minimum 6 units). At least one course must be ITALIAN 127, 128 or 129:

ITALLANG 114	Composition, Writing, and Presentation	3
ITALLANG 115	Academic and Creative Writing	3
ITALIAN 127	Inventing Italian Literature: Dante, Boccaccio, Petrarca	4
ITALIAN 128	The Italian Renaissance and the Path to Modernity	4
ITALIAN 129	Modern Italian Culture	4

\* With approval of the Chair of Undergraduate Studies, one of these courses may be replaced by a course taken at BOSP Florence.

3. *Electives.* A maximum of 10 elective units may be applied to the minor. Prior approval from the Chair of Undergraduate Studies is required. The following courses have been pre-approved as electives:

- Coursework within the department. Additional ITALIAN courses at the 100- or 200-level taught by Italian faculty.
- Bing Overseas Program. Courses taken at the Bing Overseas Studies in Florence program with prior approval of the Chair of Undergraduate Studies.
- Thinking Matters or Education as Self-Fashioning courses taught at least partially by a faculty member in Italian. Maximum of 5 units.
- Structured Liberal Education. Students may count 5 units of SLE towards the major electives. Maximum of 5 units.
- Digital Humanities Course. Student work must reflect Italian interests. Prior approval of the Chair of Undergraduate Studies. Maximum of 5 units.

## Minor in Modern Languages

The Division of Literatures, Cultures, and Languages offers a minor in Modern Languages. This minor draws on literature and language courses offered through this and other literature departments. See the "Division of Literatures, Cultures, and Languages (p. )" section of this bulletin for further details about the minor and its requirements.

## Coterminal Master's Program in French

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 46)" section of this bulletin. For University coterminal master's degree application forms, see the Registrar's Publications page (<https://studentaffairs.stanford.edu/registrar/publications/#Coterm>).

Each year the department admits a small number of undergraduates to the coterminal M.A. degree in French. Applications for Autumn Quarter must be submitted by January 31 of the senior year to the director of the

department. Students must submit the Coterminal Online Application (<https://applyweb.com/stanterm>) and include the following:

- a written statement of purpose
- two letters of recommendation from faculty at Stanford
- a transcript.

Students accepted into the coterminal program must have been undergraduate majors in French and must meet all requirements both for the B.A. and the M.A.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Arts in French

University regulations pertaining to the M.A. are listed in the "Graduate Degrees (p. 50)" section of this bulletin.

The terminal M.A. in French provides a flexible combination of language, literature, cultural history, and methodology course work designed to enhance the preparation of secondary school, junior college, or college teachers.

Candidates must complete a minimum of 45 units of graduate work, all courses being taken for a letter grade, with a minimum grade point average (GPA) of 3.3, as well as pass the master's examination at the end of their studies. To fulfill the requirements in a single year, enrollment must be for an average of 15 units per quarter.

Candidates must take one cultural history course (to be taken either inside or outside the Department of French and Italian). All remaining units are to be taken in advanced French literature courses (200 level or above), three of which must be concerned with the pre-revolutionary period of French cultural history.

Applicants should consult Graduate Admissions (<http://gradadmissions.stanford.edu>) for information related to the application process. Candidates for this degree are not eligible for financial aid or for teaching assistantships.

## Examination

The terminal M.A. examination is administered between the third and fifth week of Spring Quarter by a three-member committee, selected each year by the Chair of Graduate Studies. It consists of two parts:

### 1. Written Exam

The two-hour written exam tests the candidate's general knowledge of French literature and is based on the French Ph.D. reading list which may be obtained from the chair of Graduate Studies, Student Affairs Officer, or by referencing the French and Italian Graduate Student Handbook.

The exam requires that the candidate answer two questions (out of three) in a manner that demonstrates his/her ability to synthesize and draw parallels between periods, genres, and systems of representation on the basis of the standard reading list. One question must be answered in French. Use of a dictionary is allowed.

If the student's performance on the exam is deemed a 'pass' by two out of three of the members of the examining committee, the student is then permitted to go on to the oral examination (taken later the same week). Should the candidate fail the M.A. written exam, he/she is given a second chance at the end of Spring Quarter.

### 2. Oral Exam

The 90-minute oral exam is based upon the student's answers on the written exam. It examines the candidate's knowledge and understanding of French literary history on the basis of the standard reading list.

At the conclusion of the oral exam, the examination committee meets in closed session and discusses the student's performance on the written and the oral portions of the examination. If it is judged adequate, the M.A. degree is granted. In no event may the master's written and oral exams be taken more than twice.

## Doctor of Philosophy in French

University regulations pertaining to the Ph.D. are listed in the "Graduate Degrees (p. 50)" section of this bulletin.

### Degree Requirements

#### 1. Course work

A candidate for the Ph.D. degree must complete at least 135 units of graduate-level study. 72 of the 135 units must be taken within the department. All courses counted towards the 135-unit requirement for the PhD be at the graduate level. Excess course work can be taken at the undergraduate level but may not be used towards the Ph.D. requirements. All course work should be selected in consultation with the Chair of Graduate Studies.

*Required Courses—*

		Units
FRENCH 369	Introduction to the Profession of Literary Studies (must be taken in first year of studies)	1-2
DLCL 301	The Learning and Teaching of Second Languages (must be taken in the first year of studies)	3
DLCL 311	Professional Workshop	1
A minimum of five courses on French literature and culture taught at the graduate level. Three of the required five courses must be taken within the first year.		15

*Elective Courses—* Apart from the required courses above, students are granted considerable freedom in structuring a course of study appropriate to their individual needs. During the first year, most course work is done within the French and Italian department, in order to ensure an adequate preparation for the qualifying examination. Students are encouraged to take a variety of courses in order to be exposed to different periods and issues. Students are not allowed to take Independent Study during their first year. In the

second and third years, however, the program of study is tailored to the specific interests of the student.

## 2. Examinations

Completion of all department and University examinations.

## 3. Dissertation

Submission and approval of a dissertation.

## 4. Teaching

Ph.D. students are required to teach a minimum of five courses within their five years of funding.

## 5. Language Requirements

Attaining a native or near-native fluency in French is a requirement to qualify for the Ph.D. degree. Upon entering the program, candidates must contact the Language Center and arrange to take the OPI (Oral Proficiency Interview) to determine their fluency in French. An advanced level or above must have been reached by the time candidates take their qualifying exam in Autumn Quarter of the second year of study. If a student fails to score in the advanced bracket of the OPI test upon entering, he/she is tested again at the beginning of the second year. It is the responsibility of the candidates to design a course of study to improve his or her proficiency in French. Candidates who do not meet the minimum language requirement must discuss their plans to meet this requirement with the Chair of Graduate Studies.

In addition, candidates are required to achieve a high level of proficiency in one additional foreign language, with the language in question to be determined by the student and adviser as a function of the student's area of specialization. Such proficiency may be demonstrated either by completing a graduate seminar in the language in question, or by passing an exam that establishes a third-year or above level of competence in writing, reading, and speaking. In the case of ancient Greek and Latin, a high level of proficiency means a level superior to a second-year collegiate level of proficiency in reading and writing. The second foreign language requirement must be completed by the end of the third year.

## 6. Candidacy

Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the Ph.D. program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, coursework, performance on the Qualifying Exam (or Field Exam for those with a waiver of the Qualifying Exam), and successful completion of teaching and research assistantships. A student must also have completed at least 3 units of work with each of 4 Stanford faculty members prior to consideration for candidacy. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The Department of French and Italian conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University candidacy policy is available in the Bulletin (p. 52) and GAP (<http://gap.stanford.edu/4-6.html>).

## 7. TGR Status

Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the

dissertation, completed 135 units, and submitted a Doctoral Dissertation Reading Committee form, must request Terminal Graduate Registration status to complete their dissertations. Each quarter, all TGR students must enroll in FRENCH 802 TGR Dissertation for zero units, in the appropriate section for their adviser.

## Grading

Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty: while the grade will stand, the student may be required to revise and resubmit the work associated with that course.

## Examinations

There are three examinations: the qualifying examination, the field examination, and the University oral examination. Students may not take any department or University exam while course work is incomplete.

### Qualifying Examination

The first oral examination, which takes place in the week prior to autumn quarter of the second year of study, tests the student's knowledge of language and literature and his/her aptitude for critical thinking. The examining committee, determined by the Director of French and Italian, schedules the precise exam date and time.

The exam is based on a standard reading list covering major works from all periods of literature in the language(s) of study, from the Middle Ages to present day. The list may be expanded to reflect a student's particular interests, but not abridged. The reading list may be obtained from the Chair of Graduate Studies, the graduate student services officer, or by referencing the French and Italian student handbook.

The exam is 90 minutes in length and consists of two parts:

1. A 20-minute presentation by the candidate on a topic to be determined by the student. This presentation may be given in English or in the language of study and should engage, in a succinct manner, an issue or set of issues of broad relevance to the literary history of the language(s) of study. The presentation must not simply be a text read aloud, but rather must be given from notes. It is meant to be suggestive and not exhaustive, so as to provoke further discussion. You may bring a single letter-sized page of notes, printed in 12-point font, with no full sentences except for quotations; you must hand it in at the end of the exam.
2. A 70-minute question and answer period in which the examining committee follows up on the candidate's presentation and discusses the reading list with the student. At least part of this portion of the exam takes place in the language(s) of study. The student is expected to demonstrate a solid knowledge of the texts on the reading list and of the basic issues which they raise, as well as a broader sense of the cultural/literary context into which they fit and demonstrate the ability to formulate an original point of view on such texts and contexts.

Students who do not pass the qualifying exam their first time may be placed on probation with limited enrollment and be allowed to retake the exam at the end of Autumn Quarter. Should the student not pass the retake exam, his or her studies in the Ph.D. program are concluded.

Students already holding an advanced degree in the relevant area may request to be excused from the Qualifying Exam. However, the student must present a formal request for a waiver to the Chair of Graduate Studies by the end of autumn quarter of the first year. Such a request must document the course work completed elsewhere and include all relevant reading lists. Only in cases where taking the Qualifying Exam

would involve considerable repetition of already completed work is such a waiver likely to be granted.

### Field Examination

The second oral examination takes place in week prior to Autumn Quarter of the third year of study. Students waived from the qualifying exam take the field exam in the week prior to Autumn Quarter of the second year of study. The exam is 100 minutes in length and consists of two parts:

1. A 20-minute presentation by the student on a topic (a particular literary genre or a broad theoretical, historical, or interdisciplinary question) freely chosen and developed by the individual student working in collaboration with his/her adviser and the Chair of Graduate Studies. The student should design this research project so that it has the focus of an article or a seminar he/she might teach. The student should discuss the proposed topic with the Chair of Graduate Studies before the end of the quarter preceding the quarter in which he/she plans to take the exam; together they choose a committee of three faculty members with interests close to the proposed topic. In most cases, one of these committee members is the student's adviser. This presentation is followed by a 20-minute discussion.
2. A 60-minute discussion of a reading list, assembled by the student, which covers about a century of writing. The reading list should include works in all genres relevant to the period covered and should be around two single-spaced pages in length. The list may well include critical and scholarly works or texts from outside the traditional domain of literary studies in the chosen tradition (such as film, philosophy, other literary traditions), but such coverage should be regarded as supplemental except in rare instances where the chair and faculty advisers have agreed to define these materials as the student's field. Students are required to discuss the reading list for the examination with the Chair of Graduate Studies and with members of their committee during the quarter preceding the examination. A final reading list must be submitted to the committee no later than two weeks preceding the examination. Each member of the committee is assigned a 20-minute period to question the candidate on the reading list and its intellectual-historical implications. The aim of these questions is to establish the student's credentials as a specialist in the period of his/her choosing, so the core of the reading list must be made up of texts that are essential to any specialist. It follows that reading lists must not focus on the narrow area of the student's research interest. The tendency to bias reading lists towards the dissertation topic, be it an author or a genre, does not cancel the obligation to cover the major figures and genres. It is understandable that some students, by their third year, have become so deeply committed to their work toward the dissertation that they wish to use the preparation period for the examination as part of their dissertation research. Certainly, some of the exam work may prove relevant, but students should also remember that the examination is the central means of certifying their expertise in a literary period.

### The University Oral Examination

This examination takes the form of a dissertation proposal defense. It is to be taken no later than Spring Quarter of the student's third year. Students must have completed all course work and language requirements before the quarter in which they take the University oral examination. One quarter prior to the University oral examination, students must schedule the exam date and time as well as work with their primary adviser to obtain an outside chair for the examination.

Two weeks before the exam, the student must submit to the committee a 25-35 page proposal, which must contain the following parts:

1. a clear presentation of the student's central thesis
2. a synthetic overview of the dissertation
3. a description of the methodology that is used in the dissertation

4. an in-depth discussion of current secondary sources on the topic.

The student must also append a bibliography, but this does not take the place of number 4. The proposal must be prepared in close consultation with the dissertation director during the months preceding the exam.

The exam committee consists of four members, in addition to a committee chair from outside the Division of Literatures, Cultures, and Languages, whose principal functions are to keep track of time and to call on the four members of the committee who question the candidate on the talk and on the reading list.

After a 20-minute presentation on the part of the candidate, each member of the committee (apart from the committee chair) questions the student for 20 minutes. At the end of the hour and forty minutes, the faculty readers vote on the outcome of the exam. If the outcome is favorable, (four out of five votes in favor of the student passing), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory, the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second exam. A student who fails a second time will be released from the Ph.D. program and awarded a terminal M.A. degree.

### Advising

Given the interdisciplinary nature of the Ph.D. programs and the opportunity they afford each student to create an individualized program of study, regular consultation with an adviser is of the utmost importance. The adviser for all entering graduate students is the Chair of Graduate Studies, whose responsibility it is to assist students with their course planning and to keep a running check on progress in completing the course, teaching, and language requirements. By the end of the second year of study, each student should have chosen a faculty adviser whose expertise is appropriate to his/her own area of research and interests.

### Yearly Review

The faculty provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

## Doctor of Philosophy in Italian

University regulations pertaining to the Ph.D. are listed in the "Graduate Degrees" section of this bulletin.

### Degree Requirements

#### 1. Course work

A candidate for the Ph.D. degree must complete at least 135 units of graduate-level study. 72 of the 135 units must be taken within the department. All courses counted towards the 135-unit requirement for the PhD be at the graduate level. Excess coursework can be taken at the UG level, but not used towards the PhD requirements. All

course work should be selected in consultation with the Chair of Graduate Studies.

#### Required Courses—

ITALIAN 369	Introduction to the Profession of Literary Studies (must be taken in the first year of studies)	1-2
DLCL 301	The Learning and Teaching of Second Languages (must be taken in the first year of studies)	3
DLCL 311	Professional Workshop	1
A minimum of five courses on Italian literature and culture taught at the graduate level. Three of the required five courses must be taken within the first year.		

*Elective Courses—* Apart from the required courses above, students are granted considerable freedom in structuring a course of study appropriate to their individual needs. During the first year, most course work is done within the French and Italian department, in order to ensure an adequate preparation for the qualifying examination. Students are encouraged to take a variety of courses in order to be exposed to different periods and issues. Students are not allowed to take Independent Study during their first year. In the second and third years, however, the program of study is tailored to the specific interests of the student.

## 2. Examinations

Completion of all department and University examinations.

## 3. Dissertation

Submission and approval of a dissertation.

## 4. Teaching

Ph.D. students are required to teach a minimum of five courses within their five years of funding.

## 5. Language Requirements

Attaining a native or near-native fluency in Italian is a requirement to qualify for the Ph.D. degree. Upon entering the program, candidates must contact the Language Center and arrange to take the OPI (Oral Proficiency Interview) to determine their fluency in Italian. An advanced level or above must have been reached by the time candidates take their qualifying exam in the Autumn Quarter of the second year of study. If a student fails to score in the advanced bracket of the OPI test upon entering, he/she is tested again at the beginning of the second year. It is the responsibility of the candidates to design a course of study to improve their proficiency in Italian. Candidates who do not meet the minimum language requirement must discuss their plans to meet this requirement with the Chair of Graduate Studies. By the end of the third year, students must have passed a reading examination in one additional foreign language. If the candidate's period of concentration is earlier than the Romantic period, this must be Latin; if Romantic or later, French.

## 6. Candidacy

Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the Ph.D. program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, course work, performance on the qualifying exam, and successful completion of teaching and research assistantships. A student must also have completed at least 3 units of work with each of four Stanford faculty members prior to consideration for candidacy. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete

the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The Department of Italian Studies conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University candidacy policy is available in the Bulletin (p. 52) and GAP (<http://gap.stanford.edu/4-6.html>).

## Units

## 7. TGR Status

Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the dissertation, completed 135 units, and submitted a Doctoral Dissertation Reading Committee form, must request Terminal Graduate Registration status to complete their dissertations. Each quarter, all TGR students must enroll in ITALIAN 802 TGR Dissertation for zero units, in the appropriate section for their adviser.

## Grading

Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty: while the grade will stand, the student may be required to revise and resubmit the work associated with that course.

## Examinations

There are three examinations: the qualifying examination, the field examination, and the University oral examination. Students may not take any department or University exam while course work is incomplete.

### Qualifying Examination

The first oral examination, which takes place in the first two weeks of October of the second year of study, tests the student's knowledge of language and literature and his/her aptitude for critical thinking. The examining committee, determined by the Director of French and Italian, schedules the precise exam date and time.

The exam is based on a standard reading list covering major works from all periods of literature in the language(s) of study, from the Middle Ages to present day. The list may be expanded to reflect a student's particular interests, but not abridged. The reading list may be obtained from the Chair of Graduate Studies, the graduate student affairs officer, or by referencing the French and Italian student handbook.

The exam is 90 minutes in length and consists of two parts:

1. A 20-minute presentation by the candidate on a topic to be determined by the student. This presentation may be given in English or in the language of study and should engage, in a succinct manner, an issue or set of issues of broad relevance to the literary history of the language(s) of study. The presentation must not simply be a text read aloud, but rather must be given from notes. It is meant to be suggesting and not exhaustive, so as to provoke further discussion.
2. A 70-minute question and answer period in which the examining committee follows up on the candidate's presentation and discusses the reading list with the student. At least part of this portion of the exam takes place in the language(s) of study. The student is expected to demonstrate a solid knowledge of the texts on the reading list and of the basic issues which they raise, as well as a broader sense of the cultural/literary context into which they fit and demonstrate the ability to formulate an original point of view on such texts and contexts.

Students who do not pass the qualifying exam their first time may be placed on probation with limited enrollment and be allowed to retake the exam at the end of Autumn Quarter. Should the student not pass the retake exam, his/her studies in the Ph.D. program are concluded.

Students already holding an advanced degree in the relevant area may request to be excused from the Qualifying Exam. However, the student must present a formal request for a waiver to the Chair of Graduate Studies by the end of autumn quarter of the first year. Such a request must document the course work completed elsewhere and include all relevant reading lists. Only in cases where taking the Qualifying Exam would involve considerable repetition of already completed work is such a waiver likely to be granted.

### Field Examination

The second oral examination takes place in the Autumn Quarter of the third year of study. The exam is 100 minutes in length and consists of two parts:

1. A 20-minute presentation by the student on a topic (a particular literary genre or a broad theoretical, historical, or interdisciplinary question) freely chosen and developed by the individual student working in collaboration with his/her adviser and the Chair of Graduate Studies. The student should design this research project so that it has the focus of an article or a seminar he/she might teach. The student should discuss the proposed topic with the Chair of Graduate Studies before the end of the quarter preceding the quarter in which he/she plans to take the exam; together they choose a committee of three faculty members with interests close to the proposed topic. (In most cases, one of these committee members is the student's adviser.) This presentation is followed by a 20-minute discussion.
2. A 60-minute discussion of a reading list, assembled by the student, which covers about a century of writing. The reading list should include works in all genres relevant to the period covered and should be around two single-spaced pages in length. The list may well include critical and scholarly works or texts from outside the traditional domain of literary studies in the chosen tradition (such as film, philosophy, other literary traditions), but such coverage should be regarded as supplemental except in rare instances where the chair and faculty advisers have agreed to define these materials as the student's field. Students are required to discuss the reading list for the examination with the Chair of Graduate Studies and with members of their committee during the quarter preceding the examination. A final reading list must be submitted to the committee no later than two weeks preceding the examination. Each member of the committee is assigned a 20-minute period to question the candidate on the reading list and its intellectual-historical implications. The aim of these questions is to establish the student's credentials as a specialist in the period of his/her choosing, so the core of the reading list must be made up of texts that are essential to any specialist. It follows that reading lists must not focus on the narrow area of the student's research interest. The tendency to bias reading lists towards the dissertation topic, be it an author or a genre, does not cancel the obligation to cover the major figures and genres. It is understandable that some students, by their third year, have become so deeply committed to their work toward the dissertation that they wish to use the preparation period for the examination as part of their dissertation research. Certainly, some of the exam work may prove relevant, but students should also remember that the examination is the central means of certifying their expertise in a literary period.

### The University Oral Examination

This examination takes the form of a dissertation proposal defense. It is to be taken no later than Autumn Quarter of the student's fourth year. Students must have completed all course work and language requirements before the quarter in which they take the University oral

examination. One quarter prior to the University oral examination, students must schedule the exam date and time as well as work with their primary adviser to obtain an outside chair for the examination.

Two weeks before the exam, the student must submit to the committee a 25-35 page proposal, which must contain the following parts:

1. a clear presentation of the student's central thesis
2. a synthetic overview of the dissertation
3. a description of the methodology that is used in the dissertation
4. an in-depth discussion of current secondary sources on the topic.

The student must also append a bibliography, but this does not take the place of number 4. The proposal must be prepared in close consultation with the dissertation director during the months preceding the exam.

The exam committee consists of four members, in addition to a committee chair from outside the Division of Literatures, Cultures, and Languages, whose principal functions are to keep track of time and to call on the four members of the committee who question the candidate on the talk and on the reading list.

After a 20-minute presentation on the part of the candidate, each member of the committee (apart from the committee chair) questions the student for 20 minutes. At the end of the hour and forty minutes, the faculty readers vote on the outcome of the exam. If the outcome is favorable, (four out of five votes in favor of the student passing), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory, the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second exam. A student who fails a second time will be released from the Ph.D. program and awarded a terminal M.A. degree.

### Advising

Given the interdisciplinary nature of the Ph.D. programs and the opportunity they afford each student to create an individualized program of study, regular consultation with an adviser is of the utmost importance. The adviser for all entering graduate students is the Chair of Graduate Studies, whose responsibility it is to assist students with their course planning and to keep a running check on progress in completing the course, teaching, and language requirements. By the end of the second year of study, each student should have chosen a faculty adviser whose expertise is appropriate to his/her own area of research and interests.

### Yearly Review

The faculty provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; or (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

# Doctor of Philosophy in French and Italian

University regulations pertaining to the Ph.D. are listed in the "Graduate Degrees" section of this bulletin.

## Degree Requirements

### 1. Course work—

A candidate for the Ph.D. degree must complete at least 135 units of graduate-level study. 72 of the 135 units must be taken within the department. All courses counted towards the 135-unit requirement for the PhD be at the graduate level. Excess coursework can be taken at the UG level, but not used towards the PhD requirements. All course work should be selected in consultation with the Chair of Graduate Studies.

*Required courses—*

### 2.

FRENCH/ ITALIAN 369	Introduction to the Profession of Literary Studies (must be taken in first year of studies)	1-2
DLCL 301	The Learning and Teaching of Second Languages (must be taken in first year of studies)	3
DLCL 311	Professional Workshop	1
A minimum of four advanced courses on French literature and culture, and four advanced courses on Italian literature and culture. Four of the required eight courses must be taken within the first year.		24

*Elective Courses—*Apart from the required courses above, students are granted considerable freedom in structuring a course of study appropriate to their individual needs. During the first year, most course work is done within the French and Italian department, in order to ensure an adequate preparation for the qualifying examination. Students are encouraged to take a variety of courses in order to be exposed to different historical periods and issues. Students are not allowed to take Independent Study during their first year. In the second and third years, however, the program of study is tailored to the specific interests of the student.

### 3. Examinations

Successful completion of all department and University examinations.

### 4. Dissertation

Submission and approval of a dissertation. The dissertation topic must include a substantial quotient of material from both the French and Italian tradition, and the dissertation must include either (1) at least one chapter on French materials and one chapter on Italian materials, or (2) at least two chapters focusing on a comparison between French and Italian materials.

### 5. Teaching

Ph.D. students are required to teach a minimum of five courses within their five years of funding. Of these five courses the student is required to teach at least one French language course and one Italian language course.

### 6. Language Requirements

Attaining a native or near-native fluency in both French and Italian is the individual responsibility of all candidates in the Ph.D. program, and remedial course work needed to achieve such fluency cannot count towards the Ph.D. degree. For students specializing in areas (a) medieval and renaissance and (b) renaissance and early modern, proficiency in Latin equivalent to a second year collegiate level of proficiency (the equivalent of CLASSICS 11L, CLASSICS 12L, and CLASSICS 13L) in reading is also required. Such proficiency may be demonstrated by successfully completing a course in the language in question (at least second-year level, but preferably a graduate seminar); or by passing an exam that establishes a second-year or above level of competence. In no

case is passage of a standard reading competence exam considered sufficient.

For students specializing in area (c) modern and contemporary, proficiency in a third language (beyond French and Italian) is not required; students are, however, encouraged to acquire competency in a third language or area that is relevant to their research (e.g. German).

The language requirements should be completed as soon as possible, but in any case not later than the end of the third year.

### 7. Candidacy

Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the Ph.D. program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, course work, performance on the qualifying exam (or field exam for those with a waiver of the qualifying exam), and successful completion of teaching and research assistantships. A student must also have completed at least 3 units of work with each of 4 Stanford faculty members prior to consideration for candidacy. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The Department of French Studies conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University candidacy policy is available in the Bulletin (p. 52) and GAP (<http://gap.stanford.edu/4-6.html>).

### 8. TGR Status

Doctoral students who have been admitted to candidacy, completed all required courses and degree requirements other than the dissertation, completed 135 units, and submitted a Doctoral Dissertation Reading Committee form, must request Terminal Graduate Registration status to complete their dissertations. Each quarter, all TGR students must enroll in FRENCH 802 TGR Dissertation or ITALIAN 802 TGR Dissertation for zero units, in the appropriate section for their adviser.

## Grading

Doctoral students in the department must take required courses for a letter grade if available and are expected to earn a grade of 'B+' or better in each course. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty: while the grade stands, the student may be required to revise and resubmit the work associated with that course.

## Examinations

There are three examinations: the qualifying examination, the field examination, and the University oral examination. Students may not take any department or University exam while coursework is incomplete.

## Qualifying Examination

The first oral examination, which takes place in the first two weeks of October of the second year of study, tests the student's knowledge of language and literature and his/her aptitude for critical thinking. The



examining committee, determined by the Director of French and Italian, schedules the precise exam date and time.

Students may take either two qualifying exams, one in French and one in Italian, or a single qualifying exam in French and Italian. The combined French and Italian qualifying exam covers one of three periods, (a) medieval and renaissance, (b) renaissance and early modern, or (c) modern and contemporary. For each period it is based on a standard reading list. The list may be expanded to reflect a student's particular interests, but not abridged. One third of the combined exam takes place in English, one third in French, and one third in Italian (with the student free to choose which portion transpires in which language). The reading lists may be obtained from the Chairs of Graduate Studies, the graduate student affairs officer, or by referencing the French and Italian student handbook.

The exam is 90 minutes in length and consists of two parts:

1. A 20-minute presentation by the candidate on a topic to be determined by the student. This presentation may be given in English or in the language of study and should engage, in a succinct manner, an issue or set of issues of broad relevance to the literary history of the language(s) of study. The presentation must not simply be a text read aloud, but rather must be given from notes. It is meant to be suggesting and not exhaustive, so as to provoke further discussion.
2. A 70-minute question and answer period in which the examining committee follows up on the candidate's presentation and discusses the reading list with the student. At least part of this portion of the exam takes place in the languages of study. The student is expected to demonstrate a solid knowledge of the texts on the reading list and of the basic issues which they raise, as well as a broader sense of the cultural/literary context into which they fit, and demonstrate the ability to formulate an original point of view on such texts and contexts.

Students who do not pass the qualifying exam their first time may be placed on probation with limited enrollment and be allowed to retake the exam at the end of Autumn Quarter. If the student does not pass the second exam, his/her studies in the Ph.D. program will be concluded.

If, at the qualifying exam stage, a student's work is judged insufficient for admission to candidacy for the Ph.D., the student may petition to continue in French only or Italian only. This petition is reviewed by the qualifying exam committee, the relevant Chair of Graduate Studies, and the Director of the Department of French and Italian.

Students already holding an advanced degree in the relevant area may request to be excused from the Qualifying Exam. However, the student must present a formal request for a waiver to the Chair of Graduate Studies by the end of autumn quarter of the first year. Such a request must document the course work completed elsewhere and include all relevant reading lists. Only in cases where taking the Qualifying Exam would involve considerable repetition of already completed work is such a waiver likely to be granted.

### Field Examination

The second oral examination takes place in the Autumn Quarter of the third year of study. The exam is 100 minutes in length and consists of two parts:

1. A 20-minute presentation by the student on a topic (a particular literary genre or a broad theoretical, historical, or interdisciplinary question) freely chosen and developed by the individual student working in collaboration with his/her adviser and the Chair of Graduate Studies. The student should design this research project so that it has the focus of an article or a seminar he/she might teach. The student should discuss the proposed topic with the Chairs of Graduate Studies before the end of the quarter preceding the quarter in which he/she plans to take the exam; together they choose a

committee of three faculty members with interests close to the proposed topic. (In most cases, one of these committee members is the student's adviser.) This presentation is followed by a 20-minute discussion.

2. A 60-minute discussion of a reading list, assembled by the student, which covers about a century of writing. The reading list should include works in all genres relevant to the period covered and should be around two single-spaced pages in length. The list may well include critical and scholarly works or texts from outside the traditional domain of literary studies in the chosen tradition (such as film, philosophy, other literary traditions), but such coverage should be regarded as supplemental except in rare instances where the chair and faculty advisers have agreed to define these materials as the student's field. Students are required to discuss the reading list for the examination with the Chairs of Graduate Studies and with members of their committee during the quarter preceding the examination. A final reading list must be submitted to the committee no later than two weeks preceding the examination. Each member of the committee is assigned a 20-minute period to question the candidate on the reading list and its intellectual-historical implications. The aim of these questions is to establish the student's credentials as a specialist in the period of his/her choosing, so the core of the reading list must be made up of texts that are essential to any specialist. It follows that reading lists must not focus on the narrow area of the student's research interest. The tendency to bias reading lists towards the dissertation topic, be it an author or a genre, does not cancel the obligation to cover the major figures and genres. It is understandable that some students, by their third year, have become so deeply committed to their work toward the dissertation that they wish to use the preparation period for the examination as part of their dissertation research. Certainly, some of the exam work may prove relevant, but students should also remember that the examination is the central means of certifying their expertise in a literary period.

### The University Oral Examination

This examination takes the form of a dissertation proposal defense. It is to be taken no later than Autumn Quarter of the student's fourth year. Students must have completed all course work and language requirements before the quarter in which they take the University oral examination. One quarter prior to the University oral examination, students must schedule the exam date and time as well as work with their primary adviser to obtain an outside chair for the examination.

Two weeks before the exam, the student must submit to the committee a 25-35 page proposal. This proposal must contain the following parts:

1. a clear presentation of the student's central thesis
2. a synthetic overview of the dissertation
3. a description of the methodology that is used in the dissertation
4. an in-depth discussion of current secondary sources on the topic.

The student must also append a bibliography, but this does not take the place of number 4. The reading list should include works in both French and Italian in all genres relevant to the period covered. The proposal must be prepared in close consultation with the dissertation director during the months preceding the exam.

The exam committee consists of four members, in addition to a committee chair from outside the Division of Literatures, Cultures, and Languages, whose principal functions are to keep track of time and to call on the four members of the committee who question the candidate on the talk and on the reading list.

After a 20-minute presentation on the part of the candidate, each member of the committee (apart from the committee chair) questions the student for 20 minutes. At the end of the hour and forty minutes, the faculty readers vote on the outcome of the exam. If the outcome is favorable

(four out of five votes in favor of the student passing), the student is free to proceed with work on the dissertation. If the proposal is found to be unsatisfactory, the dissertation readers may ask the student to revise and resubmit the dissertation prospectus and to schedule a second exam. A student who fails a second time will be released from the Ph.D. program and awarded a terminal M.A. degree.

## Advising

Given the interdisciplinary nature of the Ph.D. programs and the opportunity they afford each student to create an individualized program of study, regular consultation with an adviser is of the utmost importance. The adviser for all entering graduate students is the Chair of Graduate Studies, whose responsibility it is to assist students with their course planning and to keep a running check on progress in completing the course, teaching, and language requirements. By the end of the second year of study, each student should have chosen a faculty adviser whose expertise is appropriate to his/her own area of research and interests.

## Yearly Review

The faculty provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; or (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

## Ph.D. Minor in French or Italian

The Ph.D. may be combined with a minor in a related field, including Comparative Literature, Linguistics, Modern Thought and Literature, Art History, History, Music, Philosophy, and Spanish. Ph.D. candidates in French may minor in Italian, and vice versa. Students interested in a minor should design their course of study with their adviser(s).

## Ph.D. Minor in French Literature

The department offers a minor in French Literature. The requirement for a minor in French is completion of 24 units of graduate course work in the French section. Interested students should consult the graduate adviser.

## Ph.D. Minor in Italian Literature

The department offers a minor in Italian Literature. The requirement for a minor in Italian is a minimum of 24 units of graduate course work in Italian literature. Interested students should consult the graduate adviser.

## Faculty in French and Italian

*Emeriti:* (Professors) Jean-Marie Apostolidès, John G. Barson, Robert G. Cohn, John Freccero, Hans U. Gumbrecht, Ralph M. Hester, Elisabeth Mudimbe-Boyi, Michel Serres, Carolyn Springer

*Director:* Cécile Alduy

*Chairs of Graduate Studies:* Laura Wittman

*Chairs of Undergraduate Studies:* Marisa Galvez (French), Robert Harrison (Italian)

*Professors:* Cécile Alduy, Jean-Pierre Dupuy, Dan Edelstein, Joshua Landy, Robert Harrison

*Associate Professors:* Marisa Galvez, Laura Wittman

*Assistant Professors:* David Lummus

*Lecturers:* Biliانا Kassabova (Winter, Spring), Elizabeth Marcus (Mellon Fellow), Marie-Pierre Ulloa (Winter, Spring)

*Courtesy Professors:* Keith Baker, Margaret Cohen, Paula Findlen, Michael Marrinan

*Courtesy Associate Professor:* James P. Daughton

*Postdoctoral Fellow:* Andrei Pesic

## Overseas Studies Courses in French

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPPARIS 30	The Avant Garde in France through Literature, Art, and Theater	4
OSPPARIS 32	French History and Politics: Understanding the Present through the Past	5
OSPPARIS 34	Franco-American Encounters: Paris-New York in the 20th Century	4
OSPPARIS 54	The Artist's World: The Workshop, Patronage and Public in 19th and 20th Century France	4
OSPPARIS 81	France During the Second World War: Between History and Memory	5
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4
OSPPARIS 186F	Contemporary African Literature in French	4

## Overseas Studies Courses in Italian

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPFLOR 34	The Virgin Mother, Goddess of Beauty, Grand Duchess, and the Lady: Women in Florentine Art	4
OSPFLOR 41	The Florentine Sketchbook: A Visual Arts Practicum	4
OSPFLOR 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition	4
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
OSPFLOR 54	High Renaissance and Mannerism: the Great Italian Masters of the 15th and 16th Centuries	4
OSPFLOR 58	Space as History: Social Vision and Urban Change	4
OSPFLOR 67	The Celluloid Gaze: Gender, Identity and Sexuality in Cinema	4
OSPFLOR 71	A Studio with a View: Drawing, Painting and Informing your Aesthetic in Florence	4
OSPFLOR 111Y	From Giotto to Michelangelo: The Birth and Flowering of Renaissance Art in Florence	4
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4

# GERMAN STUDIES

Courses offered by the Department of German Studies are listed on the *Stanford Bulletin's* ExploreCourses web site under the subject code GERMAN. For courses in German language instruction with the subject code GERLANG, see the "Language Center" section of this bulletin.

The department is a part of the Division of Literatures, Cultures, and Languages (p. 482).

The department provides students with the linguistic and analytic ability to explore the significance of the cultural traditions and political histories of the German-speaking countries of Central Europe. At the same time, the interdisciplinary study of German culture, which can include art, economics, history, literature, media theory, philosophy, political science, and other fields, encourages students to evaluate broader and contradictory legacies of the German past, the history of rapid modernization and the status of Germany, Austria, and Switzerland today.

The German experience of national identity, political unification, and integration into the European Union sheds light on wider issues of cultural cohesion and difference, as well as on the causes and meaning of phenomena such as racial prejudice, anti-Semitism, and the Holocaust. In general, an education in German Studies not only encourages the student to consider the impact of German-speaking thinkers and artists, but also provides a lens through which the contours of the present and past, in Europe and elsewhere, can be evaluated.

The department offers students the opportunity to pursue course work at all levels in the languages, cultures, literatures, and societies of the German-language traditions. Whether interested in German literature, the influence of German philosophy on other fields in the humanities, or the character of German society and politics, students find a broad range of courses covering language acquisition and refinement, literary history and criticism, cultural history and theory, history of thought, continental philosophy, and linguistics.

By carefully planning their programs, students may fulfill the B.A. requirements for a double major in German Studies and another subject. A coterminal program is offered for the B.A. and M.A. degrees in German Studies. Doctoral students may elect Ph.D. minors in Comparative Literature, Humanities, Linguistics, and Modern Thought and Literature.

Special collections and facilities at Stanford offer possibilities for extensive research in German Studies and related fields pertaining to Central Europe. Facilities include the Stanford University Libraries and the Hoover Institution on War, Revolution, and Peace. Special collections include the Hildebrand Collection (texts and early editions from the 16th to the 19th century), the Austrian Collection (with emphasis on source material to the time of Maria Theresa and Joseph II, the Napoleonic wars, and the Revolution of 1848), and the Stanford Collection of German, Austrian, and Swiss Culture. New collections emphasize culture and cultural politics in the former German Democratic Republic. The Hoover Institution has a unique collection of historical and political documents pertaining to Germany and Central Europe from 1870 to the present. The department also has its own reference library.

Haus Mitteleuropa, the German theme house at 620 Mayfield, is an undergraduate residence devoted to developing an awareness of the culture of Central Europe. A number of department courses are regularly taught at the house, and there are in-house seminars and conversation courses. Assignment is made through the regular undergraduate housing draw.

## Mission of the Undergraduate Program in German Studies

The mission of the undergraduate program in German Studies is to provide students with the German language skills, the ability to interpret literature and other cultural material, and the capacity to analyze the societies of the German-speaking countries of Central Europe. In addition, its interdisciplinary component prepares students to understand other cultures from the perspectives of multiple disciplines. The program prepares students for careers in business, social service, and government, and for graduate work in German Studies.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. oral proficiency in German beyond the interpersonal level with presentational language abilities.
2. writing proficiency in German beyond the interpersonal level with presentational language abilities.
3. close reading skills of authentic texts in German.
4. the ability to develop effective and nuanced lines of interpretation.

## Graduate Programs in German Studies

The University requirements for the M.A. and Ph.D. degrees are described in the "Graduate Degrees" section of this bulletin.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in German Studies and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in German Studies. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of German Studies and to pursue career tracks in higher education and in other sectors.

## German Studies and a Minor Field

Students may work toward a Ph.D. in German Studies with minors in such areas as Comparative Literature, History, Humanities, Linguistics, or Modern Thought and Literature. Students obtaining a Ph.D. in such combinations may require additional training.

## Bachelor of Arts in German Studies

Majors must demonstrate basic language skills, either by completing GERLANG 1,2,3, First-Year German, or the equivalent such as an appropriate course of study at the Stanford in Berlin Center. Students also enroll in intermediate and advanced courses on literature, culture, thought, or language. A maximum of 10 Advance Placement (AP) units may be counted towards the major with the approval of the Chair of Undergraduate Studies. No more than ten units may be taken on a credit/no credit basis. With the exception of GERMAN 191, which is required, all courses listed below are recommended, and substitutes are permitted with the approval of the Chair of Undergraduate Studies. Students may combine a major in German Studies with a major in any other field. Relevant courses in other fields may count towards the German Studies major.

## Degree Requirements

Completion of 60 units. Units earned towards the Bachelor of Arts in German Studies with honors degree may be applied to the 60 unit total.

### 1. Writing in the Major (WIM Requirement):

GERMAN 116	Writing About Germany: New Topics, New Genres	3-5
GERMAN 150	Masterpieces: Kafka	3-5

### 2. Completion of GERMAN 120A, 120B, and 120C or approved substitutes:

GERMAN 120A	Berlin: Literature, History, and Politics in the 20th and 21st Centuries	3-5
GERMAN 120B	Fairy Tales	3-5
GERMAN 120C	German in Public: Popular Music in Germany and Austria from 1945 to the Present	3-5

### 3. Completion of German Studies Core series or approved substitutes:

GERMAN 131	What is German Literature?	3-5
GERMAN 132	History and Politics of the Future in Germany, 1900-Present	3-5
GERMAN 133	Marx, Nietzsche, Freud	3-5

### 4. Senior Capstone Project:

GERMAN 191	German Capstone Project	1
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5. Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.

6. Remaining units must be completed through elective courses approved in consultation with the Chair of Undergraduate Studies. Structured Liberal Education courses and all courses taken at the Berlin Overseas campus may count toward the major electives. Thinking Matters courses approved by the Chair of Undergraduate Studies may also be counted toward the electives. Subject to approval by the Chair of Undergraduate Studies, courses from other fields may count if they contribute to the student's language skills, the ability to interpret literature and other cultural material, or the capacity to analyze societies.

## German and Philosophy

The German and Philosophy major option offers students the opportunity to combine studies in literature and philosophy. Students take most of their courses from departments specializing in the intersection of literature and philosophy. This option is not declared in Axxess; it does not appear on the transcript or diploma. This option requires a minimum of 16 courses, for a minimum total of 65 units.

## Degree Requirements

### German Studies:

1. Completion of GERMAN 116 or GERMAN 150 and two courses from the series GERMAN 120A, GERMAN 120B, and GERMAN 120C.
2. Completion of GERMAN 131, 132, and 133 or approved substitutes:

GERMAN 131	What is German Literature?	3-5
GERMAN 132	History and Politics of the Future in Germany, 1900-Present	3-5
GERMAN 133	Marx, Nietzsche, Freud	3-5

3. GERMAN 191 German Capstone Project

4. Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the undergraduate student services officer for the major to begin the process.

### Philosophy:

1. PHIL 80 Mind, Matter, and Meaning
2. GERMAN 181 Philosophy and Literature
3. Aesthetics, Ethics, Political Philosophy: one course from PHIL 170 series.
4. Language, Mind Metaphysics, and Epistemology: one course from PHIL 180 series.

**Units** History of Philosophy: one course in the history of Philosophy, numbered above PHIL 100.

6. Two additional elective courses of special relevance to the study of philosophy and literature as identified by the committee in charge of the program. Students must consult with their advisers, the Chair of Undergraduate Studies, and the undergraduate adviser of the program in philosophical and literary thought.

7. Capstone: One of the courses must be taken in the student's senior year. When choosing courses, students must consult with their advisers, the Chair of Undergraduate Studies, and the undergraduate adviser of the program in philosophical and literary thought:

<b>Units</b>	ITALIAN 236E	Dante's "Purgatorio" and "Paradiso"	4-5
	COMPLIT 223	Literature and Human Experimentation	3-5
	PHIL 194W	Capstone Seminar: Literature and the Moral Imagination	4

Units devoted to meeting the department's language requirement are not counted toward the 65-unit requirement.

The capstone seminar and the two related courses must be approved by both the German Studies Chair of Undergraduate Studies and the undergraduate adviser of the program in philosophical and literary thought administered through the DLCL. Substitutions, including transfer credit, are not normally permitted for items 3b, 3c, and 3d, and are not permitted under any circumstances for items 2, 3a, and 5. Up to 10 units taken in the Philosophy Department may be taken CR/NC or S/NC; the remainder must be taken for a letter grade.

## Honors

German majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

**Units**

Honors students are encouraged to participate in the honors college hosted by Bing Honors College ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) and coordinated by the Division of Literatures, Cultures, and Languages. The

honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/00\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/00_honors_BingHonors.html)) website.

Enrollment: A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

1. Spring Quarter of the junior year (optional) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the Director of the department and will be approved or returned for submission.
2. Autumn Quarter of the senior year (required) DLCL 189A Honors Thesis Seminar (4 units S/NC) taught by a DLCL appointed faculty member. The course will focus on researching and writing the honors thesis.
3. Winter Quarter of the senior year (required) DLCL 189B Honors Thesis Seminar (2-4 units Letter grade) under the primary thesis adviser. Focus will be on writing under guidance of primary adviser. The letter grade will determine if honors is granted or not.
4. Spring Quarter of the senior year (option; mandatory if not taken during junior year) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Honors essays are due to the thesis adviser and Student Service Officer no later than 5:00 p.m. on May 15th of the terminal year.
5. Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation (1 unit S/NC). Enroll with primary thesis adviser.

## Overseas Studies and Internships in German Studies

All students who are planning to study at Stanford in Berlin or engage in an internship are encouraged to consult with the Chair of Undergraduate Studies and the Overseas Studies office about integrating work done abroad into their degree program. Through the Center, students with at least two years of college-level German can also take courses at the Freie Universität, Technische Universität, or Humboldt Universität.

All credits earned in Berlin can be applied to the undergraduate major in German Studies. For course descriptions and additional offerings, see the listings in the *Stanford Bulletin's* ExploreCourses (<http://explorecourses.stanford.edu>) web site, or the Bing Overseas Studies (<http://bosp.stanford.edu>) web site.

Internships in Germany are arranged through the Bing Overseas Studies Program. In addition, students may consult with the department to arrange local internships involving German language use or issues pertaining to Germany or Central Europe. Returning interns who wish to develop a paper based on their experience should enroll in GERMAN 116 Writing about Germany.

## Joint Major Program: German Studies and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

## German Studies Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Program (p. 278)" section of this bulletin for details on Computer Science requirements.

To graduate with a joint major in Computer Science and German Studies, students must complete a minimum of 50 units. Majors must demonstrate basic language skills, either by completing GERLANG 1,2,3, First-Year German, or the equivalent such as an appropriate course of study at the Stanford in Berlin Center. Students also enroll in intermediate and advanced courses on literature, culture, thought, or language. A maximum of 10 Advance Placement (AP) units may be counted towards the major with the approval of the Chair of Undergraduate Studies. No more than 10 units may be taken on a credit/no credit basis. Courses listed below are recommended. Substitutes are permitted with the approval of the Chair of Undergraduate Studies. Relevant courses in other fields can count towards the German Studies major.

## Degree Requirements

Completion of 50 units.

1. Writing in the Major (WIM Requirement):

		Units
GERMAN 116	Writing About Germany: New Topics, New Genres	3-5
GERMAN 150	Masterpieces: Kafka	3-5

2. Completion of GERMAN 120A, 120B, and 120C or approved substitutes:

		Units
GERMAN 120A	Berlin: Literature, History, and Politics in the 20th and 21st Centuries	3-5
GERMAN 120B	Fairy Tales	3-5
GERMAN 120C	German in Public: Popular Music in Germany and Austria from 1945 to the Present	3-5

3. Completion of German Studies Core series or approved substitutes:

		Units
GERMAN 131	What is German Literature?	3-5
GERMAN 132	History and Politics of the Future in Germany, 1900-Present	3-5
GERMAN 133	Marx, Nietzsche, Freud	3-5

4. Senior Capstone Project:

		Units
GERMAN 191	German Capstone Project	1
GERMAN 199	Individual Work (Enroll in two units GERMAN 199 and preferably take concurrently with the Computer Science capstone requirement.)	1-12

5. Senior year, the student enrolls in a 2 unit independent study GERMAN 199 with a DLCL faculty member. The faculty member advising this project must sign off on this description. In order to have it approved as their capstone German Studies and Computer Science project, the student must submit a description of their project to the Chair of Undergraduate Studies in German.

6. Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the Undergraduate Student Affairs Officer for the major to begin the process.
7. The remaining units needed to reach 50 units could be completed through elective courses taken in German Studies, at the BOSP Berlin Center, or in other departments, as approved by the Chair of Undergraduate Studies.
  - Structured Liberal Education courses.
  - All courses taken at the Berlin Overseas campus may count toward the major electives.
  - Thinking Matters courses approved by the Chair of Undergraduate Studies may also be counted toward the electives.
  - Subject to approval by the Chair of Undergraduate Studies, courses from other fields may count if they contribute to the student's language skills, the ability to interpret literature and other cultural material, or the capacity to analyze societies.

## Honors Program

Students have the option to complete the honors program for Computer Science and German Studies, by completing an honors thesis that is partially or fully integrated with Computer Science; such a thesis would fulfill both the capstone and honors requirements for this degree. Students also have the option to complete the honors program for German Studies only; such a thesis would not fulfill the capstone requirement for this degree.

German Studies majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, see the Bing Honors ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) website.

Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

## Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axxess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/>

change-UG-program) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

## Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) . Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

## Transcript and Diploma

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

## Minor in German Studies

The Department of German Studies offers a minor in German Studies. The minor requires at least six courses and at least 24 units of course work. 15 units must be taken in the department of German Studies or with faculty members from German Studies. GERLANG courses from the Language Center and courses at the Bing Overseas Studies Center in Berlin may be counted toward this requirement. Students may use 5 units from SLE and/or a Thinking Matters course taught by a German Studies faculty member toward their electives for the minor. A maximum of 5 units of transfer credit may be applied with the approval of the Chair of Undergraduate Studies. Units may not be double counted. All courses must be taken for a letter grade, except where letter grades are not offered.

## Minor in Modern Languages

The Division of Literatures, Cultures, and Languages offers a minor in Modern Languages. This minor draws on literature and language courses offered through this and other literature departments. See the "Division of Literatures, Cultures, and Languages (p. 483)" section of this bulletin for further details about this minor and its requirements.

## Master of Arts in German Studies

This program is designed for those who do not intend to continue studies through the Ph.D. degree at Stanford. In order to complete the M.A. degree, students must complete a minimum of 45 units of graduate work. If students enroll for three quarters for a minimum of 15 units per quarter, they will be able to fulfill the M.A. requirements in one year. The M.A. program requires students to take the three graduate core courses (German 320, GERMAN 321, and GERMAN 322). These courses cover texts from our core reading lists in three areas of German Studies: pre-1700, 1700-1900, and post-1900. The remaining courses may be selected by the student but they must be graduate-level courses in German and/or approved courses in related fields such as art history, comparative literature, linguistics, history, or philosophy.

M.A. candidates must take an oral examination toward the end of their last quarter. In preparation for the oral exam students are expected to compile a reading list of 60 texts comprised of:

- 15 items from each of the three core; lists (pre-1700, 1700-1900, 1900-2000)
- 10 items from the film/opera lists
- 5 additional items of their own choice

This M.A. reading list must be compiled in consultation with the advisor.

## Coterminal Program

Students may apply to combine programs for the B.A. and M.A. degrees in German Studies. Coterminal students in German Studies may count eligible courses taken up to one academic year before enrollment in the first graduate quarter. Students are reminded that course transfer is subject to approval of the undergraduate and graduate departments.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Doctor of Philosophy in German Studies

The requirements for the Ph.D. in German Studies include:

1. **Required Courses.** A total of 135 units is required for the Ph.D.; doctoral candidates must complete at least one course with each member of the department. All courses counted towards the 135-unit requirement for the Ph.D. must be at the graduate level. Undergraduate courses may be taken but not used towards the Ph.D. requirements. During the Autumn, Winter, and Spring quarters in year one, students are required each quarter to enroll in and complete at least two graduate courses taught by German Studies faculty and submit at least one seminar paper. GERMAN 320, GERMAN 321, and GERMAN 322 are required courses for all graduate students. It is highly recommended that students take GERMAN 369 Introduction to the Profession of Literary Studies in year one. Students should take all courses for letter grades when the option is available. During the Summer Quarter, students may take a language course, or conduct research abroad, but they must also enroll in independent study units with their adviser (GERMAN 399 Individual Work) and complete a research paper.

In year two, students are required to enroll and complete one graduate course and submit one seminar paper each quarter (Autumn, Winter, Spring). It is highly recommended that students take DLCL 311 Professional Workshop in year two. During the second Summer Quarter, students enroll in independent study units (GERMAN 399 Individual Work) with their adviser and complete a dissertation chapter or prospectus. All graduate students must participate in the German Graduate Colloquium (students may enroll in GERMAN 397 Graduate Studies Colloquium for 1 unit per quarter). For more information, see the Graduate Handbook 2017-18.

a. **First Year.** Students must enroll in 10 graduate units each quarter during their first year of graduate study, including the Summer Quarter. During the Autumn, Winter, and Spring quarters of the first year, students should select courses that provide an introduction to the major areas of the discipline. During the Summer of the first year, students prepare a research paper on a topic from their presumed area of specialization. For more information, see the Graduate Handbook 2017-18.

		Units
GERMAN 320		1-5
GERMAN 321		1-5
GERMAN 322	Myth and Modernity	1-5
GERMAN 399	Individual Work	1-12
DLCL 301	The Learning and Teaching of Second Languages	3

b. **Second Year.** Students must enroll in 10 graduate units each quarter during their second year of graduate study, including the Summer Quarter. In the Autumn Quarter, students enroll in individual work with a faculty adviser to refine the research paper written over the Summer. A committee comprised of three faculty members review this qualifying paper at the end of the Autumn Quarter. In the Winter and Spring quarters, students take seminars that help them to refine their dissertation topic. During the second Summer, students prepare a draft chapter, which is presented to a faculty committee at the beginning of the Autumn Quarter. For more information, see the Graduate Handbook 2017-2018.

c. **Second-year required course work:**

		Units
GERMAN 399	Individual Work (Autumn and Summer quarters)	1-10

d. **Third Year.** Students who have not reached TGR status (135 units) must complete 10 units each quarter during their third year of graduate study until TGR status is achieved.

e. **Third-year required coursework:**

		Units
GERMAN 399	Individual Work (Winter and Spring quarters)	1-10

2. **Qualifying Examination.** Immediately following the end of classes in the Spring Quarter of the first year, all Ph.D. students must take their qualifying examination. This examination is designed to cover the full range of German literary history. It is based on the German Studies reading list available in the Graduate Handbook 2017-18 and builds on the core courses GERMAN 320, GERMAN 321, and GERMAN 322. Students who fail this examination may request to retake it once before October 15. A second fail of the qualifying examination results in dismissal from the Ph.D. program.

3. **Qualifying Paper Submission.** Based upon summer independent study and progress in GERMAN 399 Individual Work, the Ph.D. student submits a polished research paper in Autumn Quarter of their second year. The paper must be submitted by December 1 and is reviewed by a committee of three faculty members, including the adviser, who must approve it. A qualifying paper that does not meet approval may be revised and resubmitted by February 15. A second failure to submit a paper meeting approval of the faculty readers results in dismissal from the program.

4. **Candidacy.** Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the Ph.D. program. Per University policy, students are expected to complete departmental qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency,



course work, performance on the qualifying exam, the qualifying paper, and successful completion of teaching/research assistantships.

5. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. Additional information about University candidacy policy is available in the Bulletin (p. 52) and GAP (<http://gap.stanford.edu/4-6.html>).

6. Dissertation Chapter Defense. Building on work in winter and spring quarters of the student's second year, and ideally on the qualifying paper, students spend the Summer Quarter of the second year completing a draft chapter of the dissertation or a detailed preliminary dissertation prospectus. It must be discussed in a one-hour session of the reading committee at the beginning of the Autumn Quarter. The reading committee is comprised of three faculty members. At least two members of the reading committee must have primary appointments in German Studies. Students select members of the reading committee in consultation with the primary adviser.

7. After completion of the dissertation prospectus, all students are strongly encouraged to spend at least one quarter abroad in a German-speaking country, while remaining in regular contact with their advisers.

8. Language Requirement. A reading knowledge of one language other than English and German is required. Students in Medieval Studies must also have a reading knowledge of Latin. Reading knowledge is assessed by an examination administered by the Language Center. The language requirement must be satisfied by the end of the third year.

9. The University Oral Examination. The University oral examination in the Department of German Studies involves a defense of a substantial portion of the dissertation, normally at least three draft chapters, and takes place no later than the end of Autumn Quarter of the fifth year. The student's work must be distributed to the committee at least four weeks before the formal University oral examination. The committee consists of the dissertation committee (three faculty members), one additional reader, plus an outside chair, selected in consultation with the primary adviser. The examination lasts no longer than two hours. It begins with a brief statement by the candidate (no longer than 15 minutes) followed by questions from the four examiners, each of whom is limited to 20 minutes. The remaining time is reserved for optional questions from the chair of the examination. Students who fail the University oral examination are allowed one opportunity to retake it. A second fail of the University oral examination results in dismissal from the Ph.D. program.

10. Submission and approval of a dissertation.

11. Teaching Assistant. The teaching requirement includes four quarters of language teaching during the second and third years of study and is mandatory for continued enrollment or support in the program. Students must also teach a fifth course which may be a language course, but they may alternatively request to teach or co-teach a literature course at a later time in the course of study, normally once their dissertation has reached an advanced stage, contingent upon department need and subject to approval of the Director of German Studies. Such teaching does not extend the length or scope of support. Graduate students are advised to develop skills in the teaching of literature by participating in the teaching of undergraduate courses beyond language courses. Students may enroll in independent studies with faculty members to gain experience as apprentices in undergraduate teaching.

12. Research Assistant. The department expects candidates to demonstrate research skills appropriate to their special areas of study.

13. Graduate Studies Colloquium. Enrollment and/or participation in the Colloquium is mandatory for all students (students conducting research abroad are exempt). The Colloquium meets every two weeks throughout the year and involves presentation of student work and professionalization workshops.

14. German Studies Lecture Series. Regular attendance at lectures sponsored by the Department is required.

15. The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of University, department, and program requirements for the degree, and fulfillment of minimum progress requirements. Failure to meet these requirements results in corrective measures, which may include a written warning, academic probation, and/or dismissal from the program.

16. Annual Review. The Department of German Studies conducts annual reviews of each student's academic performance at the end of the Spring Quarter. All students are given feedback from the Chair of Graduate Studies, helping them to identify areas of strength and potential weakness. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. At any point during the degree program, evidence that a student is performing at a less than satisfactory level may be cause for a formal academic review of that student. Possible outcomes of the annual review include: continuation of the student in good standing, or placing the student on probation, with specific guidelines for the period of probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: restoration to good standing; continued probation, with guidelines for necessary remedial steps; or dismissal from the program.

## Ph.D. Minor in German Studies

The department offers a Ph.D. Minor in German Studies. The requirement for the Ph.D. minor is completion of 25 units of graduate course work in German Studies classes. Interested students should consult the Director of Graduate Studies.

## Faculty in German Studies

*Emeriti:* (Professors) Theodore M. Andersson, Gerald Gillespie, Katharina Mommsen, Kurt Müller-Vollmer, Orrin W. Robinson III

*Director:* Adrian Daub

*Chair of Graduate Studies:* Amir Eshel

*Chair of Undergraduate Studies:* Russell Berman (Autumn), Matthew Wilson Smith (Winter, Spring)

*Professors:* Russell A. Berman, Elizabeth Bernhardt, Adrian Daub, Amir Eshel, Kathryn Starkey (on leave)

*Associate Professor:* Matthew Wilson Smith

*Assistant Professor:* Lea Pao

*Lecturers:* Colleen Anderson (Mellon Fellow), Idan Gillo (Autumn), Friederike Kneupling (Winter)

*Courtesy Professors:* R. Lanier Anderson, Karol Berger, Michael Friedman, Hester Gelber, Thomas S. Grey, Hans U. Gumbrecht, Stephen Hinton, Norman Naimark, Thomas Sheehan, Brent Sockness, Elaine Treharne

*Courtesy Associate Professors:* Christopher Krebs, Laura Stokes, Marisa Galvez, Nadeem Hussain, Charolette Fonrobert, Brent Sockness

*Courtesy Assistant Professor:* Edith Sheffer

*Visiting Professors:* Christian Geulen (Spring), Niklaus Largier (Autumn)

*Postdoctoral Fellow:* Jamele Watkins

## Overseas Studies Courses in German Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPBER 17	Split Images: A Century of Cinema	3-4
OSPBER 66	Theory from the Bleachers: Reading German Sports and Culture	3
OSPBER 70	The Long Way to the West: German History from the 18th Century to the Present	4-5
OSPBER 101A	Contemporary Theater	4-5
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
OSPBER 161X	The German Economy in the Age of Globalization	4-5
OSPBER 174	Sports, Culture, and Gender in Comparative Perspective	5

## GLOBAL STUDIES

The Stanford Global Studies Division (SGS) is a hub for internationally focused research and teaching on campus. SGS prepares Stanford students for the world through an interdisciplinary education that cultivates knowledge of different cultures, and deepens our understanding of the global affairs through innovative research. Stanford Global Studies is comprised of 14 centers and programs, which are described below.

### Global Studies Minor

The Global Studies minor (<https://sgs.stanford.edu/programs-centers/global-studies-minor>) is available to Stanford undergraduates from any major, and is designed to provide students with the opportunity to pursue interdisciplinary study in one of six specializations, including in-depth language study, while integrating this knowledge into a larger vision of global affairs:

- African Studies (<https://africanstudies.stanford.edu/study/academic-programs/undergraduate-minor>)
- European Studies (<http://tec.fsi.stanford.edu/node/219264>)
- Iranian Studies (<https://iranian-studies.stanford.edu/students/minor>)
- Islamic Studies (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/sgs/Global%20Studies%20Minor>)
- Latin American Studies (<https://clas.stanford.edu/academics/undergraduate-minor>)
- South Asian Studies (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/sgs/Global%20Studies%20Minor>)

All students are required to complete 28 units, including a 3 unit gateway course. The remaining 25 units are unique to each specialization. Upon completion of the minor, students present their capstone projects in a seminar with other Global Studies minor participants. Students participating in the Bing Overseas Studies Program are especially encouraged to enroll. For questions, contact Dr. Katherine Kuhns at [kkuhns@stanford.edu](mailto:kkuhns@stanford.edu).

To declare the Global Studies minor, students must:

1. Set up an appointment with the appropriate specialization adviser (see appropriate specialization page for contact information).
2. Declare the Global Studies minor in Axess (<http://axess.stanford.edu>).
3. Complete the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program (<https://stanford.box.com/change-UG-program>) form in order to declare the specialization. Submit the form to the specialization adviser as noted on the relevant tab in this section of this bulletin.

### Center for African Studies

*Director:* James Ferguson  
*Office:* 100 Encina Commons  
*Web Site:* <http://africanstudies.stanford.edu>

The Center for African Studies (CAS) coordinates an interdisciplinary program in African Studies for undergraduates and graduate students. The program seeks to enrich understanding of the interactions among the social, economic, cultural, historical, linguistic, genetic, geopolitical, ecological, and biomedical factors that shape and have shaped African societies. CAS offers a certificate and a Master of Arts (M.A.) degree, in addition to a specialization in African Studies as part of the Global Studies minor ([https://africanstudies.stanford.edu/study/academic-](https://africanstudies.stanford.edu/study/academic-programs/undergraduate-minor)

[programs/undergraduate-minor](https://africanstudies.stanford.edu/study/academic-programs/undergraduate-minor)). For further information, see the "African Studies (p. 362)" section of this bulletin.

### Center for East Asian Studies

*Director:* Jun Uchida  
*Office:* Knight Building, 521 Memorial Way  
*Web Site:* <http://ceas.stanford.edu>

The Center for East Asian Studies (CEAS) supports teaching and research on East Asia-related topics across all disciplines; disseminates knowledge about East Asia through projects of local, regional, national, and international scope; and serves as the intellectual gathering point for a collaborative and innovative community of scholars and students of East Asia. CEAS works with all schools, departments, research centers, and student groups to facilitate and enhance all aspects of East Asia-related research, teaching, outreach, and exchange across the Stanford campus.

For further information, see the "East Asian Studies (p. 504)" section of this bulletin.

### France-Stanford Center for Interdisciplinary Studies

*Director:* Amalia Kessler  
*Office:* Building 260, Room 122  
*Web Site:* <http://francestanford.stanford.edu>

The France-Stanford Center for Interdisciplinary Studies, founded in partnership with the French Ministry of Foreign Affairs, aims to bridge the disciplines of the humanities, social sciences, sciences, engineering, business, and law, addressing historical and contemporary issues of significance for France and the United States. The Center brings together Stanford faculty and students and academics in France to advance collaborative research and foster interdisciplinary inquiry. Its programs include conferences, support for collaborative research projects, internships, exchanges, lectures, and seminars.

### Global Studies Internship Program

*Web Site:* <https://global-internships.stanford.edu>

The Stanford Global Studies Division offers highly qualified Stanford students an opportunity to extend classroom knowledge of the world to immersive cultural and working experiences every summer through the Global Studies Internship Program. Currently enrolled freshmen, sophomores, juniors, seniors, and coterms at Stanford in all majors are eligible to apply, including students who are undeclared. For more information, visit <http://global-internships.stanford.edu/>.

### WSD HANDA Center for Human Rights and International Justice

*Director:* David Cohen  
*Office:* Encina Hall West, Room W208  
*Web Site:* <https://handacenter.stanford.edu/>

The WSD HANDA Center equips a new generation of leaders with the knowledge and skills necessary to protect and promote human rights and dignity for all. Reflecting a deep commitment to international justice and the rule of law, the center collaborates with partners across Stanford University and beyond on innovative programs that foster critical inquiry in the classroom and in the world. The center offers an undergraduate minor. For further information, see the "Human Rights (p. )" section of this bulletin.

## Program in International Relations

*Director:* Mike Tomz

*Office:* Encina Hall West, Room W216

*Web Site:* <http://internationalrelations.stanford.edu>

International Relations (IR) is an interdisciplinary undergraduate major focusing on changing political, economic, and cultural relations within the international system in the modern era. The IR program also offers an interdisciplinary minor (p. 628) and honors program. For further information, see the "International Relations (p. 619)" section of this bulletin.

## Hamid and Christina Moghadam Program In Iranian Studies

*Director:* Abbas Milani

*Office:* Encina Hall West, W211

*Web Site:* <http://iranian-studies.stanford.edu>

The Hamid and Christina Moghadam Program in Iranian Studies at Stanford fosters the interdisciplinary study of Iran as a civilization, one of the oldest in the world. The program combines pedagogy, policy analysis, and research on all aspects of Iran's past, present, and future. The program organizes lectures and student research conferences on Iran. The program also offers a specialization in Iranian Studies as part of the Global Studies minor (<https://iranian-studies.stanford.edu/students/minor>).

## Sohaib and Sara Abbasi Program in Islamic Studies

*Director:* Lisa Blaydes

*Office:* Encina Hall West, Room W214

*Web Site:* <http://islamicstudies.stanford.edu>

The mission of the Sohaib and Sara Abbasi Program in Islamic Studies is to serve as a forum for interdisciplinary research and teaching in Islamic studies, complemented by seminars, colloquia and public lectures. The program seeks to illuminate Islamic history from its beginnings to the 21st century, the religion of Islam in its many aspects, and the diversity of Muslim cultures and societies, past and present, not only in the Middle East but also including South and Southeast Asia, Africa, Europe, and America. In addition to geographical breadth, the program promotes scholarship from both the humanities and the social sciences. The program offers student grants for research and language training and a specialization in Islamic Studies as part of the Global Studies minor (<https://islamicstudies.stanford.edu/study/undergraduate-minor>).

## Taube Center For Jewish Studies

*Director:* Ari Kelman

*Office:* Building 360, Room 362H

*Web Site:* <http://jewishstudies.stanford.edu>

The interdisciplinary Taube Center for Jewish Studies coordinates and promotes the study of all aspects of Jewish life. The center offers an undergraduate minor and an interdisciplinary major through the Center for Comparative Studies in Race and Ethnicity (<https://ccsre.stanford.edu/academics/undergraduate-program>). For further information, see the "Jewish Studies (p. 631)" section of this bulletin.

## Center for Latin American Studies

*Director:* Alberto Díaz-Cayeros

*Office:* Bolivar House

*Web Site:* <http://las.stanford.edu>

The Stanford Center for Latin American Studies supports research and teaching on Latin America by the faculty and students of Stanford in all fields of study. The center offers a master's degree, in addition to a specialization in Latin American Studies as part of the Global Studies minor (<https://clas.stanford.edu/academics/undergraduate-minor>). For further information, see the "Center for Latin American Studies (p. 637)" section of this bulletin.

## Mediterranean Studies Forum

*Director:* Lisa Blaydes

*Office:* Encina Hall West, Room W214

*Web Site:* <http://mediterraneanstudies.stanford.edu>

The Mediterranean Studies Forum encourages scholars to explore the interplay among societies, cultures, and communities around the Mediterranean Basin from the Middle Ages to the present. The forum also studies the relations of the Mediterranean with other regions and areas of the world. The central goal of the forum is to contribute to interfield and interdisciplinary dialogue among scholars of these areas through lectures, colloquia, workshops, conferences, and publications. Particular programming fields include Turkish Studies and Sephardic Studies.

## Center for Russian, East European and Eurasian Studies

*Director:* Pavle Levi

*Office:* Encina Hall West, W203

*Web Site:* <http://creees.stanford.edu>

The Center for Russian, East European and Eurasian Studies (CREEES) is Stanford University's hub for the interdisciplinary study of a vast region stretching from the former Berlin Wall to the Bering Strait. CREEES is home to a one year master's degree, and supports undergraduates and graduate students throughout campus, especially in regards to funding for research and language study. CREEES also hosts renowned visiting scholars, lecture series, conferences, and public events. For further information, see the "Center for Russian, East European and Eurasian Studies (p. 721)" section of this bulletin.

## Center for South Asia

*Director:* Jisha Menon

*Office:* Encina Hall West, W102

*Web Site:* <http://southasia.stanford.edu>

The Center for South Asia (CSA) serves to coordinate and develop Stanford's resources for the study of South Asia across all the disciplines in the School of Humanities and Sciences. It works closely with departments and other units of the University to increase faculty strength, support research, enhance the curriculum, build the library collection, and sponsor programs and events. The program also offers a specialization in South Asian Studies as part of the Global Studies minor (<https://southasia.stanford.edu/academics/undergraduate-minor>).

## The Europe Center

*Director:* Kenneth Scheve

*Office:* Encina Hall Central C243

*Web Site:* <http://europe.stanford.edu>

The Europe Center is a multidisciplinary institute committed to the examination of European society, culture, politics, diplomacy, and security. The program also offers a specialization in European Studies as part of the Global Studies minor (<http://tec.fsi.stanford.edu/node/219264>).

## Minor in Global Studies

The minor in Global Studies is designed to give students an in-depth interdisciplinary study in one of six specializations within a larger global perspective.

Global Studies is centered on the interdisciplinary study of regions and their intersecting cultures, languages, history, politics, and societies. Historically, Global (or Area) Studies have sought ways to understand the distinctiveness of cultures and nations by applying the combined knowledge from the social sciences and humanities to their study. This approach was further developed during World War II and the Cold War to be able to understand both American allies and enemies.

Today, Global Studies examine regions and cultures within the larger context of globalization. It applies more branches of knowledge, from human biology and earth sciences to music and management engineering, to better understand the character of regions, their respective developmental trajectories, and the way those trajectories fit into a larger global context.

All students are required to complete 28 units, including GLOBAL 101 Critical Issues in Global Affairs (3 units). The remaining 25 units are unique to each specialization. Upon completion of the minor, students present their capstone projects in a seminar with other Global Studies minor participants. Students participating in the Bing Overseas Studies Program are especially encouraged to enroll.

Each student chooses one of the six specializations. The specialization appears on the transcript but it does not appear on the diploma.

### Admission

Students from any major interested in applying for admission to the Global Studies minor program should consult the relevant center adviser, or Executive Director of Stanford Global Studies <kkuhns@stanford.edu>. To declare the Global Studies minor with one of six specializations, students must:

1. Set up an appointment with the appropriate specialization adviser (see appropriate specialization page for contact information).
2. Declare the Global Studies minor in Axess (<http://axess.stanford.edu>).
3. Complete the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program (<https://stanford.app.box.com/v/change-UG-program>) form in order to declare the specialization. Submit the form to the specialization adviser as noted on the relevant tab in this section of this bulletin.

## Minor in Global Studies with African Studies Specialization

The minor in Global Studies, African Studies specialization, offers students the opportunity to complement their major course of study with an in-depth, interdisciplinary exploration of the cultures, histories, politics, religions, and societies of Africa.

Students from any major interested in applying for admission to this minor program should consult the minor adviser at the Center for African Studies. Students declare the minor and the African Studies specialization in Axess (<http://axess.stanford.edu>) (see below for detailed instructions).

Students consult with their minor adviser to develop individual programs. The minor is especially well-suited for undergraduates who plan to make service, research, or study abroad in Africa as part of their Stanford experience.

## Declaring the Global Studies Minor with African Studies Specialization

To declare the Global Studies minor with African Studies specialization, students must:

1. Set up an appointment with Laura Hubbard, <lhubbard@stanford.edu>, Associate Director for the Center for African Studies.
2. Declare the Global Studies minor in Axess (<http://axess.stanford.edu>).
3. Complete the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program ([https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change\\_UG\\_program.pdf](https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf)) form in order to declare the African Studies specialization. Submit the form to the minor adviser, Laura Hubbard, in the Center for African Studies office (Encina Hall West, Room 219, 417 Galvez Mall).

### Learning Outcomes

The SGS minor specialization in African Studies enables students to:

1. develop critical knowledge and skills in African Studies
2. organize their interest in Africa into a coherent course of study through directed mentorship and participation in intellectual community.
3. prepare for research, study, or service in Africa

Upon completion of requirements, final certification of the minor is made by the Center for African Studies. The minor and the specialization appear on the transcript but they do not appear on the diploma.

### Requirements

A total of 28 units which include the following:

1. GLOBAL 101 Critical Issues in Global Affairs (3 units)
2. A minimum of 25 units of Africa-related courses. Students may not double-count courses for completing major and minor requirements.
3. At least one quarter's exposure to a sub-Saharan African language. The Center for African Studies (p. 362) and the Special Languages Program of the Language Center (p. 632) can arrange instruction in any of several languages spoken in West, East, Central, and Southern Africa.
4. One entry level course that covers more than one region of Africa.
5. A designated focus of study, either disciplinary or regional, through a three course concentration developed with the minor adviser.
6. A minimum 25-page research paper, with a focus on Africa. This paper may be an extension of a previous paper written for an African Studies course. Other approaches to fulfilling the capstone requirement may be accepted with the approval of the Director of African Studies.
  - Students present their work in an end-of-year capstone seminar with other SGS minors and led by SGS faculty.

### Course List

For a representative, rather than comprehensive, list of courses that count towards the minor, see the Related Courses tab in this section of the Bulletin. Other courses may also fulfill the requirements; students should consult their African Studies minor adviser concerning which courses might fulfill minor requirements.

## Minor in Global Studies with European Studies Specialization

The Stanford Global Studies, European Studies specialization, is designed for undergraduates with an interdisciplinary interest in the history, culture, politics, societies, and institutions of Europe, past and present.

The minor is especially well-suited for undergraduates who plan to make Europe-based overseas studies a part of their Stanford experience.

### Declaring the Global Studies Minor with European Studies Specialization

To declare the Global Studies minor with European Studies specialization, students must:

1. Set up an appointment with minor advisers, Kenneth Scheve (scheve@stanford.edu), Faculty Director for The Europe Center, or Christophe Crombez (crombez@stanford.edu) to discuss your academic plan.
2. Declare the Global Studies minor in Axess (<http://axess.stanford.edu>).
3. Complete the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program ([https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change\\_UG\\_program.pdf](https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf)) form in order to declare the European Studies specialization. Submit the form to Karen Haley (khaley@stanford.edu), in Encina Hall Central, Rm C243.

### Learning Outcomes

The SGS minor specialization in European Studies enables students to:

1. Organize their studies in a coherent and mentored minor.
2. Prepare for or follow up on involvement in a Bing Overseas Studies Program in Europe.

Upon completion of requirements, final certification of the minor is made by Stanford Global Studies. The minor and the specialization appear on the transcript but they do not appear on the diploma.

### Requirements

1. Completion of 28 units that include the following:
  - a. GLOBAL 101 Critical Issues in Global Affairs (3 units)
  - b. INTNLREL 122 Introduction to European Studies (5 units)
  - c. 5 unit survey course on European history or culture. The list of course alternatives that fulfill this requirement this year are:
    - DLCL 100 CAPITALS: How Cities Shape Cultures, States, and People
    - HISTORY 106B Global Human Geography: Europe and Americas
    - HISTORY 110B Renaissance to Revolution: Early Modern Europe
    - HISTORY 132 Ordinary Lives: A Social History of the Everyday in Early Modern Europe
    - HISTORY 137A
    - HISTORY 230D Europe in the World, 1789-Present
  - d. 15 additional units on a coherent theme of interest developed with the minor adviser. This combination of courses can be on any thematic subject with an interdisciplinary and comparative focus on Europe. See the Related Courses tab below for example courses.
  - e. At least 13 of the 28 units need to be completed on the Stanford campus.

2. Advanced proficiency in a modern European language achieved by one of the following:
  - a. Completion of six quarters of college-level study of a modern European language.
  - b. Completion of a course taught in a modern European language at the 100-level or higher and with a letter grade of 'B' or higher. This may be a course on a European language or literature, or other subject as long as it fulfills the above criteria. (This course may fulfill both the minor foreign language requirement and the minor 28 unit minimum requirement.)
  - c. Achieve the advanced proficiency level on the ACTFL scale in a test administered by the Stanford Language Center. (p. 632)
3. A capstone experience in European Studies, including but not limited to one of the following:
  - a. Completion of a 25-page minimum research paper with a focus on European Studies.
  - b. Completion of an overseas study program or internship in Europe.

Students will present their work in an end-of-year capstone seminar with other SGS minors and led by SGS faculty.

### Course List

For a representative, rather than comprehensive, list of courses that count towards the minor, see the Related Courses tab in this section of the Bulletin. Other courses may also fulfill the requirements; students should consult their European Studies minor adviser concerning which courses might fulfill minor requirements.

## Minor in Global Studies with Iranian Studies Specialization

The Stanford Global Studies, Iranian Studies specialization, is designed for undergraduates with an interdisciplinary interest in the modern history and politics of Iran or the Middle East; Islam, particularly Shiism; the geopolitics of the Middle East; and the religions, ethnicities, and cultures.

Students consult with their minor adviser to develop individual programs. The minor is especially well-suited for undergraduates who plan graduate studies, teaching, or research and analysis focused on Iran.

Upon completion of requirements, final certification of the minor is made by Stanford Global Studies. The minor and the specialization appear on the transcript but they do not appear on the diploma.

### Declaring the Global Studies Minor with Iranian Studies Specialization

To declare the Global Studies minor with Iranian Studies specialization, students must:

1. Set up an appointment with Roma Parhad, <rparhad@stanford.edu>, Program Manager for the Iranian Studies Program.
2. Declare the Global Studies minor in Axess (<http://axess.stanford.edu>).
3. Complete the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program ([https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change\\_UG\\_program.pdf](https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf)) form in order to declare the Iranian Studies specialization. Submit the form to the minor adviser Roma Parhad in Encina Hall West, Rm 211.

### Requirements

A total of 28 units which include the following:

1. GLOBAL 101 Critical Issues in Global Affairs (3 units)
2. One area-specific entry course that deals with Iran and the Middle East. If a student wants to take a course on a subject matter not

directly related to Iran, the consent of the Director of Iranian Studies is required.

3. A minimum of 25 units of qualifying courses. 15 units must be from the list of core courses. The remaining 10 units can be chosen from the list of approved elective courses.
  - At least 10 of the 25 units must be completed at the home campus; the remaining 15 units could be completed in an approved study abroad programs.
4. Completion of two quarters of Persian language, or proven proficiency in the language.
5. A capstone experience in Iranian Studies for up to 5 units. The project offers students the option to conduct a major independent research paper related to Iran under faculty guidance.
  - Students present their work in an end-of-year capstone seminar with other SGS minors and led by SGS faculty.

### Course List

For a representative, rather than comprehensive, list of courses that count towards the minor, see the Related Courses tab in this section of the Bulletin. Other courses may also fulfill the requirements; students should consult their Iranian Studies minor adviser concerning which courses might fulfill minor requirements.

## Minor in Global Studies with Islamic Studies Specialization

The minor in Stanford Global Studies, Islamic Studies specialization, offers students an interdisciplinary and global exploration of Islam and Muslim societies and cultures. Focus is on knowledge of Islam in all its internal complexity, the history of Islam from its beginnings to the 21st century, Islamic social contexts, and the diversity of human experience as seen in literature and the arts originating in societies affected by Islamic civilizations. Students explore the global extent of Islam and the growth of its diasporas by taking courses on geographical regions such as the Middle East, South Asia, Eurasia, Africa, Western Europe, and Americas) and from disciplines such as anthropology, art and art history, comparative literature, history, political science, international relations, and religious studies.

Students consult with their minor adviser to develop individual programs.

### Declaring the Global Studies Minor with Islamic Studies Specialization

To declare the Global Studies minor with Islamic Studies specialization, students must:

1. Set up an appointment with Zack Al-Witri, <zalwitri@stanford.edu>, Associate Director for the Islamic Studies Program to discuss your academic plan.
2. Declare the Global Studies minor in Axess (<http://axess.stanford.edu>).
3. Complete the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program ([https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change\\_UG\\_program.pdf](https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf)) form in order to declare the Islamic Studies specialization. Submit the form to the minor adviser Zack Al-Witri in Encina Hall West, 212.

### Learning Outcomes

The SGS minor specialization in Islamic Studies enables students to:

1. organize their studies in a coherent and mentored minor.
2. gain exposure to the past and present of Islam in diverse social, political, and cultural settings around the globe.

3. prepare for or follow up on involvement in a Bing Overseas Studies Program such as in Istanbul, France, Germany, or Cape Town.

Upon completion of requirements, final certification of the minor is made by the Abbasi Program in Islamic Studies. The minor and the specialization appear on the transcript but they do not appear on the diploma.

### Requirements

1. Completion of 28 units that includes GLOBAL 101 Critical Issues in Global Affairs (3 units)
2. A minimum of 25 units of Islamic studies-related courses.
3. At least one course must be an area-specific entry course focusing on the Islamic world. The following courses may be used to fulfill this requirement:
  - POLISCI 149T Middle Eastern Politics (5 units)
  - HISTORY 84N The American Empire in the Middle East (4 units)
  - HISTORY 82C Making of the Islamic World, 600-1500 (3 units)
  - RELIGST 180 Gender Relations in Islam (4 units)
  - HISTORY 181B Formation of the Contemporary Middle East (5 units)
  - HISTORY 280D ( units)
  - RELIGST 135 Islam in America (4 units)
  - COMPLIT 201 ( units)
  - POLISCI 149S Islam, Iran, and the West (5 units)
  - RELIGST 139 Religion along the Silk Road (4 units)
  - RELIGST 218 Islam, Race and Revolution: A Pan-American Approach (3-5 units)
4. At least one course must be from each of the following areas:
  - Islamic Arts, Literatures, and Cultures
  - Islam, History, and Politics
  - Religion of Islam
5. Completion of three courses in a relevant language such as Arabic, Persian, Turkish, Ottoman Turkish, Urdu, Pashto, Kazakh, or Swahili.
6. A capstone project such as a minimum 25-page research paper, directed reading and research with an Abbasi Program faculty member, or an overseas study, internship, or language training program that is approved by the Abbasi Program.
  - Students present their work in an end-of-year capstone seminar with other SGS minors and led by SGS faculty.

### Course List

For a representative, rather than comprehensive, list of courses that count towards the minor, see the Related Courses tab in this section of the Bulletin. Other courses may also fulfill the requirements; students should consult their Islamic Studies minor adviser concerning which courses might fulfill minor requirements.

## Minor in Global Studies with Latin American Studies Specialization

The minor in Global Studies, Latin American Studies (LAS) specialization, consists of a core set of courses surveying the history, politics, society, ecology, and culture of the Latin American region; advanced language training; and in-depth course work.

Students from any major interested in applying for admission to the minor in Global Studies, Latin American Studies (LAS) specialization, should consult Stanford Global Studies and the Center for Latin American Studies (CLAS (<https://clas.stanford.edu/academics/undergraduate-minor>)). Students who wish to complete the minor must declare online (through Axess (<http://axess.stanford.edu>)) and submit a proposal of course work no later than the second quarter of the junior year. The minor

must be completed by the second quarter of the senior year. Units taken for a student's major cannot be double-counted towards the minor.

Students consult with their minor adviser to develop individual programs. The minor is especially well-suited for undergraduates who plan to make service, research, or study abroad in Latin America a part of their Stanford experience.

The Global Studies Minor with Specialization in Latin American Studies is open to students in any major.

Upon completion of all requirements, final certification of the minor is made by the Center for Latin American Studies subcommittee on undergraduate programs. The minor and the specialization appear on the transcript but they do not appear on the diploma.

## Declaring the Global Studies Minor with Latin American Studies Specialization

To declare the Global Studies minor with Latin American Studies specialization, students must:

1. Set up an appointment with the CLAS associate director to discuss your academic plan.
2. Declare the Global Studies minor in Axess (<http://axess.stanford.edu>).
3. Complete the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program ([https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change\\_UG\\_program.pdf](https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf)) form in order to declare the Latin American Studies specialization. Submit the form to the minor adviser Elizabeth Saenz-Ackermann in Bolivar House, 582 Alvarado Row.

## Requirements

1. Students may not double-count courses for completing major and minor requirements. Completion of 28 units as follows:
  - a. GLOBAL 101 Critical Issues in Global Affairs (3 units)
  - b. A 5-unit course surveying Latin America, either ILAC 131 Introduction to Latin America: Cultural Perspectives or an approved substitute. For further information contact a CLAS undergraduate adviser at [latinamerica@stanford.edu](mailto:latinamerica@stanford.edu).
  - c. 20 additional units in courses which together comprise a coherent focus on a theoretical problem or issue of the region, such as but not limited to
    - i culture and identity
    - ii political economy
    - iii sustainable development.
  - d. At least 15 of the 28 units must be completed at Stanford.
  - e. All courses to be counted toward the minor must be taken for a letter grade.
2. Foreign Language Requirement. The minimum requirement for completion of the minor in Global Studies with Latin American Studies Specialization is advanced proficiency in Spanish or Portuguese by one of the following:
  - a. Completion of seven quarters of college-level study of Spanish or Portuguese.
  - b. Completion of a course taught in Spanish or Portuguese at the 100-level or higher, with a letter grade of 'B' or higher. This may be a course on Spanish or Portuguese language or literature, or some other subject.
  - c. Achievement of the advanced proficiency level on the ACTFL scale in a test administered by the Stanford Language Center. Contact the Stanford Language Center (p. 632) for test dates and procedures.
3. Recommended: experience in Latin America such as study abroad, field research, or an internship.

- Students might present their work in an end-of-year capstone seminar with other SGS minors and led by SGS faculty.

## Course List

For a representative, rather than comprehensive, list of courses that count towards the minor, see the Related Courses tab (p. 640) in this section of the Bulletin. Other courses may also fulfill the requirements; students should consult their Latin American Studies minor adviser concerning which courses might fulfill minor requirements.

## Minor in Global Studies with South Asian Studies Specialization

The minor in Stanford Global Studies, South Asian Studies specialization, offers students a focused study from an interdisciplinary perspective of the cultures, histories, politics, religions, and societies of South Asia, including India, Pakistan, Sri Lanka, Nepal, Bhutan, Bangladesh, and the Maldives.

The Global Studies Minor with Specialization in South Asian Studies is open to students in any major. Students consult with their minor adviser to develop individual programs.

## Declaring the Global Studies Minor with South Asian Studies Specialization

To declare the Global Studies minor with South Asian Studies specialization, students must:

1. Set up an appointment with Sangeeta Mediratta, <[smedirat@stanford.edu](mailto:smedirat@stanford.edu)>, Associate Director for the South Asian Studies Center to discuss your academic plan.
2. Declare the Global Studies minor in Axess (<http://axess.stanford.edu>).
3. Complete the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program ([https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change\\_UG\\_program.pdf](https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf)) form in order to declare the South Asian Studies specialization. Submit the form to the minor adviser Sangeeta Mediratta in Encina Hall West, Rm 104.

## Learning Outcomes

The SGS minor specialization in South Asian Studies enables students to:

1. acquire a nuanced and sophisticated understanding of the texts and contexts of South Asian Studies .
2. work on this geographical and disciplinary area within the broader contours, conversations, and methods of Global Studies.
3. enhance students' ability to understand and participate in an increasingly global world.
4. develop critical and wide-ranging insight into a key world area.

Upon completion of requirements, final certification of the minor is made by the Center for South Asian Studies. The minor and the specialization appear on the transcript but they do not appear on the diploma.

## Requirements

A total of 28 units which include the following:

1. GLOBAL 101 Critical Issues in Global Affairs (3 units)
2. At least 25 units of qualifying courses. Students may not double-count courses for completing major and minor requirements. At least 10 of the 25 units must be completed at Stanford. All courses to be counted toward the minor must be taken for a letter grade.



- a. A 5-unit core course such as ANTHRO 149 South Asia: History, People, Politics or HISTORY 106A Global Human Geography: Asia and Africa.
  - b. 20 units in courses that together represent an area of interdisciplinary focus such as, but not limited to, the following:
    - i immigration and law
    - ii urbanization and film
    - iii history and culture. Each course (with the exception of BOSP courses) must be at the 100-level or higher.
  - c. All courses, with the exception of Overseas Studies courses, must be at the 100-level or higher. For a list of courses, see the "Related Courses" tab in this section.
3. Foreign Language Requirement. Language requirement: Intermediate proficiency in a South Asian language by one of the following:
- a. Completion of two introductory language courses in a South Asian language such as Urdu, Hindi, Persian, Bengali, Pashto, Tamil, Telugu, Kannada, Gujarati, Malayalam, Garhwali, Nepalese, Tibetan, or Sindhi; other languages may also qualify.
  - b. Intermediate proficiency in any of the above languages, as measured by the ACTFL scale in a test administered by the Stanford Language Center (p. 632).
4. A capstone experience in South Asia such as study abroad, field research, an internship, or another example of sustained and serious involvement in South Asia. The approach taken must be approved by the Center for South Asia faculty director..
- Students present their work in an end-of-year capstone seminar with other SGS minors and led by SGS faculty.

## Course List

For a representative, rather than comprehensive, list of courses that count towards the minor, see the Related Courses tab in this section of the Bulletin. Other courses may also fulfill the requirements; students should consult their South Asian Studies minor adviser concerning which courses might fulfill minor requirements.

SGS Division Director: Jeremy Weinstein (<https://profiles.stanford.edu/jeremy-weinstein>) (Political Science)

### SGS Directors:

Center for African Studies: James Ferguson (<https://www.stanford.edu/dept/anthropology/cgi-bin/web/?q=node/42>) (Anthropology)

Center for East Asian Studies: Jun Uchida (<https://history.stanford.edu/people/jun-uchida>) (History)

France-Stanford Center: Amalia Kessler (<https://law.stanford.edu/directory/amalia-d-kessler>) (Law)

WSD Handa Center for Human Rights and International Justice: David Cohen (<https://classics.stanford.edu/people/david-cohen>) (Classics)

Program in International Relations: Mike Tomz (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/sgs/web.stanford.edu/~tomz>) (Political Science)

Hamid and Christina Moghadam Program In Iranian Studies: Abbas Milani (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/sgs/www.hoover.org/profiles/abbas-milani>) (Hoover Institution)

Sohaib and Sara Abbasi Program in Islamic Studies: Lisa Blaydes (<https://politicalscience.stanford.edu/people/lisa-blaydes>) (Political Science)

Taube Center For Jewish Studies: Ari Kelman (<http://jewishstudies.stanford.edu/faculty/ari-y-kelman>) (Graduate School of Education)

Center for Latin American Studies: Alberto Díaz-Cayeros ([http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/sgs/fsi.stanford.edu/people/alberto\\_d%C3%ADazcayeros](http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/sgs/fsi.stanford.edu/people/alberto_d%C3%ADazcayeros)) (Freeman Spogli Institute for International Studies)

Mediterranean Studies Forum: Lisa Blaydes (<https://politicalscience.stanford.edu/people/lisa-blaydes>) (Political Science)

Center for Russian, East European and Eurasian Studies: Pavle Levi (<https://art.stanford.edu/people/pavle-levi>) (Art & Art History),

Center for South Asia: Jisha Menon (<https://www.stanford.edu/dept/MTL/cgi-bin/.../jisha-menon>) (Theater and Performance Studies)

The Europe Center: Kenneth Scheve ([http://tec.fsi.stanford.edu/people/kenneth\\_f\\_scheve](http://tec.fsi.stanford.edu/people/kenneth_f_scheve)) (Political Science)

The following lists are representative rather than comprehensive lists of courses that may apply to the six specializations in the minor in Stanford Global Studies. Students should consult their adviser to determine courses that apply to their specific program.

## African Studies Specialization

The following is a current selection of courses related to African Studies. Students should consult with their minor adviser to determine the applicability of any course to the minor in Stanford Global Studies, African Studies specialization.

		Units
AFRICAST 109	Running While Others Walk: African Perspectives on Development	5
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	3-5
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 113V	Freedom in Chains: Black Slavery in the Atlantic, 1400s-1800s	5
AFRICAST 132	Literature and Society in Africa and the Caribbean	4
AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 138	Conflict and Reconciliation in Africa: International Intervention	3-5
AFRICAST 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AFRICAST 181	Media Representations of Africa	3-5
AFRICAST 195	Shifting Frames	1-2
AFRICAST 300	Contemporary Issues in African Studies	1
<b>Related Courses from Other Departments</b>		
AFRICAST 114N	Desert Biogeography of Namibia Prefield Seminar	3
AFRICAST 119	Novel Perspectives on South Africa	2-3
AFRICAST 122F	Histories of Race in Science and Medicine at Home and Abroad	4
AFRICAST 141A	Science, Technology, and Medicine in Africa	4
AFRICAST 145B	The African Atlantic	3-5
AFRICAST 199	Independent Study or Directed Reading	1-5
AFRICAST 229	Literature and Global Health	3-5
AFRICAST 235	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 249	Bodies, Technologies, and Natures in Africa	4-5
ANTHRO 1	Introduction to Cultural and Social Anthropology	3-5

ANTHRO 13A	Islamic Routes: Archaeology and Heritage of Muslim Societies	3-5
ANTHRO 41	Genes and Identity	3
ANTHRO 140	Ethnography of Africa	3
ANTHRO 141B	The Anthropology of Bits and Bytes: Digital Media in the Developing World	5
ANTHRO 147	Nature, Culture, Heritage	5
ANTHRO 185	Medical Anthropology of Contemporary Africa	5
COMPLIT 121	Poems, Poetry, Worlds	5
ECON 118	Development Economics	5
HISTORY 47	History of South Africa	3
HISTORY 48	The Egyptians	3-5
HISTORY 48Q	South Africa: Contested Transitions	4
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 145B	Africa in the 20th Century	5
HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	4-5
HISTORY 238J	The European Scramble for Africa: Origins and Debates	5
HISTORY 283	Middle East Oil and Global Economy	4-5
HUMBIO 129	Critical Issues in International Women's Health	4
OSPCPTWN 16	Sites of Memory	3
OSPCPTWN 18	Xhosa Language and Culture	2
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3
OSPCPTWN 30	Engaging Cape Town	2
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	3
OSPCPTWN 50	[Independent Study] Conservation & Resources in Sub-Saharan Africa	2-3
OSPCPTWN 55	Arts of Change	2-4
OSPCPTWN 57	Directed Study in Health Systems and Policy	1-3
OSPCPTWN 63	Socio-Ecological Systems	3
OSPCPTWN 67	ICT4D: An Introduction to the Use of ICTs for Development	3
OSPCPTWN 69	Comparatively Assessing South Africa's Transition to Democracy: Past, Present and Future	3
OSPCPTWN 70	Youth Citizenship and Community Engagement	3
OSPCPTWN 75	Giving Voice to the Now: Studies in the South African Present	3
OSPCPTWN 78	Postcolonial Modernist Art Movements in Africa	3
OSPCPTWN 79	Creative Cityness in the Global South	3
POLISCI 11N	The Rwandan Genocide	3
POLISCI 114D	Democracy, Development, and the Rule of Law	5
POLISCI 146A	African Politics	4-5
POLISCI 242A	Why is Africa Poor?	5
SURG 150	Principles and Practice of International Humanitarian Surgery	4
THINK 42	Thinking Through Africa: Perspectives on Health, Wealth, and Well-Being	4

## European Studies Specialization

The following is a current selection of courses related to European Studies. Students should consult with their minor adviser to determine

the applicability of any course to the minor in Stanford Global Studies, European Studies specialization.

		Units
ARTHIST 101	Introduction to Greek Art I: The Archaic Period	4
ARTHIST 102	Introduction to Greek Art II: The Classical Period	4
ARTHIST 105	Art & Architecture in the Medieval Mediterranean	4
ARTHIST 107A	St. Petersburg, a Cultural Biography: Architecture, Urban Planning, the Arts	4
ARTHIST 108	Virginity and Power: Mary in the Middle Ages	4
ARTHIST 111	Introduction to Italian Renaissance, 1420-1580	4
ARTHIST 114	Mystical Naturalism: Van Eyck, Dürer, and the Northern Renaissance	4
ARTHIST 117	Picturing the Papacy, 1300-1850	4
ARTHIST 118	Titian, Veronese, Tintoretto	4
ARTHIST 120	Living in a Material World: Seventeenth-century Dutch and Flemish Painting	4
ARTHIST 121	18th-Century Art in Europe, ca 1660-1780	4
ARTHIST 122	The Age of Revolution: Painting in Europe 1780-1830	4
ARTHIST 124	The Age of Naturalism, Painting in Europe 1830-1874	4
ARTHIST 126	Post-Naturalist Painting	4
ARTHIST 142	Architecture Since 1900	4
ARTHIST 147	Modernism and Modernity	4
ARTHIST 203	Artists, Athletes, Courtesans and Crooks	5
ARTHIST 210	Giotto	5
ARTHIST 213	Renaissance Print Culture: Art in the Cantor Arts Center	5
COMPLIT 115	Vladimir Nabokov: Displacement and the Liberated Eye	1-5
COMPLIT 181	Philosophy and Literature	5
COMPLIT 247	Bollywood and Beyond: An Introduction to Indian Film	3-5
DLCL 100	CAPITALS: How Cities Shape Cultures, States, and People	3-5
ENGLISH 81	Philosophy and Literature	5
ENGLISH 233	Baroque and Neobaroque	3-5
FILMSTUD 131	Cinematograph	3-5
FILMSTUD 331	Cinematograph	3-5
FRENCH 181	Philosophy and Literature	5
FRENCH 192	Women in French Cinema: 1958-	3-5
FRENCH 205	Songs of Love and War: Gender, Crusade, Politics	3-5
FRENCH 219	The Renaissance Body in French Literature and Medicine	3-5
GERMAN 181	Philosophy and Literature	5
GERMAN 267	Prospects for Transatlantic Relations: Globalization and its Discontents	1-2
GLOBAL 101	Critical Issues in Global Affairs	3
GLOBAL 106	Populism and the Erosion of Democracy	5
HISTORY 10B	Renaissance to Revolution: Early Modern Europe	3
HISTORY 85B	Jews in the Contemporary World: Faith and Ethnicity, Visibility and Vulnerability	3
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 110B	Renaissance to Revolution: Early Modern Europe	5
HISTORY 132	Ordinary Lives: A Social History of the Everyday in Early Modern Europe	5
HISTORY 140A	The Scientific Revolution	5
HISTORY 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5

HISTORY 222	Crime and Punishment in Early Modern Europe and Russia	4-5	AMELANG 146A	Third-Year Persian, First Quarter	4
HISTORY 230D	Europe in the World, 1789-Present	4-5	AMELANG 146B	Third-Year Persian, Second Quarter	4
HISTORY 239H	Colonialism and Empire in Modern Europe	5	AMELANG 146C	Third-Year Persian, Third Quarter	4
HISTORY 330D	Europe in the World, 1789-Present	4-5	AMELANG 216A	Contemporary Language of Iran, First Quarter	3
ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5	AMELANG 216B	Contemporary Language of Iran, Second Quarter	3
ILAC 136	Modern Iberian Literatures	3-5	AMELANG 216C	Contemporary Language of Iran, Third Quarter	3
ILAC 157	Medieval and Early Modern Iberian Literatures	3-5	ANTHRO 134B	Conflict and Change in the Middle East	5
ILAC 193	The Cinema of Pedro Almodovar	3-5	ANTHRO 150A	Minaret and Mahallah: Women and Islam in Central Asia	3-5
ILAC 199	Individual Work	1-12	ANTHRO 181A	Gender in the Middle East: Iran, Turkey, and Egypt	4
ILAC 242	Poetry Workshop in Spanish	3-5	ARTHIST 118A	Public Space in Iran: Murals, Graffiti, Performance	3-4
INTNLREL 122	Introduction to European Studies	5	CLASSICS 146	Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire	3-5
INTNLREL 123	The Future of the European Union: Challenges and Opportunities	5	CLASSICS 147	Priests, Prophets, and Kings: Religion and Society in Late Antique Iran	4-5
ITALIAN 181	Philosophy and Literature	5	CLASSICS 148	Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran	3-5
JEWISHST 5	Biblical Greek	3-5	CLASSICS 246	Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire	3-5
JEWISHST 5B	Biblical Greek	3-5	CLASSICS 247	Priests, Prophets, and Kings: Religion and Society in Late Antique Iran	4-5
JEWISHST 148	Writing Between Languages: The Case of Eastern European Jewish Literature	1-5	CLASSICS 248	Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran	3-5
JEWISHST 183	The Holocaust	4-5	COMPLIT 194	Independent Research	1-5
JEWISHST 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5	COMPLIT 249A	The Iranian Cinema: Image and Meaning	1-3
LAW 5005	European Union Law	2-3	COMPLIT 249B	Iranian Cinema in Diaspora	1-3
ME 421	European Entrepreneurship and Innovation Thought Leaders Seminar	1	COMPLIT 249C	Contemporary Iranian Theater	1-3
OSPBBER 161X	The German Economy in the Age of Globalization	4-5	COMPLIT 399	Individual Work	1-15
OSPMADRD 43	The Jacobean Star Way and Europe: Society, Politics and Culture	5	CSRE 95I	Revolutionary Practices: Space and Public Discourse in Iran	4
OSPMADRD 74	Islam in Spain and Europe: 1300 Years of Contact	4	DLCL 144	An Introduction to Persian Literature, an Aesthetic Tradition Over a Millennium Old	3-4
OSPPARIS 122X	Challenges of Integration in the European Union	4-5	DLCL 227	Persian, Arabic, Turkish, and Hebrew Languages, Literatures, and Cultures	1
PHIL 81	Philosophy and Literature	5	FEMGEN 3B	Transhistory: Gender Diversity from Medieval to Modern	1-3
PHIL 115	Problems in Medieval Philosophy: Islamic Aristotelianism and Western Scholasticism	3-5	FEMGEN 181A	Gender in the Middle East: Iran, Turkey, and Egypt	4
PHIL 215	Problems in Medieval Philosophy: Islamic Aristotelianism and Western Scholasticism	3-5	FILMSTUD 135	Around the World in Ten Films	3-4
POLISCI 140P	Populism and the Erosion of Democracy	5	GLOBAL 101	Critical Issues in Global Affairs	3
REES 100	Current Issues in Russian, East European, and Eurasian Studies	1-2	GLOBAL 249A	The Iranian Cinema: Image and Meaning	1-3
REES 105	Central and East European Politics	5	GLOBAL 249B	Iranian Cinema in Diaspora	1-3
REES 205	Central and East European Politics	5	GLOBAL 249C	Contemporary Iranian Theater	1-3
SLAVIC 181	Philosophy and Literature	5	HISTORY 3B	Transhistory: Gender Diversity from Medieval to Modern	1-3
SOC 309	Nations and Nationalism	4-5	HISTORY 82C	Making of the Islamic World, 600-1500	3

## Iranian Studies Specialization

The following is a current selection of courses related to Iranian Studies. Students should consult with their minor adviser to determine the applicability of any course to the minor in Stanford Global Studies, Iranian Studies specialization.

		Units
AFRICAAM 94	Public Space in Iran: Murals, Graffiti, Performance	3-4
AMELANG 144	An Introduction to Persian Literature, an Aesthetic Tradition Over a Millennium Old	3-4
AMELANG 144A	First-Year Modern Persian, First Quarter	5
AMELANG 144B	First-Year Modern Persian, Second Quarter	5
AMELANG 144C	First-Year Modern Persian, Third Quarter	5
AMELANG 145A	Second-Year Modern Persian, First Quarter	5
AMELANG 145B	Second-Year Modern Persian, Second Quarter	5
AMELANG 145C	Second-Year Modern Persian, Third Quarter	5
HISTORY 284F	Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5
HISTORY 384F	Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5
INTNLREL 174	Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country	5
INTNLREL 198	Senior Thesis	2-10
MS&E 93Q	Nuclear Weapons, Energy, Proliferation, and Terrorism	3

POLISCI 118P	U.S. Relations in Iran	5
POLISCI 149S	Islam, Iran, and the West	5
POLISCI 149T	Middle Eastern Politics	5
POLISCI 211N	Nuclear Politics	3-5
POLISCI 215F	Nuclear Weapons and International Politics	5
POLISCI 219	Directed Reading and Research in International Relations	1-10
POLISCI 229	Directed Reading and Research in American Politics	1-10
POLISCI 245E	Middle East Politics	5
POLISCI 245R	Politics in Modern Iran	5
POLISCI 311N	Nuclear Politics	3-5
POLISCI 315F	Nuclear Weapons and International Politics	5
RELIGST 180	Gender Relations in Islam	4
RELIGST 209	Priests, Prophets, and Kings: Religion and Society in Late Antique Iran	4-5
RELIGST 209A	Sugar in the Milk: Modern Zoroastrianism as Race, Religion, and Ethnicity	4-5
RELIGST 209D	'Crow Eaters' & 'Fire Worshipers': Exploring Contemporary Zoroastrianism Thru Reading Parsi Lit	3-5
RELIGST 209E	Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran	3-5
RELIGST 229	Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire	3-5
RELIGST 309	Priests, Prophets, and Kings: Religion and Society in Late Antique Iran	4-5
RELIGST 309A	Sugar in the Milk: Modern Zoroastrianism as Race, Religion, and Ethnicity	4-5
RELIGST 309D	'Crow Eaters' & 'Fire Worshipers': Exploring Contemporary Zoroastrianism Thru Reading Parsi Lit	3-5
RELIGST 309E	Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran	3-5
RELIGST 329	Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire	3-5
ANTHRO 133B	Covering Islam: On What We Learn to See, Think and Hear about Islam & Muslims	3-5
ANTHRO 134B	Conflict and Change in the Middle East	5
ANTHRO 139	Ethnography of Africa	5
ANTHRO 142A	Youth in the Global South: Beyond Active Subjects and Passive Objects	5
ANTHRO 144A	Practice of Everyday Life in Kazakhstan: From Nomadism to Modernity	3-5
ANTHRO 146B	Global Heritage, World Heritage: History and Intersections in Contemporary Society	5
ANTHRO 147A	Folklore, Mythology, and Islam in Central Asia	3-5
ANTHRO 147B	World Heritage in Global Conflict	5
ANTHRO 149	South Asia: History, People, Politics	5
ANTHRO 149A	Cities and Citizens in the Middle East	4
ANTHRO 150A	Minaret and Mahallah: Women and Islam in Central Asia	3-5
ANTHRO 181A	Gender in the Middle East: Iran, Turkey, and Egypt	4
ANTHRO 247B	World Heritage in Global Conflict	5
ANTHRO 249	South Asia: History, People, Politics	5
ANTHRO 318	Democracy and Political Authority	5
ANTHRO 341	The Archaeology of Religious Crusading in Medieval Europe	5
ANTHRO 347	Religion and Modernity	5
ARABLANG 14A	Short Stories and Poetry from the Arab World - Part I	3
ARCHLGY 13	Islamic Routes: Archaeology and Heritage of Muslim Societies	3-5
ARCHLGY 132	The Anthropology of Heritage: Concepts, Contexts and Critique	3-5
ARCHLGY 147B	World Heritage in Global Conflict	5
ARCHLGY 232	The Anthropology of Heritage: Concepts, Contexts and Critique	3-5
ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval	5
ARTHIST 105	Art & Architecture in the Medieval Mediterranean	4
ARTHIST 105B	Medieval Journeys: Introduction through the Art and Architecture	3-5
ARTHIST 118A	Public Space in Iran: Murals, Graffiti, Performance	3-4
ARTHIST 205	Cairo and Istanbul: Urban Space, Memory, Protest	5
ARTHIST 205A	Islamic Painting: Landscape, Body, Power	5
ARTHIST 208	Hagia Sophia	5
ARTHIST 208B	The Art of Medieval Spain: Muslims, Christians, Jews	5
ARTHIST 209	Art and Religious Experience in Byzantium and Islam	5
ARTHIST 305	Art & Architecture in the Medieval Mediterranean	4
ARTHIST 405	Art, Ekphrasis, and Music in Byzantium and Islam	5
ARTHIST 408	Hagia Sophia	5
ARTHIST 408B	The Art of Medieval Spain: Muslims, Christians, Jews	5
ARTHIST 409	Iconoclasm	5
CLASSICS 56	Introduction to the Visual Arts: Prehistoric through Medieval	5
COMPLIT 102	Film Series: Understanding Turkey Through Film	1
COMPLIT 121	Poems, Poetry, Worlds	5
COMPLIT 145	Reflection on the Other: The Jew and the Arab in Literature	3-5
COMPLIT 247	Bollywood and Beyond: An Introduction to Indian Film	3-5
COMPLIT 249A	The Iranian Cinema: Image and Meaning	1-3

## Islamic Studies Specialization

The following is a current selection of courses related to Islamic Studies. Students should consult with their minor adviser to determine the applicability of any course to the minor in Stanford Global Studies, Islamic Studies specialization.

### Units

#### Islamic Arts, Literatures, and Cultures

AFRICAAM 94	Public Space in Iran: Murals, Graffiti, Performance	3-4
AFRICAST 133B	Covering Islam: On What We Learn to See, Think and Hear about Islam & Muslims	3-5
AMELANG 126	Reflection on the Other: The Jew and the Arab in Literature	3-5
AMSTUD 15	Global Flows: The Globalization of Hip Hop Art, Culture, and Politics	1-2
ANTHRO 13A	Islamic Routes: Archaeology and Heritage of Muslim Societies	3-5
ANTHRO 28N	Secularism and its Critics	3-5
ANTHRO 49	Violence and Belonging in the Middle East	5
ANTHRO 132	Religion and Politics in the Muslim World	5
ANTHRO 132B	Islam Law in Muslim and Non-Muslim Societies	3-5
ANTHRO 133A	Anthropology of the Middle East	3-5

COMPLIT 249B	Iranian Cinema in Diaspora	1-3	GLOBAL 136	Contemporary Muslim Political Thought	4
COMPLIT 249C	Contemporary Iranian Theater	1-3	HISTORY 39	Modern Britain and the British Empire	3
COMPLIT 252A	Great Arabic Poetry	3-5	HISTORY 45B	Africa in the Twentieth Century	3
COMPLIT 252B	Great Arabic Prose	3-5	HISTORY 80	The Ottoman Empire: Conquest, Coexistence, and Coffee	3-5
CSRE 129	Camus	4-5	HISTORY 82C	Making of the Islamic World, 600-1500	3
CSRE 133A	Anthropology of the Middle East	3-5	HISTORY 83S	Refugees of Palestine and Syria: History, Identity, and Politics of Exile in the Middle East	5
CSRE 133B	Covering Islam: On What We Learn to See, Think and Hear about Islam & Muslims	3-5	HISTORY 84N	The American Empire in the Middle East	4
CSRE 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	3-4	HISTORY 85S	A History of Strangers: Jews in the Mediterranean	5
CSRE 249	The Algerian Wars	3-5	HISTORY 102	History of the International System	5
DLCL 227	Persian, Arabic, Turkish, and Hebrew Languages, Literatures, and Cultures	1	HISTORY 139	Modern Britain and the British Empire	5
DLCL 245	LA ALJAMÍA, ROMÁRABE LANGUAGE	3-5	HISTORY 181B	Formation of the Contemporary Middle East	5
FRENCH 249	The Algerian Wars	3-5	HISTORY 182C	Making of the Islamic World, 600-1500	5
GLOBAL 199	Capstone Project: Global Studies Minor	1-5	HISTORY 182G	Making Palestine Visible	3-5
GLOBAL 249A	The Iranian Cinema: Image and Meaning	1-3	HISTORY 209C	Liberalism and Violence	4-5
GLOBAL 249B	Iranian Cinema in Diaspora	1-3	HISTORY 246	The Dynamics of Change in Africa	4-5
GLOBAL 249C	Contemporary Iranian Theater	1-3	HISTORY 283	Middle East Oil and Global Economy	4-5
HISTORY 7E	Islamic Routes: Archaeology and Heritage of Muslim Societies	3-5	HISTORY 283G	Place, Nature, and Life: Production of Space in European and Muslim History	4-5
HISTORY 239G	The Algerian Wars	3-5	HISTORY 284F	Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5
HISTORY 296F	Short Stories from India and Pakistan	3-5	HISTORY 286	Jews Among Muslims in Modern Times	4-5
ICA 296F			HISTORY 309C	Liberalism and Violence	4-5
ILAC 278A	Senior Seminar: Cervantes's Novelas Ejemplares	3-5	HISTORY 346	The Dynamics of Change in Africa	4-5
JEWISHST 106	Reflection on the Other: The Jew and the Arab in Literature	3-5	HISTORY 381	Economic and Social History of the Modern Middle East	4-5
MUSIC 7B	Musical Cultures of the World	3	HISTORY 381B	Modern Egypt	4-5
MUSIC 13N	Bollywood and Beyond: South Asian Popular and Folk Music	3	HISTORY 382F	History of Modern Turkey	4-5
MUSIC 80T	Jewish Music in the Lands of Islam	4	HISTORY 383G	Place, Nature, and Life: Production of Space in European and Muslim History	4-5
MUSIC 146K	Studies in Ethnomusicology: Music of South Asia	3-5	HISTORY 384F	Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5
MUSIC 186	Religion and Music in South Asia	4-5	HISTORY 386	Jews Among Muslims in Modern Times	4-5
MUSIC 187	Music and Culture from the Land of Fire: Introduction to Azerbaijani Mugham	1-5	HISTORY 493	Research Seminar on Political Thought	4-5
MUSIC 246K	Studies in Ethnomusicology: Music of South Asia	3-5	ILAC 278A	Senior Seminar: Cervantes's Novelas Ejemplares	3-5
MUSIC 286	Religion and Music in South Asia	4-5	JEWISHST 85S	A History of Strangers: Jews in the Mediterranean	5
OSPMADRD 74	Islam in Spain and Europe: 1300 Years of Contact	4	JEWISHST 286	Jews Among Muslims in Modern Times	4-5
REES 35	Films of Central Asia	1-2	JEWISHST 386	Jews Among Muslims in Modern Times	4-5
REES 54A	Central Asia Through Films: A Weekly 3-Hour Seminar	3-5	OSPPARIS 45	Comparative Politics in the Contemporary Arab World	4
REES 244A	Practice of Everyday Life in Kazakhstan: From Nomadism to Modernity	3-5	POLISCI 149S	Islam, Iran, and the West	5
REES 247A	Folklore, Mythology, and Islam in Central Asia	3-5	POLISCI 212A	Special Topics: EGYPT: Politics, Terror and Society: From Vision to Reality	5
RELIGST 283	Religion and Literature	4	POLISCI 215A	Special Topics: State-Society Relations in the Contemporary Arab World-Key Concepts and Debates	5
TAPS 157	World Drama and Performance	4	RELIGST 135	Islam in America	4
TAPS 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	3-4	<b>Islamic Politics</b>		
TAPS 357	World Drama and Performance	4	COMM 177Y	Specialized Writing and Reporting: Foreign Correspondence	4-5
URBANST 144	Cities and Citizens in the Middle East	4	COMM 277Y	Specialized Writing and Reporting: Foreign Correspondence	4-5
<b>Islamic History</b>			CSRE 82G	Making Palestine Visible	3-5
AFRICAAM 145B	Africa in the 20th Century	5	GLOBAL 136	Contemporary Muslim Political Thought	4
ANTHRO 108B	Gender in the Arab and Middle Eastern City	5	IPS 214	Refugees in the Twenty-first Century	3-5
CLASSICS 176	History of Muslim Science: from Alexandria to Baghdad	3-5	IPS 250A	International Conflict Resolution Colloquium	1
CSRE 82G	Making Palestine Visible	3-5	OSPPARIS 45	Comparative Politics in the Contemporary Arab World	4
CSRE 218	Islam, Race and Revolution: A Pan-American Approach	3-5			
ETHICSOC 103X	Contemporary Muslim Political Thought	4			

POLISCI 118P	U.S. Relations in Iran	5	ARABLANG 23H	Second-Year Arabic for Heritage Learners, Third Quarter	5
POLISCI 149S	Islam, Iran, and the West	5	ARABLANG 24	Arabic Skills Workshop	4
POLISCI 149T	Middle Eastern Politics	5	ARABLANG 125A	Colloquial Arabic, First Quarter	4
POLISCI 222	The Political Psychology of Intolerance	5	ARABLANG 125B	Conversational/Colloquial Arabic, Second Quarter	4
POLISCI 245R	Politics in Modern Iran	5	ARABLANG 126A	Media Arabic, First Quarter	2-4
POLISCI 246A	Paths to the Modern World: Islam and the West	5	ARABLANG 127	Intermediate to Advanced Conversation	3
POLISCI 441L	Grad Seminar on Middle Eastern Politics	3-5	ARABLANG 131	Third-Year Arabic, First Quarter	5
REES 320	State and Nation Building in Central Asia	3-5	ARABLANG 131H	Third-Year Arabic for Heritage Learners, First Quarter	5
THINK 26	How Do You Build a Nation? Inclusion and Exclusion in the Making of Modern Iran	4	ARABLANG 132	Third-Year Arabic, Second Quarter	5
<b>Languages</b>			ARABLANG 132H	Third-Year Arabic for Heritage Learners, Second Quarter	5
AMELANG 15T	Intermediate to Advanced Turkish Conversation	2	ARABLANG 133	Third-Year Arabic, Third Quarter	5
AMELANG 84A	Accelerated First-Year Turkish, Part 1	5	ARABLANG 133H	Third-Year Arabic for Heritage Learners, Third Quarter	5
AMELANG 84B	Accelerated First-Year Turkish, part 2	5	ARABLANG 141	Fourth-Year Arabic, First Quarter	4
AMELANG 144A	First-Year Modern Persian, First Quarter	5	ARABLANG 142	Fourth-Year Arabic, Second Quarter	4
AMELANG 144B	First-Year Modern Persian, Second Quarter	5	ARABLANG 143	Fourth-Year Arabic, Third Quarter	4
AMELANG 144C	First-Year Modern Persian, Third Quarter	5	ARABLANG 297	Directed Reading	1-5
AMELANG 145A	Second-Year Modern Persian, First Quarter	5	ARABLANG 394	Graduate Studies in Arabic Conversation	1-3
AMELANG 145B	Second-Year Modern Persian, Second Quarter	5	ARABLANG 395	Graduate Studies in Arabic	1-5
AMELANG 145C	Second-Year Modern Persian, Third Quarter	5	COMPLIT 245	Introductory Ottoman Turkish	1-3
AMELANG 146A	Third-Year Persian, First Quarter	4	COMPLIT 248A	Reading Turkish I	2-4
AMELANG 146B	Third-Year Persian, Second Quarter	4	COMPLIT 248B	Reading Turkish II	2-4
AMELANG 146C	Third-Year Persian, Third Quarter	4	COMPLIT 248C	Advanced Turkish-English Translation	2-4
AMELANG 184A	First-Year Turkish, First Quarter	5	SPECLANG 109A	First-Year Bengali, First Quarter	5
AMELANG 184B	First-Year Turkish, Second Quarter	5	SPECLANG 109B	First-Year Bengali, Second Quarter	5
AMELANG 184C	First-Year Turkish, Third Quarter	5	SPECLANG 109C	First-Year Bengali, Third Quarter	5
AMELANG 185A	Second-Year Turkish, First Quarter	5	SPECLANG 110A	Second-Year Bengali	4
AMELANG 185B	Second-Year Turkish, Second Quarter	5	SPECLANG 110B	Second-Year Bengali - Second Quarter	4
AMELANG 185C	Second-Year Turkish, Third Quarter	5	SPECLANG 110C	Second-Year Bengali - Third Quarter	4
AMELANG 186A	Third-Year Turkish, First Quarter	4	SPECLANG 152A	First-Year Hindi, First Quarter	5
AMELANG 186B	Third-Year Turkish, Second Quarter	4	SPECLANG 152B	First-Year Hindi, Second Quarter	5
AMELANG 186C	Third-Year Turkish, Third Quarter	4	SPECLANG 152C	First-Year Hindi, Third Quarter	5
AMELANG 297	Directed Reading in African and Middle Eastern Languages	1-5	SPECLANG 152H	Heritage Hindi	5
AMELANG 395	Graduate Studies in African and Middle Eastern Languages	1-5	SPECLANG 153A	Second-Year Hindi, First Quarter	4
ARABLANG 1	First-Year Arabic, First Quarter	5	SPECLANG 153B	Second-Year Hindi, Second Quarter	4
ARABLANG 1A	Accelerated First-Year Arabic, Part I	5	SPECLANG 153C	Second-Year Hindi, Third Quarter	4
ARABLANG 1H	First-Year Arabic for Heritage Learners, First Quarter	5	SPECLANG 154A	Third-Year Hindi, First Quarter	4
ARABLANG 2	First-Year Arabic, Second Quarter	5	SPECLANG 154B	Third-Year Hindi, Second Quarter	4
ARABLANG 2A	Accelerated First-Year Arabic, Part II	5	SPECLANG 154C	Third-Year Hindi, Third Quarter	4
ARABLANG 2H	First-Year Arabic for Heritage Learners, Second Quarter	5	SPECLANG 156A	First-Year Indonesian, First Quarter	5
ARABLANG 3	First-Year Arabic, Third Quarter	5	SPECLANG 157A	Second-Year Indonesian, First Quarter	4
ARABLANG 3H	Beginning Arabic for Heritage Learners, Third Quarter	5	SPECLANG 192A	First-Year Kazakh, First Quarter	4
ARABLANG 10	Arabic Calligraphy	3	SPECLANG 192B	First-Year Kazakh, Second Quarter	4
ARABLANG 21	Second-Year Arabic, First Quarter	5	SPECLANG 192C	First-Year Kazakh, Third Quarter	4
ARABLANG 21A	Accelerated Second-Year Arabic, Part I	5	SPECLANG 193A	Second-Year Kazakh, First Quarter	3
ARABLANG 21H	Second-Year Arabic for Heritage Learners, First Quarter	5	SPECLANG 193B	Second-Year Kazakh, Second Quarter	3
ARABLANG 22	Second-Year Arabic, Second Quarter	5	SPECLANG 193C	Second-Year Kazakh, Third Quarter	3
ARABLANG 22A	Accelerated second-Year Arabic, Part II	5	SPECLANG 218A	Beginning Urdu, First Quarter	5
ARABLANG 22H	Second-Year Arabic for Heritage Learners, Second Quarter	5	SPECLANG 218B	Beginning Urdu, Second Quarter	4
ARABLANG 23	Second-Year Arabic, Third Quarter	5	SPECLANG 218C	Beginning Urdu, Third Quarter	4
			SPECLANG 219B	Intermediate Urdu, Second Quarter	4
			SPECLANG 229A	Beginning Pashto, First Quarter	5
			SPECLANG 229B	Beginning Pashto, Second Quarter	5
			SPECLANG 239A	Second-Year Uzbek, First Quarter	3

SPECLANG 239B	Second-Year Uzbek, Second Quarter	3
SPECLANG 239C	Second-Year Uzbek, Third Quarter	3
SPECLANG 240A	Third-Year Uzbek, First quarter	3

## Latin American Studies Specialization

1. All courses to be counted toward the minor must be taken at the 100-level or higher, with the exception of Overseas Studies courses (see also note 1, above).
2. All courses to be counted toward the minor must be taken for a letter grade.
3. Some courses have prerequisites or special enrollment requirements. Students are responsible for making sure they have completed any prerequisites and/or secured an instructor's permission, as needed.

## Culture and Society

		Units
AMSTUD 271	Mexicans in the United States	5
ANTHRO 100D	Chavin de Huantar Research  Seminar	3-5
ANTHRO 102B	Aztec Language and Culture	3
ANTHRO 108A	The Formation of Political State in the Peruvian Andes	3-5
ANTHRO 122A	Race and Culture in Mexico and Central America	3-5
ANTHRO 124N	Maya Mythology and the Popol Vuh	3
ANTHRO 206A	Incas and their Ancestors: Peruvian Archaeology	3-5
ANTHRO 215B	Peoples and Cultures of Ancient Mesoamerica	5
ANTHRO 222A	Race and Culture in Mexico and Central America	3-5
ANTHRO 222C	Research in Maya Hieroglyphic Writing	1-2
ANTHRO 335A	Animism and Alter-Native Modernities	5
ARCHLGY 100D	Chavin de Huantar Research  Seminar	3-5
CHILATST 140	Migration in 21st Century Latin American Film	3-5
CSRE 126B	Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population	3-4
FILMSTUD 316	International Documentary	4
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 112	Medicine and Disease in the Ancient World	5
HISTORY 170C	Modern Latin America	3-5
HISTORY 273C	Caribbean Migration to the United States	4-5
HISTORY 274E	Urban Poverty and Inequality in Latin America	5
HISTORY 274G	Public Space, the Private Sphere, and Dictatorship in Latin America	5
HISTORY 275B	History of Modern Mexico	4-5
HISTORY 366B	Immigration Debates in America, Past and Present	3-5
HISTORY 371	Graduate Colloquium: Explorations in Latin American History and Historiography	4-5
HISTORY 373E	The Emergence of Nations in Latin America: Independence Through 1880	4-5
HISTORY 375C	History of Modern Mexico	4-5
HISTORY 379	Latin American Development: Economy and Society, 1800-2014	4-5
ILAC 110N	Brazil: Musical Culture and Films	3-5
ILAC 113Q	Borges and Translation	3-5
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5
ILAC 132E	Introduction to Global Portuguese: Cultural Perspectives	3-5
ILAC 140	Migration in 21st Century Latin American Film	3-5
ILAC 161	Modern Latin American Literature	3-5
ILAC 226	Impersonality and Anonymity in Contemporary Latin American Culture	3-5

ILAC 241	Fiction Workshop in Spanish	3-5
ILAC 242	Poetry Workshop in Spanish	3-5
ILAC 243	Latin American Aesthetics	3-5
ILAC 274	Aurality and Literature	3-5
ILAC 277	Senior Seminar: Spanish and Society - Cultures of Salsa	3-5
ILAC 278A	Senior Seminar: Cervantes's Novelas Ejemplares	3-5
ILAC 336	One World or Many? Representing Distance, Time, and Place in Iberian Expansion	3-5
ILAC 342	Meat	3-5
ILAC 348	US-Mexico Border Fictions: Writing La Frontera, Tearing Down the Wall	3-5
ILAC 363	Visions of the Andes	3-5
ILAC 373	Baroque Brazil	3
LATINAM 248	Racial and Gender Inequalities in Latin America	3-5
LAW 5027	Social Conflict, Social Justice, and Human Rights in 21st Century Latin America	2
LAW 5028	Regional Human Rights Protections: The Inter-American System	3
OSPMADRD 55	Latin Americans in Spain: Cultural Identities, Social Practices, and Migratory Experience	4
OSPMADRD 83	Narrating the Nation: National and Post-National Spanish and Latin American Literature	4
OSPSANTG 14	Women Writers of Latin America in the 20th Century	4-5
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	4-5
OSPSANTG 30	Short Latin American Fiction of the 20th Century	4-5
OSPSANTG 49	Chile - Another "End of the World"?	3-5
OSPSANTG 68	The Emergence of Nations in Latin America	4-5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
OSPSANTG 129X	Latin America in the International System	4-5
SOC 350W	Workshop: Migration, Ethnicity, Race and Nation	1-3

## Environment, Ecology, and Sustainability

		Units
ANTHRO 160	Social and Environmental Sustainability: The Costa Rican Case	3-5
ANTHRO 162	Indigenous Peoples and Environmental Problems	3-5
ANTHRO 260	Social and Environmental Sustainability: The Costa Rican Case	3-5
ANTHRO 262	Indigenous Peoples and Environmental Problems	3-5
ANTHRO 278	Evolution and Conservation in Galapagos	5
ANTHRO 337B	Anthropological Approaches to Health Issues in Contemporary Latin America	5
BIO 234	Conservation Biology: A Latin American Perspective	3
BIOE 371	Global Biodesign: Medical Technology in an International Context	3
EARTHSYS 121	Building a Sustainable Society: New Approaches for Integrating Human and Environmental Priorities	3
ETHICSOC 278M	Introduction to Environmental Ethics	4-5
GEOPHYS 212	Topics in Climate Change	2
HISTORY 276K	The Nature State: Latin American Conservation in Global Perspective	4-5
HISTORY 278D	Race, Ethnicity, and the Environment in Latin America	4-5

HISTORY 376K	The Nature State: Latin American Conservation in Global Perspective	4-5	HISTORY 39	Modern Britain and the British Empire	3
HISTORY 378D	Race, Ethnicity, and the Environment in Latin America	4-5	HISTORY 139	Modern Britain and the British Empire	5
HUMBIO 129	Critical Issues in International Women's Health	4	MUSIC 30N	A Stranger in a Strange Land: Jewish Musics in Translation	3
HUMBIO 129S	Global Public Health	4	MUSIC 186	Religion and Music in South Asia	4-5
OSPSANTG 58	Living Chile: A Land of Extremes	5	MUSIC 286	Religion and Music in South Asia	4-5

## Political Economy

			Units		
ECON 106	World Food Economy	5	RELIGST 209D	'Crow Eaters' & 'Fire Worshippers': Exploring Contemporary Zoroastrianism Thru Reading Parsi Lit	3-5
ECON 129	Credit markets and development: Some evidence from Latin America and the World	5	RELIGST 251	Readings in Indian Buddhist Texts	3-5
EDUC 306A	Economics of Education in the Global Economy	5	RELIGST 256	The Brahma Net Sutra (Fanwang Jing)	4
EDUC 404	Topics in Brazilian Education: Public Policy and Innovation for the 21st Century	1-2	RELIGST 259	Religion and Music in South Asia	4-5
HISTORY 172A	Mexico: From Colony to Nation, or the History of an impossible Republic?	5	SPECLANG 109A	First-Year Bengali, First Quarter	5
HISTORY 177D	U.S. Intervention and Regime Change in 20th Century Latin America	5	SPECLANG 109B	First-Year Bengali, Second Quarter	5
INTNLREL 141A	Camera as Witness: International Human Rights Documentaries	5	SPECLANG 109C	First-Year Bengali, Third Quarter	5
INTNLREL 179	Major Themes in U.S.-Latin America Diplomatic History	5	SPECLANG 152A	First-Year Hindi, First Quarter	5
IPS 241	International Security in a Changing World	5	SPECLANG 152B	First-Year Hindi, Second Quarter	5
LATINAM 177	Mapping Poverty, Colonialism and Nation Building in Latin America	1-2	SPECLANG 152C	First-Year Hindi, Third Quarter	5
LAW 5017	Law in Latin America	2	SPECLANG 153A	Second-Year Hindi, First Quarter	4
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5	SPECLANG 153B	Second-Year Hindi, Second Quarter	4
POLISCI 244C	Political Change in Latin America: The contemporary challenge to democracy	5	SPECLANG 153C	Second-Year Hindi, Third Quarter	4
POLISCI 247G	Governance and Poverty	5	SPECLANG 154A	Third-Year Hindi, First Quarter	4
POLISCI 248S	Latin American Politics	3-5	SPECLANG 154B	Third-Year Hindi, Second Quarter	4
POLISCI 347G	Governance and Poverty	3-5	SPECLANG 154C	Third-Year Hindi, Third Quarter	4
POLISCI 348S	Latin American Politics	3-5	SPECLANG 183A	First-Year Sanskrit, First Quarter	4
POLISCI 440B	Comparative Political Economy	3-5	SPECLANG 183B	First-Year Sanskrit, Second Quarter	4
			SPECLANG 218A	Beginning Urdu, First Quarter	5
			SPECLANG 218B	Beginning Urdu, Second Quarter	4
			SPECLANG 218C	Beginning Urdu, Third Quarter	4
			SPECLANG 219A	Intermediate Urdu, First Quarter	4
			SPECLANG 219B	Intermediate Urdu, Second Quarter	4
			SPECLANG 229A	Beginning Pashto, First Quarter	5
			SPECLANG 229B	Beginning Pashto, Second Quarter	5
			TAPS 157	World Drama and Performance	4
			TIBETLNG 3	First Year Tibetan, Third Quarter	4
			TIBETLNG 23	Intermediate/Advance Tibetan, Third Quarter	4
			URBANST 114	Urban Culture in Global Perspective	5

## South Asian Studies Specialization

The following is a current selection of courses related to South Asian Studies. Students should consult with their minor adviser to determine the applicability of any course to the minor in Stanford Global Studies, South Asian Studies specialization.

		Units
AMELANG 144A	First-Year Modern Persian, First Quarter	5
AMELANG 144B	First-Year Modern Persian, Second Quarter	5
AMELANG 144C	First-Year Modern Persian, Third Quarter	5
AMELANG 146A	Third-Year Persian, First Quarter	4
AMELANG 146B	Third-Year Persian, Second Quarter	4
AMELANG 146C	Third-Year Persian, Third Quarter	4
ANTHRO 28N	Secularism and its Critics	3-5
ANTHRO 126	Urban Culture in Global Perspective	5
ANTHRO 149	South Asia: History, People, Politics	5
COMPLIT 247	Bollywood and Beyond: An Introduction to Indian Film	3-5
FEMGEN 24	Sexuality, Gender, and Religion	2
GLOBAL 250	Bollywood and Beyond: An Introduction to Indian Film	3-5



# HISTORY AND PHILOSOPHY OF SCIENCE

Courses offered by the Program in History and Philosophy of Science are listed under the subject code HPS on the Stanford Bulletin's ExploreCourses web site.

The Program in History and Philosophy of Science (HPS) teaches students to examine the sciences, medicine and technology from a number of perspectives, conceptual, historical and social. The community of scholars includes core faculty and students in History and Philosophy and affiliated members in Classics, Anthropology, English, Political Science, Communication, and other disciplines. Together, they draw upon the multiple methods of their disciplines to study the development, functioning, applications, and social and cultural engagements of the sciences.

Stanford's Program in History and Philosophy of Science is a collaborative enterprise of the departments of History and Philosophy. Each department has its own undergraduate and graduate degree programs in this area, but these overlap and interact through the structure of requirements, advising, team-taught courses, an active graduate student community and a shared colloquium series (<http://HPS.stanford.edu/colloquia.html>).

The program's courses span from antiquity to the late 20th century, with emphasis on:

- ancient science
- Renaissance science
- the Scientific Revolution
- Enlightenment and transatlantic science
- history of medicine and the body
- history and philosophy of biology
- history and philosophy of modern physics
- history of the philosophy of science from the early modern period to the present
- central issues in contemporary philosophy of science
- gender, science, and technology

## Undergraduate Degrees

HPS offers undergraduates the opportunity to study science, medicine and technology by combining scientific and humanistic perspectives in a single program. Students can pursue HPS through the two departments (History and Philosophy) that coordinate this interdisciplinary program.

The HPS Program offers students an in-depth understanding of the nature and evolution of scientific ideas, practices, and institutions; their contemporary significance to intellectual life; and their material transformation of the modern world.

The Department of History offers an interdisciplinary track in History of Science, and Medicine (p. 579). This track is especially well suited to students who wish to combine history and science, or who are interested in studying the history of science and medicine in combination with premed science requirements in preparation for a future career in medicine and public health.

The Department of Philosophy offers a special program in History and Philosophy of Science (p. 673). This program is especially well suited to students who want to combine their concentration in Philosophy with the study of science and its history.

Students interested in HPS should contact the faculty advisors (in 2017-18 Paula Findlen for History and Michael Friedman for Philosophy) to discuss the undergraduate program.

## Graduate Degrees

Graduate students in the Program in History and Philosophy of Science can pursue a Ph.D. either in History, through its Ph.D. concentration in History of Science, Medicine, and Technology, or in Philosophy, through its Ph.D. subplan in History and Philosophy of Science. Diplomas will be issued by the respective departments, but the HPS study will not be noted on the transcript nor on the diploma. Ph.D. students completing the requirements of the HPS program will receive a certificate issued by the Program.

Graduate students in the Program in History and Philosophy of Science that wish to pursue a Ph.D. in Philosophy must fulfill Departmental degree requirements (p. 679) and the following requirements:

1. HPS colloquium series attendance
2. One of the following graduate level Philosophy of Science courses: 263, 264, 264A, 265, 265C, 266, 267A or 267B
3. One elective seminar in the history of science
4. One elective seminar (in addition to the course satisfying requirement 2) in philosophy of science

Philosophy Ph.D. students declaring the HPS subplan in Axes will have it appear on the official transcript but is not printed on the diploma.

The Program in History and Philosophy of Science degree requirements for the Ph.D. in History of Science, Medicine and Technology, in addition to the general History Department Ph.D. degree requirements (p. 589), are:

1. HPS colloquium series attendance
2. the History Department core seminar in History of Science, Medicine and Technology
3. Four other courses in the history of science, technology and/or medicine
4. One course in the philosophy of science
5. Four additional courses in a given geographical or national field of research, one of which must be a core course

The courses described above must include two research seminars, at least one of which must be in the history of science, technology and/or medicine. Students are expected to write papers on substantially different topics for each seminar. You should also aim to present your research at the annual meeting of a professional society associated with the history of science, technology and/or medicine sometime during your third or fourth year. For more information, see the program's (<http://hps.stanford.edu/grad.html>) web site.

## Bachelor of Arts Programs

HPS offers undergraduates the opportunity to study science, medicine and technology by combining scientific and humanistic perspectives in a single program. Students can pursue HPS through the two departments (History and Philosophy) that coordinate this interdisciplinary program.

The HPS Program offers students an in-depth understanding of the nature and evolution of scientific ideas, practices, and institutions; their contemporary significance to intellectual life; and their material transformation of the modern world.

The Department of History offers an interdisciplinary track in History of Science, and Medicine (p. 579). This track is especially well suited to students who wish to combine history and science, or who are interested in studying the history of science and medicine in combination with premed science requirements in preparation for a future career in medicine and public health.

The Department of Philosophy offers a special program in History and Philosophy of Science (p. ). This program is especially well suited to students who want to combine their concentration in Philosophy with the study of science and its history.

Students interested in HPS should contact the faculty advisers (in 2017-18 Jessica Riskin for History and Michael Friedman for Philosophy) to discuss the undergraduate program.

### Course Sequences

The following courses are offered in 2017-18 in the area of History and Philosophy of Science.

## Introductory

		Units
HPS/PHIL 60	Introduction to Philosophy of Science	5
HPS 61	Philosophy and the Scientific Revolution	5

## Science in History

This sequence is designed to introduce students to the history of Science from antiquity to the 20th century. Students are advised to take most or all of this sequence as a core foundation.

		Units
HISTORY 40/140	World History of Science	3
HISTORY 44	Women and Gender in Science, Medicine and Engineering	3
HISTORY 103E	The International History of Nuclear Weapons	5
HISTORY 105A		3-5
HISTORY 140	World History of Science	5
HISTORY 140A	The Scientific Revolution	5
MATH 163	The Greek Invention of Mathematics	3-5
HISTORY 203C/303C	History of Ignorance	5
HISTORY 240/340	The History of Evolution	4-5
HISTORY 240G	Science and Empire, 1500-1900	5
HISTORY 342	Darwin in the History of Life	4-5
HISTORY 431	Early Modern Things	4-5

## Medicine in History

This sequence is designed to introduce students to the history of medicine from antiquity to the 20th century.

		Units
AMSTUD 41Q	Madwomen: The History of Women and Mental Illness in the U.S.	3
HISTORY 242F	Medicine in an Age of Empires	4-5
HISTORY 243G/343G	Tobacco and Health in World History	4-5
HISTORY 244C	The History of the Body in Science, Medicine, and Culture	4-5

## Philosophical Perspectives on Science, Medicine, and Technology

This sequence is designed to introduce students to the philosophy of science. Students are advised to take HPS 60 Introduction to Philosophy of Science above as a starting point, and combine a number of the electives listed below in conjunction with courses in the other concentrations that address their specific interests.

		Units
PHIL 162	Philosophy of Mathematics	4
PHIL 164/264	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 165/265	Philosophy of Physics: Philosophical Issues in Quantum Mechanics	4
PHIL 167A/267A	Philosophy of Biology	4
PHIL 167B/267B	Philosophy, Biology, and Behavior	4
PHIL 224	Kant's Philosophy of Physical Science	2-4
PHIL 224A	Mathematics in Kant's Philosophy	4
PHIL 263	Significant Figures in Philosophy of Science: Einstein	4
PHIL 265C	Philosophy of Physics: Probability and Relativity	4
PHIL 266	Probability: Ten Great Ideas About Chance	4
PHIL 324	Kant's System of Nature and Freedom	4
PHIL 326	Kant's Transcendental Deduction	4
PHIL 361	Social Dimensions of Scientific Knowledge	4
PHIL 362	Grad Seminar on Philosophy of Science	4
PHIL 365	Seminar in Philosophy of Physics	2-4
PHIL 374F	Science, Religion, and Democracy	4

## Advanced Course Sequences

### Contemporary Perspectives on Science, Medicine and Technology

The following courses focus on contemporary cultural and social science approaches to science, technology, and medicine.

		Units
HPS 199	Directed Reading	1-15
HPS 299	Graduate Individual Work	1-15
ANTHRO 180	Science, Technology, and Gender	3-5
HISTORY 204D	Advanced Topics in Agnotology	4-5
HISTORY 243S/443A	Human Origins: History, Evidence, and Controversy	4-5
HISTORY 444	Graduate Research Seminar: Gender in Science, Medicine, and Engineering	5

## Graduate Degrees

Graduate students in the Program in History and Philosophy of Science can pursue a Ph.D. either in History, through its Ph.D. concentration in History of Science, Medicine, and Technology, or in Philosophy, through its Ph.D. subplan in History and Philosophy of Science. Diplomas will be issued by the respective departments, but the HPS study will not be noted on the transcript nor on the diploma. Ph.D. students completing the requirements of the HPS program will receive a certificate issued by the Program.

Graduate students in the Program in History and Philosophy of Science that wish to pursue a Ph.D. in Philosophy must fulfill Departmental degree requirements (p. ) and the following requirements:

1. HPS colloquium series attendance
2. One of the following graduate level Philosophy of Science courses: 263, 264, 264A, or 266
3. One elective seminar in the history of science
4. One elective seminar (in addition to the course satisfying requirement 2) in philosophy of science

Philosophy Ph.D. students declaring the HPS subplan via the Declaration or Change to a Field of Study form (<http://studentaffairs.stanford.edu/>)

sites/default/files/registrar/files/grad-subplan-change.pdf) will have it appear on the official transcript but is not printed on the diploma.

The Program in History and Philosophy of Science degree requirements for the Ph.D. in History of Science, Medicine and Technology, in addition to the general History Department Ph.D. degree requirements (p. ), are:

1. HPS colloquium series attendance
2. the History Department core seminar in History of Science, Medicine and Technology
3. Four other courses in the history of science, technology and/or medicine
4. One course in the philosophy of science
5. Four additional courses in a given geographical or national field of research, one of which must be a core course

The courses described above must include two research seminars, at least one of which must be in the history of science, technology and/or medicine. Students are expected to write papers on substantially different topics for each seminar. You should also aim to present your research at the annual meeting of a professional society associated with the history of science, technology and/or medicine sometime during your third or fourth year. For more information, see the program's (<http://HPST.stanford.edu/grad.html>) web site.

## Course Sequences

See the Bachelors tab for all History and Philosophy of Science courses offered in 2017-2018.

*Co-chairs:* Paula Findlen (History), Michael Friedman (Philosophy)

*Committee-in-Charge:* Paula Findlen (History), Michael Friedman (Philosophy), Helen Longino (Philosophy), Reviel Netz (Classics), Robert Proctor (History), Jessica Riskin (History), Thomas Ryckman (Philosophy)

*Program Committee:* Paula Findlen (History), Michael Friedman (Philosophy), Helen Longino (Philosophy), Tom Mullaney (History), Reviel Netz (Classics), Robert Proctor (History), Jessica Riskin (History), Thomas Ryckman (Philosophy), Londa Schiebinger (History)

*Professors:* Keith Baker (History), Paula Findlen (History), Michael Friedman (Philosophy), Gabrielle Hecht (CISAC, History), David Holloway (History, Institute for International Studies, Political Science), Helen Longino (Philosophy), Reviel Netz (Classics), Robert Proctor (History), Jessica Riskin (History), Londa Schiebinger (History), Fred Turner (Communication), Richard White (History), Caroline Winterer (History)

*Associate Professors:* Thomas Mullaney (History), Sarah Jain (Anthropology), Priya Satia (History)

*Professor (Teaching):* Thomas Ryckman (Philosophy)

*Professor (Research):* Rega Wood (Philosophy, emerita)

*Senior Lecturer:* Paul Edwards (STS)

*Other Affiliation:* Henry Lowood (Stanford University Libraries), Larry Lagerstrom (UAR)

*Visiting Scholar:* Adrienne Mayor (Classics), Alessandra Celati

## Overseas Studies Courses in History and Philosophy of Science

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

### Units

explorecourses:OSHPs

# HISTORY

Courses offered by the Department of History are listed under the subject code History on the Stanford Bulletin's ExploreCourses web site (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=HISTORY&filter-catalognumber-HISTORY=on&filter-coursestatus-Active=on&filter-term-Summer=on>).

## Mission of the Department of History

History courses teach the analytical, interpretive, and writing knowledge and skills necessary for understanding the connections between past and present. History is a pragmatic discipline in which the analysis of change over time involves sifting the influences and perspectives that affect the course of events, and evaluating the different forms of evidence historians exploit to make sense of them. Teaching students how to weigh these sources and convert the findings into persuasive analysis lies at the heart of the department's teaching. Graduates with a History major pursue careers and graduate study in law, public service, business, writing, education, and journalism.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of what it means to think historically: locating subjects in time and place and being sensitive to the contingencies of context and to change over time.
2. critical and interpretive thinking skills using course's primary source materials.
3. the ability to identify different types of sources of historical knowledge.
4. analytical writing skills and close reading skills.
5. effective oral communication skills.

## Degrees Offered

The Department of History offers the following degree programs: Bachelor of Arts, Bachelor of Arts and Sciences, Master of Arts, and Doctor of Philosophy.

## Graduate Programs in History

The primary goal of the Stanford Department of History's graduate program is the training of scholars. Most students who receive doctorates in the program go on to teach at colleges or universities. Other students have obtained positions in university administration and research.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in History and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in History. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of History and to interpret and present the results of such research.

## History Course Catalog Numbering System

Location	Introductory Seminars: 1N, 44Q, 95N	Sources and Sophomore Methods Seminars: 3S	Lectures: 1B, 64, 102, 103D,F, 105C, 106A,B, 107	Colloquia: 201A, 202A,B,G, 203,B,C, 204,C,E,G, 206,206A, 207C, 208C, 243G, 301A, 302A,B,G, 303,303B,C,F, 304,C,G, 305, 306A, D, 307C,E, 308C, 343G, 399A	Research Seminars and Workshops: 306K, 401A
International, Global, Thematic					
Ancient and Medieval Europe	11N		101	207F, 215K, 307F	
Early Modern and Modern Europe		33S, 38S	110B, C, 131A, 133A, 134A	230C, 231G, 232A, 233, 331G, 332A, 333	326A, 430, 433A, B, 438
Eastern Europe, Russia, Eurasia	20N	20S	125	221B, 224A, 228, 321A, 328	424A, B
History of Science	41Q, 44Q	42S	130A, 140, 144	208A, 232F, 308A, 332F	
Africa	48N, 48Q		145B, 147		445A, B
United States	36N, 41Q, 50K, 60N	71S, 74S, 76S	64, 130A, 150A, B, C, 151, 158C, 159, 161, 166, B, 167A	201, 203C, 251G, 252B, 253D, 256, G, 257C, 258, E, 260, 261G, 262A, E, 269, 301, 303C, 351B, C, E, 356, 358, 369	460
Latin America	78N		174	277D	471A, B
Middle East			181B, 182C, 187	281B, 284, F, 288, 381, B, 384, F	481
Jewish History			185B		486A
Asia	98N		191B, 192, 195, C, 196, 198	290E, 292, D, 297, 390E, 391B, 392, D, 396D, 397	491A, B, 494C

# Bachelor of Arts in History

## Prerequisites for the Major

Before declaring the History major, students must take one lecture course. They must take a second lecture course within one year of declaring. Fulfilling this requirement are courses numbered HISTORY 1-199 (with the exception of Freshman (xxN) and Sophomore (xxQ) Introductory Seminars).

The choices for 2017-18 are:

		Units
HISTORY 1B	Global History: The Early Modern World, 1300 to 1800	3-5
HISTORY 1C	Global History: Empires, Technology, and Modernity	3-5
HISTORY 102	History of the International System	5
HISTORY 103D	Human Society and Environmental Change	4
HISTORY 103E	The International History of Nuclear Weapons	5
HISTORY 103F	The Changing Face of War: Introduction to Military History	5
HISTORY 104	Introduction to Geospatial Humanities	3-5
HISTORY 105A		3-5
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 107D	Rise and Fall of Atlantic Slavery, 1500 to 1900	3-5
HISTORY 110B	Renaissance to Revolution: Early Modern Europe	5
HISTORY 115D	Europe in the Middle Ages, 300-1500	3-5
HISTORY 116	Traders and Crusaders in the Medieval Mediterranean	3-5
HISTORY 120A	The Russian Empire, 1450-1800	5
HISTORY 125		3-5
HISTORY 131G	From Oil to Opium: Commodities and Consumption In European and Global History, 1800-present	5
HISTORY 137	The Holocaust	4-5
HISTORY 138A		5
HISTORY 139	Modern Britain and the British Empire	5
HISTORY 140	World History of Science	5
HISTORY 140A	The Scientific Revolution	5
HISTORY 145B	Africa in the 20th Century	5
HISTORY 147	History of South Africa	5
HISTORY 150A	Colonial and Revolutionary America	5
HISTORY 150B	Nineteenth Century America	5
HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 152	History of American Law	5
HISTORY 155D	The Asian American Movement: A History of Activism	3-5
HISTORY 161	The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History	3-5
HISTORY 168D	Martin Luther King, Jr.: The Inner Life and Global Vision	3-5
HISTORY 180	The Ottoman Empire: Conquest, Coexistence, and Coffee	3-5
HISTORY 181B	Formation of the Contemporary Middle East	5
HISTORY 182G	Making Palestine Visible	3-5
HISTORY 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	5
HISTORY 190	Early Chinese Thought	3-5
HISTORY 193	The Chinese Empire from the Mongol Invasion to the Boxer Uprising	5

HISTORY 194B	Japan in the Age of the Samurai	5
HISTORY 195	Modern Korean History	5
HISTORY 195C	Modern Japanese History: From Samurai to Pokemon	5
HISTORY 198	The History of Modern China	5

## Bachelor of Arts Requirements

Completion of the major requires planning. History majors should plan to meet with their faculty advisers twice yearly, once in the Autumn and once in the Winter or Spring quarters. These meetings should take place within the first three weeks of the quarter, before the final study list deadline.

History majors are required to complete a minimum of 63 units (i.e. a minimum of 13 courses) to include:

	Units
<b>1. One Sources and Methods Seminar (HISTORY 1S-99S)<sup>1</sup></b>	5
Sources and Methods courses offered this year are:	
HISTORY 7S Stanford Collects: A History of Collecting	5
HISTORY 9S Censorship & Propaganda: From Renaissance to Revolution	5
HISTORY 22S From 'superfluous women' to the 'Yolocaust': The Experience of War in 20th Century Europe	5
HISTORY 37S Love and Lust in the French Empire, 1830-1962	5
HISTORY 45S The Cold War and the Shaping of Modern Africa	5
HISTORY 51S American Travel, Tourism and Empire in the Pacific, 1880s-1970s	5
HISTORY 68S New Orleans: An American City?	5
HISTORY 85S A History of Strangers: Jews in the Mediterranean	5
HISTORY 90S The Forgotten War: The Korean War in Historical Perspective	5
HISTORY 95S Protest in Modern China	5
<b>2. Two 200-level undergraduate colloquia (HISTORY 200-298)<sup>2</sup></b>	10
<b>3. At least one other small group course</b>	5
To be chosen among the department's undergraduate 200-level courses (excluding HISTORY 209S), Sources & Methods seminars or Stanford Introductory Seminars	
<b>4. Two lecture courses<sup>3</sup></b>	10
One of which must be either	
A Europe survey course such as:	
HISTORY 110B Renaissance to Revolution: Early Modern Europe	
HISTORY 115D Europe in the Middle Ages, 300-1500	
Or, or a United States survey course such as:	
HISTORY 150A Colonial and Revolutionary America	
HISTORY 150B Nineteenth Century America	
HISTORY 150C The United States in the Twentieth Century	
The second must be a lecture course in African, Asian, Middle East, or Latin American History.	
<b>5. Completion of the Writing in the Major (WIM) requirement<sup>4</sup></b>	
HISTORY 209S Research Seminar for Majors	5
<b>6. At least 6 additional courses to total a minimum of 63 units.</b>	28

<sup>1</sup> Sources and Methods seminars constitute the department's "skills" class and should be taken as early as possible in a student's course of study. They are designed for freshmen and sophomores considering or beginning the History major. This requirement must be completed prior to enrolling in HISTORY 209S Research Seminar for Majors.

<sup>2</sup> ExploreCourses lists all colloquia offered this year (<https://explorecourses.stanford.edu/search?filter-term=Summer=on&filter-component-COL=on&filter-coursestatus=Active=on&filter-term-Spring=on&filter-term-Winter=on&filter-term-Autumn=on&filter-academiclevel-UG=on&page=0&q=HISTORY&view=catalog&filter-catalognumber-HISTORY=on&collapse=%2c6%2c7%2c&academicYear=20142015>).

<sup>3</sup> Students may count courses they took as prerequisites to the major for this requirement.

<sup>4</sup> In completing this course, students must write a 20-25 page essay based on original research and including at least two drafts. HISTORY 209S Research Seminar for Majors may be taken in either the junior or the senior year. Students must complete the Sources and Methods seminar before enrolling in the Research Seminar.

- Winter: Early Modern Travel/Imaginative Geographies; Europe before 1500
- Spring: American Political History; Open

## Honors Program

For a limited number of majors, the department offers a special program leading to Departmental Honors in History. Students accepted for this program, in addition to fulfilling the general requirements stated above, begin work as early as Spring Quarter of the junior year and complete the essay by mid-May of the senior year. In addition to HISTORY 299H Junior Honors Colloquium, students must enroll in 11-15 units of Senior Research in the senior year, to be distributed as best fits their specific project. For students in the Honors program, Senior Research units (HISTORY 299A Senior Research I, HISTORY 299B Senior Research II, HISTORY 299C Senior Research III) are taken in addition to the thirteen required courses in History.

### Additional Requirements

1. Courses comprising the 63 units must be taken for a letter grade, and the student must maintain a grade point average (GPA) in History courses of 2.0 or higher.
2. At least nine courses must be taken from within the Stanford Department of History. Transfer students and those who study abroad may be granted exemptions from this requirement at the discretion of the Director of Undergraduate Studies.
3. At least six quarters of enrollment in the major. Each candidate for the B.A. in History should declare the major by the Autumn Quarter of the third year of study or earlier, if possible.
4. One HISTORY 299S Undergraduate Directed Research and Writing taken for 3-5 units and for a letter grade may be applied toward the thirteen courses required for the B.A. in History.
5. *Capstone*: The History department organizes a series of luncheon workshops quarterly, at which students present their research essays and honors theses.
6. The department encourages students to acquire proficiency in foreign languages and study at one of Stanford's overseas programs. Such studies are not only valuable in themselves; they can provide an opportunity for independent research and a foundation for honors essays and graduate study.
7. Advanced Placement credits do not fulfill any major requirements.

To enter this program, the student must be accepted by a member of the department who agrees to advise the research and writing of the essay, and must complete the Junior Honors Colloquium (299H) offered in Winter Quarter. An exception to the latter requirement may be made for those studying overseas Winter Quarter of the junior year, but such students should consult with the director of the honors program, if possible, prior to going overseas. Students who study abroad for the entire junior year and want to write an honors thesis should plan to take the Research Seminar for Majors in the first quarter following completion of the study abroad program. Under exceptional circumstances, students are admitted to the program in Autumn Quarter of the senior year. Such students must not enroll in any HISTORY 299A Senior Research I, HISTORY 299B Senior Research II, HISTORY 299C Senior Research III, units until HISTORY 209S Research Seminar for Majors, has been completed.

In considering an applicant for such a project, the adviser and director of the honors program take into account general preparation in the field of the project and expect a GPA of at least 3.5 in the student's previous work in History and a 3.3 in overall University work. Students completing the thesis with a grade of 'B+' or higher are eligible for Departmental Honors in History. To enter the Honors program, apply at the Department of History office.

For further information on History courses' satisfaction of major requirements, see the Department of History (<http://history.stanford.edu/programs/undergraduate>) web site.

Outstanding honors essays may be considered for the University's Robert M. Golden Medal, as well as for departmental James Birdsall Weter prize.

### Writing in the Major (WIM) Requirement

History's Writing in the Major requirement is satisfied by completing HISTORY 209S Research Seminar for Majors.

*Honors Program Requirements*—To graduate with departmental honors in History, students must:

This course may be taken in either the junior or senior year, but not before completing the sources and methods seminar requirement. Students write a 20-25 page research essay. Original research and revision are important parts of the research essay. Students must conduct substantial research in the libraries and must submit at least two drafts (a rough draft and a final draft) of the essay. Students who wish to write an honors thesis should take HISTORY 209S Research Seminar for Majors in the junior year. Where appropriate, a student can use the research seminar to begin working on the honors thesis.

1. complete HISTORY 299H Junior Honors Colloquium in the junior year.
2. maintain a GPA of at least 3.3 in overall University work and a 3.5 in the History major during the final 5 quarters of enrollment/thesis preparation, or obtain the consent of the Director of the Honors Program.
3. select both a primary thesis adviser (who is a member of the Stanford History faculty) and a secondary adviser (who is a Stanford University faculty member with an active teaching appointment for the duration of academic year 2017-18) no later than Autumn Quarter of the senior year.
4. submit on May 7, 2018 by noon a 16,250- 30,000 words honors thesis including bibliography that receives a grade of 'B+' or better.
5. enroll in the 11-15 units of Senior Research as specified below.
6. participate in mandatory Honors Program activities throughout senior year (including, but not limited to, writing workshops and the annual Honors Presentation Luncheon) as specified in the Honors Program Handbook.

HISTORY 209S Research Seminar for Majors fulfills the WIM requirement only. It does not fulfill geographical requirements or small group course requirements.

Students select their research topics based on the general topics of each quarter's offerings.

- HISTORY 209S Research Seminar for Majors
  - Autumn: Gender, Race, Sexuality; History of Science/Honors

HISTORY 299A Senior Research I, HISTORY 299B Senior Research II, HISTORY 299C Senior Research III do not fulfill any history major

requirements other than honors, but the units do count towards the 180 required for B.A. degree conferral.

*Required Course*—To be taken in the junior year:

HISTORY 299H	Junior Honors Colloquium	Units 1
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*Required Course*—Recommended to be taken in junior year:

HISTORY 209S	Research Seminar for Majors	Units 5
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An exception (for HISTORY 299H Junior Honors Colloquium) may be made for those studying overseas Winter Quarter of the junior year, but such students should consult with the Director of the Honors Program prior to going overseas.

To be taken in the senior year:

HISTORY 299A	Senior Research I	Units 1-5
HISTORY 299B	Senior Research II	1-5
HISTORY 299C	Senior Research III	1-5

## Overseas Studies or Study Abroad

Courses offered by Stanford's Bing Overseas Studies Program and appearing on the History department's cognate course list automatically receive credit towards the major or minor in History. Course work completed in non-Stanford Study Abroad programs is evaluated for major/minor credit by designated History department faculty on a case-by-case basis. Students in non-Stanford Study Abroad programs are advised to take classes with reading and writing components comparable to History department course loads.

## History Fields of Study or Degree Options

The Department of History offers the following tracks to the B.A. in History. These tracks are not declared on Axxess; they do not appear on the transcript or on the diploma. The tracks are:

- General History
- Global Affairs and World History
- History, Philosophy, and the Arts
- History of Science and Medicine
- History and Law
- Public History/Public Service

The General History track emphasizes breadth of study among historical areas and periods as well as concentration in one selected field. The Global Affairs and World History track emphasizes an understanding of today's world through a historical examination of its evolution, from the early modern to the contemporary era. The four tracks with interdisciplinary emphasis (History, Philosophy, and the Arts; History of Science and Medicine; History and Law; and Public History/Public Service) combine the study of history with the methods and approaches of other disciplines, and involve substantial course work outside of History.

### General History Track

In addition to completing the requirements for all History majors, the student in the General History track is required to satisfy breadth and concentration requirements.

1. *Breadth Requirements*: to ensure chronological and geographical breadth, at least two courses must be completed in a pre-modern chronological period and in each of three geographical fields:

- a. Field I (Africa, Asia, and Middle East)
  - b. Field II (the Americas)
  - c. Field III (Europe, including Western Europe, Eastern Europe, and Russia).
  - d. Courses fulfilling the pre-modern chronological period (Field IV) may also count for Fields I-III.
2. Courses for 2017-18 follow below.
  3. *Concentration*: to develop some measure of expertise, students must complete four courses in a single area (including one undergraduate colloquium or research seminar). The proposed concentration must be approved by the major adviser; a proposal for a thematic concentration must be approved by both the adviser and the department's director of undergraduate studies. Areas of concentration are:
    - Africa
    - Asia
    - Eastern Europe and Russia
    - Europe before 1700
    - Europe since 1700
    - Jewish History
    - Latin America
    - Science and Medicine
    - The United States
    - The Middle East
    - International History
    - Comparative Empires and Cultures
    - or a thematic subject treated comparatively, such as war and revolution, work, gender, family history, popular culture, or high culture.
  4. *Required course*: HISTORY 102 History of the International System is a required course for students who select the International History concentration. This course is offered in Spring Quarter.

### Field I: Africa/Asia/Middle East

		Units
HISTORY 45B	Africa in the Twentieth Century	3
HISTORY 47	History of South Africa	3
HISTORY 48	The Egyptians	3-5
HISTORY 48Q	South Africa: Contested Transitions	4
HISTORY 84N	The American Empire in the Middle East	4
HISTORY 90	Early Chinese Thought	3-5
HISTORY 93	The Chinese Empire from the Mongol Invasion to the Boxer Uprising	3
HISTORY 94B	Japan in the Age of the Samurai	3
HISTORY 95	Modern Korean History	3
HISTORY 95C	Modern Japanese History: From Samurai to Pokemon	3
HISTORY 98	The History of Modern China	3
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 145B	Africa in the 20th Century	5
HISTORY 147	History of South Africa	5
HISTORY 148	The Egyptians	3-5
HISTORY 181B	Formation of the Contemporary Middle East	5
HISTORY 190	Early Chinese Thought	3-5
HISTORY 193	The Chinese Empire from the Mongol Invasion to the Boxer Uprising	5
HISTORY 194B	Japan in the Age of the Samurai	5
HISTORY 195	Modern Korean History	5
HISTORY 195C	Modern Japanese History: From Samurai to Pokemon	5

HISTORY 198	The History of Modern China	5
HISTORY 246	The Dynamics of Change in Africa	4-5
HISTORY 281B	Modern Egypt	4-5
HISTORY 283G	Place, Nature, and Life: Production of Space in European and Muslim History	4-5
HISTORY 290	North Korea in Historical Perspective	4-5
HISTORY 290E	Movies and Empire in East Asia	4-5

## Field II: The Americas

		Units
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 50B	Nineteenth Century America	3
HISTORY 50C	The United States in the Twentieth Century	3
HISTORY 54N	African American Women's Lives	3
HISTORY 61N	The Worlds of Thomas Jefferson	3
HISTORY 69Q	American Road Trips	4
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 150A	Colonial and Revolutionary America	5
HISTORY 150B	Nineteenth Century America	5
HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 152	History of American Law	5
HISTORY 154D		4
HISTORY 255D	Racial Identity in the American Imagination	4-5
HISTORY 256E	The American Civil War	5
HISTORY 258E	History of School Reform: Origins, Policies, Outcomes, and Explanations	3-5
HISTORY 256G	Constructing Race and Religion in America	4-5
HISTORY 260	California's Minority-Majority Cities	4-5
HISTORY 260K	Exploring American Religious History	4
HISTORY 272D	Teaching Mexican American History in High School	5

## Field III: Europe, Eastern Europe, and Russia

		Units
HISTORY 1B	Global History: The Early Modern World, 1300 to 1800	3-5
HISTORY 14N	Making the Middle Ages	3
HISTORY 15D	Europe in the Middle Ages, 300-1500	3-5
HISTORY 22S	From 'superfluous women' to the 'Yolocaust': The Experience of War in 20th Century Europe	5
HISTORY 23N	The Soviet Union and the World: View from the Hoover Archives	3
HISTORY 25N	Stalin's Europe, 1944-1948	3
HISTORY 37S	Love and Lust in the French Empire, 1830-1962	5
HISTORY 39	Modern Britain and the British Empire	3
HISTORY 40A	The Scientific Revolution	3
HISTORY 85B	Jews in the Contemporary World: Faith and Ethnicity, Visibility and Vulnerability	3
HISTORY 101	The Greeks	4-5
HISTORY 115D	Europe in the Middle Ages, 300-1500	3-5
HISTORY 139	Modern Britain and the British Empire	5
HISTORY 140A	The Scientific Revolution	5
HISTORY 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5
HISTORY 202G	Peoples, Armies and Governments of the Second World War	4-5
HISTORY 218	The Holy Dead: Saints and Spiritual Power in Medieval Europe	4-5

HISTORY 220G	Demons, Witches, Old Believers, Holy Fools, and Folk Belief: Popular Religion in Russia	4-5
HISTORY 224A	The Soviet Civilization	4-5
HISTORY 230C	Paris: Capital of the Modern World	4-5
HISTORY 232G	Early Modern Cities	4-5
HISTORY 237D	The French Revolution and the Birth of Modern Politics	4-5
HISTORY 237F	20th Century British History through the Hoover Archives	4-5
HISTORY 238J	The European Scramble for Africa: Origins and Debates	5
HISTORY 283G	Place, Nature, and Life: Production of Space in European and Muslim History	4-5

## Field IV: Pre-1700

		Units
HISTORY 1B	Global History: The Early Modern World, 1300 to 1800	3-5
HISTORY 7D	Rise and Fall of Atlantic Slavery, 1500 to 1900	3-5
HISTORY 10N	Thinking About War	3
HISTORY 14N	Making the Middle Ages	3
HISTORY 15D	Europe in the Middle Ages, 300-1500	3-5
HISTORY 16	Traders and Crusaders in the Medieval Mediterranean	3-5
HISTORY 40	World History of Science	3
HISTORY 40A	The Scientific Revolution	3
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 90	Early Chinese Thought	3-5
HISTORY 94B	Japan in the Age of the Samurai	3
HISTORY 101	The Greeks	4-5
HISTORY 107D	Rise and Fall of Atlantic Slavery, 1500 to 1900	3-5
HISTORY 115D	Europe in the Middle Ages, 300-1500	3-5
HISTORY 116	Traders and Crusaders in the Medieval Mediterranean	3-5
HISTORY 140	World History of Science	5
HISTORY 140A	The Scientific Revolution	5
HISTORY 150A	Colonial and Revolutionary America	5
HISTORY 190	Early Chinese Thought	3-5
HISTORY 194B	Japan in the Age of the Samurai	5
HISTORY 206B	Intoxicated: Commodities & Globalization in the Early Modern World	4-5
HISTORY 207C	The Global Early Modern	4-5
HISTORY 218	The Holy Dead: Saints and Spiritual Power in Medieval Europe	4-5
HISTORY 232G	Early Modern Cities	4-5
HISTORY 240G	Science and Empire, 1500-1900	4-5
HISTORY 242F	Medicine in an Age of Empires	4-5
HISTORY 283G	Place, Nature, and Life: Production of Space in European and Muslim History	4-5
HISTORY 294C	First Encounters: China and the West, 1500-1860	4-5

## Global Affairs and World History Track

The Global Affairs and World History Track is designed to offer an empirically rich curriculum for Stanford students interested in international affairs. The goal is to impart an understanding of today's world through a historical examination of its evolution, from the early modern to the contemporary era. This track appeals to students who are aiming for a career in the international arena, and who seek to inform themselves about the complexities of cultural diversity and spatial differentiation on the ground. Deploying both connective and



comparative modes of analysis, majors who choose this track will acquire a robust understanding of the relevance of the past to current events.

The Global Affairs and World History track features gateway courses in Global Human Geography, a recommended skills component, a geographical concentration, and a core cluster of global and comparative offerings. Students choosing this track also develop proficiency in a foreign language at the second-year level or above. Incorporating primary sources in a language other than English into the capstone seminar or honors thesis is encouraged.

*Gateway Courses (two courses):* Students must complete two of the following courses:

		Units
HISTORY 1B	Global History: The Early Modern World, 1300 to 1800	3-5
HISTORY 1C	Global History: Empires, Technology, and Modernity	3-5
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 106B	Global Human Geography: Europe and Americas	5

*Note:* If a student wishes to do more than two of these courses, the course is applied to the methodological cluster.

*Geographical Cluster (four courses):* Students select four History courses in one geographic area, such as Europe, Latin America, Asia, Middle East, or Africa. The faculty coordinator must pre-approve all courses in this cluster.

*Global and Comparative Courses (Methodological Cluster) (six courses):* Majors selecting this track take at least 6 thematic history courses of global scope. Courses offered in 2017-18 are:

		Units
HISTORY 1B	Global History: The Early Modern World, 1300 to 1800	3-5
HISTORY 1C	Global History: Empires, Technology, and Modernity	3-5
HISTORY 9N	How to Start Your Own Country: Sovereignty and State-Formation in Modern History	3
HISTORY 10N	Thinking About War	3
HISTORY 23N	The Soviet Union and the World: View from the Hoover Archives	3
HISTORY 39	Modern Britain and the British Empire	3
HISTORY 40	World History of Science	3
HISTORY 40A	The Scientific Revolution	3
HISTORY 44	Women and Gender in Science, Medicine and Engineering	3
HISTORY 45B	Africa in the Twentieth Century	3
HISTORY 47	History of South Africa	3
HISTORY 63N	The Feminist Critique: The History and Politics of Gender Equality	3-4
HISTORY 84N	The American Empire in the Middle East	4
HISTORY 90	Early Chinese Thought	3-5
HISTORY 95	Modern Korean History	3
HISTORY 95C	Modern Japanese History: From Samurai to Pokemon	3
HISTORY 95N	Maps in the Modern World	4-5
HISTORY 98	The History of Modern China	3
HISTORY 102	History of the International System	5
HISTORY 103D	Human Society and Environmental Change	4
HISTORY 103E	The International History of Nuclear Weapons	5

HISTORY 103F	The Changing Face of War: Introduction to Military History	3-5
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 107D	Rise and Fall of Atlantic Slavery, 1500 to 1900	3-5
HISTORY 108C	Sugar and Slavery, Race and Revolution: The Caribbean 1450-1888	3-5
HISTORY 131G	From Oil to Opium: Commodities and Consumption in European and Global History, 1800-present	5
HISTORY 139	Modern Britain and the British Empire	5
HISTORY 140	World History of Science	5
HISTORY 140A	The Scientific Revolution	5
HISTORY 145B	Africa in the 20th Century	5
HISTORY 147	History of South Africa	5
HISTORY 181B	Formation of the Contemporary Middle East	5
HISTORY 190	Early Chinese Thought	3-5
HISTORY 195	Modern Korean History	4-5
HISTORY 195C	Modern Japanese History: From Samurai to Pokemon	5
HISTORY 198	The History of Modern China	5
HISTORY 202D	The History of Genocide	4-5
HISTORY 202G	Peoples, Armies and Governments of the Second World War	4-5
HISTORY 203C	History of Ignorance	5
HISTORY 204	What is History?	5
HISTORY 204D	Advanced Topics in Agnotology	4-5
HISTORY 205K	The Age of Revolution: America, France, and Haiti	4-5
HISTORY 206J	Resist, Rebel, Revolt: A Global History	4-5
HISTORY 207C	The Global Early Modern	4-5
HISTORY 208A	Science and Law in History	4-5
HISTORY 208K	Global Capitalism and the Global South	5
HISTORY 224A	The Soviet Civilization	4-5
HISTORY 224C	Genocide and Humanitarian Intervention	3
HISTORY 226E	Famine in the Modern World	3
HISTORY 232C	European Security Since World War Two	4-5
HISTORY 238J	The European Scramble for Africa: Origins and Debates	5
HISTORY 243G	Tobacco and Health in World History	4-5
HISTORY 246	The Dynamics of Change in Africa	4-5
HISTORY 256	350 Years of America-China Relations	4-5
HISTORY 281B	Modern Egypt	4-5
HISTORY 286	Jews Among Muslims in Modern Times	4-5
HISTORY 290	North Korea in Historical Perspective	4-5
HISTORY 290E	Movies and Empire in East Asia	4-5
HISTORY 292D	Japan in Asia, Asia in Japan	4-5
HISTORY 295F	Race and Ethnicity in East Asia	4-5

*Proficiency in a foreign language:* Students electing the Global Affairs and World History track must acquire proficiency in a foreign language through two years of college-level course work (second-year, third-quarter) or by passing a proficiency exam. Language courses do not count toward the 13 required courses in the major; students may, however, be interested in pairing this track in the History major with a foreign language minor.

*Skills Training:* Students in the Global Affairs and World History track are encouraged to acquire technical proficiencies relevant for geo-historical analysis and fieldwork abroad. Please see the Undergraduate Student Services Coordinator for further information on these courses.

Those planning to pursue research overseas are also advised to enroll in the one-credit workshop, HISTORY 299X Preparing for International Field Work: Public Service or Research in Spring Quarter.

**Overseas Study Experience:** Students electing this track are encouraged to study abroad, with a Stanford BOSP program or another program approved by the directors of the track. Course work taken overseas may be accepted for credit in the track on a case by case basis, in consultation with a faculty coordinator.

**Research Seminar for Majors:** HISTORY 209S Research Seminar for Majors fulfills Writing in the Major requirement.

**General Requirements:**

As for all History majors, students in this track must complete two lecture courses (one Europe or U.S., and one Africa, Asia, Middle East, or Latin America), two 200-level courses, a Sources and Methods seminar, and HISTORY 209S Research Seminar for Majors.

## History Tracks with Interdisciplinary Emphasis (HMIE)

There are four History Tracks with Interdisciplinary Emphasis:

- History, Philosophy, and the Arts
- History of Science and Medicine
- History and the Law
- Public History/Public Service

These tracks are designed for students who are interested in other disciplines who want to focus on the historical aspects of the subject matter covered by that discipline, who want to understand how interdisciplinary approaches can deepen their understanding of history, or who are primarily interested in developing interdisciplinary approaches to historical scholarship by combining the careful attention to evidence and context that motivates historical research with the analytic and methodological tools of science and the humanities.

In pursuing the designated requirements for all History majors, students in HMIE are required to complete their thirteen courses for the major as follows:

**Gateway Course:** Students are required to take the appropriate gateway course for their interdisciplinary track. This course introduces students to the application of particular interdisciplinary methods to the study of history. See the section on each HMIE for the gateway course appropriate to that major track. *Note:* The History and the Law track has no gateway course requirement.

**Methodological Cluster:** This cluster is designed to acquaint students with the ways in which interdisciplinary methods are employed in historical scholarship, by practicing historians and scholars in other disciplines whose work is historical. This program of study must provide methodological coherence and must be approved in advance by the student's adviser. See the section on each HMIE for the appropriate historical methods courses.

**Geographic Cluster:** History is embedded in time and place. This cluster is designed to emphasize that the purpose of studying methodology is to more fully understand the history of a particular region of the world. Students select a particular geographic region, as specified in the History major, and complete four courses in that area.

**Interdisciplinary Cluster:** These courses, taken outside the Department of History, acquaint students with the methods and approaches of another discipline appropriate for the interdisciplinary study of history. This program of study must provide methodological coherence and must be approved in advance by the student's adviser. See the section on each HMIE for appropriate interdisciplinary courses.

**Research Seminar for Majors:** HISTORY 209S Research Seminar for Majors fulfills Writing in the Major Requirement.

HMIE tracks do not mandate the breadth or concentration requirements of the General History track. IHUM courses taught by History faculty may apply to HMIE tracks only insofar as their content is specifically appropriate to the particular methodological or geographic cluster; IHUM courses are no longer offered.

## History, Philosophy, and the Arts

The History, Philosophy, and the Arts (HPA) track is designed for the student who wishes to complement his or her work in History with study in literature and philosophy, particularly in a foreign language. For the purposes of this track, Arts are defined broadly, including fine art and art history, drama, films, memoirs and autobiography, poetry and novels, as well as canonical works in philosophy, political science, and history of political thought. It appeals to students who are interested in studying the humanities and its conceptual and linguistic worlds in their historical context, or who want to focus on both the literature and history of a specific geographical area while also learning the language of that area.

**Gateway Courses (two courses):** Students must take two of the following courses:

		Units
HISTORY 1C	Global History: Empires, Technology, and Modernity	3-5
HISTORY 9N	How to Start Your Own Country: Sovereignty and State-Formation in Modern History	3
HISTORY 140A	The Scientific Revolution	5
HISTORY 201K	A History of the Global Left: Revolutionary Movements against Empire	4-5

*Note:* If a student wishes to do more than two of these courses, the course is applied to the methodological cluster.

**Methodological Cluster (two courses):** This two-course cluster teaches students how historians, in particular, analyze literary texts and philosophical works as documentary sources for writing cultural and intellectual history. Students choose two courses from among the pre-approved HPA methodology curriculum. These courses need not be in the student's geographic concentration. For 2017-18, these courses are:

		Units
HISTORY 1C	Global History: Empires, Technology, and Modernity	3-5
HISTORY 9N	How to Start Your Own Country: Sovereignty and State-Formation in Modern History	3
HISTORY 9S	Censorship & Propaganda: From Renaissance to Revolution	5
HISTORY 20N	Russia in the Early Modern European Imagination	4
HISTORY 36N	Gay Autobiography	4
HISTORY 50A	Colonial and Revolutionary America	3
HISTORY 51S	American Travel, Tourism and Empire in the Pacific, 1880s-1970s	5
HISTORY 54N	African American Women's Lives	3
HISTORY 68D	Martin Luther King, Jr.: The Inner Life and Global Vision	3-5
HISTORY 85S	A History of Strangers: Jews in the Mediterranean	5
HISTORY 95S	Protest in Modern China	5
HISTORY 115D	Europe in the Middle Ages, 300-1500	3-5
HISTORY 139	Modern Britain and the British Empire	5
HISTORY 140A	The Scientific Revolution	5
HISTORY 150A	Colonial and Revolutionary America	5

HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 152	History of American Law	5
HISTORY 168D	Martin Luther King, Jr.: The Inner Life and Global Vision	3-5
HISTORY 190	Early Chinese Thought	3-5
HISTORY 198	The History of Modern China	5
HISTORY 201K	A History of the Global Left: Revolutionary Movements against Empire	4-5
HISTORY 218	The Holy Dead: Saints and Spiritual Power in Medieval Europe	4-5
HISTORY 230C	Paris: Capital of the Modern World	4-5
HISTORY 255D	Racial Identity in the American Imagination	4-5
HISTORY 290E	Movies and Empire in East Asia	4-5
HISTORY 293E	Female Divinities in China	4-5

**Geographical Cluster (four courses):** Students select four History courses in one geographic area. These are: Europe, Britain and the countries of the former British Empire, Asia, North America, Latin America, the Middle East, or Africa. These four courses must be taken in addition to the two methodological courses required above.

**Interdisciplinary Cluster (four courses):** Four courses, taken outside the Department of History, must address the literature and arts, broadly defined, of the area chosen for the geographic concentration. The student's adviser must pre-approve all courses in this cluster; these courses may not be double-counted towards a minor or major other than History.

**Research Seminar for Majors:** HISTORY 209S Research Seminar for Majors fulfills Writing in the Major requirement.

**General Requirements:** Like all History majors, students in History Interdisciplinary Programs must complete two lecture courses (one Europe or U.S., one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

## History of Science and Medicine

The History of Science and Medicine (HS&M) track is a collaborative program of the Department of History and the Program in the History and Philosophy of Science. The major is designed for students interested in both sciences and humanities, and in the interactions between the two. It is also especially useful for students contemplating medical school, since it allows them to study the history of medicine, biology, and allied sciences in conjunction with fulfilling the premed science requirements.

**Gateway Course (one course):** HISTORY 140A The Scientific Revolution

**Methodological Cluster (three courses):** These History courses focus on the history of science and medicine. For 2017-18, these courses are:

		Units
HISTORY 40	World History of Science	3
HISTORY 44	Women and Gender in Science, Medicine and Engineering	3
HISTORY 103E	The International History of Nuclear Weapons	5
HISTORY 140	World History of Science	5
HISTORY 203C	History of Ignorance	5
HISTORY 204D	Advanced Topics in Agnotology	4-5
HISTORY 208A	Science and Law in History	4-5
HISTORY 240	The History of Evolution	4-5
HISTORY 240G	Science and Empire, 1500-1900	4-5
HISTORY 241D	Einstein and the Structure of Reality	4-5
HISTORY 242F	Medicine in an Age of Empires	4-5

HISTORY 243G	Tobacco and Health in World History	4-5
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**Geographical Cluster (four courses):** Students select four History courses in one geographic area. Examples include: Europe, Britain and the countries of the former British Empire, Asia, North America, Latin America, the Middle East, or Africa. These four courses must be taken in addition to the three methodological cluster courses. Courses in the history of science, technology, and medicine that have a geographic focus may be used to fulfill this requirement, but cannot be double-counted in the methodological cluster.

**Interdisciplinary Cluster (four courses):** Students select four courses in scientific disciplines and/or in philosophy of science, anthropology of science, or sociology of science. These courses require faculty adviser pre-approval.

**Research Seminar for Majors:** HISTORY 209S Research Seminar for Majors fulfills the Writing in the Major requirement.

**General Requirements:** As with all History majors, students in History Interdisciplinary Programs must complete two lecture courses (one Europe or U.S., one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

## History and Law

The History and Law (HL) interdisciplinary track is for students who want to explore the intersections between historical and legal studies. The HL curriculum focuses on the role of legal institutions, policies, and structures in various societies. HL track majors enroll in at least four History department courses that focus on issues of law in civil societies and four courses that provide a geographic concentration. In addition, students enroll in four courses outside History that provide disciplinary or interdisciplinary perspectives on the role of law in shaping societies and a Research Seminar for Majors.

**Gateway Course:** There is no gateway course for this track. Instead, students take an extra course in the Methodological cluster.

**Methodological Cluster (four courses):** Students enroll in at least four History department courses, including courses outside History taught by faculty affiliated with the department, that focus on how law, policies, constitutions, and legal structures affect the development of various societies. *Note:* The Methodological Cluster for this HIP contains one extra course since there is no Gateway course.

For 2017-18, these courses are:

		Units
HISTORY 9N	How to Start Your Own Country: Sovereignty and State-Formation in Modern History	3
HISTORY 9S	Censorship & Propaganda: From Renaissance to Revolution	5
HISTORY 50B	Nineteenth Century America	3
HISTORY 61	The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History	3-5
HISTORY 61N	The Worlds of Thomas Jefferson	3
HISTORY 63N	The Feminist Critique: The History and Politics of Gender Equality	3-4
HISTORY 85S	A History of Strangers: Jews in the Mediterranean	5
HISTORY 150A	Colonial and Revolutionary America	5
HISTORY 150B	Nineteenth Century America	5
HISTORY 161	The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History	3-5
HISTORY 202D	The History of Genocide	4-5
HISTORY 203C	History of Ignorance	5

HISTORY 204D	Advanced Topics in Agnotology	4-5
HISTORY 208A	Science and Law in History	4-5
HISTORY 222	Crime and Punishment in Early Modern Europe and Russia	4-5
HISTORY 224A	The Soviet Civilization	4-5
HISTORY 237D	The French Revolution and the Birth of Modern Politics	4-5
HISTORY 238J	The European Scramble for Africa: Origins and Debates	5
HISTORY 243G	Tobacco and Health in World History	4-5
HISTORY 260	California's Minority-Majority Cities	4-5
HISTORY 293A	Research Seminar on Political Thought	4-5

*Geographical Cluster (four courses):* Students select four History courses in one geographic area. These are: Europe, Britain and the countries of the former British Empire, Asia, North America, Latin America, the Middle East, or Africa. These four courses must be taken in addition to the three methodological courses required above.

*Interdisciplinary Cluster (four courses):* Students may select from courses offered in the School of Law, School of Education, and others as appropriate. *Note:* Courses in the School of Law and School of Education require the permission of the instructor before undergraduate students can enroll, since these are graduate-level courses.

*Research Seminar for Majors:* HISTORY 209S Research Seminar for Majors fulfills the Writing in the Major requirement.

*General Requirements:* Like all history majors, students in History Interdisciplinary Programs must complete two lecture courses (one Europe or U.S., one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

### Public History/Public Service

The Public History/Public Service (PH/PS) interdisciplinary history track is designed for students who wish to include in their course of studies the application of historical study in (1) public settings such as museums and heritage sites, national and state parks, public agencies, and private foundations, and (2) public service settings in non-profit organizations, public agencies, and educational institutions.

PH/PS majors enroll in a gateway course on public history and public service and in four History department courses that provide a geographic concentration as well as completing a two-course methodological requirement. PH/PS majors must also complete an internship through a regularly offered community engaged learning course or through a summer internship or fellowship. In addition, students, in consultation with the PH/PS faculty coordinator, must complete four courses from outside the History department (see the annual listing of community engaged learning courses [Cardinal Courses] provided by the Haas Center for Public Service).

*Gateway Course (one course):* HISTORY 201 From Confederate Monuments to Wikipedia: The Politics of Remembering the Past

*Geographical Cluster (four courses):* Students select four History courses in one geographic area, such as the United States, Europe, Latin America, Asia, Middle East, or Africa.

*Interdisciplinary Cluster (four courses):* Students select four courses from outside the History department that addresses a theme or topic of interest. The faculty coordinator must pre-approve all courses in this cluster.

*Methodological Cluster (two courses):* Students must enroll in one Sources and Methods seminar course and one additional 200-level History course.

The Writing in the Major (WIM) requirement must be completed in a Research Seminar for Majors.

*Public Service/Service Learning Internship (one course):* Students must engage in at least a one quarter internship through a community engaged learning course or through a full-time public service or public history summer internship or fellowship. This internship must be pre-approved by the faculty coordinator.

Students who complete a paid summer internship in lieu of one for academic credit must enroll in 3 units of HISTORY 299S Undergraduate Directed Research and Writing with the faculty coordinator of the PH/PS track and write a 20-page research paper related to their internship work. This research paper is in addition to that required for the Research Seminar for Majors.)

The following History community engaged learning courses are offered in 2017-18:

		Units
HISTORY 201	From Confederate Monuments to Wikipedia: The Politics of Remembering the Past	5
HISTORY 260	California's Minority-Majority Cities	4-5
HISTORY 272D	Teaching Mexican American History in High School	5

If students elect to fulfill the internship requirement through a History Department service-learning course, they must enroll in an additional course in either the geographical cluster or the Interdisciplinary cluster in order to complete the 13 courses required for the major.

*Research Seminar for Majors:* HISTORY 209S Research Seminar for Majors fulfills Writing in the Major requirement.

*General Requirements:* As with all history majors, students in History Interdisciplinary Programs must complete two lecture courses (one Europe or US, one Africa, Asia, Middle East or Latin America), two 200-level courses, a Sources and Methods seminar, and a Research Seminar for Majors.

### History Secondary Teacher's Credential

Applicants for the Single Subject Teaching Credential (Secondary) in the social studies may obtain information regarding this program from the Credential Administrator, School of Education.

### Joint Major Program in History and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

### History Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Progra (p. 278)m" section of this bulletin for details on Computer Science requirements.

Students majoring in the History and Computer Science joint major program fulfill all of the breadth, focus, and WIM requirements of

the standard History major. Students in the JMP are excused from completing one elective course, reducing the required unit count of the History major from 63 to 59 units (i.e., from a minimum of 13 courses to 12 courses). All courses comprising the major must be taken for a letter grade.

For details on the requirements of the History major, see the Bachelor's tab (p. 579) of this section of this bulletin.

### Integrative Capstone Experience

One of the highlights of the JMP is an integrative capstone experience, which enables students to work with faculty mentors in the two departments to devise and complete original projects that bring together the different fields. Some students may choose to complete capstone projects under the auspices of HISTORY 209S Research Seminar for Majors which is the required Writing in the Major requirement for all History majors including those in the JMP. Others may choose to complete their capstones under the auspices of other courses in Computer Science or History, or in the context of senior honors projects in one or the other or both departments. In keeping with University policy, units obtained from a capstone course taken within a particular department can be applied to only that department's requirements.

### Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

### Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>). Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

### Transcript and Diploma

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

## Minor in History

Students must declare the minor in History no later than Autumn Quarter of the senior year via Axess. Minor declarations are approved by the Department of History and confirmation is sent via email to the student.

Candidates for the minor in History must complete six courses, at least three of which must have a field or thematic focus. Students completing the minor may choose to concentrate in such fields as African, American, Asian, British, European (medieval, early modern, or modern), Russian and East European history, comparative empires and cultures, or such thematic topics as the history of gender, the family, religion, technology, or revolution. Students may also petition to have a concentration of their own design count toward the minor.

### Degree Requirements

All six courses must be of at least 3 units each and must be taken for a letter grade. The student must maintain a grade point average (GPA) in History courses of 2.0 (C) or higher. Two of the six courses must be small-group in format (Stanford Introductory Seminars, Sources and Methods Seminars, departmental colloquia, and research seminars). History courses taken at Stanford overseas campuses may count toward

the minor, but at least three of the six courses must be taken from Stanford History faculty.

Advanced Placement credits do not fulfill any minor requirements.

### Optional Courses for the Minor

History courses taken at non-Stanford Study Abroad programs may count toward the minor (provided the History Department approves them), but at least three of the six courses must be taken from Stanford History faculty. One course from certain Introduction to the Humanities courses and Thinking Matters courses (those taught by History faculty) may count toward the six-course requirement, but not for the three-course field of concentration. One Undergraduate Directed Research and Writing HISTORY 299S) course may count toward the minor, if taken for 3-5 units and for a letter grade. A maximum of three transfer courses may be used toward the minor.

## Coterminal Master's Program in History

The department each year admits a limited number of undergraduates for coterminal M.A. degree in History. Coterminal applications are accepted during Autumn Quarter for admission in Spring Quarter. Applicants are responsible for checking their compliance with University coterminal requirements listed in the "Coterminal Bachelor's and Master's Degrees (p. 46)" section of this bulletin.

### Admission

Applicants must meet the same general standards as those seeking admission to the M.A. program. Students must submit the Coterminal Online Application (<https://applyweb.com/stanterm>), including a written statement of purpose, a transcript, GRE test scores, and three letters of recommendation, at least two of which should be from members of the Department of History faculty. To be competitive, coterminal applicants should have a 3.75 GPA in their undergraduate history major (or equivalent if they are entering without a History major.) The decision on admission rests with the department faculty upon recommendation by the graduate admissions committee.

Students must meet all requirements for both degrees. They must complete 15 full-time quarters (or the equivalent), or three full-time quarters after completing 180 units, for a total of 225 units. During the senior year they may, with the consent of the instructors, register for as many as two graduate courses. In the final year of study, they must complete at least three courses that fall within a single Ph.D. field.

The application filing deadline is December 5, 2017.

The coterminal M.A. program is not declarable on Axess.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Arts in History

University requirements for the M.A. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The department requires the completion of nine courses (totaling not less than 45 units) of graduate work; seven courses of this work must be Department of History courses. Of the seven, one must be a seminar and four must be either graduate colloquia or graduate seminars. Directed reading may be counted for a maximum of 10 units. A candidate whose undergraduate training in history is deemed inadequate must complete nine courses of graduate work in the department. The department does not recognize for credit toward the M.A. degree any work that has not received the grade of 'A' or 'B.'

### Terminal M.A. Program

Applicants who do not wish to continue beyond the M.A. degree are admitted to this program at the discretion of the faculty in individual fields (U.S., modern Europe, and so on). Students admitted may not apply to enter the Ph.D. program in History during the course of work for the M.A. degree.

### M.A. in Teaching (History)

The department cooperates with the School of Education in offering the Master of Arts in Teaching degree. For the general requirements, see the "School of Education (p. )" section of this bulletin. For certain additional requirements made by the Department of History, contact the department office. Candidates must possess a teaching credential or relevant teaching experience.

### Admission

Applicants for admission to graduate work must take the General Test of the Graduate Record Examination. It may be taken at most American colleges and in nearly all foreign countries. For details, see the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

Students admitted to graduate standing do not automatically become candidates for a graduate degree. With the exception of students in the terminal M.A. program, they are admitted with the expectation that they will be working toward the Ph.D. degree and may become candidates to receive the M.A. degree after completing three quarters of work.

The application filing deadline is December 5, 2017.

## Doctor of Philosophy in History

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

Students planning to work for the doctorate in history should be familiar with the general degree requirements of the University outlined in the "Graduate Degrees (p. 50)" section of this bulletin. Those interested in applying for admission to the M.A. and Ph.D. programs should contact the graduate program coordinator in the History department. Online applications are available in September of the year prior to intended enrollment. The application filing deadline is December 5, 2017. Applicants must file a report of their general scores on the Graduate Record Examination and submit a writing sample of 10-25 pages on a

historical topic. Successful applicants for the M.A. and Ph.D. programs may enter only in Autumn Quarter.

Upon enrollment in the graduate program in History, the student has a member of the department designated as an adviser with whom to plan the Ph.D. program. Much of the first two years of graduate study is spent taking courses, and, from the outset, the student should be aware that the ultimate objective is not merely the completion of courses but preparation for general examinations and for writing a dissertation.

Admission to the Department of History in the graduate division does not establish any rights respecting candidacy for an advanced degree. At the end of the first year of graduate study, students are evaluated by the faculty and given a progress report. A decision as to whether the student is admitted to candidacy for the Ph.D. is normally made by the start of the student's third year.

After the completion of certain further requirements, students must apply for acceptance for candidacy for the doctorate in the graduate division of the University.

### Admission

Applicants for admission to graduate work must take the General Test of the Graduate Record Examination. It may be taken at most American colleges and in nearly all foreign countries. For details, see the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

Students admitted to graduate standing do not automatically become candidates for a graduate degree. With the exception of students in the terminal M.A. program, they are admitted with the expectation that they will be working toward the Ph.D. degree and may become candidates to receive the M.A. degree after completing three quarters of work.

The application filing deadline is December 5, 2017.

## Degree Requirements

### Required Courses

		Units
<b>For all first-year Ph.D. students</b>		
HISTORY 304	Approaches to History	4-5
HISTORY 305	Graduate Pedagogy Workshop	1
<b>For first-year and second-year Ph.D. students in American History</b>		
HISTORY 351A	Core in American History, Part I	4-5
HISTORY 351B	Core in American History, Part II	4-5
HISTORY 351C	Core in American History, Part III	4-5
HISTORY 351D	Core in American History, Part IV	4-5
HISTORY 351E	Core in American History, Part V	4-5
HISTORY 351F	Core in American History, Part VI	4-5

Other Graduate Core Colloquia required for Ph.D. students studying in fields other than the above are listed in the Department of History's Graduate Handbook.

### University Oral Examinations

The student is expected to take the University oral examination in the major concentration in the third graduate year.

### Dissertation

The student must complete and submit a dissertation which is the result of independent work and is a contribution to knowledge. It should evidence the command of approved techniques of research, ability to organize findings, and competence in expression. For details and procedural information, inquire in the department.

### Dissertation Committee

The reading committee consists of the principal dissertation adviser (first reader), and two additional members of the Department (second and third readers) agreed upon by the adviser and the student.

### Financial Support

Students who are admitted with financial support are provided multiple years of support through fellowships, teaching and research assistantships, and tuition grants. Applicants should indicate on the admissions application whether they wish to be considered for such support. No separate application for financial aid is required.

U.S. citizens and permanent resident aliens who are interested in area language studies in East Asia, Africa, and the republics of the former Soviet Union may request a Foreign Language and Area Studies (FLAS) fellowship application from the FLAS coordinator of the respective programs offering the FLAS (CEAS, CAS, CREEES). The FLAS application deadlines are in January and February (CAS).

### Resources

The degree requirements section relates to formal requirements, but the success of a student's graduate program depends in large part on the quality of the guidance received from faculty and on the library resources available. Prospective graduate applicants are advised to study the list of History faculty and the courses this faculty offers. As to library resources, no detailed statement is possible in this bulletin, but areas in which library resources are unusually strong are described following.

The University Library maintains strong general collections in almost all fields of history. It has a very large microtext collection, including, for instance, all items listed in Charles Evans' American Bibliography, and in the Short-Title Catalogues of English publications, 1474-1700, and virtually complete microfilmed documents of the Department of State to 1906. It also has a number of valuable special collections including the Borel Collection on the History of California; many rare items on early American and early modern European history; the Brasch Collection on Sir Isaac Newton and scientific thought during his time; the Gimon Collection on French political economy, and other such materials.

The rich collection of the Hoover Institution on the causes, conduct, and results of WW I and WW II are being augmented for the post-1945 period. The materials include government documents, newspaper and serial files, and organization and party publications (especially the British and German Socialist parties). There are also important manuscript collections, including unpublished records of the Paris Peace Conference of 1919 and the Herbert Hoover archives, which contain the records of the Commission for Relief in Belgium, the American Relief Administration, the various technical commissions established at the close of WW I for reconstruction in Central and Eastern Europe, the personal papers of Herbert Hoover as United States Food Administrator, and other important personal papers. Other materials for the period since 1914 relate to revolutions and political ideologies of international importance; colonial and minority problems; propaganda and public opinion; military occupation; peace plans and movements; international relations; international organizations and administration including the publications of the United Nations, as well as principal international conferences. The Hoover Institution also possesses some of the richest collections available anywhere on the British labor movement; Eastern Europe, including the Soviet Union; East Asia (runs of important newspapers and serials and extensive documentary collections, especially for the period of WW II); and Africa since 1860, especially French-speaking Africa, the former British colonies, and South Africa.

### Requirements

1. In consultation with the adviser, students select an area of study from the list below in which to concentrate their study and later take the University oral examination. The major concentrations are:

- Europe, 300-1500
  - Europe, 1400-1800
  - Europe since 1700
  - Jewish History
  - Russia
  - Eastern Europe
  - Middle East and Central Asia
  - South Asia
  - East Asia before 1600
  - China since 1600
  - Japan since 1600
  - Korea since 1800
  - Africa
  - Britain and the British Empire since 1460
  - Latin America
  - The United States (including colonial America)
  - The History of Science and Medicine
  - Transnational, International, and Global
2. The department seeks to provide a core colloquium in every major concentration. Students normally enroll in this colloquium during the first year of graduate study.
  3. Students are required to take two research seminars, at least one in the major concentration. Normally, research seminars are taken in the first and second years.
  4. Each student, in consultation with the adviser, defines a secondary concentration. This concentration should represent a total of four graduate courses or their equivalents, and it may be fulfilled by working in a historical concentration or an interdisciplinary concentration. The historical concentrations include:
    - a. One of the concentrations listed above (other than the student's major concentration).
    - b. One of the concentrations listed below, which falls largely outside the student's major concentration:
      - The Ancient Greek World
      - The Roman World
      - Europe, 300-1000
      - Europe, 1000-1400
      - Europe, 1400-1600
      - Europe, 1600-1789
      - Europe, 1700-1871
      - Europe since 1848
      - England, 450-1460
      - Britain and the British Empire, 1460-1714
      - Britain and the British Empire since 1714
      - Russia to 1800
      - Russia since 1800
      - Eastern Europe to 1800
      - Eastern Europe since 1800
      - Jewish History
      - Middle East and Central Asia to 1800
      - Middle East and Central Asia since 1800
      - Africa
      - South Asia
      - China before 1600
      - China since 1600
      - Japan before 1600
      - Japan since 1600
      - Latin America to 1825

- Latin America since 1810
  - The United States (including Colonial America) to 1865
  - The United States since 1850
  - The History of Science and Medicine
  - Transnational, International, and Global
- c. Work in a national history of sufficiently long time to span chronologically two or more major concentrations. For example, a student with Europe since 1700 as a major concentration may take France from 1000 to the present as a secondary concentration.
- d. A comparative study of a substantial subject across countries or periods. The secondary concentration requirement may also be satisfied in an interdisciplinary concentration. Students plan these concentrations in consultation with their advisers. Interconcentrations require course work outside the Department of History which is related to the student's training as a historian. Interdisciplinary course work can either add to a student's technical competence or broaden his or her approach to the problems of the research concentration.
5. Each student, before conferral of the Ph.D., is required to satisfy the department's teaching requirement.
6. There is no University or department foreign language requirement for the Ph.D. degree. A reading knowledge of one or more foreign languages is required in concentrations where appropriate. The faculty in the major concentration prescribes the necessary languages. In no concentration is a student required to take examinations in more than two foreign languages. Certification of competence in commonly taught languages (that is, French, German, Italian, Portuguese, Russian, and Spanish) for candidates seeking to fulfill the language requirement in this fashion is done by the appropriate language department of the University. Certification of competence in other languages is determined in a manner decided on by faculty in the major concentration. In either case, certification of language competence must be accomplished before a student takes the University oral examination.
7. The student is expected to take the University oral examination in the major concentration in the third graduate year.
8. The student must complete and submit a dissertation which is the result of independent work and is a contribution to knowledge. It should evidence the command of approved techniques of research, ability to organize findings, and competence in expression. For details and procedural information, inquire in the department.

James J. Sheehan, Peter Stansky, David B. Tyack, Lyman P. Van Slyke; (Senior Lecturer) Joseph J. Corn

*Chair:* Matthew H. Sommer

*Professors:* Keith M. Baker, Joel Beinin, James T. Campbell, Clayborne Carson, Gordon Chang, Robert Crews, Paula Findlen, Zephyr Frank, Estelle Freedman, Fiona Griffiths, Stephen Haber, Gabrielle Hecht, David Holloway, Nancy S. Kollmann, Mark E. Lewis, Norman M. Naimark, Robert Proctor, Jack N. Rakove, Jessica Riskin, Richard L. Roberts, Aron Rodrigue, Richard P. Saller, Priya Satia, Walter Scheidel, Londa Schiebinger, Matthew H. Sommer, Richard White, Kären E. Wigen, Caroline Winterer, Steven J. Zipperstein

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*Senior Lecturers:* Katherine Jolluck, Martin W. Lewis

*Lecturers:* Luca Scholz

## Overseas Studies Courses in History

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPAUSTL 40	Australian Studies	3
OSPBER 70	The Long Way to the West: German History from the 18th Century to the Present	4-5
OSPCTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPFLOR 43	Machiavelli	3-4
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
OSPFLOR 53	Italy and Italians at War: 1939-1945	3
OSPFLOR 58	Space as History: Social Vision and Urban Change	4
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4
OSPMADRD 47	Cultural Relations between Spain and the United States: Historical Perceptions and Influences, 1776-2	4
OSPOXFRD 41	Western Thought: Origins of Twentieth Century Semiotics	5
OSPOXFRD 65	Plagues and the History of Great Britain	4
OSPPARIS 81	France During the Second World War: Between History and Memory	5

## Ph.D. Minor in History

Students pursuing a Ph.D. other than in History may apply for the Ph.D. Minor in History. Ph.D. students cannot pursue a minor in their own program. The minimum University requirement for a Ph.D. minor is 20 units of History course work at the graduate level (courses numbered 300 and above) at Stanford. All units should be in a single field. Units taken for the minor can be counted as part of the overall requirement for the Ph.D. of 135 units taken at Stanford. Courses used for a minor may not be used to meet the requirements for a master's degree.

### Degree Requirements

20 units of History course work at the graduate level (HISTORY 300-399W and 400-499X) at Stanford. All units should be in a single field.

### Optional Courses for the Minor

A Ph.D. minor form outlining the program of study must be approved by the major and minor departments.

*Emeriti:* (Professors) Barton J. Bernstein, Albert Camarillo, Peter Duus, Terence Emmons, Harold L. Kahn, David M. Kennedy, Carolyn Lougee Chappell, Mark Mancall, Peter Paret, Paul A. Robinson, Paul Seaver,



OSPSANTG 62	Topics in Chilean History	4-5
OSPSANTG 68	The Emergence of Nations in Latin America	4-5

# HUMAN BIOLOGY

Courses offered by the Program in Human Biology are listed under the subject code HUMBIO on the Stanford Bulletin's ExploreCourses web site.

The program offers a Bachelor of Arts and a Bachelor of Science in Human Biology, as well as a minor and an honors program.

## Mission of the Undergraduate Program in Human Biology

The mission of the undergraduate program in Human Biology is to provide students with an interdisciplinary approach to understanding human beings from biological, behavioral, social, and cultural perspectives. Courses in the major allow students to see connections and parallels with other fields as they learn to formulate and evaluate health, environmental, and other public policy issues that influence human welfare. The program prepares majors to pursue advanced training in professional or graduate programs.

To achieve these goals, all students complete a 30-unit core sequence, normally in the sophomore year, which provides the foundation for the major. Also during the sophomore year, students consult with student advisers to choose a faculty adviser and complete the declaration process. Together they plan a road map of course work designed to help each student focus on an Area of Concentration within Human Biology. Early planning and subsequent refining of an individualized course of study, in consultation with student and faculty advisers, is a strength and requirement of the program. The curriculum draws on faculty from across the University. To complete a B.A. or B.S. in Human Biology, students must take courses from within the program and from other University departments. Many Human Biology majors go on to advanced training in professional schools, or graduate programs in the behavioral, natural, and social sciences, including coterminal master's degree programs in other University departments. Additional information about the major may be obtained from the program's offices or at the Program in Human Biology (<https://humanbiology.stanford.edu>) web site.

## Learning Outcomes (Undergraduate)

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes.

### Communication

Because Human Biology is an interdisciplinary program with an emphasis on both empirical inquiry and applied knowledge, excellent communication skills are critical to majors. Successful students must be able to engage with literature and audiences not only from multiple disciplines but also with varying levels of subject expertise and to communicate information and ideas clearly, precisely, concisely, and purposefully in any setting. Toward this end, a graduate of Human Biology is expected to be able to:

1. adopt an appropriate style for written communication in the biological and social sciences
2. accurately summarize a scientific article
3. synthesize and criticize multiple sources of scientific literature
4. revise effectively in response to feedback
5. write collaboratively
6. present information visually in a variety of forms (charts, graphs, figures, and posters) for different audiences, purposes, and occasions
7. communicate in a variety of major scientific genres (such as abstracts, literature reviews, posters, research proposals, research presentations, and policy proposals) and popular genres (such as op-eds, PSA, podcasts, and science blogs)

8. use citations to provide context and to credit others for their intellectual contributions
9. communicate scientific knowledge to both specialist and non-specialist audiences
10. construct a well-supported, logical argument based on relevant evidence and established conceptual frameworks
11. frame a research question in relation to the current state of knowledge in a field
12. articulate a well-reasoned hypothesis
13. listen to any speaker and pose questions
14. deliver an oral presentation and respond to audience questions

### Data Analysis

Data is used in the social and biological sciences to make observations and judgments regarding patterns of human behavior and function. These data are sometimes imperfect or incomplete, but they are used nevertheless to make decisions and policies regarding humans individually and in groups within the worlds they inhabit. Thus, students should cultivate a capacity within the Human Biology major to examine and analyze data. A graduate of Human Biology is expected to be able to:

1. recognize that different scientific disciplines draw on various sources and types of evidence
2. translate a research topic into a hypothesis or focused question that can be tested using quantitative or qualitative data
3. identify variables that are relevant to a study and describe their nature (e.g., categorical, continuous) and interrelationships (independent, dependent, covariates)
4. use statistical software to summarize and describe data of various types
5. choose an appropriate analytical framework or statistical model for testing a given hypothesis, considering the structure of the data (e.g., sample size, distribution, qualitative or quantitative nature)
6. employ quantitative or qualitative data to support a conclusion
7. judge whether a statistical association provides empirical support for causation
8. detect mistakes commonly made in empirical reasoning and data analysis
9. assess the limits of available data and identify potential sources of uncertainty
10. present data accurately, clearly, and effectively in the forms of tables, graphs, and figures
11. explore specialized modes of data analysis such as meta-analysis, bioinformatics, modeling, and epidemiological approaches

### Scientific Literacy

The Program in Human Biology prepares students to join a broad scientific community with a culture of building and sharing knowledge. A goal of the major is to cultivate judicious consumers of research in the natural and social sciences, irrespective of their individual career paths. A graduate of Human Biology is expected to be able to:

1. appreciate the distinct roles of common genres of scientific writing, including peer-reviewed research papers, review articles, commentaries, and popular science writing
2. acknowledge and apply the normative and ethical standards of conducting and publishing research, including accuracy, transparency, and responsibility to colleagues and subjects
3. evaluate the credibility and importance of a published article and its relevance within a field
4. engage with peer-reviewed scientific literature actively and critically
5. identify research questions, understand their theoretical or practical importance

6. assess research methodologies and experimental or other study design
7. evaluate evidence and statistical analyses presented in support of claims
8. interpret data presented in a table, graph, or figure
9. use a hypothesis or framework to make predictions or pose questions about a novel setting

## Student Advisers

Human Biology has an advising program comprising faculty and student advisers. Before declaring Human Biology as the undergraduate major, each student must meet with student advisers who assist in developing a coherent study plan based on an individualized Area of Concentration, and the selection of breadth, depth, and upper-division courses. The student advisers also assist students in selecting an appropriate faculty adviser and a suitable capstone experience for their Area of Concentration and career goals. Student advisers offer drop-in services during scheduled office hours every weekday.

## Storey House

Storey House, 544 Lasuen Mall, is an undergraduate resident theme house for Human Biology, devoted to developing an intellectual community among Human Biology majors at Stanford and allowing faculty and students to become acquainted and to share their Human Biology interests and research. Its goals are to foster intellectual discussion in the residential lives of the students living in Storey House, mentoring relationships between upperclassmen and core students in the house, and stimulating events for all Human Biology majors facilitated by academic theme associates. Assignment is made through pre-assignment and the regular undergraduate housing draw.

## Declaring the Major

The program offers a Bachelor of Arts and Bachelor of Science in Human Biology. A prospective major must consult with the student and faculty advisers to obtain detailed information about the program and guidance in the development of an individual course of study.

At the time the major is declared, the student must submit a written statement (3-5 pages) of academic and long-term goals and the proposed list of courses satisfying the requirements for the major. The proposal is then reviewed by the student advisers who help identify an appropriate faculty adviser.

It is important to declare in the sophomore year, and planning may begin once a student in good academic standing has passed two of six courses in the core. The University requires students to declare a major by the end of Spring Quarter of the sophomore year.

Students who plan to pursue graduate work should be aware of the admission requirements of the schools to which they intend to apply. Early planning is advisable to guarantee completion of major and graduate school requirements.

## Fundamental Program Requirements (34+ units)

Both degree programs, B.A. and B.S., require that the student complete all three of the Human Biology Fundamental Program requirements which include the Human Biology core, statistics and capstone.

### Human Biology Core (30 units)

The required core sequence introduces the biological and social sciences and, most importantly, relationships between the two. Classes meet throughout the academic year. The A and B series are designed to be taken concurrently. Students should initiate the core in Autumn Quarter

of the sophomore year. Freshmen are not permitted to enroll. Majors must earn a minimum letter grade of 'C-' in core courses. The Human Biology core consists of the following courses:

		Units
HUMBIO 2A	Genetics, Evolution, and Ecology	5
HUMBIO 2B	Culture, Evolution, and Society	5
HUMBIO 3A	Cell and Developmental Biology	5
HUMBIO 3B	Behavior, Health, and Development	5
HUMBIO 4A	The Human Organism	5
HUMBIO 4B	Environmental and Health Policy Analysis	5
Total Units		30

### Statistics (3-5 units)

The statistics course must be taken for a letter grade by majors. The minimum grade requirement is 'C-'. (*Note:* Students who did not declare before September 21, 2015, may not use STATS 60 to fulfill the statistics requirement.) Statistics may be chosen from courses such as:

		Units
BIO 141	Biostatistics	3-5
CME 106	Introduction to Probability and Statistics for Engineers	4
CS 109	Introduction to Probability for Computer Scientists	3-5
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
EDUC 400A	Introduction to Statistical Methods in Education	3-4
HRP 259	Introduction to Probability and Statistics for Epidemiology	3-4
HUMBIO 85A	Essential Statistics for Human Biology	4
HUMBIO 88	Introduction to Statistics for the Health Sciences	4
HUMBIO 89	Statistics in the Health Sciences	3
SOC 181B	Sociological Methods: Statistics	5
STATS 116	Theory of Probability	3-5

In certain circumstances, students completing an additional major or minor in another department may submit a petition to waive the units requirement for Statistics; contact Human Biology Student Services for more information.

### Capstone (1-7 units)

The following options fulfill the Capstone (<https://humanbiology.stanford.edu/capstone>) requirement:

1. *Human Biology Practicum*: HUMBIO 191 Human Biology Practicum (1 unit total, S/NC grading). Allows students to integrate their academics with their community-engaged learning, research or pre-professional experiences through reflective written work and presentation; well-suited for career-enhancing project presentations or expressions of personal values and purpose. Required for students who wish to enroll in the Human Biology Synthesis (HUMBIO 192). Students can take workshops over several quarters, and enroll in one unit of 191 for the quarter they complete their five workshops.
2. *Human Biology Synthesis (by application)*: This sequence should be taken for 2-3 units in Autumn (HUMBIO 192A Human Biology Synthesis), Winter (HUMBIO 192W Human Biology Synthesis) and/or Spring (HUMBIO 192S Human Biology Synthesis) for 6 units total, letter grade (corequisite HUMBIO 191 Human Biology Practicum). The sequence expands upon the work of the Human Biology Practicum, although the student may also focus on a different aspect of the area of concentration topic. It allows students the opportunity to craft a culminating, creative work of scholarship based on a synthesis of personal and academic interests, including service projects. The work must be exhibited during senior year.

3. *Honors in Human Biology (by application)*: HUMBIO 194 Honors also satisfies the Capstone requirement.
4. Non-Human Biology activities that fulfill the Capstone requirement:
  - a. Biology Senior Reflection
  - b. Notation in Science Communication
  - c. Interdisciplinary Honors

## Bachelor of Arts in Human Biology

The B.A. in Human Biology (HUMBIO) requires 81+ units in the major divided among four levels of courses: fundamental program requirements, breadth requirement, depth requirement and upper-division.

The B.A. degree is designed for students who prefer a traditional liberal arts degree with a curriculum based across the natural sciences, social sciences, and humanities. The degree is suitable regardless of whether a student plans to attend graduate or professional school. The B.A. degree gives students a solid foundation in biology, while allowing students more flexibility and breadth in the social sciences and humanities.

For the B.A. degree, majors take 10 or more units of breadth courses and 5 or more classes in the upper-division and depth courses from a set of pre-approved Social Sciences and Humanities courses. For the 5 or more B.A. eligible courses in your Depth and Upper Division, 3 of those courses must be in the Depth section. Many pre-approved courses satisfy University Ways of Thinking and Doing requirements, specifically Aesthetic and Interpretive Inquiry, Creative Expression, Engaging Diversity, Ethical Reasoning, and Social Inquiry. Students still also take courses in the natural sciences, although fewer than for the B.S. degree.

## Bachelor of Science in Human Biology

The B.S. in Human Biology (HUMBIO) requires 81+ units in the major divided among four levels of courses: fundamental program requirements, breadth requirement, depth requirement and upper-division.

The B.S. degree allows students a more scientific and technical focus for their studies, and requires completion of course work and specialization in the biological sciences, physical sciences, mathematics, and/or computer science and engineering.

For the B.S. degree, majors take 10 or more units of breadth courses and 5 or more classes in the upper-division and depth courses from a set of pre-approved life and natural sciences courses. For the five or more B.S. eligible courses in the depth and upper division, three of those courses must be in the depth section. Many pre-approved courses satisfy University Ways requirements, specifically applied quantitative reasoning, formal reasoning, and scientific methods and analysis courses. Students still also take courses in the social sciences or humanities, although fewer than for the B.A. degree.

## Breadth and Depth Requirement

These courses inform the student's chosen area of concentration topic. The student selects courses for these two requirement categories, in consultation with the advising program who approve the final course selections. A Human Biology area of concentration topic generally falls within one (or a combination of 2) of the following areas of emphasis:

- Environment and Environmental Policy
- Health and Health Policy
- Human Performance
- Human Development
- Biomedical Science and Biocomputation
- Brain and Behavior
- Ethics and Medical Humanities

- Evolution

### Breadth Requirement (20+ units)

20-unit minimum, consistent with the student's chosen area of concentration topic. This requirement allows the student to explore the topic with a broad focus. Courses may include introductory-level courses from across the University and lab courses, and may be taken for credit or letter grade. The minimum grade requirement is 'C-'.

### Depth Requirement (20+ units)

A minimum of five courses totaling at least 20 units consistent with the student's chosen area of concentration topic. This requirement allows the student to gain expertise on the topic and to focus on educational and post-baccalaureate goals. Courses are non-introductory and are usually numbered over 100. Three or more departments must be represented in the depth requirement. Each course must be taken for a letter grade and at least three units. The minimum grade requirement is 'C-'. Three or more courses in the Depth must be in your chosen degree option of B.S. or B.A..

### Upper-Division Requirement (9+ units)

Students must take three Human Biology upper-division courses numbered 100 to 189. These courses should be used to explore subjects outside the depth requirement. One upper-division course may be taken satisfactory/no credit. Each course must be taken for a minimum of 3 units. Minimum grade requirement for upper-division courses is 'C-'. All non-laboratory advanced HUMBIO courses (those numbered 100 to 189) fulfill the Human Biology upper-division requirement. A list of Overseas Studies courses that satisfy upper-division requirements and are given in 2016-17 can be found on the Overseas tab (p. 596) of this section of this bulletin.

## Honors Program

The honors program in Human Biology provides qualified majors the opportunity to work closely with faculty on an individual research project, culminating in an honors thesis. Students may begin honors research from a number of starting points including topics introduced in the core or upper-division courses; independent interests stemming from an internship experience; or collaborating with faculty from the natural, social, or behavioral sciences.

Students may apply to the honors program if they have completed the Human Biology core with a minimum GPA of 3.0, have an overall Stanford GPA of 3.2, and meet other requirements detailed in the honors handbook. Interested students should consult the Human Biology Honors web site (<http://humanbiology.stanford.edu/academics/honors>) and meet with the Human Biology Associate Director or student services officer.

Most honors projects involve a total of 10-15 units of course work in HUMBIO 193 and 194:

		Units
HUMBIO 193	Research in Human Biology	1-5
HUMBIO 194	Honors	1-10

Admission to the honors program is by preliminary application in early February, followed by the full application in early March of the junior year. Students planning to undertake honors begin research or preparation as early as completion of the sophomore year.

The honors thesis is normally completed by the middle of Spring Quarter of the senior year. Honors students present summaries of their research at the Human Biology Honors Poster Symposium in May.

Human Biology also holds a Summer Honors College just prior to Autumn Quarter each year for students who have applied to the honors program. Students apply to Summer Honors College in April of the junior year.

## Minor in Human Biology

A minor in Human Biology provides an introductory background to the relationship between the biological and social aspects of humanity's origin, development, and future. Many of the major problems facing human civilization today involve both biological and social aspects. Scientific approaches to these problems are essential, but they must be broadly conceived, integrating what is known of the biological with an understanding of the social and cultural setting in which they exist. Students with a minor in Human Biology are expected to develop a strong background in the integration between the biological and social aspects of human beings.

Students declaring a minor in Human Biology must do so no later than two quarters prior to their intended quarter of degree conferral (for example, a student must declare a minor before the end of Autumn Quarter to graduate the following Spring Quarter).

To minor in Human Biology, students must take the Human Biology Core:

- HUMBIO 2A Genetics, Evolution, and Ecology
- HUMBIO 2B Culture, Evolution, and Society
- HUMBIO 3A Cell and Developmental Biology
- HUMBIO 3B Behavior, Health, and Development
- HUMBIO 4A The Human Organism
- HUMBIO 4B Environmental and Health Policy Analysis
- and one additional upper-division course (for example, any HUMBIO course numbered 100-189).

The student must earn a minimum letter grade of 'C-'. Courses that count towards the fulfillment of major requirements may not be counted towards the minor.

*Emeriti* (Professors) Carol Boggs (Biology), Doug Brutlag (Biochemistry), Stanley Falkow (Microbiology/Immunology), A. Dale Kaiser (Biochemistry), Herant Katchadourian (Human Biology), Donald Kennedy (Biology), Gordon Matheson (Orthopaedic Surgery), Ellen FitzSimmons Porzig (Developmental Biology), Carol Winograd (Medicine)

*Director* Paul Fisher (Neurology)

*Associate Director* Katherine Preston

*Professors* Laurence Baker (Health Research and Policy), Ben Barres (Neurobiology), Donna Bouley (Comparative Medicine), William H. Durham (Anthropology), Heidi Feldman (Pediatrics: Neonatology), Russell D. Fernald (Biology), Paul Fisher (Neurology), Margaret Fuller (Developmental Biology), Angela Garcia (Anthropology), Garry Gold (Rad/Musculoskeletal Imaging), Lawrence H. Goulder (Economics), James J. Gross (Psychology), H. Craig Heller (Biology), Jill Helms (Surgery: Plastics), Richard Klein (Anthropology and Biology), Tanya Luhrmann (Anthropology), Yvonne Maldonado (Pediatrics: Infectious Diseases), Michael Marmor (Ophthalmology), Roeland Nusse (Developmental Biology), Ruth O'hara (Psychiatry and Behavioral Sciences) Amado Padilla (Education), Julie Parsonnet (Infectious Diseases), Rob Reich (Political Science), Allan Reiss (Interdisciplinary Brain Science Research), Thomas Robinson (Pediatrics), Robert Sapolsky (Biology), Walter Scheidel (Classics and History), Randall Stafford (Stanford Prevention Research Center), William Talbot (Developmental Biology), Shripad Tuljapurkar (Biology), Jeffrey Wine (Psychology), Paul Wise (Pediatrics: Neonatology)

*Associate Professors* Kate Bundorf (Health Reserach and Policy), Anne Fernald (Psychology), Jeremy Goldhaber-Fiebert (Primary Care and Outcomes Research), Brenda Golianu (Anesthesia), Joachim Hallmayer (Psychiatry and Behavioral Sciences - Child and Adolescent Psychiatry

and Child Development), Peter Kao (Pulmonary and Critical Care Medicine), Norman G. Miller (Primary Care and Outcomes Research), Jelena Obradovic (Education)

*Assistant Professors* Geoffrey Abrams (Orthopaedic Surgery), Sanjay Basu (Primary Care and Outcomes Research), Eran Bendavid (General Internal Medicine), Jorah Dannenberg (Philosophy), Alvan Ikoku (Comparative Literature), Anshul Kundaje (Genetics and Computer Science), Michelle Monje-Deisseroth (Neurology), Jamie Zeitzer (Psychiatry and Behavioral Sciences)

*Professor (Research)* Christopher Gardner (Stanford Prevention Research Center), David Lyons (Psychiatry and Behavioral Sciences), Marcia Stefanick (Stanford Prevention Research Center)

*Associate Professor (Research)* Karen Parker (Psychiatry and Behavioral Sciences)

*Professors (Teaching)* Donald Barr (Pediatrics), David Magnus (Pediatrics/SCBE), Robert Siegel (Microbiology and Immunology), Gary Darmstadt (Pediatrics - Neonatology)

*Associate Professors (Teaching)* Catherine Heaney (Psychology), Lianne Kurina (General Internal Medicine), Eunice Rodriguez (Pediatrics), Kristin Sainani (Health Research and Policy – Epidemiology)

*Clinical Assistant Professors* Cynthia Nguyen (Psychiatry and Behavioral Sciences), Rita Popat (Health Research and Policy, Epidemiology), Daryn Reicherter (Psych/Public Mental Health & Population Sciences)

*Senior Research Scholar* Wesley F. Alles (Med/HIP/BeWell)

*Other Teaching Faculty and Staff* William Abrams, Maya Adam (Pediatrics - Infectious Diseases), Judy Chu, Sophia Colamarino (Psychiatry and Behavioral Sciences), Anne Firth-Murray, Anne Friedlander, Ronald Garcia (Center for Excellence), Renu Heller (Biology), Catherine Ley (Infectious Diseases), Mark Mabry, Lisa Medoff, Joe Nation (Public Policy), Katherine Preston, Lisa Goldman Rosas (Stanford Prevention Research Center), Annette Salmeen, Clea Sarnquist (Pediatrics - Infectious Diseases), Darwin Scott Smith (Microbiology and Immunology), Clyde Wilson, Jennifer Wolf (Education)

*Course Associates* Andrea Fisher, Annie Kaufman, David Ly, Christine Nguyen, Siyou Song, Sarita Sooklal, Taylor Streaty, Jazzmin Williams

*Honors Chair* Katherine Preston

## Overseas Studies Courses in Human Biology

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPAUSTL 10	Coral Reef Ecosystems	3
OSPAUSTL 25	Freshwater Systems	3
OSPAUSTL 30	Coastal Forest Ecosystems	3
OSPCTWN 43	Public and Community Health in Sub-Saharan Africa	3

OSPCPTWN 63	Socio-Ecological Systems	3
OSPCPTWN 67	ICT4D: An Introduction to the Use of ICTs for Development	3
OSPFLOR 85	Bioethics: the Biotechnological Revolution, Human Rights and Politics in the Global Era	4
OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4
OSPMADRD 72	Issues in Bioethics Across Cultures	4
OSPOXFRD 19	Constructing Natures: Science and Technology in the British Landscape	5
OSPOXFRD 58	Ethical, Legal, and Policy Issues in the Biosciences: Comparative Perspectives	3
OSPPARIS 98	Global Health Systems: the Future	5

# HUMAN RIGHTS

Courses offered by the WSD Handa Center for Human Rights and International Justice are listed under the subject code HUMRTS (<https://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=20162017&q=HUMRTS&collapse=>) on the Stanford Bulletin's ExploreCourses web site.

WSD Handa Center for Human Rights and International Justice is the newest addition to the Stanford Global Studies Division. Originally founded in 2000 at the University of California Berkeley by Professor David Cohen, the Handa Center relocated to Stanford in May 2014.

The Handa Center is dedicated to promoting the rule of law, accountability, and human rights around the world through education, critical scholarship, and policy advocacy. Working within the School of Humanities and Sciences, the Handa Center supports academic and professional development opportunities for undergraduates and graduate students interested in pursuing work in human rights or international justice. The Center offers career and academic advising, research opportunities, campus events, and student fellowship funding.

The Center also invites student participation in a diverse portfolio of well-established international programs. These include innovative human rights-related digital archival resource development efforts, justice-sector capacity-building programs, community-engaged learning initiatives, and international criminal trial monitoring opportunities.

The Handa Center's interdisciplinary Human Rights Minor ensures students receive invaluable mentorship from experienced human rights scholars and practitioners, while lending academic rigor to the scholastic experience of the undergraduates who choose this path. The minor provides structure to diverse academic offerings on human rights-related topics, encouraging students from across the University to understand how human rights are interconnected across seemingly disparate disciplines.

The Human Rights Minor is open to students in any major.

To declare the Human Rights Minor, students must:

1. Contact Handa Center Program Manager Jessie Brunner ([jbrunner@stanford.edu](mailto:jbrunner@stanford.edu)) to state your interest in the Human Rights Minor.
2. You will receive a personalized human rights minor declaration form to complete.
3. Once you have completed the form, schedule an appointment to review your preliminary academic plan with Handa Center staff. All plans will be reviewed by Faculty Director, David Cohen.
4. Once the Faculty Director has approved your academic plan, you may declare Human Rights as your minor in Axess.

## Requirements

1. Completion of a minimum of 25 units of Human Rights-related course work. Students may not double-count courses for completing major and minor requirements.
2. Gateway: HUMRTS 101: Crossdisciplinary Perspective on Human Rights Theory and Practice (4 units)
3. At least one course across each of three streams:
  - a. Foundations
  - b. Contemporary issues
  - c. Practice
4. Capstone: HUMRTS 199 Human Rights Capstone (3-5 units)

5. Under the supervision of an Academic Council member, students propose and complete a capstone project. This should either include:
  - a. a 25-page research paper on a human rights topic approved by the supervising faculty; or
  - b. an alternative culminating work requiring equivalent effort such as an original short film produced by the student, an annotated digital human rights database, a curated exhibit, or a software application designed to address human rights challenges, approved in advance by the supervising faculty.
6. At least 10 of the 25 units must be completed on Stanford's campus.
7. All courses to be counted toward the minor must be taken for a letter grade, except where letter grades are not offered, as required by University policy.
8. All students must maintain a GPA of no less than 3.0 in the classes counting toward the minor.

*Director:* David Cohen

*Associate Director:* Penelope Van Tuyl

*Faculty Advisory Board:* JP Daughton (History), Larry Diamond (Political Science, Faculty Director of the Haas Center for Public Service), James Fearon (Political Science, Frank Fukuyama (Political Science, Director of CDDRL), Katherine Jolluck (History), Margaret Levi (Political Science, Director of CASBS), Tanya Luhrmann (Anthropology), Anne Firth Murray (Feminist, Gender, and Sexuality Studies), Norman Naimark (History, Director of SGS), Josh Ober (Classics and Philosophy), David Palumbo-Liu (English and Comparative Literature), Richard Roberts (History, Co-Director of the Center for African Studies), Beth Van Schaack (Law, International Policy Studies), Jeremy Weinstein (Political Science), Paul Wise (Medicine)

# HUMANITIES

The undergraduate minor in Humanities provides Stanford students with a broad foundation in the humanities, emphasizing literature, philosophy, and history. The program combines this general knowledge with a focus on the particular cultures of a global region and allows students to reflect on and discuss many of the critical questions that arise everywhere that human beings live together.

## Requirements

Students in any field qualify for the Humanities minor by meeting the following requirements.

Courses applied to the minor must be taken for a letter grade where offered, and must count for a minimum of 3 units; a grade point average (GPA) of 2.0 or better must be achieved in each course. All electives must be approved by the faculty directors. Bing Overseas courses may count with pre-approval of the faculty director Dan Edelstein. Transfer credit and AP credit do not apply to this minor. Courses applied toward the minor may not fulfill requirements for another degree.

The Humanities Core consists of:

1. a required foundational lecture course, introducing students to key texts and ideas from antiquity that underpin major civilizations
2. a required three quarter track exploring different intellectual and cultural traditions; students choose a track and take all three of the courses in it
3. two additional courses in a humanities department chosen by the student. Students should consult with a faculty director on their choice of electives. Students choose between two options:
  - a. pursue an in-depth sequence of two courses related to their track of choice within a single humanities department, or
  - b. pursue a broader sequence of two courses related to their track of choice in two different humanities departments, ideally selecting from among the disciplinary gateway courses such as:
    - ARTHIST 1B Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present
    - DLCL 100 CAPITALS: How Cities Shape Cultures, States, and People
    - HISTORY 1A Global History: The Ancient World (not offered this year) or HISTORY 1B Global History: The Early Modern World, 1300 to 1800
    - PHIL 1 Introduction to Philosophy
    - TAPS 1 Introduction to Theater and Performance Studies

### Units

#### Foundation Course

Offered once a year; in 2017-18 it is offered in Winter Quarter	3
HUMCORE 1 Humanities: An Introduction to How Humans Think About Themselves	

#### Traditions

Students choose one track and take all three courses	9
European (9 total units, 3 per course, count toward the minor unit requirement)	
HUMCORE 11 Humanities Core: Great Books, Big Ideas – Europe, The Ancient World	
HUMCORE 12 Humanities Core: Great Books, Big Ideas – Europe, Middle Ages and Renaissance	
HUMCORE 13 Humanities Core: Great Books, Big Ideas – Europe, Modern	

East Asian (9 total units, 3 per course, count toward the minor unit requirement)

HUMCORE 21 Humanities Core: Love and Betrayal in Asia	
HUMCORE 22 Humanities Core: Everybody Eats: The Language, Culture, and Ethics of Food in East Asia	
HUMCORE 23 Humanities Core: Technology and Media in Modern Japan	

#### Electives

Take two humanities courses in consultation with a faculty director	6
Total Units	18

## Certificate

The Humanities Interdisciplinary Program offers a certificate to students who complete a three quarter HUMCORE sequence. To receive the certificate, a student must submit a request web form (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/humanities/%20http://web.stanford.edu/~denisew1/certificate.fb>) listing the courses taken. To receive the certificate, all courses must be for a letter grade where offered

*Faculty Directors:* Dan Edelstein and Debra Satz



# IBERIAN AND LATIN AMERICAN CULTURES

Courses offered by the Department of Iberian and Latin American Cultures, formerly the Department of Spanish and Portuguese, are listed under the subject code ILAC on the Stanford Bulletin's ExploreCourses web site. For courses in Catalan, Portuguese, and Spanish language instruction with the subject codes CATLANG, PORTLANG and SPANLANG, see the "Language Center (<http://www.stanford.edu/dept/registrar/bulletin/5966.htm>)" section of this bulletin.

The Language Center offers a series of second- and third-year courses designed for students who grew up in homes where Spanish is spoken (heritage speakers) and who wish to develop their existing linguistic strengths. See the "Language Center (<http://www.stanford.edu/dept/registrar/bulletin/5966.htm>)" section of this bulletin.

The department is a part of the Division of Literatures, Cultures, and Languages (p. 482).

## Mission of the Undergraduate Program in Iberian and Latin American Cultures

Studying Iberian and Latin American cultures at Stanford means engaging in a deep and compelling exploration of the languages, literatures, and cultures of the Iberian Peninsula, Latin America (including Brazil), and Latina/o communities in the United States. To achieve the goal of training students as experts in these areas, the department balances an emphasis on literary studies with philosophical, historical, and social approaches to cultural issues. Given the focus on critical thinking, open discussion, and close textual analysis, undergraduate majors are provided excellent preparation for a large number of professional fields, including business, education, international relations, law, and medicine. The graduate program provides rigorous and highly individualized advanced training in the analysis of Iberian, Latin American (including Brazil), and Latina/o literatures, and students go on to produce innovative original research and find excellent jobs, both in academe and beyond.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. oral proficiency in Catalan, Portuguese, and/or Spanish beyond the interpersonal level with presentational language abilities;
2. close reading skills of texts in Catalan Portuguese, and/or Spanish;
3. writing proficiency in Catalan, Portuguese, and/or Spanish beyond the interpersonal level with presentational language abilities.

## Bachelor of Arts in Iberian and Latin American Cultures

In this major, students engage in a thoroughly transnational and cross-linguistic study of Iberian and Latin American (including Brazil) literatures and cultures. Courses emphasize critical thinking and close textual analysis, with an emphasis on the deep and often understudied intersections between literature written in Catalan, Portuguese, and Spanish from the medieval period to the present day.

## Bachelor of Arts in Spanish

This undergraduate program is designed for students who want to move towards fluency in reading, listening, speaking, and writing Spanish while developing a contextualized understanding of the language through linguistic and cultural study. This degree emphasizes critical use of the Spanish language in a global perspective.

## Learning Outcomes (Graduate)

The purpose of the terminal M.A. program in Iberian and Latin American Cultures is for students to develop further the knowledge and skills acquired as undergraduates and to prepare students for a professional career or doctoral studies. This is achieved through the completion of graduate courses in the student's major area of interest as well as in related areas.

The Ph.D. in Iberian and Latin American Cultures is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis with respect to the areas and traditions taught by the department. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to develop innovative research and to present the results of this research to the world in compelling ways.

## Bachelor of Arts in Iberian and Latin American Cultures

This program is designed for students who wish to engage in a transitional and cross-linguistic study of Iberian and Latin American literatures and cultures. Courses emphasize critical thinking and close textual analysis, with an emphasis on the deep and often understudied intersections between literature written in Catalan, Portuguese, and Spanish from the medieval period to the present day. B.A. Iberian and Latin American Cultures appears on the official transcript and on the diploma. The major in Iberian and Latin American Cultures required 60 units of coursework. Courses cannot be duplicated for two degrees. All courses must be taken for a letter grade.

## Prerequisites

For all ILAC courses taught in Spanish, students must have successfully completed SPANLANG 101 The Structure of Spanish or SPANLANG 102 Composition and Writing Workshop or successfully tested above this level through the Language Center. Students are advised to take core courses before 200-level courses.

## Declaring the Major

Students declare the major in Iberian and Latin American Cultures through Axess. Students should meet with the Chair of Undergraduate Studies to discuss appropriate courses and options within the major, and to plan the course of study. Majors are also urged to attend department events such as public talks and conferences.

## Double Majors

The major in ILAC is designed to combine with a second major in another field and with study abroad. Students should be aware, however, that university policy prevents one course from counting for both degree programs.

## General Course Requirements

Students must complete a total of 60 units for the major. The first five requirements listed below are considered core requirements and must be taken at Stanford University. AP credit and Transfer credit from other Universities do not count towards this major.

1. A Writing in the Major (WIM) course: 5 units are required. This is offered as a Senior Seminar, open to Seniors only and to Juniors by

petition, if they have demonstrated need to be away from campus during their Senior year. The course designated as WIM for 2017-18 is:

ILAC 278A Senior Seminar: Cervantes's *Novelas Ejemplares* 3-5

2. Core courses in literature. All three courses must be completed. Majors are required to take these courses for 4 units.

		Units
ILAC 136	Modern Iberian Literatures	3-5
ILAC 157	Medieval and Early Modern Iberian Literatures (WIM 2015-2016)	3-5
ILAC 161	Modern Latin American Literature	3-5

3. Core courses in culture, history, and civilization. Choose at least two of three. Majors are required to take these courses for 4 units.

		Units
ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5
ILAC 132E	Introduction to Global Portuguese: Cultural Perspectives	3-5

4. Elective Courses. Elective courses can be taken within the following parameters:

- Up to 15 units of language courses (not including conversational courses) in Spanish, Portuguese, or Catalan.
- Additional 100- or 200- level ILAC literature courses.
- Up to 15 units of pre-approved coursework from Stanford Study Abroad programs in Madrid or Santiago. A course taught abroad by a core member of the ILAC faculty does not count against this limit.
- Up to 5 units of pre-approved coursework from outside ILAC
- Up to 10 units of Thinking Matters courses taught at least partially by an ILAC faculty member

5. In addition to course requirements for the major, students must also take an Oral Proficiency Interview (OPI) in Catalan, Portuguese, or Spanish by contacting the Language Center two quarters prior to degree conferral.

## Bachelor of Arts in Spanish

This program is designed for students who want to move towards fluency in reading, listening, speaking, and writing Spanish while developing a contextualized understanding of the language through linguistic and cultural study. This degree emphasizes critical use of the language in a global perspective. "B.A. Spanish" appears on the official transcript and on the diploma. The major in Spanish requires 60 units of coursework. All coursework must be done in Spanish. If a class is taught in a language other than Spanish, then written work (e.g. final papers) must be completed in Spanish. Courses cannot be duplicated for two degrees. All courses must be taken for a letter grade.

### Prerequisites

Students must have completed SPANLANG 101 or 102 or (successfully tested above this level through the Language Center) Students are advised to take core courses before 200-level courses.

#### Declaring the Major

Students declare the major in Spanish through Axess. Students should meet with the Chair of Undergraduate Studies to discuss appropriate courses and options within the major, and to plan the course of study.

Majors are also urged to attend department events such as public talks and conferences.

### Double Majors

The Spanish major is designed to combine with a second major in another field and with study abroad. Students should be aware, however, that university policy prevents one course from counting for both degree programs.

### General Course Requirements

Students must complete a total of 60 units for the major. The first four requirements listed below are core requirements and must be taken at Stanford University. AP credit and Transfer credit from other Universities do not count towards this major.

1. A Writing in the Major (WIM) course: 5 units are required. This is offered as a Senior Seminar, open to Seniors only and to Juniors by petition, if they have demonstrated need to be away from campus during their Senior year. The course designated as WIM for 2017-18 is:

ILAC 277 Senior Seminar: Spanish and Society - Cultures of Salsa 3-5

2. Core courses in culture, history, and civilization. Choose at least one. Majors are required to take their selected courses for 4 units.

		Units
ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5

3. Elective Courses. Elective courses can be taken within the following parameters:

- Additional 100- or 200-level ILAC courses.
- Up to 15 units of pre-approved coursework from Stanford study abroad programs in Madrid or Santiago. A course abroad taught by a core member of the ILAC faculty does not count against this limit.
- Up to 5 units of pre-approved coursework from outside ILAC.
- Up to three courses of SPANLANG at the second year level or above i.e., SPANLANG 11C, 11R, 12C, 12R, 13C, 13R, 21B, 22B, 23B, 101, and 102.

4. In addition to the course requirements listed above, all majors must test their proficiency in Spanish through the Language Center by Winter Quarter of their senior year. Students must receive a notation of at least advanced-mid to be deemed adequately proficient. Those needing outside tutoring are advised to do so; resources are available through the VPTL and ILAC. The proficiency examination consists of both an oral interview and a writing proficiency test.

## Honors Program

ILAC majors and Spanish majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the

key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) website.

Enrollment: A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

- Spring Quarter of the junior year (optional) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the Director of the department and will be approved or returned for submission.
- Autumn Quarter of the senior year (required) DLCL 189A Honors Thesis Seminar (4 units S/NC) taught by a DLCL appointed faculty member. Course will focus on researching and writing the honors thesis.
- Winter Quarter of the senior year (required) DLCL 189B Honors Thesis Seminar (2-4 units Letter grade) under the primary thesis adviser. Focus will be on writing writing under guidance of primary adviser. The letter grade will determine if honors is granted or not.
- Spring Quarter of the senior year (option; mandatory if not taken during junior year) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Honors essays are due to the thesis adviser and Student Service Officer no later than 5:00 p.m. on May 15th of the terminal year.
- Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation (1 unit S/NC). Enroll with primary thesis adviser.

## Joint Major Programs: ILAC and Computer Science & Spanish and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

### Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axxess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

### Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>). Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

### Transcript and Diploma

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

## Iberian and Latin American Studies Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Progra (p. 278)m" section of this bulletin for details on Computer Science requirements.

This program is designed for students who wish to engage in a transitional and cross-linguistic study of Iberian and Latin American literatures and cultures. Courses emphasize critical thinking and close textual analysis, with an emphasis on the deep and often understudied intersections between literature written in Catalan, Portuguese, and Spanish from the medieval period to the present day. B.A. Iberian and Latin American Cultures appears on the official transcript and on the diploma. The major in Iberian and Latin American Cultures required 50 units of coursework. Courses cannot be duplicated for two degrees. All courses must be taken for a letter grade.

### Prerequisites

For all ILAC courses taught in Spanish, students must have successfully completed SPANLANG 102 Composition and Writing Workshop or tested above this level through the Language Center. One course above 100 and one core course, or consent of the instructor, are prerequisites for 200-level courses.

### Requirements

Students must complete a total of 50 units for the major. The first six requirements listed below are considered core requirements and must be taken at Stanford University.

1. A Writing in the Major (WIM) course: 5 units are required. This is offered as a Senior Seminar, open to Seniors only and to Juniors by petition, if they have demonstrated need to be away from campus during their Senior year. The course designated as WIM for 2017-18 is:

		Units
ILAC 278A	Senior Seminar: Cervantes's Novelas Ejemplares	3-5

2. Core courses in literature. All three courses must be completed

		Units
ILAC 136	Modern Iberian Literatures	3-5
ILAC 157	Medieval and Early Modern Iberian Literatures (WIM 2015-16)	3-5
ILAC 161	Modern Latin American Literature	3-5

3. Core courses in culture, history, and civilization. Choose at least one.

		Units
ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5

4. **Capstone Project:** Senior year, the student enrolls in a 2-unit DLCL 299 with a DLCL faculty member. The faculty member advising this project must sign off on this description. In order to have it approved as their capstone Computer Science and ILAC project must be written in proficient Spanish, Portuguese, or Catalan. The student must submit a description of the project to the Chair of Undergraduate Studies in ILAC by May 15th of the junior year or no later than October 1st of the senior year.
5. **Elective Courses.** Elective courses can be taken within the following parameters:
  - Up to 15 units of language courses (not including conversational courses) in Spanish, Portuguese, or Catalan.
  - Additional 100- or 200- level ILAC literature courses.
  - Up to 15 units of pre-approved course work from Stanford Study Abroad programs in Barcelona, Madrid, or Santiago. A course taught abroad by a core member of the ILAC faculty does not count against this limit.
  - Up to 5 units of pre-approved course work from outside ILAC
  - Up to 10 units of Thinking Matters courses taught at least partially by an ILAC faculty member

6. In addition to course requirements for the major, students must also take an Oral Proficiency Interview (OPI) in Catalan, Portuguese, or Spanish through the Language Center two quarters prior to degree conferral.

## Spanish Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Program (p. 278)" section of this bulletin for details on Computer Science requirements.

This program is designed for students who want to move towards fluency in reading, listening, speaking, and writing Spanish while developing a contextualized understanding of the language through linguistic and cultural study. This degree emphasizes critical use of the language in a global perspective. All course work must be done in Spanish. If a class is taught in a language other than Spanish, then written work (such as final papers) must be completed in Spanish. Courses cannot be duplicated for two degrees. All courses must be taken for a letter grade.

### Prerequisites

Students must be at or above the level of SPANLANG 13 or tested above this level through the Language Center.

### Requirements

Students must complete a total of 50 units for the major. The first five requirements listed below are core requirements and must be taken at Stanford University.

1. A Writing in the Major (WIM) course. 5 units are required. This is a prerequisite for every course in the major; however, concurrent enrollment is allowed. . WIM offerings change nearly every year, but a WIM designated ILAC course from any year satisfies the requirement.

ILAC 277	Senior Seminar: Spanish and Society - Cultures of Salsa	3-5
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2. Core courses in culture, history, and civilization. Choose at least one.

ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5

3. **Capstone Project:** Senior year, the student enrolls in a 2-unit independent study DLCL 299 with a DLCL faculty member. The faculty member advising this project must sign off on this description. In order to have it approved as their capstone Spanish and Computer Science project must be written in proficient Spanish. The student must submit a description of the project to the Chair of Undergraduate Studies in ILAC by May 15th of the junior year or no later than October 1st of the senior year.

4. **Elective Courses.** Elective courses can be taken within the following parameters:

- Additional 100- or 200-level ILAC courses.
- Up to 15 units of pre-approved coursework from Stanford study abroad programs in Barcelona, Madrid, or Santiago. A course abroad taught by a core member of the ILAC faculty does not count against this limit.
- Up to 5 units of pre-approved coursework from outside ILAC.
- Up to three courses of SPANLANG at the second year level or above.

5. In addition to the course requirements listed above, all majors must test their proficiency in Spanish through the Language Center by winter quarter of their senior year. Students must receive a notation of at least "Advanced Mid" to be deemed adequately proficient. Those needing outside tutoring will be advised to do so (resources available through the VPTL and ILAC). The proficiency examination will consist of both an oral interview and a writing proficiency test.

## Minors in Spanish and Portuguese

Both the minor in Portuguese and the minor in Spanish are for students who want to combine acquisition of linguistic competence with the study of the literatures and cultures of the Lusophone or Spanish-speaking worlds. Each minor requires six courses totaling a minimum of 23 units. Each course must be taken for a letter grade.

Up to three courses of second-year Spanish language (for Spanish minor) or Portuguese (for Portuguese minor) or above may count towards the degree, not including conversational, oral communication, business, or medical language courses.

With the approval of the Chair of Undergraduate Studies, Independent Study and the following courses may count towards the degree.

Up to two courses from abroad may apply towards the minor. One or both may be a language course at second-year or above. One or both may be a literature or culture course listed as authorized by the ILAC department on the BOSP website. (A literature or culture course taught by a core member of the ILAC faculty abroad does not count against this limit.) At least two courses at the 100 or 200 level must be taken in the ILAC department (or with ILAC faculty abroad).

One 3-5 unit (5 unit maximum) course on a related topic from another department.

AP credit and Transfer credit from other Universities do not count towards this minor.

### Units Minor in Portuguese

**Required Courses: Minimum of 6 courses and 23 units.** Units 23

- |   |  |
|---|--|
| 1. Two 100- or 200-level courses in literature or culture with a Lusophone component                                    |  |
| 2. Any additional 100- or 200-level courses in literature and culture to complete the required 23 units and six courses |  |
| 3. Pre-Approved Courses for 2017-18 to fulfill 1 and 2 above  |  |
| ILAC 110N   | Brazil: Musical Culture and Films <span style="float: right;">3-5</span> |

ILAC 132E	Introduction to Global Portuguese: Cultural Perspectives	3-5
ILAC 161	Modern Latin American Literature	3-5
ILAC 217	Fernando Pessoa: Aesthetics as Ontology	3-5
ILAC 274	Aurality and Literature	3-5

## Minor in Spanish

**Required Courses: Minimum of 6 courses and 23 units.**

Units

23

1. A 100- or 200-level course in ILAC with a significant component of Iberian literature, film, or other cultural texts.
2. A 100- or 200-level course in ILAC with a significant component of Latin American literature, film, or other cultural texts.
3. Any additional 100- or 200-level courses in literature and culture to complete the required 23 units and six courses.

## Master of Arts in Iberian and Latin American Cultures

The purpose of the terminal M.A. program in Iberian and Latin American Cultures is for students to develop further the knowledge or skills acquired as undergraduates, and to prepare students for a professional career or doctoral studies. This is achieved through the completion of graduate courses in the student's major area of interest as well as in related areas. Students in this program may not apply concurrently for entrance to the Ph.D. program.

### Coterminal Master of Arts in Iberian and Latin American Cultures

The coterminal degree program allows undergraduates to study for a master's degree in Iberian and Latin American Cultures while completing their bachelor's degree(s) in ILAC or a different department. The course requirements for the coterminal M.A. are the same as those for the terminal M.A., and students should be aware that University policy prevents one course from counting for both the B.A. and M.A. degrees.

#### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Degree Requirements for the Master of Arts in Iberian and Latin American Cultures

Students must complete a minimum of 45 graduate-level units, 36 of which must be taken at Stanford. All 45 units must have a letter grade of 'B' or above. Students enrolled in the terminal M.A. program must file a Program Proposal for a Master's Degree during their first quarter of enrollment. Any changes to the proposal should be reviewed and approved by the Chair of Graduate Studies.

The requirements for the terminal M.A. and coterminal M.A. are:

1. A 200-level or above course in literary or cultural theory
2. Two 200-level or above courses in Latin American (including Brazilian) or Latinx/Chicanx literature and culture
3. Two 200-level or above courses in Iberian literature and culture
4. One 300-level course in Latin American (including Brazilian) or Latinx/Chicanx literature and culture
5. One 300-level course in Iberian literature and culture
6. Enrollment in at least two graduate seminars (200- or 300- level) offered in the department each quarter
7. Intermediate-high proficiency in Portuguese or Catalan (equivalent to one year of university study).

Independent study courses (ILAC 299 Individual Work, ILAC 399 Individual Work) and crosslisted courses originating outside the department may not be used to fulfill requirements except by consent of the Chair of Graduate Studies.

## Doctor of Philosophy in Iberian and Latin American Cultures

The Ph.D. in Iberian and Latin American Cultures is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis with respect to the areas and traditions taught by the department. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to develop innovative research and to present the results of this research to the world in compelling ways.

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin. The requirements of the Ph.D. in Iberian and Latin American Cultures (ILAC) are:

### 1. Course Work

A total of 135 units is required for the Ph.D. During each quarter preceding advancement to TGR status, students are required to complete (for a letter grade) at least two graduate courses (200- or 300- level) offered through the department. These are taken for for three units each.

All courses counted towards the 135-unit requirement for the Ph.D. be at the graduate level. Excess course work can be taken at the UG level, but not used towards the Ph.D. requirements. Students should make every effort to take a seminar with a core member of the faculty each quarter and one course with each faculty member of the department during the first two years of study. Students may take independent study courses (ILAC 299, ILAC 399) only during the Summer Quarter until they reach TGR status. Any exceptions must be made in consultation with the Chair of Graduate Studies, the relevant faculty member, and/or the student's faculty adviser. During the first three years of study, students must also meet with their primary advisor and the Chair of Graduate Studies early in the Spring Quarter of each year to plan a course to plan a course of study for the 10 units to be completed during the Summer Quarter. Students who transfer graduate units from another institution may adjust the course of study outlined below. See the 2017-18 Graduate Handbook for details.

Doctoral students in the department must take required courses for a letter grade if available, and they are expected to earn a grade of 'B+' or better in each course taken in the DLCL. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty and the following actions may be taken: 1) the grade stands, and the student's academic performance is monitored to ensure that satisfactory progress is being made; 2) the grade stands and the student is required to revise and resubmit the work associated with the course; or 3) the student may be required to retake the course.

In consultation with the Chair of Graduate Studies, students in their first year choose one major field and two minor areas of study from the following:

- A1. Medieval and Early Modern Iberian Literature and Culture
- A2. Eighteenth- and Nineteenth-Century Iberian Literature and Culture
- A3. Twentieth- and Twenty-First-Century Iberian Literature and Culture
- B1. Colonial and Nineteenth-Century Latin American Literature and Culture
- B2. Twentieth- and Twenty-First-Century Latin American Literature and Culture
- B3. African and/ or Brazilian Literature and Culture
- C. US Latinx Literature and Culture

Students must select one minor area from a group (A, B, C) other than that in which their major area falls. At least four graduate-level courses must be taken in the major area of study. At least two graduate-level courses must be taken in each minor area.

### 1a. First Year

Students must enroll in and complete a minimum of 30 graduate units during their first year of graduate study as well as 10 units during the summer. First year-required course work:

- One 200-level or above course in literary or cultural theory ( DLCL 369 Introduction to the Profession of Literary Studies is highly recommended)
- Three 200-level or above courses in Latin American (including Brazil) or Latinx literature and culture
- Three 200-level or above courses in Iberian literature and culture
- Enrollment in and completion of DLCL 301 The Learning and Teaching of Second Languages
- Intermediate-high proficiency in Portuguese or Catalan (equivalent to one year of university study)

### 1b. Second Year

Students must enroll in and complete a minimum of 30 graduate units during their second year of graduate study as well as 10 units during the Summer. In addition, second-year students must complete at least two graduate seminars (200- or 300- level) offered in the department each quarter and enroll in DLCL 311 during one quarter (but attend all year). All DLCL courses must be taken for a letter grade.

### 1c. Third Year

Students must enroll in and complete a minimum of 30 graduate units during their third year of graduate study as well as 10 units during the summer. In addition, third-year students must enroll in and complete at least two graduate seminars (200- or 300- level) offered in the department each quarter. All DLCL courses must be taken for a letter grade.

### 1d. Fourth Year

Students must enroll in and complete 15 units of graduate work during the Autumn and Winter quarters of their fourth year. All DLCL courses must be taken for a letter grade.

## 2. Language

All students are required to have advanced-high proficiency in English and Spanish by the time they take the comprehensive examination.

In addition, students specializing in Iberian literature and culture must attain intermediate-mid proficiency in Catalan and Portuguese (equivalent to two quarters of university study for each language); for students specializing in Latin American and/or US Latinx/Chicanx literature and culture, the level of advanced-low or (C1) proficiency in Portuguese (equivalent to four quarters of university study) must be attained. Alternatively, they may study Portuguese for three quarters and study one quarter of Catalan or a Native American language such as Nahuatl, Quechua, or Tupi. This requirement must be fulfilled before students take the comprehensive examination. Students wishing to satisfy the language requirements in Catalan and/or Portuguese may do so by passing a proficiency exam administered by the Language Center. Further explanation of the language requirements and options for satisfying them can be found in the 2017-18 Graduate Handbook.

## 3. Examinations

All students must pass the following: 1) a qualifying exam; 2) a written and oral comprehensive examination; and 3) a University oral examination.

### 3a. Qualifying Examination

In the Autumn Quarter of their first year, students receive a digital reader with a selection of texts related to all areas of Iberian and Latin American literature and culture. These texts serve as the basis for the qualifying exam, which is administered the first week of Autumn Quarter of the student's second year of study. During the one-hour oral examination, students meet with a faculty committee and must answer questions in English and/or in Spanish submitted by all active members of the ILAC faculty. Students who fail this examination may request to retake it during the Winter Quarter of the same year.

### 3b. Comprehensive Examination

This exam consists of two parts: 1) the submission of a written paper; and 2) an oral question and answer period. It is designed for students to demonstrate intellectual competence in multiple areas of study. This exam occurs during Spring Quarter of the third year of graduate study, and it must be completed prior to the last day of instruction in that same quarter. Students with transferred credits may take this exam earlier in the third year. Students must select a major and two minor areas for the exam from the following options:

- A1. Medieval and Early Modern Iberian Literature and Culture
- A2. Eighteenth- and Nineteenth-Century Iberian Literature and Culture
- A3. Twentieth- and Twenty-First-Century Iberian Literature and Culture
- B1. Colonial and Nineteenth-Century Latin American Literature and Culture
- B2. Twentieth- and Twenty-First-Century Latin American Literature and Culture
- B3. Luso-Afro-Brazilian Literature and Culture
- C. Latinx Literature and Culture

Students must select one minor area from a group (A, B, C) other than that in which their major area falls.

The committee for the comprehensive exam consists of three ILAC professors to serve on the committee, one for each of the three examination areas chosen by the student. Students are responsible for forming their own committee. In consultation with each member of the committee, the student must develop a list of 130 texts (approximately 60 for the major area and 35 for each of the minor areas) and should propose organizing themes (in discussion with the committee and as appropriate). In addition, the student must submit a 6,000-word research paper on a topic preferably related to the dissertation. This paper must

be written in English. The comprehensive exam reading list and research paper must be presented to committee members and to the graduate student services coordinator at least two weeks prior to the oral portion of the comprehensive exam. The oral exam is based upon the submitted list and research paper and lasts no more than two hours.

### 3c. University Oral Examination

Ph.D. candidates in ILAC are required to take a University oral examination after successfully completing the comprehensive examination and before the end of the Spring Quarter of their fourth year. Students with transferred credits may take this exam earlier in the fourth year. This examination is a defense of the dissertation prospectus. During the examination, the candidate speaks for approximately 20 minutes on the proposed dissertation, the methods to be used in research and the conclusions the candidate expects to reach. Afterward, each member of the committee, in an order established by the chair of the committee, questions the candidate further. The examination lasts no more than two hours.

The University oral examination committee must be finalized no later than the last week of the quarter during which the student successfully completes the comprehensive examination. The examination committee should include the dissertation adviser and three other members, usually from the reading committee, and a chair from outside the department, for a total of five members. All members must belong to the Academic Council. The adviser and two other members must be ILAC faculty. Once a committee and date are finalized, the student must submit the University oral examination form to the graduate student services coordinator. The members of the oral examination committee must receive copies of the dissertation prospectus no later than three weeks prior to the examination.

The dissertation prospectus should consist of approximately 10 pages (3,000 words). It must contain a title along with the following sections: 1) statement of thesis; 2) statement of project significance, both for the student's chosen sub-field(s) and the humanities at large; 3) chapter outline; 4) preliminary biography; 5) timetable for completion.

## 4. Teaching

Each Ph.D. candidate must teach a minimum of five quarters of undergraduate courses (three are taught during the second year and the remaining two during the third year). Language course assignments are arranged through the Language Center. In preparation for teaching, Ph.D. candidates are required to take DLCL 301 The Learning and Teaching of Second Languages during the Spring Quarter of their first year. All students must complete one full year (three quarters), plus an additional quarter during the regular academic year of teaching in the Language Center. Students then may apply to co-teach an ILAC literature or culture course with a core ILAC faculty member or they may choose to teach another course in the Language Center to satisfy the requirement of five quarters of undergraduate teaching. Other additional teaching opportunities may arise, but these do not satisfy the teaching requirement.

## 5. Ph.D. Dissertation

The doctoral dissertation should demonstrate the student's ability to carry out original research and to organize and present the results in publishable form. A copy of the completed dissertation must be submitted to each member of the reading committee at least eight weeks before the University filing deadline in the quarter during which the candidate expects to receive the Ph.D. degree. Committee members will have three weeks to read the dissertation before determining whether to approve or require changes. Ph.D. dissertations must be completed and approved within five years from the date of admission to candidacy. Students taking more than five years must apply for reinstatement of candidacy, which is reviewed on a case by case basis.

## Yearly review

The department conducts annual reviews of each student's academic performance at the end of the Spring Quarter. All students are given feedback from the Chair of Graduate Studies, which helps them to identify areas of strength and potential weakness. In most cases, students are simply given constructive feedback; however, if there are more serious concerns, a student may be placed on probation with specific guidelines for addressing the problems detected. At any point during the degree program, evidence that a student is performing at a less than satisfactory level may be cause for a formal academic review of that student.

Possible outcomes of the spring review include: continuation of the student in good standing, or placing the student on probation, with specific guidelines for the period of probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: restoration to good standing; continued probation, with guidelines for necessary remedial steps; or dismissal from the program.

## Candidacy

Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the Ph.D. program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence.

In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, course work, performance on the qualifying exam, and successful completion of teaching and research assistantships. A student must also have completed at least 3 units of work with each of four Stanford faculty members prior to consideration for candidacy.

In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to complete the requirements of the degree program successfully. Candidacy is determined by faculty vote. Failure to advance to candidacy results in the dismissal of the student from the doctoral program.

Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The department conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University candidacy policy is available in the Bulletin (p. ) and GAP (<http://gap.stanford.edu/4-6.html>).

## Ph.D. Minor in Iberian and Latin American Cultures

Stanford Ph.D. students wishing to earn a minor in Iberian and Latin American Cultures must complete 25 units, with a grade point average (GPA) or 3.0 or above, selected from courses numbered 200 or higher.

For more information, students should speak with the ILAC Chair of Graduate Studies. Students in the Ph.D. program in ILAC who choose a minor in another department should consult with advisers in that department.

## Faculty in Iberian and Latin American Cultures

*Emeriti:* (Professors) Bernard Gicovate, Mary Pratt, Michael P. Predmore, María-Paz Haro (Teaching), Sylvia Wynter (Teaching), Yvonne Yarbro-Bejarano

*Director:* Lisa Surwillo

*Chair of Graduate Studies:* Héctor Hoyos

*Chair of Undergraduate Studies:* Lisa Surwillo

*Professors:* Joan Ramon Resina (also Comparative Literature), Jorge Ruffinelli (on leave Autumn)

*Associate Professors:* Vincent Barletta (also Comparative Literature), Héctor Hoyos, Lisa Surwillo

*Assistant Professors:* Marília Librandi Rocha

*Lecturer:* Ximena Briceño, Nicole Hughes (Mellon Fellow)

*Courtesy Professors:* John Fellstiner, Zephyr Frank, Roland Greene, Hans U. Gumbrecht, Ramon Saldivar, James A. Fox, Paula Moya

*Visiting Professor:* Florencia Garramuño (Winter)

*Visiting Lecturer:* Jordi Falgàs i Casanovas (Autumn)

## Overseas Studies Courses in Iberian and Latin American Cultures

### Study Abroad Programs in Iberian and Latin American Cultures

All majors are encouraged to study abroad. To transfer credits from non-Stanford programs abroad, consult the Bing Overseas Studies Office. Course work taken abroad may be applied toward both our major and minor programs. Students planning to study abroad must consult with the Chair of Undergraduate Studies to coordinate the course work from abroad with their degree program. The maximum number of units is identified in the elective section for each major.

The Department, The Center for Latin American Studies (<https://clas.stanford.edu>), and the Bechtel International Center maintain information on study abroad programs. Stanford supports the options listed below and credits course work taken in academically sound programs. Students considering different options are encouraged to speak with the Director of the Department or the Chair of Undergraduate Studies.

### Stanford in Santiago de Chile and Madrid, Spain

The Bing Overseas Studies Programs in Santiago de Chile and Madrid, Spain require a certain level of proficiency in Spanish. For more information, students should consult the program summary of their interested campus. Course work is primarily in Spanish. Information is available in the "Overseas Studies" section of this bulletin or at the Bing Overseas Studies web site. Internships and research opportunities may be arranged for students staying for two quarters. Admission is highly competitive.

The department also recognizes other programs, and students are encouraged to discuss their interests with the Director of the Department or with the Chair of Undergraduate Studies.

### Brazil and Portugal

The University maintains a relationship with the State University of Rio de Janeiro in Brazil at the graduate level. Students interested in study

in Brazil should contact Professor Marília Librandi Rocha. Students interested in study in Portugal should contact Professor Vincent Barletta.

### Bing Overseas Studies Program

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPMADRD 43	The Jacobean Star Way and Europe: Society, Politics and Culture	5
OSPMADRD 45	Women in Art: Case Study in the Madrid Museums	4
OSPMADRD 46	Drawing with Four Spanish Masters: Goya, Velazquez, Picasso and Dali	4
OSPMADRD 47	Cultural Relations between Spain and the United States: Historical Perceptions and Influences, 1776-2	4
OSPMADRD 55	Latin Americans in Spain: Cultural Identities, Social Practices, and Migratory Experience	4
OSPMADRD 61	Society and Cultural Change: The Case of Spain	4
OSPMADRD 83	Narrating the Nation: National and Post-National Spanish and Latin American Literature	4
OSPSANTG 14	Women Writers of Latin America in the 20th Century	4-5
OSPSANTG 49	Chile - Another "End of the World"?	3-5
OSPSANTG 68	The Emergence of Nations in Latin America	4-5
OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
OSPSANTG 118X	Artistic Expression in Latin America	5



# INTERNATIONAL POLICY STUDIES

Courses offered by the Ford Dorsey Program in International Policy Studies are listed under the subject code IPS on the Stanford Bulletin's ExploreCourses web site (<http://explorecourses.stanford.edu/search.jsessionid=CD85410D8306285785D60502AD7D575F?page=0&q=ips&filter-coursestatus-Active=on&view=timeschedule&collapse=&catalog=71>).

The Ford Dorsey Program in International Policy Studies (IPS), established in 1982, is an interdisciplinary program devoted to rigorous analysis of international policy issues in diplomacy, governance, security, global health, and international economic policy. Its goal is to provide students with exposure to issues they will face in the international arena, and to develop the skills and knowledge to address those issues. The program allows students to specialize in democracy, development, and the rule of law; energy, environment, and natural resources; global health; international political economy; or international security and cooperation.

The IPS program combines a rigorous scholarly focus with practical training designed to prepare students for careers in public service and other settings where they can have an impact on international issues.

The program is designed to integrate perspectives from political science, law, economics, history, and other disciplines, while also incorporating research opportunities and a focus on implementation and administration of solutions addressing global problems.

University requirements for the M.A. degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

## Learning Outcomes (Graduate)

The purpose of the master's program is to help students develop knowledge and skills in preparation for professional careers in international policy and related fields. This is achieved through completion of required courses in the global, quantitative, and skills core, as well as courses in an area of concentration and the capstone practicum course. Students are also encouraged to gain experience through a summer internship and research skills through assistantships with Stanford faculty.

## Admission

To apply or for information on graduate admission, see the Office of Graduate Admissions (<https://gradadmissions.stanford.edu>) website. Applications for admission in Autumn Quarter must be filed with supporting credentials by 11:59 pm on Tuesday, January 9, 2018.

## Language Requirement

In order to earn the M.A. degree in International Policy Studies, students must be proficient in a foreign language. Foreign language proficiency can be demonstrated by:

- Completion of three years of university-level coursework in a foreign language (verified by a transcript)
- Passing an oral and written proficiency exam at Stanford prior to graduation
- Status as a non-native English speaker

## Prerequisite Course Work

The IPS program requires the completion of five prerequisite courses prior to matriculation. These are microeconomics, macroeconomics, statistics, international trade and international finance. International trade and international finance are often covered in a single international

economics course. While not a required prerequisite course, an understanding of calculus is important for the statistics sequence in the Quantitative Core (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/internationalpolicystudies/#masterstext>).

Prerequisite courses may be taken at four-year institutions, community colleges, or through online courses, and must be taken for a letter grade. Proof of completion, which is usually verified by a transcript, is required. Stanford courses satisfying these requirements are:

Microeconomics and Macroeconomics

ECON 51	Economic Analysis II
ECON 52	Economic Analysis III
International Finance and International Trade	
ECON 165	International Finance
ECON 166	International Trade

Statistics (prerequisite coursework should cover, at minimum, most of the content in STATS 200)

STATS 160	Introduction to Statistical Methods: Precalculus
STATS 200	Introduction to Statistical Inference

## Application Materials

In addition to the web-based application, applicants must submit the following materials:

- Statement of purpose on relevant personal, academic, and career plans and goals
- Official transcripts (two hard copies, which are mailed to the IPS program office, and one scanned copy electronically uploaded to the online application)
  - Stanford students, and alumni with an active SUNet ID and password, may request an official eTranscript to be sent from Stanford University and automatically deposited into the application; in this case, hard copies are not required.
- Three letters of recommendation
- Graduate Record Examination (GRE) scores
- Academic writing sample (written in English, 7-15 pages in length, and double-spaced)
- Resume or curriculum vitae
- TOEFL scores (only required of applicants who are non-native English speakers and who did not attend undergraduate institutions where English is the language of instruction; please see Graduate Admissions (<https://gradadmissions.stanford.edu/about/frequently-asked-questions/gre-and-toefl>) for additional information)

Applicants are expected to have a B.A. or B.S. degree from an accredited school.

Applicants should plan to review the admissions section (<https://ips.stanford.edu/admissions/ma-admissions>) of the IPS website as well as the Frequently Asked Questions (<https://ips.stanford.edu/admissions/frequently-asked-questions>).

## Master of Arts in International Policy Studies (IPS)

University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

## Degree Requirements

To earn the M.A. degree in International Policy Studies, students matriculating in Autumn Quarter 2017 must complete the courses listed in the curriculum below. These requirements include:

- Two courses in the global core (4 unit)
- Four courses in the quantitative core (19-20 units)
- Four courses in the skills core (16-20 units)
- Six or more courses in the area of concentration (26 units)
- The capstone (8 units)

The minimum number of units required to graduate is 73.

During the first year of the program, students must complete required course work in statistics, econometrics, international economics, advanced economics, international relations theory, policy writing, and an introductory (gateway) course in the area of concentration. During the second year of the program, students are required to complete either the practicum or master's thesis during Autumn and Winter quarters. Only students with two or more years of relevant policy work may petition to write a master's thesis.

Students who matriculated in Autumn Quarter of a previous year should review their degree requirements by visiting the University's Archived Bulletins (<http://exploreddegrees.stanford.edu/archive/#text>).

## Curriculum

(\*) signifies degree requirement must be completed during first year

### Global Core

Director's Seminar (*)	1
IPS 300 IPS Student-Faculty Colloquium	
International Relations Theory (*)	3
IPS 201 Managing Global Complexity	

### Quantitative Core

Statistics Course (*)	5
ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists	
Econometrics Course - Select one of the following (*):	5
ECON 102B Applied Econometrics	
International Economics Course - Select one of the following (*):	5
IPS 202 Topics in International Macroeconomics	
IPS 203 Issues in International Economics	
Advanced Economics Course - Select one of the following:	4-5
IPS 202 Topics in International Macroeconomics	
IPS 203 Issues in International Economics	
IPS 204A Microeconomics for Policy	
IPS 204B Economic Policy Analysis for Policymakers	

### Skills Core

Policy Writing - Select one of the following (*):	5
IPS 210 The Politics of International Humanitarian Action	
IPS 211 The Transition from War to Peace: Peacebuilding Strategies	
IPS 213 International Mediation and Civil Wars	
IPS 244 U.S. Policy toward Northeast Asia	
IPS 264 Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia	
IPS 316S Decision Making in U.S. Foreign Policy	
Justice - Select one of the following:	4-5
IPS 208A International Justice	
POLISCI 336 Introduction to Global Justice	
POLISCI 336S Justice	
Decision Making - Select one of the following:	4-5
ECON 137 Decision Modeling and Information	
GSBGEN 646 Behavioral Decision Making	

IPS 207B	Public Policy and Social Psychology: Implications and Applications	
LAW 7508	Problem Solving and Decision Making for Public Policy and Social Change	
MS&E 152	Introduction to Decision Analysis	
MS&E 252	Decision Analysis I: Foundations of Decision Analysis	
POLISCI 352	Introduction to Game Theoretic Methods in Political Science	
Skills Elective - Select one of the pre-approved electives below. Alternatively, this requirement may be fulfilled by completing: A) an additional elective course in one's area of concentration; B) an additional policy writing course; C) an additional quantitative course; or D) a pre-approved course in one of the four other areas of concentration (see "Related Courses" tab for listing)		3-5
CEE 251	Negotiation	
CS 106A	Programming Methodology	
CS 377E	Designing Solutions to Global Grand Challenges	
ECON 135	Finance for Non-MBAs	
ENGR 103	Public Speaking	
GSBGEN 315	Strategic Communication	
IPS 204B	Economic Policy Analysis for Policymakers	
LAW 7821	Negotiation	
LAW 7823	Advanced Negotiation: International	
ME 301	LaunchPad: Design and Launch your Product or Service	
ME 316B	Product Design Master's Project	
ME 377	Design Thinking Studio	
STRAMGT 323	Organizational Psychology of Design Thinking	
<b>Area of Concentration: Gateway and elective courses:</b>		<b>26</b>
<b>Capstone</b>		
Select one to be completed during Autumn and Winter quarters of the second year:		8
IPS 209	Practicum	
IPS 209A	IPS Master's Thesis	
(*) indicates degree requirement that must be completed during first year		
<b>Total Units</b>		<b>73-78</b>

## Area of Concentration Curriculum

Students are required to choose one area of concentration from the list below and complete at least six courses within the concentration for a minimum of 26 total units. Each area of concentration has a gateway course, which must be taken during the first year and prior to enrolling in subsequent courses. Additionally, each area of concentration has a list of approved elective courses, which can be found under the Related Courses (p. 613) tab of this page. Courses not listed under the Related Courses (p. 613) tab have not been approved and need to be petitioned. Petitions are reviewed by the IPS Faculty Director. The petition form (<http://ips.stanford.edu/resources>) can be found on the IPS web site.

## Area of Concentration Requirements:

1. Students must select an area of concentration during the first year of the program.
2. Students must complete a minimum of six courses within the area of concentration, including the gateway course, for a minimum total of 26 units.
  - a. The gateway course counts towards the six total courses within the area of concentration.
  - b. Each of the six courses must be taken for a minimum of three units.

- c. Additional one or two-unit courses may be applied to the concentration in order to reach the minimum of 26 units
  - d. 1 unit courses must be petitioned since they are generally only offered as S/NC. If a 2 unit course is only offered for Satisfactory/No Credit (S/NC) it must also be petitioned.
3. All course work must be taken for a letter grade.
  4. Students concentrating in International Political Economy are required to take IPS 202 Topics in International Macroeconomics for the international economics requirement and IPS 203 Issues in International Economics for the area of concentration gateway. In addition, they must complete IPS 204A Microeconomics for Policy or IPS 204B Economic Policy Analysis for Policymakers to fulfill the advanced economics requirement.
  5. Students from any other area of concentration may fulfill the advanced economics requirement by taking IPS 204A Microeconomics for Policy, IPS 204B Economic Policy Analysis for Policymakers, or the second course in the international economics category listed within the Quantitative Core.

### Area of Concentration Gateway Courses

	Units
<b>Democracy, Development, and Rule of Law Gateway Course:</b>	5
IPS 230 Democracy, Development, and the Rule of Law	
<b>Energy, Environment, and Natural Resources Gateway Course:</b>	3-4
CEE 207A Understanding Energy	
<b>Global Health Gateway Course:</b>	4
HUMBIO 129S Global Public Health	
<b>International Political Economy Gateway Course:</b>	5
IPS 202 will be applied towards the international economics requirement and IPS 203 will be applied towards the area of concentration gateway course	
IPS 202 Topics in International Macroeconomics	
IPS 203 Issues in International Economics	
<b>International Security and Cooperation Gateway Course:</b>	5
Students with an advanced background may petition to be exempted from the gateway course and instead take six elective courses in the concentration. Consultation with the student services officer and approval from the faculty director are required for this option.	
IPS 241 International Security in a Changing World	

### IPS-Specific Academic Policies

The University's general requirements, applicable to all graduate degrees at Stanford, are listed in the "Graduate Degrees (p. 52)" section of this bulletin. In addition, the IPS-specific degree requirement academic policies are listed below.

#### Course Petitions

Students may petition for units from a course that is not currently listed in the Related Course (p. 613)s (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/internationalpolicystudies/#relatedcoursestext>) tab to fulfill area of concentration requirements. A course petition may also be used to apply for an exemption from a core course that covers course work previously completed at the graduate level. The course petition (<http://ips.stanford.edu/resources>) must be submitted electronically to IPS no later than Friday of the first week of the academic quarter in which the course is offered. The IPS faculty director reviews the petition and renders a decision within one week of the petition submission. Notification is sent via email by the IPS staff.

#### Directed Readings

Students may arrange directed reading courses if the current course offerings do not meet particular research or study needs. Directed reading courses are independent study projects students may undertake

with Stanford faculty members. Once the student has identified a faculty member to support his or her studies, the student must submit the directed reading (<http://ips.stanford.edu/resources>) proposal (<http://ips.stanford.edu/resources>) to the IPS office for review by the IPS faculty director. Directed reading petitions must be submitted no later than the end of the second week of the quarter. The IPS faculty director reviews the directed reading proposal and renders a decision no later than two days prior to the Final Study List Deadline. If approved, the IPS staff creates a section number for the specific instructor so the student can enroll in the course. The course is listed as IPS 299 Directed Reading and the section number corresponds to the instructor. There are two restrictions for directed readings:

1. Students can receive credit for a maximum of 5 units per directed reading course.
2. Students must receive a letter grade for the directed reading course.

#### Academic Standing and Grade Requirement

IPS graduate students must maintain a minimum 3.0 cumulative GPA to remain in good academic standing. In addition, a minimum 3.0 cumulative GPA is required for conferral of the M.A. degree.

All courses taken to fulfill requirements for the M.A. degree in International Policy Studies must be taken for a letter grade. The only exceptions are: IPS 300 IPS Student-Faculty Colloquium, which is only offered as S/NC; courses taken in the Law School, the School of Medicine, or the Graduate School of Business where a letter grade may not be offered; or 1 or 2 unit elective courses, which are only offered as S/NC that have been approved via petition in the area of concentration. Pre-approval is required from the IPS student services officer in order to apply a non-letter grade course in Law, Medicine, or the Graduate School of Business toward the IPS degree.

#### Language Requirement

Proficiency in a foreign language is required and may be demonstrated by completion of three years of university-level course work in a foreign language or by passing an oral and written proficiency examination prior to graduation. International students who speak English as a second language already meet this requirement.

#### Additional Academic Requirements

1. Students are not required to repeat a course that covers material they have already mastered. In such cases, students may petition to substitute a different course for a required course in one of the core areas (global, quantitative, skills). This flexibility does not reduce the unit requirements for the M.A. degree.
2. All graduate degree candidates must submit a Master's Degree Program Proposal (i.e., IPS Program Proposal) to the International Policy Studies office no later than the seventh week of Spring Quarter. Submission of the IPS Program Proposal requires scheduling a 30-minute advising session with the IPS student services adviser to review degree progress and outline course work that needs to be completed during the second year of the program in order to graduate. The University requires each student to have a program proposal on file with the academic program in order for the student to apply to graduate. Failure to complete this process results in a hold being placed on the student's account.
3. During the first year of the program, first-year graduate students in IPS are required to electronically submit their course enrollment to the IPS student services officer no later than the second Friday of each academic quarter.
4. A maximum of 10 undergraduate units can be applied towards the IPS degree (ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists, ECON 102B Applied Econometrics, and MS&E 152 Introduction to Decision Analysis do not count towards the 10-unit maximum allowance). Courses listed at the 100-level or below are considered to be at the undergraduate

level. The exceptions are History and Political Science, which list undergraduate courses at the 200-level and below.

5. Units from language courses do not count towards the IPS degree requirements except in cases in which they are used to substitute for units that were made available through an exemption from a core course. English proficiency courses for international students do not count towards the IPS degree requirements.
6. Only students with two or more years of relevant policy work may petition to write a master's thesis (IPS 209A IPS Master's Thesis)

## Coterminal Master's Program

Undergraduates at Stanford may apply for admission to the coterminal master's program in IPS when they have earned a minimum of 120 units toward graduation, including Advanced Placement and transfer credit, and no later than the quarter prior to the expected completion of their undergraduate degree. The coterminal application requires the following supporting materials:

- Two letters of recommendation from University faculty
- Academic writing sample of at least eight double-spaced pages
- Statement of purpose focusing on relevant personal, academic, and career plans and goals
- Resume

Students must submit the Coterminal Online Application (<https://applyweb.com/stanterm>). Applications must be filed together with supporting materials by 11:59 pm on Tuesday, January 9, 2018.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 46)" section of this bulletin. For University coterminal master's forms, see the Registrar's Publications page (<https://registrar.stanford.edu/resources-and-help/student-forms/coterminal-forms>).

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Exchange Program

### Stanford–Vienna Academic Exchange

The Stanford–Vienna Academic Exchange is an Autumn Quarter exchange program between the Ford Dorsey Program in International

Policy Studies and the Diplomatic Academy of Vienna. Two second-year students from each institution are selected by application to receive fellowships to spend Autumn Quarter in an academic exchange at the other institution where they take courses as full-time students, pursue extracurricular activities, and participate in the academic life of the host institution.

IPS students participating in the Stanford-Vienna Academic Exchange must complete all requirements listed in the M.A. curriculum. However, the minimum number of Stanford units required to graduate will be 58. In addition to the minimum requirement of 58 units, students must complete at minimum the equivalent of three full-time courses at the Diplomatic Academy of Vienna (DA), of which one course must be IPS 209 Practicum.

The IPS Practicum is offered as an independent study course in Vienna, and students receive a Satisfactory/No Credit (S/NC) grade for their participation in the course during Autumn Quarter. Upon return to Stanford for Winter Quarter, students must register for a total of 4 units of IPS 209 Practicum .

While on exchange at the DA, an IPS student's status is listed as active, but they are not considered enrolled at Stanford. In addition, IPS students receive an academic transcript from the DA for Autumn Quarter. Hence, there is no reference to the exchange on an IPS student's Stanford transcript.

For further information, please see the Stanford-Vienna Academic Exchange (<http://ips.stanford.edu/content/stanford-vienna-academic-exchange>) section of the IPS web site.

## Joint Degree Programs

Up to a maximum of 45 units, or one year, of the University residency requirement can be credited toward both graduate degree programs (i.e., the joint degree may require up to 45 fewer units than the sum of the individual degree unit requirements). For example, an M.A./M.P.P. has a three-year residency requirement, one year less than what is required for the separate degrees. The reduced requirement recognizes the subject matter overlap between the fields comprising the joint degree.

### Juris Doctor and Master of Arts in International Policy Studies (J.D./M.A.)

Students may choose to pursue a joint J.D./M.A. in IPS degree. The joint degree program combines the strengths of the Law School and IPS. Prospective students interested in the joint J.D./M.A. in IPS program may apply concurrently to both the Stanford Law School (SLS) and the IPS program. Two separate application forms are required and applicants must submit LSAT scores to the Law School and GRE scores to the IPS program.

Students already enrolled at SLS may apply to the joint J.D./M.A. in IPS program no later than the end of the second year of Law School. The IPS program makes rolling admissions decisions based on the student's original application materials (GRE scores are not required in addition to LSAT scores in this case). Submission of the following is required for consideration:

- IPS Joint Degree Application Form (available from the IPS website ([http://ips.stanford.edu/joint\\_program](http://ips.stanford.edu/joint_program)))
- Law School Joint Degree Petition (details available on the SLS Joint Degree Application Process (<https://law.stanford.edu/apply/how-to-apply/joint-degree-application-process>) webpage)
- Graduate Program Authorization Petition (submitted via Axess (<http://axess.stanford.edu>))
- Enrollment Agreement for Students with Multiple Programs (available for download on the University Registrar's forms page (<http://studentaffairs.stanford.edu/registrar/forms/grad/#enrollment>))

- Current resume or curriculum vitae

For further information, see the "J (p. 54) Joint Degree Programs (p. 54)" section of this bulletin, the University Registrar's site (<https://registrar.stanford.edu/students/graduate-degree-progress/joint-degree-program-information>), and the SLS' Joint and Cooperative Degree Programs (<https://law.stanford.edu/education/degrees/joint-degrees-within-stanford-university/#slnav-established-joint-degrees>) web site.

## Master of Arts in International Policy Studies and Master of Public Policy (M.A./M.P.P.)

Admission to the joint degree program requires admission to and matriculation in Stanford's Ford Dorsey program in International Policy Studies and consent of that program.

Applications for graduate study in Public Policy are only accepted from:

1. students currently enrolled in any Stanford graduate or undergraduate degree program
2. from external applicants seeking a joint degree, or
3. from Stanford alumni who have graduated within the past five years.

To be considered for matriculation beginning in the Autumn Quarter 2018-19, all application materials must be submitted no later than April 10, 2018. The early deadline for applications is Tuesday, January 23, 2018 with a final deadline on Tuesday, April 10, 2018. Early submission of MPP applications is encouraged. Admission notifications are sent on a rolling basis no later than May 1, 2018. Admitted students are encouraged to respond to offers of admission by April 15, 2018 and are required to respond to offers of admission by May 15, 2018 at the latest.

External applicants for joint degrees must apply to the department or school offering the other graduate degree (i.e., PhD, MD, MA, MS, MBA, or JD), indicating an interest in the joint degree program; applicants admitted to the other degree program are then evaluated for admission to the MPP or MA program. Applicants who are admitted to IPS may apply once they have received admission to the program but prior to matriculation in autumn quarter. They may also apply during the first or second year of the IPS program.

Details on the joint degree curriculum can be found on the Public Policy (<https://publicpolicy.stanford.edu/academics/graduate/joint-degree-programs>) web site.

For further information, see the "Joint Degree Programs (p. 54)" section of this bulletin and the University Registrar's site (<https://registrar.stanford.edu/students/graduate-degree-progress/joint-degree-program-information>).

## Dual Degree Programs

Students who have attended Stanford for at least one term and who are currently enrolled may submit a Graduate Program Authorization Petition to seek to add a new degree program in a different department to be pursued concurrently with the existing program.

It is important that the attempt to add degree programs be made while the student is enrolled. Otherwise, a new Application for Graduate Admission must be submitted and an application fee paid. Similarly, enrollment must be continuous if a new degree program is added after completion of an existing program. Summer quarter enrollment is optional for students who intend to begin a new degree program in the Autumn quarter, provided that they have been enrolled the prior Spring quarter.

Graduate Program Authorization Petitions are filed electronically in Axess (<https://axess.stanford.edu>) and approved by the current and the new department. In addition, petitions from international students is routed

to the Bechtel International Center for review. Upon all approvals, the student's record automatically updates with the requested changes.

## Master of Business Administration and Master of Arts in International Policy Studies

The dual degree is designed for students who want to work at the intersection of business and the state both in the U.S. and abroad.

Prospective students interested in the M.B.A./M.A. in IPS dual degree program may apply concurrently to both the Stanford Graduate School of Business and the IPS program. Two separate applications are required and applicants must submit GRE scores with each application.

Students already enrolled at the Stanford Graduate School of Business may apply to the M.B.A./M.A. in IPS dual degree program no later than the end of the first year. The IPS program makes rolling admissions decisions based on the student's original application materials.

Submission of the following is required for consideration:

- IPS/GSB Dual Degree Application Form (available from the IPS web site ([http://ips.stanford.edu/joint\\_program](http://ips.stanford.edu/joint_program)))
- Stanford Official Transcript
- Graduate Program Authorization Petition (submitted via Axess (<http://axess.stanford.edu>))
- Enrollment Agreement for Students with Multiple Programs (available for download on the University Registrar's forms page (<http://studentaffairs.stanford.edu/registrar/forms/grad/#enrollment>))

Completing this combined course of study requires approximately three academic years, depending on the student's background and quantitative preparation. Admissions processes for both programs are completely independent of each other and units from courses can only be applied to one degree or the other, not both.

### Leadership:

Michael McFaul, Director, Freeman Spogli Institute for International Studies  
Kathryn Stoner, Deputy Director, Freeman Spogli Institute for International Studies

### Executive Committee:

Coit D. Blacker (Freeman Spogli Institute for International Studies)  
Lisa Blaydes (Political Science)  
James Fearon (Political Science)  
Francis Fukuyama (Freeman Spogli Institute for International Studies)  
David Holloway (History)  
Beatriz Magaloni (Political Science)  
Scott Sagan (Political Science)  
Andrew Walder (Sociology)  
Jeremy Weinstein (Political Science)

### Affiliated Faculty:

Paul Brest (Law)  
Jeremy Bulow (Economics)  
Marshall Burke (Earth System Science)  
David Cohen (Handa Center for Human Rights and International Justice)  
Martha Crenshaw (Freeman Spogli Institute for International Studies)  
Larry Diamond (Hoover Institution)  
Alberto Diaz-Cayeros (Freeman Spogli Institute for International Studies)  
Pascaline Dupas (Economics)  
Karen Eggleston (Freeman Spogli Institute for International Studies)  
Donald Emmerson (Freeman Spogli Institute for International Studies)

Rodney Ewing (Geological and Environmental Sciences)  
 Marcel Fafchamps (Freeman Spogli Institute for International Studies)  
 Siegfried Hecker (Freeman Spogli Institute for International Studies)  
 Nicholas Hope (Stanford Center for International Development)  
 Takeo Hoshi (Freeman Spogli Institute for International Studies)  
 Donald Kennedy (Environmental Science and Policy, Emeritus)  
 Stephen Krasner (Political Science)  
 Yong Suk Lee (Freeman Spogli Institute for International Studies)  
 David Lobell (Earth System Science)  
 Jenny Martinez (Law)  
 Abbas Milani (Iranian Studies)  
 Grant Miller (School of Medicine)  
 Rosamond Naylor (Freeman Spogli Institute for International Studies)  
 Jean Oi (Political Science)  
 Jim Patell (Graduate School of Business)  
 Rob Reich (Political Science)  
 Condoleezza Rice (Graduate School of Business)  
 Richard Roberts (History)  
 Lee Ross (Psychology)  
 Kenneth Scheve (Political Science)  
 Mark Thurber (Freeman Spogli Institute for International Studies)  
 Stephen J. Stedman (Freeman Spogli Institute for International Studies)  
 Allen Weiner (Law)  
 Jeremy Weinstein (Political Science)  
 Paul Wise (Pediatrics)  
 Frank Wolak (Economics)  
 Amy Zegart (Hoover Institution)

#### Adjunct Professors:

Michael Armacost (Freeman Spogli Institute for International Studies)  
 Karl Eikenberry (Freeman Spogli Institute for International Studies)  
 Thomas Fingar (Freeman Spogli Institute for International Studies)  
 Kathleen Stephens (Freeman Spogli Institute for International Studies)

#### Lecturers, Academic Staff, and Scholars:

Chonira Aturupane (International Policy Studies)  
 Byron Bland (Law)  
 Deland Chan (Urban Studies)  
 Erica Gould (International Relations)  
 Kevin Hsu (Urban Studies)  
 Christine Jojarth (International Policy Studies)  
 Anja Manuel (International Policy Studies)  
 Scott McKeon (Economics)  
 Eric Morris (International Policy Studies)  
 Caroline Nowacki (Civil and Environmental Engineering)  
 Matthew Spence (Freeman Spogli Institute for International Studies)  
 Daniel Sneider (Freeman Spogli Institute for International Studies)  
 David Straub (Freeman Spogli Institute for International Studies)

#### Visiting Faculty:

Arye Carmon

## Area of Concentration Curriculum

The Ford Dorsey Program in International Policy Studies (IPS) offers five areas of concentration:

- Democracy, Development and Rule of Law (<https://ips.stanford.edu/academics/concentrations/#DDRL>) (DDRL)

- Energy, Environment, and Natural Resources (<https://ips.stanford.edu/academics/concentrations/#EENR>) (EENR)
- Global Health (<https://ips.stanford.edu/academics/concentrations/#GH>) (GH)
- International Political Economy (<https://ips.stanford.edu/academics/concentrations/#IPE>) (IPE)
- International Security and Cooperation (<https://ips.stanford.edu/academics/concentrations/#ISC>) (ISC)

Each concentration is guided by one -or more- major international research centers at Stanford. This collaboration provides IPS students with exposure to cutting-edge research on global policy issues. Students are required to choose one area of concentration and complete at least six courses within the concentration for a minimum of 26 total units. Each area of concentration requires the completion of a gateway course (indicated on the Master's tab), which must be taken during the first year and prior to enrolling in subsequent courses. Additionally, each area of concentration has a list of approved elective courses, as shown below. See the Master's tab (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/internationalpolicystudies/#masterstext>) for information on how to petition to apply a course toward the area of concentration that is not included in the lists below.

### Democracy, Development and Rule of Law

		Units
ACCT 516	Analysis and Valuation of Emerging Market Firms	2
AFRICAST 209	Running While Others Walk: African Perspectives on Development	5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	3-5
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 235	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 301A	The Dynamics of Change in Africa	4-5
ANTHRO 313	Anthropology of Neoliberalism	5
BIOE 372	Design for Service Innovation	4
CEE 207A	Understanding Energy	3-5
CEE 227	Global Project Finance	4
CEE 241A	Infrastructure Project Development	3
CEE 265D	Water and Sanitation in Developing Countries	1-3
COMM 262	Campaigns, Voting, Media, and Elections	4-5
COMM 312	Models of Democracy	3-5
CS 325B	Data for Sustainable Development	3-5
EARTHSYS 185	Feeding Nine Billion	4-5
EARTHSYS 212	Human Society and Environmental Change	4
EARTHSYS 242	Remote Sensing of Land	4
EARTHSYS 262	Data for Sustainable Development	3-5
EARTHSYS 281	Urban Agriculture in the Developing World	3-4
EASTASN 217	Health and Healthcare Systems in East Asia	3-5
EASTASN 289K	The Diplomatic and Security Challenges for Korea	3
ECON 118	Development Economics	5
EDUC 202I	International Education Policy Workshop	2-4
EDUC 306A	Economics of Education in the Global Economy	5
EDUC 377B	Strategic Management of Nonprofit Organizations and Social Ventures	4
EDUC 377C	Philanthropy: Strategy, Innovation and Social Change	3
ENGR 231	Transformative Design	3
ENVRES 380	Innovating Large Scale Sustainable Transformations	4
ESS 270	Analyzing land use in a globalized world	3

ETHICSOC 232T	Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector	5	OIT 333	Design for Extreme Affordability	4
ETHICSOC 280	Transitional Justice, Human Rights, and International Criminal Tribunals	3-5	OIT 334	Design for Extreme Affordability	4
GSBGEN 305	Investing for Good	3	PEDS 225	Humanitarian Aid and Politics	3
GSBGEN 314	Creating High Potential Ventures in Developing Economies	4	PHIL 276	Political Philosophy: The Social Contract Tradition	4
GSBGEN 367	Problem Solving for Social Change	3	POLISCI 240T	Democracy, Promotion, and American Foreign Policy	5
HISTORY 378A	The Logic of Authoritarian Government, Ancient and Modern	5	POLISCI 245R	Politics in Modern Iran	5
HISTORY 379	Latin American Development: Economy and Society, 1800-2014	4-5	POLISCI 247G	Governance and Poverty	5
HRP 274	Design for Service Innovation	4	POLISCI 314D	Democracy, Development, and the Rule of Law	5
INTNLREL 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5	POLISCI 314R	Challenges and Dilemmas in American Foreign Policy	5
IPS 207	Economics of Corruption	3-5	POLISCI 316S	Decision Making in U.S. Foreign Policy	5
IPS 210	The Politics of International Humanitarian Action	3-5	POLISCI 327C	Law of Democracy	3-5
IPS 211	The Transition from War to Peace: Peacebuilding Strategies	3-5	POLISCI 344A	Authoritarian Politics	3-5
IPS 213	International Mediation and Civil Wars	3-5	POLISCI 346P	The Dynamics of Change in Africa	4-5
IPS 216	Making Things Happen in the Real World: Leadership and Implementation	3	POLISCI 347G	Governance and Poverty	3-5
IPS 221	Politics of Data: Algorithmic Culture, Big Data, and Information Waste	3-4	POLISCI 348	Chinese Politics	3-5
IPS 224	Economic Development and Challenges of East Asia	3-5	POLISCI 355A	Data Science for Politics	5
IPS 227	Finance and Society for non-MBAs	4	POLISCI 355B	Machine Learning for Social Scientists	5
IPS 231	Russia, the West and the Rest	4	POLISCI 355C	Causal Inference for Social Science	5
IPS 232	Hacking for Diplomacy: Tackling Foreign Policy Challenges with the Lean Launchpad	3-4	POLISCI 358	Data-driven Politics	3-5
IPS 235	European Security Since World War Two	4-5	POLISCI 440A	Theories in Comparative Politics	3-5
IPS 236	The Politics of Private Sector Development	3-5	POLISCI 440B	Comparative Political Economy	3-5
IPS 237	Religion and Politics: A Threat to Democracy?	4-5	POLISCI 441L	Grad Seminar on Middle Eastern Politics	3-5
IPS 242	American Foreign Policy: Interests, Values, and Process	5	POLISCI 443S	Political Economy of Reform in China	3-5
IPS 244	U.S. Policy toward Northeast Asia	5	POLISCI 451	Design and Analysis of Experiments	3-5
IPS 245	Does Google Need a Foreign Policy? Private Corporations & International Security in the Digital Age	4	PUBLPOL 223	Thinking About War	4-5
IPS 248	America's War in Afghanistan: Multiple Actors and Divergent Strategies	3-5	PUBLPOL 242	Design Thinking for Public Policy Innovators	3
IPS 264	Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia	3-5	PUBLPOL 302A	Introduction to American Law	3-5
IPS 271	Climate Change Controversies: Past, Present, Future	3-4	PUBLPOL 307	Justice	4-5
IPS 274	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5	PUBLPOL 364	The Future of Finance	2
IPS 275	UN Habitat III: Bridging Cities and Nations to Tackle Urban Development	3-5	REES 205	Central and East European Politics	5
IPS 280	Transitional Justice, Human Rights, and International Criminal Tribunals	3-5	REES 320	State and Nation Building in Central Asia	3-5
IPS 281	Global Poverty and the Law	3	SOC 218	Social Movements and Collective Action	4
LAW 5029	Human Trafficking: Historical, Legal, and Medical Perspectives	3	SOC 230	Education and Society	4-5
LAW 5103	State-Building and the Rule of Law Seminar	3	SOC 231	World, Societal, and Educational Change: Comparative Perspectives	4-5
LAW 5104	Advanced State-Building and Rule of Law Seminar	3	SOC 240	Introduction to Social Stratification	3
ME 206A	Design for Extreme Affordability	4	SOC 314	Economic Sociology	4-5
MED 262	Economics of Health Improvement in Developing Countries	5	SOC 370A	Sociological Theory: Social Structure, Inequality, and Conflict	5
MS&E 231	Introduction to Computational Social Science	3	STRAMGT 325	Starting and Growing a Social Venture	4
			STRAMGT 368	Strategic Management of Nonprofit Organizations and Social Ventures	3
			STRAMGT 579	The Political Economy of China	2
			URBANST 137	Innovations in Microcredit and Development Finance	3
			PUBLPOL 364	The Future of Finance	2
<b>Energy, Environment, and Natural Resources</b>					
				<b>Units</b>	
			CEE 176A	Energy Efficient Buildings	3-4
			CEE 176B	Electric Power: Renewables and Efficiency	3-4
			CEE 207A	Understanding Energy	3-5
			CEE 224A	Sustainable Development Studio	1-5
			CEE 227	Global Project Finance	4
			CEE 241A	Infrastructure Project Development	3
			CEE 241C	Global Infrastructure Projects Seminar	1-2

CEE 246	Entrepreneurship in Civil & Environmental Engineering	3-4	ME 377	Design Thinking Studio	4
CEE 263D	Air Pollution and Global Warming: History, Science, and Solutions	3	MED 262	Economics of Health Improvement in Developing Countries	5
CEE 265A	Sustainable Water Resources Development	3	MS&E 243	Energy and Environmental Policy Analysis	3
CEE 265D	Water and Sanitation in Developing Countries	1-3	MS&E 273	Technology Venture Formation	3-4
CEE 266D	Water Resources and Water Hazards Field Trips	2	MS&E 295	Energy Policy Analysis	3
CEE 297M	Managing Critical Infrastructure	2	OIT 333	Design for Extreme Affordability	4
CEE 375A	Water, Climate, and Health	3	OIT 334	Design for Extreme Affordability	4
EARTHSYS 112	Human Society and Environmental Change	4	POLISCI 247G	Governance and Poverty	5
EARTHSYS 188	Social and Environmental Tradeoffs in Climate Decision-Making	1-2	POLISCI 355B	Machine Learning for Social Scientists	5
EARTHSYS 206	World Food Economy	5	PUBLPOL 220	Social Science Field Research Methods and Applications	5
EARTHSYS 211	Fundamentals of Modeling	3-5	URBANST 114	Urban Culture in Global Perspective	5
EARTHSYS 239	Ecosystem Services: Frontiers in the Science of Valuing Nature	3			
EARTHSYS 281	Urban Agriculture in the Developing World	3-4	<b>Global Health</b>		<b>Units</b>
EARTHSYS 288	Social and Environmental Tradeoffs in Climate Decision-Making	1-2	AFRICAAM 229	Literature and Global Health	3-5
ECON 106	World Food Economy	5	AFRICAST 151	AIDS in Africa	3
ECON 118	Development Economics	5	AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
ECON 155	Environmental Economics and Policy	5	AFRICAST 235	Designing Research-Based Interventions to Solve Global Health Problems	3-4
ECON 159	Economic, Legal, and Political Analysis of Climate-Change Policy	5	BIO 146	Population Studies	1
ECON 206	World Food Economy	5	BIOE 371	Global Biodesign: Medical Technology in an International Context	3
ENERGY 267	Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties	3	BIOMEDIN 251	Outcomes Analysis	4
ENERGY 271	Energy Infrastructure, Technology and Economics	3	BIOMEDIN 256	Economics of Health and Medical Care	5
ENERGY 291	Optimization of Energy Systems	3-4	BIOMEDIN 432	Analysis of Costs, Risks, and Benefits of Health Care	4
ENVRES 220	The Social Ocean: Ocean Conservation, Management, and Policy	1-2	CEE 265D	Water and Sanitation in Developing Countries	1-3
ENVRES 240	Environmental Decision-Making and Risk Perception	1-3	CS 325B	Data for Sustainable Development	3-5
ENVRES 250	Environmental Governance	3	EARTHSYS 212	Human Society and Environmental Change	4
ENVRES 380	Innovating Large Scale Sustainable Transformations	4	EARTHSYS 262	Data for Sustainable Development	3-5
ESS 270	Analyzing land use in a globalized world	3	EASTASN 217	Health and Healthcare Systems in East Asia	3-5
ESS 306	From Freshwater to Oceans to Land Systems: An Earth System Perspective to Global Challenges	2	ECON 118	Development Economics	5
FINANCE 335	Corporate Valuation, Governance and Behavior	4	ECON 127	Economics of Health Improvement in Developing Countries	5
GSBGEN 336	Energy Markets and Policy	3	ECON 249	Topics in Health Economics I	2-5
GSBGEN 367	Problem Solving for Social Change	3	GSBGEN 367	Problem Solving for Social Change	3
GSBGEN 514	Creating High Potential Ventures in Developing Economies	2	HISTORY 243G	Tobacco and Health in World History	4-5
GSBGEN 532	Clean Energy Opportunities	2	HRP 201B	Health Policy PhD Core Seminar II—First Year	2
HISTORY 283	Middle East Oil and Global Economy	4-5	HRP 207	Introduction to Concepts and Methods in Health Services and Policy Research I	2
IPS 232	Hacking for Diplomacy: Tackling Foreign Policy Challenges with the Lean Launchpad	3-4	HRP 208	Introduction to Concepts and Methods in Health Services and Policy Research II	2
IPS 266	Managing Nuclear Waste: Technical, Political and Organizational Challenges	3	HRP 212	Cross Cultural Medicine	3
IPS 270	The Geopolitics of Energy	3-5	HRP 231	Epidemiology of Infectious Diseases	3
IPS 271	Climate Change Controversies: Past, Present, Future	3-4	HRP 234	Engineering Better Health Systems: modeling for public health	4
IPS 275	UN Habitat III: Bridging Cities and Nations to Tackle Urban Development	3-5	HRP 252	Outcomes Analysis	4
LAW 2504	Environmental Law and Policy	3	HRP 256	Economics of Health and Medical Care	5
LAW 2506	Natural Resources Law and Policy	3	HRP 259	Introduction to Probability and Statistics for Epidemiology	3-4
ME 206A	Design for Extreme Affordability	4	HRP 261	Intermediate Biostatistics: Analysis of Discrete Data	3
ME 368	d.Leadership: Design Leadership in Context	4	HUMBIO 124C	Global Child Health	3
			HUMBIO 129S	Global Public Health	4
			HUMBIO 153	Parasites and Pestilence: Infectious Public Health Challenges	4



IPS 216	Making Things Happen in the Real World: Leadership and Implementation	3	GSBGEN 314	Creating High Potential Ventures in Developing Economies	4
IPS 290	Practical Approaches to Global Health Research	3	HISTORY 379	Latin American Development: Economy and Society, 1800-2014	4-5
LAW 3009	Health Law: Improving Public Health	3	HISTORY 381	Economic and Social History of the Modern Middle East	4-5
LAW 5025	Global Poverty and the Law	3	IPS 204A	Microeconomics for Policy	4-5
ME 206A	Design for Extreme Affordability	4	IPS 204B	Economic Policy Analysis for Policymakers	4-5
MED 236	Economics of Infectious Disease and Global Health	3	IPS 207	Economics of Corruption	3-5
MS&E 256	Technology Assessment and Regulation of Medical Devices	3	IPS 216	Making Things Happen in the Real World: Leadership and Implementation	3
MS&E 292	Health Policy Modeling	3	IPS 221	Politics of Data: Algorithmic Culture, Big Data, and Information Waste	3-4
OIT 333	Design for Extreme Affordability	4	IPS 224	Economic Development and Challenges of East Asia	3-5
OIT 334	Design for Extreme Affordability	4	IPS 227	Finance and Society for non-MBAs	4
PEDS 222	Beyond Health Care: the effects of social policies on health	3	IPS 230	Democracy, Development, and the Rule of Law	5
PUBLPOL 231	Health Law: Finance and Insurance	3	IPS 236	The Politics of Private Sector Development	3-5
SOC 230	Education and Society	4-5	IPS 264	Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia	3-5
SOMGEN 207	Theories of Change in Global Health	3-4	IPS 270	The Geopolitics of Energy	3-5
SURG 231	Healthcare in Haiti and other Resource Poor Countries	1	IPS 274	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5

### International Political Economy

IPE concentrators will apply IPS 202 towards the international economics requirement and IPS 203 towards the area of concentration gateway course.

		Units			
IPS 202	Topics in International Macroeconomics (International Economics Requirement)	5	MGTECON 591	Global Management Research	2
IPS 203	Issues in International Economics (IPE Gateway)	5	MKTG 337	Applied Behavioral Economics	3
ANTHRO 377	Authority: Anthropological Perspectives	5	MKTG 552	Building Innovative Brands	2
CEE 227	Global Project Finance	4	MS&E 148	Ethics of Finance	2
EARTHSYS 206	World Food Economy	5	MS&E 226	"Small" Data	3
EASTASN 217	Health and Healthcare Systems in East Asia	3-5	MS&E 231	Introduction to Computational Social Science	3
EASTASN 294	The Rise of China in World Affairs	3-5	MS&E 241	Economic Analysis	3-4
ECON 102C	Advanced Topics in Econometrics	5	MS&E 246	Financial Risk Analytics	3
ECON 106	World Food Economy	5	MS&E 273	Technology Venture Formation	3-4
ECON 118	Development Economics	5	MS&E 447	Systemic and Market Risk : Notes on Recent History, Practice, and Policy	3
ECON 135	Finance for Non-MBAs	3	MS&E 449	Buy-Side Investing	1-2
ECON 155	Environmental Economics and Policy	5	POLECON 584	Managing Global Political Risk	1
ECON 206	World Food Economy	5	POLISCI 150A	Data Science for Politics	5
ECON 241	Public Economics I	2-5	POLISCI 213E	Introduction to European Studies	5
ECON 242	Public Economics II	2-5	POLISCI 247A	Games Developing Nations Play	5
ECON 246	Labor Economics I	2-5	POLISCI 313R	Political Economy of Financial Crisis	5
ECON 251	Natural Resource and Energy Economics	2-5	POLISCI 340L	China in World Politics	5
ECON 252	The Future of Finance	2	POLISCI 344A	Authoritarian Politics	3-5
ECON 265	International Economics	2-5	POLISCI 348	Chinese Politics	3-5
ECON 266	International Trade I	2-5	POLISCI 351A	Foundations of Political Economy	3
ECON 267	International Trade II	2-5	POLISCI 352	Introduction to Game Theoretic Methods in Political Science	3-5
ECON 272	Intermediate Econometrics III	2-5	POLISCI 355B	Machine Learning for Social Scientists	5
EDUC 306A	Economics of Education in the Global Economy	5	POLISCI 358	Data-driven Politics	3-5
EDUC 377E	Improving and Measuring Social Impact	3	POLISCI 440A	Theories in Comparative Politics	3-5
ENERGY 271	Energy Infrastructure, Technology and Economics	3	POLISCI 440B	Comparative Political Economy	3-5
ESS 305	Climate Change: An Earth Systems Perspective	2	POLISCI 443S	Political Economy of Reform in China	3-5
FINANCE 324	Practical Corporate Finance	4	POLISCI 444	Comparative Political Economy: Advanced Industrial Societies	3-5
FINANCE 327	Financial Markets	4	POLISCI 450A	Political Methodology I: Regression	5
FINANCE 335	Corporate Valuation, Governance and Behavior	4	POLISCI 450D	Political Methodology IV: Advanced Topics	3-5
GSBGEN 305	Investing for Good	3			

PUBLPOL 137	Innovations in Microcredit and Development Finance	3	IPS 235	European Security Since World War Two	4-5
PUBLPOL 204	Economic Policy Analysis	4-5	IPS 236	The Politics of Private Sector Development	3-5
PUBLPOL 242	Design Thinking for Public Policy Innovators	3	IPS 237	Religion and Politics: A Threat to Democracy?	4-5
PUBLPOL 302B	Economic Analysis of Law	3	IPS 242	American Foreign Policy: Interests, Values, and Process	5
PUBLPOL 303D	Applied Econometrics for Public Policy	4-5	IPS 243	U.S. Policy Options in North Korea	3-4
PUBLPOL 354	Economics of Innovation	5	IPS 245	Does Google Need a Foreign Policy? Private Corporations & International Security in the Digital Age	4
PUBLPOL 364	The Future of Finance	2	IPS 246	China on the World Stage	4
SOC 214	Economic Sociology	4	IPS 248	America's War in Afghanistan: Multiple Actors and Divergent Strategies	3-5
SOC 231	World, Societal, and Educational Change: Comparative Perspectives	4-5	IPS 250	International Conflict Resolution	2
STATS 202	Data Mining and Analysis	3	IPS 250A	International Conflict Resolution Colloquium	1
STATS 315B	Modern Applied Statistics: Data Mining	2-3	IPS 255	Policy Practicum: Rethinking INTERPOL's Governance Model	2-3
STRAMGT 325	Starting and Growing a Social Venture	4	IPS 264	Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia	3-5
STRAMGT 330	Entrepreneurship and Venture Capital: Partnership for Growth	3	MS&E 231	Introduction to Computational Social Science	3
STRAMGT 353	Entrepreneurship: Formation of New Ventures	4	MS&E 293	Technology and National Security	3
STRAMGT 579	The Political Economy of China	2	PHIL 287	Philosophy of Action	4
<b>International Security and Cooperation</b>			POLECON 584	Managing Global Political Risk	1
The ISC gateway is IPS 241. Those with an advanced background in ISC may petition to bypass the gateway course and take six elective courses in the concentration. Those who do not plan to take IPS 241 must consult with the IPS Student Services Officer and receive approval by petition from the IPS Faculty Director.			POLISCI 110Y	War and Peace in American Foreign Policy	5
			POLISCI 149S	Islam, Iran, and the West	5
			POLISCI 212X	Civil War and International Politics: Syria in Context	5
			POLISCI 215	Explaining Ethnic Violence	5
			POLISCI 240T	Democracy, Promotion, and American Foreign Policy	5
			POLISCI 245R	Politics in Modern Iran	5
			POLISCI 314D	Democracy, Development, and the Rule of Law	5
			POLISCI 314R	Challenges and Dilemmas in American Foreign Policy	5
			POLISCI 316S	Decision Making in U.S. Foreign Policy	5
			POLISCI 340L	China in World Politics	5
			POLISCI 344A	Authoritarian Politics	3-5
			POLISCI 346P	The Dynamics of Change in Africa	4-5
			POLISCI 347G	Governance and Poverty	3-5
			POLISCI 348	Chinese Politics	3-5
			POLISCI 352	Introduction to Game Theoretic Methods in Political Science	3-5
			POLISCI 355A	Data Science for Politics	5
			POLISCI 355B	Machine Learning for Social Scientists	5
			POLISCI 359	Advanced Individual Study in Political Methodology	1-10
			POLISCI 441L	Grad Seminar on Middle Eastern Politics	3-5
			PSYCH 155	Introduction to Comparative Studies in Race and Ethnicity	5
			PSYCH 215	Mind, Culture, and Society	3
			PSYCH 383	International Conflict Resolution	2
			PUBLPOL 223	Thinking About War	4-5
			PUBLPOL 242	Design Thinking for Public Policy Innovators	3
			PUBLPOL 307	Justice	4-5
			PUBLPOL 364	The Future of Finance	2
			REES 320	State and Nation Building in Central Asia	3-5
			SOC 146	Introduction to Comparative Studies in Race and Ethnicity	5
			SOC 218	Social Movements and Collective Action	4
			SOC 240	Introduction to Social Stratification	3

SOC 245	Race and Ethnic Relations in the USA	4
SOC 310	Political Sociology	4-5
STATS 216	Introduction to Statistical Learning	3
STRAMGT 579	The Political Economy of China	2

# INTERNATIONAL RELATIONS

Courses offered by the Program in International Relations (IR) are listed under the subject code INTNLREL (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&q=INTNLREL&filter-departmentcode=INTNLREL=on&filter-coursestatus=Active=on&filter-term=Autumn=on&filter-term=Winter=on&filter-term=Spring=on&filter-term=Summer=on&page=0>) on the Stanford Bulletin's ExploreCourses web site.

The Program in International Relations offers an undergraduate Bachelor of Arts program, an honors program, and a minor in International Relations.

## Mission of the Undergraduate Program in International Relations

The undergraduate program in International Relations is an interdisciplinary undergraduate major allowing students to explore how global, regional and domestic factors influence relations between actors on the world stage. The program equips students with the skills and knowledge necessary to analyze choices and challenges that arise in this arena. IR majors pursue study in world politics, including courses in political science, economics, history, and language, focusing on issues such as international security, political economy, economic development, and democratization. Students must spend at least one quarter overseas. The major prepares students for careers in government and the corporate sector, and for admission into graduate programs in law, business, economics, and political science.

## Learning Outcomes (Undergraduate)

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in International Relations. Students are expected to demonstrate:

1. understanding of core knowledge necessary to understand contemporary world politics.
2. ability to analyze international issues and draw correct inferences using qualitative and/or quantitative analysis.
3. ability to write clearly and persuasively, communicating ideas clearly.
4. ability to evaluate theory and critique research within the discipline.

## Honors Program

The International Relations honors program offers qualified students the opportunity to conduct a major independent research project under faculty guidance. Such a project requires a high degree of initiative and dedication, significant amounts of time and energy, and demonstrated skills in research and writing.

In their junior year, students should consult with prospective honors advisers, choose the courses that provide academic background in their areas of inquiry, and demonstrate an ability to conduct independent research. Students can also select to complete an Interdisciplinary honors thesis with other programs on campus.

Prerequisites for participation include a 3.5 grade point average (GPA), a strong overall academic record, good academic standing, successful experience in writing a research paper, and submission of an acceptable thesis proposal. Students should submit their honors thesis proposal late in Winter Quarter of the junior year; please check with IR office for the exact deadline. Students are required to enroll in INTNLREL 200A International Relations Honors Field Research, in Spring Quarter of their junior year and should consider participating in Bing Honors College (<https://undergrad.stanford.edu/programs/bhc>). In their senior year, honors students must enroll in INTNLREL 200B International Relations

Honors Seminar in Autumn Quarter, INTNLREL 200C IR Honors Thesis Writing in Winter Quarter, and in research units through INTNLREL 198 Senior Thesis each quarter of their senior year (Autumn, Winter, and Spring) with their faculty adviser. Honors students present a formal defense of their theses in mid-May. Students must receive at least a grade of 'B+' in order to graduate with honors in International Relations.

## Coterminal Programs in Related Fields

It is possible for students majoring in International Relations to work simultaneously for a coterminal master's degree in a number of related fields. Coterminal students should consult advisers in both departments or programs to ensure that they fulfill the degree requirements in both fields. For information on the M.A. program in International Policy Studies, see the "International Policy Studies (p. 608)" section of this bulletin. University requirements for the coterminal M.A. are described in the "Coterminal Degree (p. 46)s" section of this bulletin. See also the Registrar's Coterminal Degree Programs (<https://registrar.stanford.edu/students/coterminal-degree-programs>) pages.

## Bachelor of Arts in International Relations

Students are encouraged to declare by the end of their sophomore year to ensure timely completion of the program. Students must submit an acceptable major proposal to the Director of the Program in International Relations (IR) and declare IR in Axess. Students completing a double major, or who have a minor, are also required to file a Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) by the Final Study List deadline for the term in which the student intends to graduate.

Students majoring in International Relations must complete a minimum of 70 units (30 units of core courses as well as 40 units of specialization courses). As part of the core curriculum, IR majors must take an Introductory economics course. The Economics department is offering ECON 1 Principles of Economics, replacing the former ECON 1A and 1B.

Students who complete only ECON 1 Principles of Economics, or the old ECON 1A, are to complete 30 units of core courses and 40 units of specialization courses in order to meet the 70 units required for the major.

Students who took courses in previous years that are not featured in the below table should consult the Stanford Bulletin for the years in which the courses were taken.

## Core Courses (30 units):

	Units
<b>Required Courses:</b>	
International Politics:	5
POLISCI 101 Introduction to International Relations	
Comparative Governance (Select one of the following):	5
HISTORY 102 History of the International System	
POLISCI 104 Introduction to Comparative Politics	
POLISCI 114D Democracy, Development, and the Rule of Law	
American Foreign Policy (Select one of the following):	5
INTNLREL 154	
INTNLREL 168 America as a World Power: U.S. Foreign Relations, 1914 to Present	
INTNLREL 173 Presidents and Foreign Policy in Modern History	
INTNLREL 174 Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country	
POLISCI 110C America and the World Economy	
POLISCI 110D War and Peace in American Foreign Policy	
POLISCI 110G Governing the Global Economy	

POLISCI 214R	Challenges and Dilemmas in American Foreign Policy	
Introductory Economics (Select one of the following):		5
ECON 1	Principles of Economics	
ECON 50	Economic Analysis I	
ECON 51	Economic Analysis II	
ECON 52	Economic Analysis III	
Skills Classes (Select one of the following):		5
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	
STATS 60	Introduction to Statistical Methods: Precalculus	
Applied Economics Courses (Select one of the following):		5
ECON 106	World Food Economy	
ECON 111	Money and Banking	
ECON 118	Development Economics	
ECON 119	The Russian Economy	
ECON 124	Economic Development and Challenges of East Asia	
ECON 125	Economic Development, Microfinance, and Social Networks	
ECON 126	Economics of Health and Medical Care	
ECON 127	Economics of Health Improvement in Developing Countries	
ECON 128	Economic Development: A Historical Perspective	
ECON 141	Public Finance and Fiscal Policy	
ECON 149	The Modern Firm in Theory and Practice	
ECON 150	Economic Policy Analysis	
ECON 164	The Law and Economics of the World Trading System	
ECON 165	International Finance	
ECON 166	International Trade	
INTNLREL 118SP	Political Economy of International Trade and Investment	
INTNLREL 122/		
INTNLREL 123	The Future of the European Union: Challenges and Opportunities	
INTNLREL 149		
IPS 202	Topics in International Macroeconomics	
IPS 203	Issues in International Economics	
IPS 207	Economics of Corruption	
OSPMADR 54	Contemporary Spanish Economy and the European Union	
OSPPARIS 91	Globalization and Its Effect on France and the European Union	
POLISCI 110C	America and the World Economy	
POLISCI 110G	Governing the Global Economy	
POLISCI 210G		
POLISCI 213R	Political Economy of Financial Crisis	
POLISCI 216G	International Organizations and Institutions	
POLISCI 245A	Politics and Public Finance	
PUBLPOL 184		
SIW 103	Economic Growth and Development Patterns, Policies, and Prospects	
SOC 114	Economic Sociology	
Total Units		30

### Specialization Courses (40 units):

The ten specializations are:

1. Africa
2. Comparative International Governance
3. East and South Asia
4. Economic Development/World Economy
5. Europe (East and West) & Russia
6. International History and Culture
7. International Security
8. Latin America and Iberian Studies
9. Middle East and Central Asia
10. Social Development/Human Well-Being

Students on the old IR plan (declared prior to Autumn Quarter 2013-14) who completed two introductory economics courses must complete a total of at least 35 units (usually seven 5 unit courses) in their primary and secondary specializations. 20 units must be from the student's primary specialization; 15 units from the secondary specialization. Functional specializations are not declared on Axess nor are they printed on the diploma or transcript.

Students who have only taken one introductory economics course must take 40 units of specialization courses in order to meet the 70 units required for the major. 20-25 units must be from the student's primary specialization; 15-20 units from the secondary specialization. Functional specializations are not declared on Axess nor are they printed on the diploma or transcript.

The following courses are approved for each functional specialization.

#### Africa

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
AFRICAAM 81	Media Representations of Africa	3-5
AFRICAAM 133	Literature and Society in Africa and the Caribbean	4
AFRICAST 81	Media Representations of Africa	3-5
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	3-5
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 135	Designing Research-Based Interventions to Solve Global Health Problems	3-4
AFRICAST 141A	Science, Technology, and Medicine in Africa	4
AFRICAST 181	Media Representations of Africa	3-5
AFRICAST 209	Running While Others Walk: African Perspectives on Development	5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	3-5
ANTHRO 147A	Folklore, Mythology, and Islam in Central Asia	3-5
HISTORY 48Q	South Africa: Contested Transitions	4
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 145B	Africa in the 20th Century	5
HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	4-5
HISTORY 147	History of South Africa	5
INTNLREL 62Q	Mass Atrocities and Reconciliation	3
OSPCPTWN 16	Sites of Memory	3
OSPCPTWN 30	Engaging Cape Town	2
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	3

OSPCPTWN 45	Transitional Justice and Transformation Debates in South Africa	3	OSPOXFRD 18	Making Public Policy: An Introduction to Political Philosophy, Politics, and Economics	4-5
OSPCPTWN 69	Comparatively Assessing South Africa's Transition to Democracy: Past, Present and Future	3	OSPOXFRD 45	British Economic Policy since World War II	5
OSPCPTWN 70	Youth Citizenship and Community Engagement	3	OSPPARIS 32	French History and Politics: Understanding the Present through the Past	5
OSPCPTWN 75	Giving Voice to the Now: Studies in the South African Present	3	OSPPARIS 45	Comparative Politics in the Contemporary Arab World	4
POLISCI 146A	African Politics	4-5	OSPPARIS 91	Globalization and Its Effect on France and the European Union	5
POLISCI 242A	Why is Africa Poor?	5	OSPPARIS 98	Global Health Systems: the Future	5
POLISCI 246P	The Dynamics of Change in Africa	4-5	OSPPARIS 122X	Challenges of Integration in the European Union	4-5
THINK 42	Thinking Through Africa: Perspectives on Health, Wealth, and Well-Being	4	OSPSANTG 68	The Emergence of Nations in Latin America	4-5

### Comparative International Governance

Crosslisted courses may appear in the list below multiple times.  
Crosslisted courses may only be taken once for credit.

		Units			
ANTHRO 132B	Islam Law in Muslim and Non-Muslim Societies	3-5	POLISCI 110G	Governing the Global Economy	5
EARTHSYS 61Q	Food and security	3	POLISCI 140P	Populism and the Erosion of Democracy	5
EARTHSYS 112	Human Society and Environmental Change	4	POLISCI 141S	Politics of India	5
GLOBAL 106	Populism and the Erosion of Democracy	5	POLISCI 143S	Comparative Corruption	3
GLOBAL 136	Contemporary Muslim Political Thought	4	POLISCI 146A	African Politics	4-5
HISTORY 48Q	South Africa: Contested Transitions	4	POLISCI 147	Comparative Democratic Development	5
HISTORY 181B	Formation of the Contemporary Middle East	5	POLISCI 148	Chinese Politics	3-5
HISTORY 202G	Peoples, Armies and Governments of the Second World War	4-5	POLISCI 149T	Middle Eastern Politics	5
HISTORY 205K	The Age of Revolution: America, France, and Haiti	4-5	POLISCI 212X	Civil War and International Politics: Syria in Context	5
HISTORY 206J	Resist, Rebel, Revolt: A Global History	4-5	POLISCI 214R	Challenges and Dilemmas in American Foreign Policy	5
HISTORY 207B	Environment, Technology and Revolution in World History	4-5	POLISCI 215A	Special Topics: State-Society Relations in the Contemporary Arab World-Key Concepts and Debates	5
HISTORY 224C	Genocide and Humanitarian Intervention	3	POLISCI 216	State Building	5
HISTORY 275B	History of Modern Mexico	4-5	POLISCI 237S	Civil Society and Democracy in Comparative Perspective	5
INTNLREL 60Q	United Nations Peacekeeping	3	POLISCI 240T	Democracy, Promotion, and American Foreign Policy	5
INTNLREL 114D	Democracy, Development, and the Rule of Law	5	POLISCI 244	An Introduction to Political Development	5
INTNLREL 122	Introduction to European Studies	5	POLISCI 244U	Political Culture	3-5
INTNLREL 135A	International Environmental Law and Policy	4-5	POLISCI 245A	Politics and Public Finance	5
INTNLREL 140A	International Law and International Relations	5	POLISCI 245R	Politics in Modern Iran	5
INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War	5	POLISCI 247G	Governance and Poverty	5
INTNLREL 145	Genocide and Humanitarian Intervention	4	POLISCI 248S	Latin American Politics	3-5
IPS 207	Economics of Corruption	3-5	REES 206	Media, Democratization and Political Transformations in Post-Soviet Societies	3-5
IPS 210	The Politics of International Humanitarian Action	3-5	SINY 144	The UN in Action	4
IPS 211	The Transition from War to Peace: Peacebuilding Strategies	3-5	SIW 146	Diplomacy in Practice: Security Issues in the South Caucasus	5
IPS 216	Making Things Happen in the Real World: Leadership and Implementation	3	THINK 51	The Spirit of Democracy	4
IPS 230	Democracy, Development, and the Rule of Law	5			
IPS 237	Religion and Politics: A Threat to Democracy?	4-5			
IPS 242	American Foreign Policy: Interests, Values, and Process	5			
JEWISHST 271C	Campaigns and Elections in Israel	5			
LAW 5005	European Union Law	2-3			
OSPCPTWN 69	Comparatively Assessing South Africa's Transition to Democracy: Past, Present and Future	3			
OSPFLO 78	The Impossible Experiment: Politics and Policies of the New European Union	5			
OSPMADRD 42	A European Model of Democracy: The Case of Spain	4			
OSPMADRD 48	Migration and Multiculturality in Spain	4			

### East and South Asia

Crosslisted courses may appear in the list below multiple times.  
Crosslisted courses may only be taken once for credit.

		Units
ANTHRO 149	South Asia: History, People, Politics	5
ANTHRO 249	South Asia: History, People, Politics	5
CHINA 256	Sino-Korean Relations, Past and Present	3-5
COMPLIT 247	Bollywood and Beyond: An Introduction to Indian Film	3-5
EARTHSYS 138	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5

					Units
EASTASN 117	Health and Healthcare Systems in East Asia	3-5			
EASTASN 162	Seminar on the Evolution of the Modern Chinese State, 1550-Present	3-5	ANTHRO 143B	Anthropology and International Development	3-5
EASTASN 189K	The Diplomatic and Security Challenges for Korea	3	BIOMEDIN 156	Economics of Health and Medical Care	5
EASTASN 289K	The Diplomatic and Security Challenges for Korea	3	CEE 107A	Understanding Energy	3-5
EASTASN 297	The International Relations of Asia since World War II	3-5	EARTHSYS 41N	The Global Warming Paradox	3
ECON 124	Economic Development and Challenges of East Asia	3-5	EARTHSYS 106	World Food Economy	5
HISTORY 90S	The Forgotten War: The Korean War in Historical Perspective	5	EARTHSYS 112	Human Society and Environmental Change	4
HISTORY 95	Modern Korean History	3	ECON 15Q	The Economics of Immigration in the US: Past and Present	3
HISTORY 95C	Modern Japanese History: From Samurai to Pokemon	3	ECON 106	World Food Economy	5
HISTORY 98	The History of Modern China	3	ECON 111	Money and Banking	5
HISTORY 106A	Global Human Geography: Asia and Africa	5	ECON 113	Economics of Innovation	5
HISTORY 193	The Chinese Empire from the Mongol Invasion to the Boxer Uprising	5	ECON 118	Development Economics	5
HISTORY 195	Modern Korean History	4-5	ECON 119	The Russian Economy	4-5
HISTORY 195C	Modern Japanese History: From Samurai to Pokemon	5	ECON 124	Economic Development and Challenges of East Asia	3-5
HISTORY 198	The History of Modern China	5	ECON 125	Economic Development, Microfinance, and Social Networks	5
HISTORY 256	350 Years of America-China Relations	4-5	ECON 126	Economics of Health and Medical Care	5
HISTORY 290	North Korea in Historical Perspective	4-5	ECON 127	Economics of Health Improvement in Developing Countries	5
HISTORY 290E	Movies and Empire in East Asia	4-5	ECON 128	Economic Development: A Historical Perspective	5
HISTORY 292D	Japan in Asia, Asia in Japan	4-5	ECON 141	Public Finance and Fiscal Policy	5
HISTORY 294C	First Encounters: China and the West, 1500-1860	4-5	ECON 149	The Modern Firm in Theory and Practice	5
HISTORY 296F	Short Stories from India and Pakistan	3-5	ECON 150	Economic Policy Analysis	4-5
HISTORY 297	The Cold War and East Asia	5	ECON 155	Environmental Economics and Policy	5
HISTORY 297F	Religion and Power in the Making of Modern South Asia	3-5	ECON 159	Economic, Legal, and Political Analysis of Climate-Change Policy	5
HISTORY 356	350 Years of America-China Relations	4-5	ECON 162	Games Developing Nations Play	5
HISTORY 392D	Japan in Asia, Asia in Japan	4-5	ECON 164	The Law and Economics of the World Trading System	5
HISTORY 392G	Modern Korea	4-5	ECON 165	International Finance	5
HISTORY 395	Modern Korean History	4-5	ECON 166	International Trade	5
HISTORY 397	The Cold War and East Asia	5	HISTORY 283	Middle East Oil and Global Economy	4-5
IPS 244	U.S. Policy toward Northeast Asia	5	HUMBIO 124E	Economics of Infectious Disease and Global Health	3
IPS 246	China on the World Stage	4	INTNLREL 110C	America and the World Economy	5
IPS 264	Behind the Headlines: An Introduction to US Foreign Policy in South and East Asia	3-5	INTNLREL 114D	Democracy, Development, and the Rule of Law	5
IPS 274	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5	INTNLREL 118S	Political Economy of International Trade and Investment	5
OSPKYOTO 13	Contemporary Religion in Japan's Ancient Capital: Sustaining and Recasting Tradition	4	INTNLREL 123	The Future of the European Union: Challenges and Opportunities	5
POLISCI 115A	The Rise of Asia	3-5	INTNLREL 135A	International Environmental Law and Policy	4-5
POLISCI 140L	China in World Politics	5	IPS 202	Topics in International Macroeconomics	5
POLISCI 141S	Politics of India	5	IPS 203	Issues in International Economics	5
POLISCI 148	Chinese Politics	3-5	IPS 207	Economics of Corruption	3-5
POLISCI 218J	Japanese Politics and International Relations	5	IPS 230	Democracy, Development, and the Rule of Law	5
POLISCI 318J	Japanese Politics and International Relations	5	IPS 275	UN Habitat III: Bridging Cities and Nations to Tackle Urban Development	3-5
RELIGST 56	Exploring Chinese Religions	4	MED 262	Economics of Health Improvement in Developing Countries	5
SOC 117A	China Under Mao	5	MS&E 185	Global Work	4
SOC 213A	Transformation of Socialist Societies	3-5	MS&E 271	Global Entrepreneurial Marketing	3-4
SOC 217A	China Under Mao	5	OSPBER 115X	The German Economy: Past and Present	4-5
			OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
			OSPBER 161X	The German Economy in the Age of Globalization	4-5
			OSPCPTWN 31	Political Economy of Foreign Aid	3

### Economic Development/World Economy

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

OSPFLOR 26	The Politics of the European Crisis: from the Maastricht Treaty to the Greek Crunch	5
OSPFLOR 78	The Impossible Experiment: Politics and Policies of the New European Union	5
OSPMADRD 54	Contemporary Spanish Economy and the European Union	4
OSPOXFRD 45	British Economic Policy since World War II	5
OSPPARIS 86	Measuring Well-Being and Sustainability in Today's World	5
OSPPARIS 91	Globalization and Its Effect on France and the European Union	5
OSPPARIS 122X	Challenges of Integration in the European Union	4-5
OSPSANTG 52	Energy and Climate Cooperation in the Americas: The Role of Chile	5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
POLISCI 110C	America and the World Economy	5
POLISCI 110G	Governing the Global Economy	5
POLISCI 110X	America and the World Economy	5
POLISCI 115A	The Rise of Asia	3-5
POLISCI 140L	China in World Politics	5
POLISCI 143S	Comparative Corruption	3
POLISCI 213R	Political Economy of Financial Crisis	5
POLISCI 216G	International Organizations and Institutions	5
POLISCI 218S	Political Economy of International Trade and Investment	5
POLISCI 241A	An Introduction to Political Economy of Development	5
POLISCI 242A	Why is Africa Poor?	5
POLISCI 243L	Politics of Economic Reform	5
POLISCI 247G	Governance and Poverty	5
PUBLPOL 104	Economic Policy Analysis	4-5
PUBLPOL 107	Public Finance and Fiscal Policy	5
PUBLPOL 204	Economic Policy Analysis	4-5
REES 219	The Russian Economy	4-5
SIW 103	Economic Growth and Development Patterns, Policies, and Prospects	5
SOC 114	Economic Sociology	4
SOC 137	Global Inequality	4
SOC 177D	Economic Elites in the 21st Century	3-5
SOC 213A	Transformation of Socialist Societies	3-5
HISTORY 139	Modern Britain and the British Empire	5
HISTORY 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5
HISTORY 219C	Science, Technology, and Modernity in the Soviet Union	5
HISTORY 221B	The 'Woman Question' in Modern Russia	5
HISTORY 224A	The Soviet Civilization	4-5
HISTORY 227D	All Quiet on the Eastern Front? East Europe and Russia in the First World War	3-5
HISTORY 228	Circles of Hell: Poland in World War II	5
HISTORY 230C	Paris: Capital of the Modern World	4-5
ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
ILAC 136	Modern Iberian Literatures	3-5
ILAC 193	The Cinema of Pedro Almodovar	3-5
INTNLREL 122	Introduction to European Studies	5
INTNLREL 123	The Future of the European Union: Challenges and Opportunities	5
IPS 231	Russia, the West and the Rest	4
ITALIAN 129	Modern Italian Culture	4
ITALIAN 155	The Mafia in Society, Film, and Fiction	4
JEWISHST 155D	Jewish American Literature	5
JEWISHST 183	The Holocaust	4-5
JEWISHST 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5
JEWISHST 282	Circles of Hell: Poland in World War II	5
OSPBER 60	Cityscape as History: Architecture and Urban Design in Berlin	5
OSPBER 70	The Long Way to the West: German History from the 18th Century to the Present	4-5
OSPBER 71	EU in Crisis	4-5
OSPBER 77	"Ich bin ein Berliner" Lessons of Berlin for International Politics	4-5
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
OSPBER 161X	The German Economy in the Age of Globalization	4-5
OSPBER 174	Sports, Culture, and Gender in Comparative Perspective	5
OSPFLOR 8	Migration and Cultural Diversity in Contemporary Italy	5
OSPFLOR 26	The Politics of the European Crisis: from the Maastricht Treaty to the Greek Crunch	5
OSPFLOR 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition	4
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
OSPFLOR 78	The Impossible Experiment: Politics and Policies of the New European Union	5
OSPFLOR 111Y	From Giotto to Michelangelo: The Birth and Flowering of Renaissance Art in Florence	4
OSPMADRD 42	A European Model of Democracy: The Case of Spain	4
OSPMADRD 54	Contemporary Spanish Economy and the European Union	4
OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4
OSPMADRD 61	Society and Cultural Change: The Case of Spain	4
OSPMADRD 72	Issues in Bioethics Across Cultures	4
OSPMADRD 74	Islam in Spain and Europe: 1300 Years of Contact	4
OSPMADRD 75	Sefarad: The Jewish Community in Spain	4

### Europe (East and West) & Russia

Crosslisted courses may appear in the list below multiple times.  
Crosslisted courses may only be taken once for credit.

		Units
ECON 119	The Russian Economy	4-5
ENGLISH 145D	Jewish American Literature	5
FEMGEN 115	Queer Reading and Queer Writing in Early Modern England	5
FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4
FRENCH 133	Literature and Society in Africa and the Caribbean	4
FRENCH 140	Paris: Capital of the Modern World	4-5
HISTORY 20N	Russia in the Early Modern European Imagination	4
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 110B	Renaissance to Revolution: Early Modern Europe	5
HISTORY 120A	The Russian Empire, 1450-1800	5
HISTORY 137	The Holocaust	4-5



OSPOXFRD 18	Making Public Policy: An Introduction to Political Philosophy, Politics, and Economics	4-5	FRENCH 205	Songs of Love and War: Gender, Crusade, Politics	3-5
OSPOXFRD 117W	Gender and Social Change in Modern Britain	4-5	GERMAN 131	What is German Literature?	3-5
OSPPARIS 32	French History and Politics: Understanding the Present through the Past	5	GERMAN 132	History and Politics of the Future in Germany, 1900-Present	3-5
OSPPARIS 68	France: Birthplace of Human Rights	5	GERMAN 133	Marx, Nietzsche, Freud	3-5
OSPPARIS 81	France During the Second World War: Between History and Memory	5	GERMAN 222	Myth and Modernity	1-5
OSPPARIS 91	Globalization and Its Effect on France and the European Union	5	HISTORY 20N	Russia in the Early Modern European Imagination	4
OSPPARIS 122X	Challenges of Integration in the European Union	4-5	HISTORY 50C	The United States in the Twentieth Century	3
POLISCI 142B	British Politics	5	HISTORY 102	History of the International System	5
POLISCI 213A	Russia and the West	5	HISTORY 103F	The Changing Face of War: Introduction to Military History	3-5
POLISCI 245A	Politics and Public Finance	5	HISTORY 110B	Renaissance to Revolution: Early Modern Europe	5
POLISCI 246A	Paths to the Modern World: Islam and the West	5	HISTORY 113	Before Globalization: Understanding Premodern World History	3-5
REES 206	Media, Democratization and Political Transformations in Post-Soviet Societies	3-5	HISTORY 120A	The Russian Empire, 1450-1800	5
REES 209	Democratic Transition in Ukraine: Values, Political Culture, Conflicts	3-5	HISTORY 139	Modern Britain and the British Empire	5
REES 219	The Russian Economy	4-5	HISTORY 145B	Africa in the 20th Century	5
SIW 146	Diplomacy in Practice: Security Issues in the South Caucasus	5	HISTORY 147	History of South Africa	5
SLAVIC 120	Hacking Russia: Technological Dreams and Nightmares of Russian Culture	3-5	HISTORY 150C	The United States in the Twentieth Century	5
SLAVIC 148	Slavic Literature and Culture since the Death of Stalin	1-5	HISTORY 177D	U.S. Intervention and Regime Change in 20th Century Latin America	5
SOC 213A	Transformation of Socialist Societies	3-5	HISTORY 181B	Formation of the Contemporary Middle East	5
<b>International History and Culture</b>			HISTORY 182C	Making of the Islamic World, 600-1500	5
Crosslisted courses may appear in the list below multiple times.			HISTORY 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5
Crosslisted courses may only be taken once for credit.			HISTORY 193	The Chinese Empire from the Mongol Invasion to the Boxer Uprising	5
			HISTORY 194B	Japan in the Age of the Samurai	5
			HISTORY 198	The History of Modern China	5
			HISTORY 202D	The History of Genocide	4-5
			HISTORY 202G	Peoples, Armies and Governments of the Second World War	4-5
			HISTORY 205K	The Age of Revolution: America, France, and Haiti	4-5
			HISTORY 206J	Resist, Rebel, Revolt: A Global History	4-5
			HISTORY 227D	All Quiet on the Eastern Front? East Europe and Russia in the First World War	3-5
			HISTORY 230C	Paris: Capital of the Modern World	4-5
			HISTORY 243G	Tobacco and Health in World History	4-5
			HISTORY 281B	Modern Egypt	4-5
			HISTORY 284F	Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5
			HISTORY 292D	Japan in Asia, Asia in Japan	4-5
			HISTORY 294C	First Encounters: China and the West, 1500-1860	4-5
			HISTORY 296F	Short Stories from India and Pakistan	3-5
			ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
			ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5
			ILAC 136	Modern Iberian Literatures	3-5
			ILAC 157	Medieval and Early Modern Iberian Literatures	3-5
			ILAC 161	Modern Latin American Literature	3-5
			ILAC 193	The Cinema of Pedro Almodovar	3-5
			ILAC 278A	Senior Seminar: Cervantes's Novelas Ejemplares	3-5
			INTNLREL 168	America as a World Power: U.S. Foreign Relations, 1914 to Present	5
			INTNLREL 168A	American Interventions, 1898-Present	5
			INTNLREL 173	Presidents and Foreign Policy in Modern History	5
			INTNLREL 174	Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country	5
ANTHRO 49	Violence and Belonging in the Middle East	5			
ANTHRO 147B	World Heritage in Global Conflict	5			
ANTHRO 152	Ritual, Politics, Power	5			
ARCHLGY 173	Heritage Institutions Inside Out: The Power of Bureaucracies	5			
ARTHIST 1A	Introduction to the Visual Arts: Prehistoric through Medieval	5			
ARTHIST 1B	Introduction to the Visual Arts: History of Western Art from the Renaissance to the Present	5			
ARTHIST 106	Byzantine Art and Architecture, 300-1453 C.E.	4			
ARTHIST 190A	Indigenous Cultural Heritage: Protection, Practice, Repatriation	3			
ARTHIST 205	Cairo and Istanbul: Urban Space, Memory, Protest	5			
ARTHIST 208C	Architecture, Acoustics and Ritual in Byzantium	1-3			
COMPLIT 145	Reflection on the Other: The Jew and the Arab in Literature	3-5			
ENGLISH 145D	Jewish American Literature	5			
FEMGEN 101	Introduction to Feminist, Gender, and Sexuality Studies	4-5			
FILMSTUD 135	Around the World in Ten Films	3-4			
FRENCH 112	Oscar Wilde and the French Decadents	3-5			
FRENCH 130	Introduction to Medieval and Renaissance French Literature	4			
FRENCH 131	Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France	4			
FRENCH 132	Literature, Revolutions, and Changes in 19th- and 20th-Century France	4			
FRENCH 133	Literature and Society in Africa and the Caribbean	4			

INTNLREL 179	Major Themes in U.S.-Latin America Diplomatic History	5	SLAVIC 129	Russian Versification: History and Theory	1-5
INTNLREL 182	The Great War	5	SLAVIC 145	Survey of Russian Literature: The Age of Experiment	1-5
IPS 237	Religion and Politics: A Threat to Democracy?	4-5	SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	1-5
ITALIAN 101	Italy: The Good, the Bad and the Ugly	3	SLAVIC 156	Vladimir Nabokov: Displacement and the Liberated Eye	1-5
ITALIAN 127	Inventing Italian Literature: Dante, Boccaccio, Petrarca	4	SLAVIC 188	20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky	1-5
ITALIAN 128	The Italian Renaissance and the Path to Modernity	4	SLAVIC 198	Writing Between Languages: The Case of Eastern European Jewish Literature	1-5
ITALIAN 129	Modern Italian Culture	4	SLAVIC 230	18th Century Russian Literature	2-4
ITALIAN 152	Boccaccio's Decameron: The Ethics of Storytelling	3-5	THINK 12	Century of Violence	4
ITALIAN 235E	Dante's "Inferno"	3-5	<b>International Security</b>		
ITALIAN 236E	Dante's "Purgatorio" and "Paradiso"	4-5	Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.		
LINGUIST 167	Languages of the World	3-4			
MUSIC 7B	Musical Cultures of the World	3			
OSPBER 70	The Long Way to the West: German History from the 18th Century to the Present	4-5			
OSPBER 77	"Ich bin ein Berliner" Lessons of Berlin for International Politics	4-5			
OSPFLOR 8	Migration and Cultural Diversity in Contemporary Italy	5			
OSPFLOR 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition	4			
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5			
OSPFLOR 111Y	From Giotto to Michelangelo: The Birth and Flowering of Renaissance Art in Florence	4			
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4			
OSPKYOTO 13	Contemporary Religion in Japan's Ancient Capital: Sustaining and Recasting Tradition	4			
OSPMADRD 43	The Jacobean Star Way and Europe: Society, Politics and Culture	5			
OSPMADRD 47	Cultural Relations between Spain and the United States: Historical Perceptions and Influences, 1776-2	4			
OSPMADRD 74	Islam in Spain and Europe: 1300 Years of Contact	4			
OSPMADRD 83	Narrating the Nation: National and Post-National Spanish and Latin American Literature	4			
OSPPARIS 30	The Avant Garde in France through Literature, Art, and Theater	4			
OSPPARIS 81	France During the Second World War: Between History and Memory	5			
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4			
OSPSANTG 68	The Emergence of Nations in Latin America	4-5			
OSPSANTG 118X	Artistic Expression in Latin America	5			
OSPSANTG 129X	Latin America in the International System	4-5			
POLISCI 131L	Modern Political Thought: Machiavelli to Marx and Mill	5			
POLISCI 149S	Islam, Iran, and the West	5			
REES 301B	History and Politics in Russian and Eastern European Cinema	5			
RELIGST 1	Religion Around the Globe	4			
RELIGST 56	Exploring Chinese Religions	4			
RELIGST 61	Exploring Islam	4			
RELIGST 65	Exploring Global Christianity	4			
RELIGST 119	Religion, Violence, and Nonviolence	4			
RELIGST 124	Sufi Islam	4			
SLAVIC 77Q	Russia's Weird Classic: Nikolai Gogol	3-4			
			<b>Units</b>		
			COMM 133	Need to Know: The Tension between a Free Press and National Security Decision Making	4-5
			EARTHSYS 61Q	Food and security	3
			EASTASN 297	The International Relations of Asia since World War II	3-5
			HISTORY 4N	A World History of Genocide	3-5
			HISTORY 90S	The Forgotten War: The Korean War in Historical Perspective	5
			HISTORY 102	History of the International System	5
			HISTORY 103E	The International History of Nuclear Weapons	5
			HISTORY 103F	The Changing Face of War: Introduction to Military History	3-5
			HISTORY 150C	The United States in the Twentieth Century	5
			HISTORY 177D	U.S. Intervention and Regime Change in 20th Century Latin America	5
			HISTORY 202D	The History of Genocide	4-5
			HISTORY 202G	Peoples, Armies and Governments of the Second World War	4-5
			HISTORY 252B	Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country	5
			HISTORY 256	350 Years of America-China Relations	4-5
			HISTORY 290	North Korea in Historical Perspective	4-5
			HISTORY 297	The Cold War and East Asia	5
			INTNLREL 60Q	United Nations Peacekeeping	3
			INTNLREL 102	History of the International System	5
			INTNLREL 110D	War and Peace in American Foreign Policy	5
			INTNLREL 140A	International Law and International Relations	5
			INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War	5
			INTNLREL 145	Genocide and Humanitarian Intervention	4
			INTNLREL 152	Organized Crime and Democracy in Latin America	5
			INTNLREL 168	America as a World Power: U.S. Foreign Relations, 1914 to Present	5
			INTNLREL 168A	American Interventions, 1898-Present	5
			INTNLREL 173	Presidents and Foreign Policy in Modern History	5
			INTNLREL 174	Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country	5
			INTNLREL 182	The Great War	5
			IPS 211	The Transition from War to Peace: Peacebuilding Strategies	3-5
			IPS 213	International Mediation and Civil Wars	3-5
			IPS 219	Intelligence and National Security	3

IPS 231	Russia, the West and the Rest	4
IPS 232	Hacking for Diplomacy: Tackling Foreign Policy Challenges with the Lean Launchpad	3-4
IPS 242	American Foreign Policy: Interests, Values, and Process	5
IPS 244	U.S. Policy toward Northeast Asia	5
IPS 246	China on the World Stage	4
IPS 248	America's War in Afghanistan: Multiple Actors and Divergent Strategies	3-5
MS&E 93Q	Nuclear Weapons, Energy, Proliferation, and Terrorism	3
MS&E 193	Technology and National Security	3
MS&E 297	"Hacking for Defense": Solving National Security issues with the Lean Launchpad	3-4
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
POLISCI 110D	War and Peace in American Foreign Policy	5
POLISCI 110Y	War and Peace in American Foreign Policy	5
POLISCI 114S	International Security in a Changing World	5
POLISCI 118P	U.S. Relations in Iran	5
POLISCI 140L	China in World Politics	5
POLISCI 149S	Islam, Iran, and the West	5
POLISCI 212X	Civil War and International Politics: Syria in Context	5
POLISCI 213A	Russia and the West	5
POLISCI 213S	A Post American Century? American Foreign Policy in a Uni-Multi-unipolar World	5
POLISCI 214R	Challenges and Dilemmas in American Foreign Policy	5
POLISCI 215	Explaining Ethnic Violence	5
POLISCI 215F	Nuclear Weapons and International Politics	5
POLISCI 216	State Building	5
POLISCI 240T	Democracy, Promotion, and American Foreign Policy	5
PUBLPOL 122	Biosecurity and Bioterrorism Response	4-5
PUBLPOL 123	Thinking About War	4-5
REES 209	Democratic Transition in Ukraine: Values, Political Culture, Conflicts	3-5
SIW 146	Diplomacy in Practice: Security Issues in the South Caucasus	5
THINK 12	Century of Violence	4
THINK 19	Rules of War	4
ILAC 130	Introduction to Iberia: Cultural Perspectives	3-5
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5
ILAC 136	Modern Iberian Literatures	3-5
ILAC 157	Medieval and Early Modern Iberian Literatures	3-5
ILAC 161	Modern Latin American Literature	3-5
ILAC 193	The Cinema of Pedro Almodovar	3-5
INTNLREL 152	Organized Crime and Democracy in Latin America	5
INTNLREL 179	Major Themes in U.S.-Latin America Diplomatic History	5
IPS 274	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
LATINAM 177	Mapping Poverty, Colonialism and Nation Building in Latin America	1-2
OSPBARCL 114	The Spanish Civil War and Historical Memory	5
OSPBARCL 150A	Universitat Autònoma de Barcelona: Humanities 1	5
OSPMADRD 14	Introduction to Spanish Culture	2
OSPMADRD 42	A European Model of Democracy: The Case of Spain	4
OSPMADRD 43	The Jacobean Star Way and Europe: Society, Politics and Culture	5
OSPMADRD 47	Cultural Relations between Spain and the United States: Historical Perceptions and Influences, 1776-2	4
OSPMADRD 54	Contemporary Spanish Economy and the European Union	4
OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4
OSPMADRD 60	Integration into Spanish Society: Service Learning and Professional Opportunities	4
OSPMADRD 61	Society and Cultural Change: The Case of Spain	4
OSPMADRD 72	Issues in Bioethics Across Cultures	4
OSPMADRD 74	Islam in Spain and Europe: 1300 Years of Contact	4
OSPMADRD 75	Sefarad: The Jewish Community in Spain	4
OSPMADRD 83	Narrating the Nation: National and Post-National Spanish and Latin American Literature	4
OSPSANTG 14	Women Writers of Latin America in the 20th Century	4-5
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	4-5
OSPSANTG 52	Energy and Climate Cooperation in the Americas: The Role of Chile	5
OSPSANTG 58	Living Chile: A Land of Extremes	5
OSPSANTG 68	The Emergence of Nations in Latin America	4-5
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
OSPSANTG 118X	Artistic Expression in Latin America	5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
OSPSANTG 129X	Latin America in the International System	4-5
POLISCI 244P	Religion and Politics in Latin America	5
POLISCI 248S	Latin American Politics	3-5
POLISCI 348S	Latin American Politics	3-5

### Latin American and Iberian Studies

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		Units
CHILATST 180E	Introduction to Chicanx/Latinx Studies	5
CSRE 142A	What is Hemispheric Studies?	5
CSRE 180E	Introduction to Chicanx/Latinx Studies	5
EARTHSYS 138	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 177D	U.S. Intervention and Regime Change in 20th Century Latin America	5
HISTORY 275B	History of Modern Mexico	4-5
HISTORY 279	Latin American Development: Economy and Society, 1800-2014	4-5
HISTORY 471A	Environmental History of Latin America	5

### Middle East and Central Asia

Crosslisted courses may appear in the list below multiple times. Crosslisted courses may only be taken once for credit.

		<b>Units</b>	ANTHRO 149A	Cities and Citizens in the Middle East	4
ANTHRO 49	Violence and Belonging in the Middle East	5	ANTHRO 150A	Minaret and Mahallah: Women and Islam in Central Asia	3-5
ANTHRO 132B	Islam Law in Muslim and Non-Muslim Societies	3-5	ANTHRO 152	Ritual, Politics, Power	5
ANTHRO 149A	Cities and Citizens in the Middle East	4	ANTHRO 181A	Gender in the Middle East: Iran, Turkey, and Egypt	4
ANTHRO 150A	Minaret and Mahallah: Women and Islam in Central Asia	3-5	ARTHIST 190A	Indigenous Cultural Heritage: Protection, Practice, Repatriation	3
ANTHRO 181A	Gender in the Middle East: Iran, Turkey, and Egypt	4	CHILATST 180E	Introduction to Chicana/Latinx Studies	5
ARTHIST 106	Byzantine Art and Architecture, 300-1453 C.E.	4	CSRE 180E	Introduction to Chicana/Latinx Studies	5
ARTHIST 205	Cairo and Istanbul: Urban Space, Memory, Protest	5	EARTHSYS 41N	The Global Warming Paradox	3
ARTHIST 208C	Architecture, Acoustics and Ritual in Byzantium	1-3	ECON 155	Environmental Economics and Policy	5
CLASSICS 171	Byzantine Art and Architecture, 300-1453 C.E.	4	EDUC 136	World, Societal, and Educational Change: Comparative Perspectives	4-5
GLOBAL 136	Contemporary Muslim Political Thought	4	EDUC 202	Introduction to Comparative and International Education	4
HISTORY 181B	Formation of the Contemporary Middle East	5	FEMGEN 101	Introduction to Feminist, Gender, and Sexuality Studies	4-5
HISTORY 182C	Making of the Islamic World, 600-1500	5	HISTORY 103D	Human Society and Environmental Change	4
HISTORY 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5	HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 224A	The Soviet Civilization	4-5	HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 281B	Modern Egypt	4-5	HISTORY 113	Before Globalization: Understanding Premodern World History	3-5
HISTORY 283	Middle East Oil and Global Economy	4-5	HISTORY 146	History of Humanitarian Aid in sub-Saharan Africa	4-5
HISTORY 284F	Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800	4-5	HISTORY 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5
IPS 237	Religion and Politics: A Threat to Democracy?	4-5	HISTORY 221B	The 'Woman Question' in Modern Russia	5
IPS 248	America's War in Afghanistan: Multiple Actors and Divergent Strategies	3-5	HISTORY 224C	Genocide and Humanitarian Intervention	3
JEWISHST 185B	Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility	4-5	HISTORY 243G	Tobacco and Health in World History	4-5
JEWISHST 271C	Campaigns and Elections in Israel	5	HUMBIO 26	Designing Research-Based Interventions to Solve Global Health Problems	3-4
MUSIC 208C	Architecture, Acoustics and Ritual in Byzantium	1-3	HUMBIO 57	Epidemic Intelligence: How to Identify, Investigate and Interrupt Outbreaks of Disease	4
OSPPARIS 45	Comparative Politics in the Contemporary Arab World	4	HUMBIO 114	Environmental Change and Emerging Infectious Diseases	4-5
POLISCI 118P	U.S. Relations in Iran	5	HUMBIO 122M	Challenges of Human Migration: Health and Health Care of Migrants and Autochthonous Populations	3
POLISCI 149S	Islam, Iran, and the West	5	HUMBIO 124E	Economics of Infectious Disease and Global Health	3
POLISCI 149T	Middle Eastern Politics	5	HUMBIO 126A	Advanced Seminar in Health and Security	3
POLISCI 212X	Civil War and International Politics: Syria in Context	5	HUMBIO 129	Critical Issues in International Women's Health	4
POLISCI 215A	Special Topics: State-Society Relations in the Contemporary Arab World-Key Concepts and Debates	5	HUMBIO 129S	Global Public Health	4
POLISCI 245R	Politics in Modern Iran	5	HUMBIO 175L	Literature and Global Health	3-5
POLISCI 246A	Paths to the Modern World: Islam and the West	5	INTNLREL 62Q	Mass Atrocities and Reconciliation	3
REES 208C	Architecture, Acoustics and Ritual in Byzantium	1-3	INTNLREL 114D	Democracy, Development, and the Rule of Law	5
REES 250A	Minaret and Mahallah: Women and Islam in Central Asia	3-5	INTNLREL 136R	Introduction to Global Justice	4
REES 320	State and Nation Building in Central Asia	3-5	INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War	5
RELIGST 61	Exploring Islam	4	INTNLREL 141A	Camera as Witness: International Human Rights Documentaries	5
RELIGST 208C	Architecture, Acoustics and Ritual in Byzantium	1-3	INTNLREL 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
<b>Social Development and Human Well-Being</b>					
Crosslisted courses may appear in the list below multiple times.					
Crosslisted courses may only be taken once for credit.					
		<b>Units</b>	INTNLREL 145	Genocide and Humanitarian Intervention	4
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	3-5	INTNLREL 180A	Transitional Justice, Human Rights, and International Criminal Tribunals	3-5
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5	IPS 210	The Politics of International Humanitarian Action	3-5
AFRICAST 141A	Science, Technology, and Medicine in Africa	4	IPS 213	International Mediation and Civil Wars	3-5
ANTHRO 126	Urban Culture in Global Perspective	5	IPS 250	International Conflict Resolution	2
ANTHRO 137	The Politics of Humanitarianism	5	IPS 270	The Geopolitics of Energy	3-5
ANTHRO 143B	Anthropology and International Development	3-5			

IPS 275	UN Habitat III: Bridging Cities and Nations to Tackle Urban Development	3-5
MS&E 92Q	International Environmental Policy	3
MS&E 185	Global Work	4
MS&E 271	Global Entrepreneurial Marketing	3-4
OSPBER 71	EU in Crisis	4-5
OSPBER 174	Sports, Culture, and Gender in Comparative Perspective	5
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	3
OSPCPTWN 45	Transitional Justice and Transformation Debates in South Africa	3
OSPCPTWN 70	Youth Citizenship and Community Engagement	3
OSPFLOR 78	The Impossible Experiment: Politics and Policies of the New European Union	5
OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4
OSPMADRD 60	Integration into Spanish Society: Service Learning and Professional Opportunities	4
OSPMADRD 61	Society and Cultural Change: The Case of Spain	4
OSPMADRD 72	Issues in Bioethics Across Cultures	4
OSPOXFRD 117W	Gender and Social Change in Modern Britain	4-5
OSPPARIS 68	France: Birthplace of Human Rights	5
OSPPARIS 81	France During the Second World War: Between History and Memory	5
OSPPARIS 86	Measuring Well-Being and Sustainability in Today's World	5
OSPPARIS 98	Global Health Systems: the Future	5
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
PEDS 223	Human Rights and Global Health	3
PEDS 225	Humanitarian Aid and Politics	3
POLISCI 133	Ethics and Politics of Public Service	3-5
POLISCI 143S	Comparative Corruption	3
POLISCI 149S	Islam, Iran, and the West	5
POLISCI 244	An Introduction to Political Development	5
POLISCI 244U	Political Culture	3-5
POLISCI 247G	Governance and Poverty	5
PUBLPOL 134	Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals	3
PUBLPOL 168	Global Organizations: The Matrix of Change	4
RELIGST 1	Religion Around the Globe	4
RELIGST 65	Exploring Global Christianity	4
RELIGST 119	Religion, Violence, and Nonviolence	4
SOC 118	Social Movements and Collective Action	4
SOC 134	Gender and Education in Global and Comparative Perspectives	4
SOC 137	Global Inequality	4
SOC 148	Comparative Ethnic Conflict	4
SOC 177D	Economic Elites in the 21st Century	3-5
STS 140	Science, Technology and Politics	5
THINK 42	Thinking Through Africa: Perspectives on Health, Wealth, and Well-Being	4
URBANST 145	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5

### Additional Policies/Requirements:

- At least one course must be an upper-division seminar or colloquium.
- At least one writing intensive course designated as Writing in the Major (WiM) for International Relations.
- All courses must be taken for a letter grade, and a minimum grade of 'C' is required for courses to count towards major requirements.
- Completion of one quarter of academic study overseas, either through the Stanford Overseas Studies Program or an approved non-Stanford program. Non-Stanford programs must be pre-approved by the IR office before the student enrolls in the program.
- All IR majors must demonstrate proficiency in a foreign language by either completing two years of course work (second-year, third-quarter) or passing a proficiency exam. Foreign language units do not count towards the major.
- Upon approval, a maximum of 15 non-Stanford units may be applied to the major for credit.

### Independent Study/Honors

		Units
INTNLREL 197	Directed Reading in International Relations	1-5
INTNLREL 198	Senior Thesis	2-10
INTNLREL 200A	International Relations Honors Field Research	3
INTNLREL 200B	International Relations Honors Seminar	3
INTNLREL 200C	IR Honors Thesis Writing	1

### Honors Program

The International Relations honors program offers qualified students the opportunity to conduct a major independent research project under faculty guidance. Such a project requires a high degree of initiative and dedication, significant amounts of time and energy, and demonstrated skills in research and writing.

In their junior year, students should consult with prospective honors advisers, choose the courses that provide academic background in their areas of inquiry, and demonstrate an ability to conduct independent research. Students can also select to complete an Interdisciplinary honors thesis with other programs on campus.

Prerequisites for participation include a 3.5 grade point average (GPA), a strong overall academic record, good academic standing, successful experience in writing a research paper, and submission of an acceptable thesis proposal. Students should submit their honors thesis proposal in the Winter Quarter of the junior year; check with IR office for the exact deadline. Students are required to enroll in INTNLREL 200A International Relations Honors Field Research, in the Spring Quarter of their junior year and should consider participating in Bing Honors College (<https://undergrad.stanford.edu/programs/bhc>). In their senior year, honors students must enroll in INTNLREL 200B International Relations Honors Seminar in Autumn Quarter, INTNLREL 200C IR Honors Thesis Writing in Winter Quarter, and in research units through INTNLREL 198 Senior Thesis each quarter of their senior year (Autumn, Winter, and Spring) with their faculty adviser. Honors students present a formal defense of their theses in mid-May. Students must receive at least a grade of 'B+' in order to graduate with honors in International Relations. For more information, refer to the International Relations (<http://internationalrelations.stanford.edu>) website.

### Minor in International Relations

A minor in International Relations (IR) is intended to provide an interdisciplinary background allowing a deeper understanding of contemporary international issues. To declare the IR minor, students must complete the application for a minor in ACESS and complete the IR Minor Declaration and Course Proposal form and submit this to the IR office. Students completing a minor are also required to file a Major-Minor and Multiple Major Course Approval Form (<https://>

stanford.box.com/MajMin-MultMaj) by the Final Study List deadline for the term in which the student intends to graduate.

Students complete the minor by taking 35 units from the IR curriculum that do not duplicate with the student's major (or, if applicable, any other minor), including the following:

	Units
<b>Required Courses:</b>	
International Politics	5
POLISCI 101 Introduction to International Relations	
American Foreign Policy (Select one of the following):	5
INTNLREL 154	
INTNLREL 168 America as a World Power: U.S. Foreign Relations, 1914 to Present	
INTNLREL 173 Presidents and Foreign Policy in Modern History	
INTNLREL 174 Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country	
POLISCI 110C America and the World Economy	
POLISCI 110D War and Peace in American Foreign Policy	
POLISCI 110G Governing the Global Economy	
POLISCI 214R Challenges and Dilemmas in American Foreign Policy	
Upper Division Specialization Courses (25 units)	25
<b>Total Units</b>	<b>35</b>

Complete at least 25 units in one of the following specializations below.

- Africa
- Comparative International Governance
- East and South Asia
- Economic Development/World Economy
- Europe (East and West) & Russia
- International History and Culture
- International Security
- Latin America and Iberian Studies
- Middle East and Central Asia
- Social Development/Human Well-Being

*Director:* Michael Tomz (Political Science).

*Faculty Committee:* Kyle Bagwell (Economics), Judith L. Goldstein (Political Science), Norman Naimark (History), Kenneth Schultz (Political Science), Kenneth Scheve (Political Science), Kathryn Stoner (Freeman Spogli Institute).

*Affiliated Faculty:* Lisa Blaydes (Political Science), Gordon Chang (History), Joshua Cohen (Political Science), Larry J. Diamond (Hoover Institution), Amir Eshel (German Studies), James Fearon (Political Science), Zephyr Frank (History), Lawrence H. Goulder (Economics), Stephen H. Haber (Political Science), David J. Holloway (History, Political Science), Karen Jusko (Political Science), Terry L. Karl (Political Science), Stephen D. Krasner (Political Science), Philip Lipsky (Political Science), Beatriz Magaloni (Political Science), Robert McGinn (Management Science and Engineering), Rosamond Naylor (Freeman Spogli Institute for International Studies), Jean C. Oi (Political Science), William J. Perry (Freeman Spogli Institute for International Studies, Management Science and Engineering), Richard Roberts (History), Jonathan Rodden (Political Science), Scott Sagan (Political Science), Debra M. Satz (Philosophy), Andrew Walder (Sociology), Amir Weiner (History), Jeremy Weinstein (Political Science).

*Other Affiliation:* Jasmina Bojic (International Relations), Christophe Crombez (Freeman Spogli Institute for International Studies), John Dunlop (Hoover Institution), Erica Gould (International Relations),

Kathleen Janus (Freeman Spogli Institute for Program on Social Entrepreneurship, International Relations), Katherine Jolluck (History), Timothy Josling (International Relations, Senior Member of Academic Council, Professor at the Food Research Institute, Emeritus), Anjini Kochar (Stanford Institute for Economic Policy Research), Martin W. Lewis (History), Pawel Lutomski (International Relations), Abbas Milani (Hoover Institution, Iranian Studies), Alice Lyman Miller (Hoover Institution), Bertrand Patenaude (Hoover Institution, International Relations), Robert Rakove (International Relations), Margaret Sena (El Centro Chicano, International Relations), Stephen Stedman (Political Science), Richard Steinberg (Stanford Global Studies), Gil-Li Vardi (Hoover Institution, International Relations).

## Overseas Studies Courses in International Relations

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 70	The Long Way to the West: German History from the 18th Century to the Present	4-5
OSPBER 71	EU in Crisis	4-5
OSPBER 77	"Ich bin ein Berliner" Lessons of Berlin for International Politics	4-5
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
OSPBER 161X	The German Economy in the Age of Globalization	4-5
OSPBER 174	Sports, Culture, and Gender in Comparative Perspective	5
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPCPTWN 38	Genocide: African Experiences in Comparative Perspective	3-5
OSPCPTWN 45	Transitional Justice and Transformation Debates in South Africa	3
OSPCPTWN 69	Comparatively Assessing South Africa's Transition to Democracy: Past, Present and Future	3
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
OSPFLOR 78	The Impossible Experiment: Politics and Policies of the New European Union	5
OSPMADRD 42	A European Model of Democracy: The Case of Spain	4
OSPMADRD 47	Cultural Relations between Spain and the United States: Historical Perceptions and Influences, 1776-2	4
OSPMADRD 48	Migration and Multiculturalism in Spain	4
OSPMADRD 54	Contemporary Spanish Economy and the European Union	4
OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4

OSPMADRD 61	Society and Cultural Change: The Case of Spain	4
OSPMADRD 72	Issues in Bioethics Across Cultures	4
OSPMADRD 74	Islam in Spain and Europe: 1300 Years of Contact	4
OSPMADRD 83	Narrating the Nation: National and Post-National Spanish and Latin American Literature	4
OSPOXFRD 18	Making Public Policy: An Introduction to Political Philosophy, Politics, and Economics	4-5
OSPOXFRD 45	British Economic Policy since World War II	5
OSPOXFRD 117W	Gender and Social Change in Modern Britain	4-5
OSPPARIS 32	French History and Politics: Understanding the Present through the Past	5
OSPPARIS 45	Comparative Politics in the Contemporary Arab World	4
OSPPARIS 68	France: Birthplace of Human Rights	5
OSPPARIS 81	France During the Second World War: Between History and Memory	5
OSPPARIS 91	Globalization and Its Effect on France and the European Union	5
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4
OSPPARIS 98	Global Health Systems: the Future	5
OSPPARIS 122X	Challenges of Integration in the European Union	4-5
OSPSANTG 14	Women Writers of Latin America in the 20th Century	4-5
OSPSANTG 68	The Emergence of Nations in Latin America	4-5
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
OSPSANTG 129X	Latin America in the International System	4-5

# JEWISH STUDIES

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The Taube Center for Jewish Studies investigates all aspects of Jewish culture, history, religion, literature, language and education from biblical times to the present. Courses are offered on the undergraduate and graduate levels in a program complemented by a full range of guest lectures, conferences, and symposia. The Center annually sponsors the Donald and Robin Kennedy Undergraduate Award for the best undergraduate essay on any theme in Jewish Studies, the Dr. Bernard Kaufman Undergraduate Research Award in Jewish Studies awarded to an undergraduate engaged in research on Jews in modernity, and the Koret Award for best essay written in Hebrew by an undergraduate. In alternate years, the Center sponsors the Nelee Langmuir Award for a student working in the field of Modern European History with a preference given to work on the Holocaust, and the Short Story Contest which awards the top three stories written on a Jewish theme.

Graduate students must apply and enroll in the program through the departments of English, History, Comparative Literature, Religious Studies, or the School of Education, and meet the requirements of those departments. All graduate students in the University with an academic interest in Jewish Studies are encouraged to participate in the Colloquium for Jews, Judaism and Jewish Culture, an ongoing opportunity to share work and meet with faculty and visiting scholars. For more information about graduate studies in Jewish Studies, contact the Center manager or Director.

## Undergraduate Program in Jewish Studies

An undergraduate program in Jewish Studies is offered through Comparative Studies in Race and Ethnicity (CSRE) (p. ). It is interdisciplinary in that it draws together a wide range of disciplines including history, literary studies, religious studies, gender studies, education, and other fields. Through its courses and extracurricular programs, the Taube Center seeks to introduce students to the ideas and experience of the Jewish people over its entire history, from the biblical period to the Holocaust and contemporary Israeli culture.

Undergraduates interested in completing a major or minor in Jewish Studies should visit the "Comparative Studies in Race and Ethnicity (CSRE) (p. 464)" section of this bulletin for program descriptions and courses.

*Interim Director:* Ari Y. Kelman (Education)

*Affiliated Faculty and Teaching Staff:* Zachary Baker (Stanford University Libraries), Joel Beinlin (History), Jonathan Berger (Music), Rowan Dorin (History), Amir Eshel (German Studies), Shelley Fisher Fishkin (English), Charlotte Fonrobert (Religious Studies), Avner Greif (Economics), Katherine Jolluck (History), Ari Y. Kelman (Education), Mark Mancall (History, emeritus), Ariel Mayse (Religious Studies), Norman Naimark (History), Reviel Netz (Classics), Jack Rakove (History), Aron Rodrigue (History), Noah Rosenberg (Biology), Janice Ross (Theater and Performance Studies), Nancy Ruttenberg (English), Gabriella Safran (Slavic Languages and Literatures), Anna Schultz (Music), Vered Karti Shemtov (Language Center, Comparative Literature), Lee Shulman (Education, emeritus), Peter Stansky (History, emeritus), Marie-Pierre Ulloa (French), Amir Weiner (History), Sam Wineburg (Education), Steven Zipperstein (History)

*Yiddish & Hebrew Instructional Staff:* Jon Levitow, Gallia Porat

*Writer-in-residence:* Maya Arad



# LANGUAGE CENTER

The Stanford Language Center oversees all language instruction at Stanford. The center's charge is to guarantee that Stanford language programs are of the highest quality; to develop and administer achievement and proficiency tests needed to implement the language requirement; to provide technical assistance and support to the graduate students, lecturers, and faculty who deliver Stanford's language instruction; and to take leadership in research and development efforts in language learning. The Language Center is a unit within the Division of Literatures, Cultures, and Languages (p. ).

## Courses

Courses offered by the Language Center are listed under the following subject codes on the Stanford Bulletin's ExploreCourses web site:

- AMELANG (African and Middle Eastern Languages and Literatures)
- ARABLANG (Arabic Language) (<https://explorecourses.stanford.edu/search?view=catalog&catalog=71&page=0&q=ARABLANG&filter-catalognumber-ARABLANG=on&filter-coursestatus-Active=on>)
- CATLANG (Catalan Language)
- CHINLANG (Chinese Language)
- EFSLANG (English for Foreign Students)
- FRENLANG (French Language)
- GERLANG (German Language)
- ITALLANG (Italian Language)
- JAPANLANG (Japanese Language)
- KORLANG (Korean Language)
- PORTLANG (Portuguese Language)
- SLAVLANG (Slavic Language)
- SPANLANG (Spanish Language)
- SPECLANG (Special Language)
- TIBETLANG (Tibetan Language)

## Beginning-Level, First-Year Courses

Beginning-level, first-year language courses require no previous knowledge of the language. The beginning-level sequence emphasizes development of the full range of language skills, reading, listening comprehension, the use of grammatical structures, and oral and written communication, through a variety of learning themes. Individual, small group, interactive work and multimedia-based activities reinforce language skills and provide the platform for adapting the curriculum to specific student learning goals. Cultural awareness is a strong component of the curriculum.

## Intermediate-Level, Second-Year Courses

Intermediate-level, second-year language courses require completion of the beginning sequence, corresponding placement or consent of the program coordinator. The intermediate-level sequence focuses on continuous mastery and development of skills that help students to converse and present accurately and more fluently, incorporate more advanced grammatical structures in their oral and written work, use idiomatic expressions in the right context, and read and write more sophisticated compositions. Curricular objectives and enhanced cultural understanding are built into the courses through a multimodal approach.

## Advanced-Level, Third-Year Courses

Advanced-level, third-year language courses require completion of the intermediate-year sequence, corresponding placement or consent of the program coordinator. The advanced-level sequence focuses on accurate understanding and use of structures through authentic texts and multimedia materials, and readings from various genres. Individual learning goals and student proficiency are taken into account to provide

a learning environment that helps students become more autonomous learners.

## Proficiency in Foreign Language Notation

A student who demonstrates levels of achievement equivalent to those expected at the end of the third quarter of the third year of study in a language may be awarded the notation "proficiency in" that language on the official transcript. Successful candidates tend to have completed the third year or beyond of language study at Stanford and spent considerable time studying abroad in the foreign language.

In order to receive the proficiency notation and for it to appear on the official transcript, the student must complete the following oral and written requirements according to the timeline below. The notation is available only for languages where external assessment is offered through Language Testing International. Successful completion of the oral component is required before proceeding with the written component.

Both oral and written components must be completed no later than the quarter preceding the graduating quarter.

For more information, contact [languagecenter@stanford.edu](mailto:languagecenter@stanford.edu).

### Application and Oral Component: Two quarters prior to graduation

1. Notify the Language Center via email of the intent to pursue the notation and request an official Oral Proficiency Interview (OPI). Since this is a formal interview conducted according to national academic and professional standards, at least two quarters of lead time are essential for scheduling.
2. Complete the 30-minute Oral Proficiency Interview as scheduled through the Language Center and conducted by a certified OPI tester. The interview must take place no later than one quarter prior to graduation and be administered on campus.
3. Receive an official rating of Advanced Low or higher on the Foreign Service Institute/American Council on the Teaching of Foreign Languages (FSI/ACTFL) scale of oral proficiency, except in the non-cognate languages which require a minimum rating of Intermediate High. Students who do not meet the minimum level for the notation will nonetheless receive an official OPI rating, which carries national recognition of their oral proficiency.

### Writing Component: One quarter prior to graduation

1. Once approved to continue with the writing component, schedule a Writing Proficiency Test (WPT) through the Language Center. As an official writing assessment, the 90-minute exam must take place no later than one quarter prior to graduation and as soon as possible after the interview. The WPT is administered on campus and rated by a certified WPT rater.
2. Receive an official rating of Advanced Low or higher on the Foreign Service Institute/American Council on the Teaching of Foreign Languages (FSI/ACTFL) scale of writing proficiency, except in the non-cognate languages which require a minimum rating of Intermediate High. Students who do not meet the minimum level for the notation will nonetheless receive an official WPT rating, which carries national recognition of their writing proficiency.

### Proficiency Notation Timetable

1. Graduating Spring/Summer: Apply Autumn; interview Autumn/Winter; writing Winter.
2. Graduating Autumn: Apply Winter; interview Winter/Spring; writing Spring.
3. Graduating Winter: Apply Spring; interview Spring/Autumn; writing Autumn.

## Overseas Studies Courses in the Language Center

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site or the Bing Overseas Studies (<http://bosp.stanford.edu>) web site. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

## African and Middle Eastern Languages and Literatures Program

The African and Middle Eastern Languages and Literatures Program offers classes in Hebrew, Persian, Swahili, Turkish, and African languages not regularly taught at Stanford. Based on current funding and student requests, the courses planned for 2017-18 are listed in the "ExploreCourses" section of this Bulletin under the AMELANG program. Additional languages may still be offered upon request, provided funding is available. Requests for the 2018-19 academic year should be made by Spring Quarter of this year to the AME program office by email to [khalil@stanford.edu](mailto:khalil@stanford.edu) ([eberrnar@stanford.edu](mailto:eberrnar@stanford.edu)).

First, second, and third year each refer to the yearly sequence of language study. Letter suffixes refer to the quarter within the sequence: "A" courses are typically taught in Autumn; "B" courses, in Winter; and "C" courses in Spring. Courses are 4 or 5 units as listed. In some circumstances, a beginning or intermediate course may be offered in alternate years. Language courses may not be repeated for credit, and must be taken in sequence.

### Fulfilling the Language Requirement in AME

Students can fulfill the language requirement by taking an African or Middle Eastern Language. At least 12 units are needed to complete the requirement. Students who have taken courses in the relevant language at another institution, or have previous knowledge of the language, can request to be tested. Tests are comprised of two parts, written and oral. Students must display first-year level proficiency in the requested language to fulfill the requirement. Testing is guaranteed only for languages currently offered. Students planning to take a test must contact the AME Program no later than the Spring Quarter of their sophomore year. To submit a request for language testing, or to request that a language be taught, and for further information on the program, see the African and Middle Eastern Language Program (<https://www.stanford.edu/dept/lc/language/courses/africanMidEastern>) web site.

## Special Language Program

The Special Language Program (SLP) offers foreign languages not otherwise taught at Stanford. Based on current funding and student requests, the courses planned for 2017-18 are listed in the "Explore Courses (<http://explorecourses.stanford.edu>)" section of this Bulletin under the Special Languages (SPECLANG) Program; however, not every course listed is taught. Additional languages may still be offered upon request, provided funding is available. Requests for the 2018-19 academic year should be made by Spring Quarter of this year at the Special Language Program office ([epriomas@stanford.edu](mailto:epriomas@stanford.edu)).

First-year courses are offered for 4 or 5 units, as listed. First, second, and third year each refer to the yearly sequence of language study. Letter suffixes refer to the quarter within the sequence: "A" courses are typically taught in Autumn; "B" courses, in Winter; and "C" courses in Spring. In some circumstances, a beginning or intermediate course may be offered in alternate years. Language courses may not be repeated for credit, and

must be taken in sequence. For additional information, see the Special Language Program (<http://www.stanford.edu/dept/SLP>) web site.

## Fulfilling the Language Requirement in Special Language Program

Students can fulfill the language requirement by taking courses offered by the Special Language Program. At least 12 units are needed to complete the requirement. Students who have already taken courses in the relevant language at another institution, or who have previous knowledge of the language, can request to be tested. Tests are comprised of written and oral parts. A student must display first-year level proficiency in the requested language in order to fulfill the requirement. Testing is guaranteed only for these languages currently offered. Students planning to take a test must contact the Special Language Program no later than the Spring Quarter of sophomore year. To submit a request for language testing, or to request that a language be taught, and for further information on the program, contact the Special Language Program office ([epriomas@stanford.edu](mailto:epriomas@stanford.edu)). ([epriomas@stanford.edu](mailto:epriomas@stanford.edu))

## Minors in the Division of Literatures, Cultures, and Languages (DLCL)

The Division of Literatures, Cultures, and Languages (p. ), of which the Language Center is a part, offers the following minors that may be of interest to foreign language students. For more information, consult the contact specified in the relevant minor following.

### Minor in Modern Languages

Faculty Director: Dan Edelstein

The Division of Literatures, Cultures, and Languages offers an undergraduate minor that draws upon courses in literature and language within the division's departments and elsewhere in the University. The minor in Modern Languages is offered to students who want to supplement the course work in their major with course work in modern languages and literatures. Students declare the Minor in Modern Languages through Axess. Appropriate courses offered through BOSP may count toward this minor with Professor Edelstein's pre-approval.

Students are required to complete 6 courses of 3 units or more in any field qualify for the minor by meeting the following requirements:

	Units
A minimum of 16 units (4 courses and 8 units per language) at the intermediate level (second year) or beyond, not including conversational, oral communication, business, or medical language courses in two languages other than English all Modern languages offered at Stanford can qualify.	16
At least two additional courses of 3 units or more, one in each modern language being studied in the minor. These courses must be taught by Academic Council members or other senior members of Stanford faculty.	6-10

It is recommended that students study, work, or intern abroad for at least eight weeks at a location where one of the languages is spoken. Course work in this minor may not duplicate work counted toward other majors or minors. Advanced Placement credit and transfer credit cannot be applied to this minor. All courses must be taken for a letter grade. By University policy, no more than 36 units may be required in this minor.

### Minor in Translation Studies

Faculty Director: Dan Edelstein

The Division of Literatures, Cultures, and Languages, in cooperation with East Asian Languages and Cultures and the English Department, teaches

undergraduates to develop and apply their foreign language knowledge to the production and analysis of translations. The minor is designed to give students majoring in a variety of fields the tools to consider the practical and theoretical issues brought up by translation as an aesthetic, cultural, and ethical practice.

Course work in this minor may not duplicate work counted toward other majors or minors. Course selection must be approved by the minor adviser. For further information, contact the minor adviser, Cintia Santana (csantana@stanford.edu).

Students must take a minimum of 23 units for a letter grade, in fulfillment of the following requirements:

	Units
1. Prerequisite: Complete or test out of a first-year course in the language of interest.	
2. Core course: At least 4 units in a Translation Studies core course: ENGLISH/DLCL 293 or DLCL 113Q.*	4
3. Language study: At least 8 units, second year or beyond (not including conversation/oral communication) and/or relevant literature courses taught in the target language. OSP and transfer units may be considered in consultation with the minor adviser.	8
4. Literature study: At least 7 units in relevant literature courses at the 100-level or above, taught in a DLCL department, East Asian Languages and Cultures, or Classics, and determined in consultation with the minor adviser. For students interested in translation from English into another language, appropriate literature courses in the English department may be substituted.	7
5. Electives: At least 4 units in a creative writing course, or a course that foregrounds translation in departments such as Anthropology, any DLCL department, English, East Asian Languages and Cultures, Classics, Linguistics (e.g., LINGUIST 130A), or Computer Science (e.g., CS 124), determined in consultation with the minor adviser.	4
6. Final Project: Students must also complete a capstone project: a significant translation and/or translation studies project (e.g. 20 pages of prose, 10 poems, or similar appropriate amount to be determined in consultation with the minor adviser). This work may be carried out under the supervision of an instructor in a required course or as an independent study.	
<b>Total Units</b>	<b>23</b>

## Minor in Middle Eastern Languages, Literatures, and Cultures

*Faculty Director:* Alexander Key

The undergraduate minor in Middle Eastern Languages, Literatures, and Cultures (MELLAC) has been designed to give students majoring in other departments an opportunity to gain a substantial introduction to Arabic, Hebrew, Middle Eastern, and African languages, and the cultures and civilizations of the Middle East and Africa. Contact the faculty director, Marie Huber at marieh@stanford.edu before declaring the minor:

- Courses for the minor must be taken for a letter grade unless only offered for faculty-elected satisfactory/no credit. All courses must be completed with a letter grade of 'C' or better.
- Students may not overlap (double-count) courses for completing major and minor requirements
- Students declaring the minor must do so no later than the last day of Spring Quarter of their junior year.

The minor in Middle Eastern Languages, Literatures and Cultures (MELLAC) has two tracks. Their requirements are as follows.

## Minor in Middle Eastern Languages, Literatures, and Cultures, Arabic Track

Requirements for the minor include:

- Completion of four ARABLANG courses at the second-year level or higher, for a total of 20 units
- Up to 5 units of transfer credit may count towards this minor with the Faculty Director's approval.
- Two literature courses taught with Arabic texts, generally offered in Comparative Literature (COMPLIT) for a total of 6-10 units
- One course relating to Arabic taught with English texts, generally offered in Comparative Literature (COMPLIT), for a total of 3-5 units.
- Students must test for Proficiency in Arabic through the Language Center by Winter Quarter of their senior year.
  - Students should minimally receive a notation of intermediate-high.
  - Those requiring outside tutoring are advised to seek resources are available through the DLCL.
- All courses must be approved by the faculty director.

## Minor in Middle Eastern Languages, Literatures, and Cultures, Hebrew, Persian, Turkish, or African Languages, Literatures and Cultures Track

Requirements for the minor include:

- Three language classes in Hebrew, Persian, Turkish, or an African language.
  - All three courses must be in the same language and first year or beyond.
- 20 additional units from relevant literature and culture courses.
  - Courses are offered through the Language Center and DLCL departments.
  - One of these courses must be a (COMPLIT) Comparative Literature course.
  - Additional courses are offered through Jewish Studies (JEWISHST), and the Center for African Studies (AFRICAST).
- The faculty director may approve some upper-level language classes to count towards the 20 additional units.
- All courses must be approved by the faculty director.

## Certificate in Language Program Management

*Faculty Director:* Elizabeth Bernhardt

Programs in contemporary foreign language teaching preparation entail a knowledge base that has grown over the past 30 years, rooted in data from an explosion of linguistic as well as applied linguistic research.

In tandem with the Language Center's primary focus on learning research and theory, which graduate students explore in the teaching preparation program, the Language Program Management certificate focuses on developing the professional leadership and academic skills necessary for a career that includes the coordination and management of language learning.

The program funds summer internships which enable the completion of a certificate in Language Program Management and are intended to help Stanford graduate students prepare themselves for such work in complement to their literary studies. The certificate program is not declared on Axess and does not appear on the transcript or diploma.

## Prerequisites

1. Foreign language acquisition: Oral Proficiency Interview (OPI) rating of at least advanced mid
2. Academic and professional development:
  - DLCL 301 The Learning and Teaching of Second Languages
  - Modified Oral Proficiency Interview (MOPI) Assessment workshop (2 days)
  - Limited OPI Tester Certification (average 6 months)
  - Teaching of three first-year language courses through the Language Center

These are generally met by the end of a graduate student's second year in the PhD program. Once meeting these criteria, the student may be admitted to the Program.

## Requirements

Upon admission to the program, students must complete the following:

1. DLCL 302 The Learning and Teaching of Second-Language Literatures: a course designed to focus student attention on the development of oral language proficiency through the upper levels and emphasize the need for upper register speaking and writing for literature learning and teaching.
2. OPI workshop (additional 2 days of training at the Advanced and Superior levels): this workshop is the extension of the MOPI. It focuses on upper register performance on the FSI-ACTFL scale. Hosted by either the Language Center, regional workshop, or at the national meeting of the ACTFL.
3. Completion of Writing Proficiency Familiarization workshop (Winter Quarter): Workshop conducted by a certified writing tester and structured in parallel to the MOPI/OPI assessment paradigm.
4. DLCL 303 Language Program Management (Summer Quarter): an administrative internship including, but not limited to, experiences with the following:
  - Shadow faculty and staff in select areas of administration and supervision within the Language Center and DLCL
  - Placement testing and student advisement
  - Technology in teaching and learning
  - Processes for teacher observation and feedback
  - Procedures in staff supervision and human resources
  - Course scheduling, budgeting, staffing, and searches
  - Interface with external programs (e.g., BOSP, Bechtel, VPTL)

*Director:* Elizabeth Bernhardt

*Associate Director:* Joan Molitoris

## African and Middle Eastern Languages

*Coordinator:* Khalil Barhoum

*Lecturers:* Saadet Ebru Ergul (Turkish), Ameneh Shervin Emami (Persian), Jon Levitow (Yiddish), Samuel Mukoma (Swahili), Gallia Porat (Hebrew), Vered Shemtov (Sr. Lecturer in Jewish Language & Literature)

Arabic Language

*Coordinator:* Khalid Obeid

*Lecturers:* Salem Aweiss, Khalil Barhoum (Sr. Lecturer), Thoraya Boumehdi, Ramzi Salti

## Catalan Language

*Coordinator:* Joan Molitoris (Associate Director, Language Center)

## Chinese Language

*Coordinator:* Chao Fen Sun (Professor, Asian Languages and Cultures)

*Lecturers:* Marina Chung, Sik Lee Dennig, Michelle DiBello, Nina Lin, Le Tang, Huazhi Wang, Hong Zeng, Youping Zhang, Xiaofang Zhou

## English for Foreign Students

*Director and Senior Lecturer:* Philip Hubbard

*Lecturers:* Robyn Brinks Lockwood, Kristopher Geda, Andrea Kevech, Carole Mawson, Kenneth Romeo, Constance Rylance, Seth Streichler, Dominic Wang

## French Language

*Coordinator:* Marie Lasnier

*Lecturers:* Maria Comsa, Heather Howard, Biliiana Kassabova, Alix Mazuet, Vera Shapirshteyn

## German Language

*Coordinator:* Paul Nissler

*Sr. Lecturer:* William E. Petig

## Italian Language

*Coordinator:* Professor Elizabeth Bernhardt (Director of the Language Center)

*Lecturers:* Marta Baldocchi, Alessandra McCarty, Giovanni Tempesta

## Japanese Language

*Coordinator:* Yoshiko Matsumoto (Professor, Asian Languages and Cultures)

*Lecturers:* Natalia Konstantinovskaia, Momoyo Kubo Lowdermilk, Emiko Yasumoto Magnani, May Maio, Emi Mukai, Momoe Saito Fu

## Korean Language

*Coordinator:* Hee-Sun Kim

*Lecturer:* Hannah Yoon

## Portuguese Language

*Coordinator and Senior Lecturer:* Lyris Wiedemann

*Lecturer:* Agripino Silveira

## Slavic Language

*Coordinator:* Eugenia Khassina

*Sr. Lecturer:* Rima Greenhill

## Spanish Language

*Coordinator:* Alice Miano

*Lecturers:* Vivian Brates, Citlalli del Carpio, Irene Corso, Joan Molitoris (Associate Director, Language Center), Carimer Ortiz Cuevas, Veronika Reinhold, Kara Sanchez, Ana Maria Sierra, María Cristina Urruela, Ana Vivancos, Hae-Joon Won

## Special Language Program

*Coordinator:* Eva Prionas, Modern Greek Language and Literature

*Lecturers:* Cathy Haas (ASL), Dzuong Nguyen (Vietnamese), Sonia Taneja (Hindi)

Tibetan Language Program

*Lecturer and Coordinator:* Robert W. Clark

## Overseas Studies Courses in the Language Center

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

## Overseas Studies Courses in Chinese

explorecourses:OSChinlang Units

## Overseas Studies Courses in French

		Units
OSPPARIS 22P	Intermediate French I	5
OSPPARIS 23P	Intermediate French II	5

## Overseas Studies Courses in German

		Units
OSPBER 1Z	Accelerated German: First and Second Quarters	8
OSPBER 2Z	Accelerated German, Second and Third Quarters	8
OSPBER 3B	German Language and Culture	7
OSPBER 21B	Intermediate German	5

## Overseas Studies Courses in Italian

		Units
OSPFLOR 1A	Accelerated First-Year Italian, Part 1	5
OSPFLOR 1F	First-Year Italian, First Quarter	5
OSPFLOR 2A	Accelerated First-Year Italian, Part 2	5
OSPFLOR 2F	First-Year Italian, Second Quarter	5
OSPFLOR 3F	First-Year Italian, Third Quarter	5
OSPFLOR 21F	Accelerated Second-Year Italian, Part A	5
OSPFLOR 22F	Accelerated Second-Year Italian Part B	5
OSPFLOR 31F	Advanced Oral Communication: Italian	3

## Overseas Studies Courses in Japanese

		Units
OSPKYOTO 2K	First-Year Japanese Language, Culture, and Communication, Second Quarter	5
OSPKYOTO 3K	First-Year Japanese Language, Culture, and Communication, Third Quarter	5
OSPKYOTO 21K	Second-Year Japanese Language, Culture, and Communication, First Quarter	5
OSPKYOTO 22K	Second-Year Japanese Language, Culture, and Communication, Second Quarter	5
OSPKYOTO 23K	Second-Year Japanese Language, Culture, and Communication, Third Quarter	5
OSPKYOTO 103K	Third-Year Japanese Language, Culture, and Communication, Third Quarter	5
OSPKYOTO 210K	Advanced Japanese	5

## Overseas Studies Courses in Spanish

		Units
OSPMADRD 12M	Accelerated Second-Year Spanish I	5
OSPMADRD 13M	Accelerated Second-Year Spanish II	5
OSPMADRD 102M	Composition and Writing Workshop for Students in Madrid	3-5
OSPSANTG 12S	Accelerated Second-Year Spanish, Part I: Chilean Emphasis	5
OSPSANTG 13S	Accelerated Second-Year Spanish, Part II: Chilean Emphasis	5
OSPSANTG 102S	Composition and Writing Workshop for Students in Santiago	3-5

# LATIN AMERICAN STUDIES

Courses offered by the Interdisciplinary Program in Latin American Studies are listed under the subject code LATINAM on the Stanford Bulletin's ExploreCourses web site (<https://explorecourses.stanford.edu>).

The Center for Latin American Studies (CLAS) supports research and teaching in all fields of study as they relate to Latin America. Academic programs encourage interdisciplinary approaches and draw on the expertise of nearly sixty active affiliated faculty members representing Stanford's various schools and departments. Stanford University Libraries' substantial Latin American collections are valuable resources for students, faculty, and visiting researchers alike. Each year CLAS hosts a number of Tinker Visiting Professors, highly distinguished Latin American and Iberian scholars who come to Stanford to teach a course in their field of specialization. The Center for Latin American Studies maintains a highly active public events calendar and provides funding to students and faculty for a variety of research, teaching, internship, and conference activities. The Center is a U.S. Department of Education Title VI National Resource Center for Latin America.

The program offers two academic programs in Latin American Studies: an undergraduate minor and a master of arts degree.

## Undergraduate Programs in Latin American Studies

Stanford Global Studies offers a minor with a Latin American Studies Specialization. Although there is no undergraduate major in Latin American Studies, students may concentrate on Latin America through other departmental and interdisciplinary degree programs, such as Anthropology (p. 371), History (p. 579), Political Science (p. 690), Iberian and Latin American Cultures (p. 600), or International Relations (p. 619). Interested students should consult the relevant departmental web sites and sections of this bulletin for further information.

Undergraduates can obtain a coterminal M.A. degree in Latin American Studies while concurrently working on their undergraduate major by applying during the regular admissions cycle no later than their senior year.

### Financial Aid

Each summer, CLAS awards grants to a small number of undergraduates to complete internships in Latin America. Applications include a proposal, academic transcript, and letters of recommendation. Students from any department are eligible to apply. See Funding (<https://clas.stanford.edu/funding/students>) section in the Center for Latin American Studies (<http://las.stanford.edu>) website.

Students in undergraduate programs who plan to enroll in Portuguese, Quechua, or Nahuatl language and area or international studies courses may be eligible for Academic Year and Summer Foreign Language and Area Studies (FLAS) fellowships. Recipients of FLAS fellowships must be American citizens or permanent residents. For detailed program information and eligibility, see the Center for Latin American Studies (<http://las.stanford.edu>) website.

## Graduate Programs in Latin American Studies

The one-year master's program in Latin American Studies is designed for students who have experience working, living, or studying in Latin America or Iberia and little prior course work on Latin America.

Stanford University does not offer a Ph.D. program in Latin American Studies; however, doctoral candidates may concentrate on Latin America through other departmental programs, such as Anthropology

(p. 371), History (p. 579), Political Science (p. 690), or Iberian and Latin American Cultures (p. 600). Interested applicants should consult the relevant departmental web sites and sections of this bulletin for admissions information and further details.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Latin American Studies and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

### Admission

The application deadline for the 2018-19 academic year is December 5, 2017. Applicants submit an online application, including a 500-word statement of purpose, resumé, 10-15 page double-spaced academic writing sample, and three letters of recommendation. In addition, all applicants must submit official transcripts and GRE general test scores. TOEFL scores are required of applicants whose first language is not English or who did not earn a degree from an undergraduate institution where English is the primary language of instruction. For information on university graduate admissions and to access the online application, visit the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) website.

Applicants must meet the University admission requirements, have a working knowledge of Spanish or Portuguese at the university third-year level or higher, and have experience working, living, or studying in Latin America or Iberia prior to admission.

CLAS takes a broad approach to evaluating applications for admission. As important as GRE scores and grades are the applicant's essay, letters of recommendation, academic writing sample, and the experiences and goals conveyed through the personal statement and resume.

Students interested in pursuing the joint degree program in Latin American Studies and Law (J.D.) or a dual degree in Latin American Studies and Business (M.B.A.) or Medicine (M.D.) must apply to each program separately and be accepted by both. Details about the joint and dual degree programs can be found in the "Master's (p. 638)" tab in this section.

### Financial Aid

The Center for Latin American Studies provides several graduate fellowships as well as limited course assistantships with the Tinker Visiting Professors each quarter. US and international MA in Latin American Studies applicants are encouraged to apply. See Funding (<https://clas.stanford.edu/funding/students>) section in the Center for Latin American Studies (<http://las.stanford.edu>) website.

MA in Latin American Studies applicants who plan to enroll in Portuguese, Quechua, or Nahuatl language and area or international studies courses may be eligible for Academic Year and Summer Foreign Language and Area Studies (FLAS) fellowships, sponsored by the US Department of Education. Recipients of FLAS fellowships must be American citizens or permanent residents. Applicants to the M.A. program who can demonstrate financial need have priority in the FLAS fellowship competition; in recent years CLAS has also awarded FLAS fellowships to students enrolled in the Professional Schools. For detailed program information and eligibility, see Funding (<https://clas.stanford.edu/funding/students>) section in the Center for Latin American Studies (<http://las.stanford.edu>) website.

CLAS awards Working Group grants to graduate students across the University who wish to organize events such as lectures, speaker series, symposia, exchange of working papers, and collaborative research efforts. For detailed program information and eligibility, see Funding

(<https://clas.stanford.edu/funding/students>) section in the Center for Latin American Studies (<http://las.stanford.edu>) website.

CLAS has a limited number of travel awards for graduate students to conduct field research work in Latin America or to present their Latin American related research in a conference. Please see Funding (<https://clas.stanford.edu/funding/students>) section in the Center for Latin American Studies (<http://las.stanford.edu>) website

The Knight-Hennessy Scholars program awards full funding to pursue a graduate education at Stanford to students from all disciplines, with additional opportunities for leadership training and collaboration across fields.

Apply to Knight-Hennessy Scholars (<https://knight-hennessy.stanford.edu/admission/apply-now>) by **September 27, 2017**, and to the Latin American Studies MA Program by **November 15, 2017**.

## Minor in Global Studies with Latin American Studies Specialization

The minor in Global Studies, Latin American Studies (LAS) specialization, consists of a core set of courses surveying the history, politics, society, ecology, and culture of the Latin American region; advanced language training; and in-depth course work.

Students from any major interested in applying for admission to the minor in Global Studies, Latin American Studies (LAS) specialization, should consult Stanford Global Studies and the Center for Latin American Studies (CLAS (<https://clas.stanford.edu/academics/undergraduate-minor>)). Students who wish to complete the minor must declare online (through Axess (<http://axess.stanford.edu>)) and submit a proposal of course work no later than the second quarter of the junior year. The minor must be completed by the second quarter of the senior year. Units taken for a student's major cannot be double-counted towards the minor.

Students consult with their minor adviser to develop individual programs. The minor is especially well-suited for undergraduates who plan to make service, research, or study abroad in Latin America a part of their Stanford experience.

The Global Studies Minor with Specialization in Latin American Studies is open to students in any major.

Upon completion of all requirements, final certification of the minor is made by the Center for Latin American Studies subcommittee on undergraduate programs. The minor and the specialization appear on the transcript but they do not appear on the diploma.

### Declaring the Global Studies Minor with Latin American Studies Specialization

To declare the Global Studies minor with Latin American Studies specialization, students must:

1. Set up an appointment with the CLAS associate director to discuss your academic plan.
2. Declare the Global Studies minor in Axess (<http://axess.stanford.edu>).
3. Complete the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program ([https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change\\_UG\\_program.pdf](https://studentaffairs.stanford.edu/sites/default/files/registrar/files/change_UG_program.pdf)) form in order to declare the Latin American Studies specialization. Submit the form to the minor adviser Elizabeth Saenz-Ackermann in Bolivar House, 582 Alvarado Row.

### Requirements

1. Students may not double-count courses for completing major and minor requirements. Completion of 28 units as follows:

- a. GLOBAL 101 Critical Issues in Global Affairs (3 units)
  - b. A 5-unit course surveying Latin America, either ILAC 131 Introduction to Latin America: Cultural Perspectives or an approved substitute. For further information contact a CLAS undergraduate adviser at [latinamerica@stanford.edu](mailto:latinamerica@stanford.edu).
  - c. 20 additional units in courses which together comprise a coherent focus on a theoretical problem or issue of the region, such as but not limited to
    - i culture and identity
    - ii political economy
    - iii sustainable development.
  - d. At least 15 of the 28 units must be completed at Stanford.
  - e. All courses to be counted toward the minor must be taken for a letter grade.
2. Foreign Language Requirement. The minimum requirement for completion of the minor in Global Studies with Latin American Studies Specialization is advanced proficiency in Spanish or Portuguese by one of the following:
    - a. Completion of seven quarters of college-level study of Spanish or Portuguese.
    - b. Completion of a course taught in Spanish or Portuguese at the 100-level or higher, with a letter grade of 'B' or higher. This may be a course on Spanish or Portuguese language or literature, or some other subject.
    - c. Achievement of the advanced proficiency level on the ACTFL scale in a test administered by the Stanford Language Center. Contact the Stanford Language Center (p. 632) for test dates and procedures.
  3. Recommended: experience in Latin America such as study abroad, field research, or an internship.
    - Students might present their work in an end-of-year capstone seminar with other SGS minors and led by SGS faculty.

### Course List

For a representative, rather than comprehensive, list of courses that count towards the minor, see the Related Courses tab (p. 640) in this section of the Bulletin. Other courses may also fulfill the requirements; students should consult their Latin American Studies minor adviser concerning which courses might fulfill minor requirements.

## Master of Arts in Latin American Studies

The Master of Arts in Latin American Studies is an interdisciplinary program. The curriculum consists of a core set of courses surveying the history, politics, society, ecology, and culture of the Latin American region; advanced language training; and in-depth course work. In consultation with a faculty adviser, students select a course of study suited to their individual interests.

### Coterminal Master's Degrees in Latin American Studies

Undergraduates at Stanford may apply for admission to the coterminal master's program in Latin American Studies when they have earned a minimum of 120 units toward graduation, including advanced placement and transfer credit, and no later than the quarter prior to the expected completion of their undergraduate degree. The application deadline for the 2018-19 academic year is **December 5, 2017**. Prospective students who are applying to the Knight-Hennessy Scholars program (<https://knight-hennessy.stanford.edu/admission/apply-now>) must apply to the scholars program by **September 27, 2017**, and to the Latin American Studies MA Program by **November 15, 2017**.

Coterminal applicants must submit:

- the Coterminal Online Application (<https://applyweb.com/stanterm>)
- a 500-word statement of purpose

- a resumé
- a 10-15 page double-spaced academic writing sample
- three letters of recommendation
- a Stanford transcript
- GRE general test scores

Coterminal applicants must have a minimum cumulative GPA of 3.5 and a working knowledge of Spanish or Portuguese at a university third-year level or higher.

### University Coterminal Requirements

Coterminal master’s degree candidates are expected to complete all master’s degree requirements as described in this bulletin. University requirements for the coterminal master’s degree are described in the “Coterminal Master’s Program (p. 46)” section. University requirements for the master’s degree are described in the “Graduate Degrees (p. 50)” section of this bulletin.

After accepting admission to this coterminal master’s degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master’s degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master’s program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master’s degree requirements.

Course transfers are not possible after the bachelor’s degree has been conferred.

The University requires that the graduate adviser be assigned in the student’s first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master’s Degree Program Proposal be completed by the student and approved by the department by the end of the student’s first graduate quarter.

### Degree Requirements

University requirements for the master’s degree are described in the “Graduate Degrees General Requirements (p. 50)” section of this bulletin.

The program requires completion of a minimum of 45 graduate units. Each student is assigned a faculty adviser who works with the student to develop a customized program of study. All courses for the M.A. degree must be at the 100-level or higher, with at least half being at the 200-level or higher.

Candidates to the M.A. in Latin American Studies must complete the following:

#### Required Courses

##### a. Culture and Society

HISTORY 371	Graduate Colloquium: Explorations in Latin American History and Historiography (students must register for 5 units)	5
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##### b. Political Economy

POLISCI 348S	Latin American Politics	5
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##### c. Environment, Ecology, and Sustainability

Course TBD: Consult with CLAS adviser		5
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##### Seminar Requirement: once per quarter. 3

LATINAM 200	Seminar on Contemporary Issues in Latin American Studies	3
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Total Units		18
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1. **Core courses (15 units):** one core 5-unit course in each of three fields of specialization: Culture and Society; Political Economy; and Environment, Ecology, and Sustainability. See above for courses offered this year.
2. **Related courses (15 units):** three courses (5 units each) from the fields of specialization listed in '1' above. For approved courses, see the "Related Courses (p. 640)" tab in this section.
3. **Elective courses (10-15 units):** three elective courses (3-5 units each) from across the University’s offerings, selected with guidance and approval from the faculty adviser.
4. **Language requirement:** at least 3 units of course work on a second Latin American language. Students proficient in both Spanish and Portuguese might take either an advanced fourth-year language course in either Spanish or Portuguese or a first-year indigenous language of Latin America (i.e. Quechua or Nahuatl); students proficient in only Spanish or only Portuguese must take a basic course a second Latin American spoken language in which they are not already proficient. Up to 6 units of foreign language coursework may be applied toward the M.A. degree. All foreign language coursework must be taken at the 100-level or higher. English as a Foreign Language (EFS) courses do not count towards the language requirement, nor towards the total amount of required units.
5. **Seminar requirement:** 3 units (1 per quarter) of LATINAM 200 Seminar on Contemporary Issues in Latin American Studies.
6. **Final Research Paper or Thesis:** students may elect to write a master’s level research paper or a thesis; for the latter they may register for LATINAM 398 Master’s Thesis for up to 10 units of thesis research under the guidance of an Academic Council faculty member. Thesis units may be counted toward the elective field unit requirements (requirement number 3, above).
7. **Grade requirements:** All courses to be counted toward the M.A. must be taken for a letter grade and earn a 'B-' or better. M.A. candidates must maintain a cumulative GPA of 3.0 or higher. The only exceptions are LATINAM 200, Law School Courses, and courses in the Graduate School of Business (GSB).

## Joint Degree Program in Latin American Studies and Law

The joint degree program in Latin American Studies and Law allows students to pursue the M.A. degree in Latin American Studies concurrently with the Doctor of Jurisprudence (J.D.) degree, with a significant number of courses that may apply to both degrees. It is designed to train students interested in a career in teaching, research, or the practice of law related to Latin American legal affairs. Students must apply separately to the Latin American Studies M.A. program and to the Stanford School of Law and be accepted by both. Completing this combined course of study requires approximately four academic years, depending on the student’s background and level of language training. For more information, see the "Joint Degree Programs (p. )” section of this bulletin and consult with the program offices for the two programs.

## Dual Master's Degree with Medicine or Business

Stanford offers dual degree programs that grant an M.A. degree in Latin American Studies and a Master of Business Administration degree or a Medical Doctor degree. Students must apply separately to and be accepted by both the Latin American Studies M.A. program and the Graduate School of Business or School of Medicine.

For further information, contact a CLAS adviser at latinamerica@stanford.edu



*Director of the Center:* Alberto Díaz-Cayeros

*Associate Director:* Elizabeth Sáenz-Ackermann

*Tinker Visiting Professors:* Carlos Eduardo Areces (Spring), Rodrigo Cádiz (Spring), Florencia Garramuño (Winter), Claudia Leal (Winter, Autumn), Carlos Pereira (Fall), Enrique Seira (Spring).

*Affiliated Faculty and Staff:*

*Anthropology:* George Collier (emeritus), Lisa Curran, Carolyn Duffey, William Durham, James Fox, Angela Garcia, John Rick

*Art and Art History:* Enrique Chagoya

*Biology:* Gretchen Daily, Rodolfo Dirzo, Judith Frydman, Harold Mooney (emeritus), Peter Vitousek, Virginia Walbot

*BOSP Santiago:* Ivan Jaksic

*Business, Graduate School of:* Saumitra Jha, Ken Shotts

*Carnegie Institution for Science:* Gregory Asner

*Comparative Literature:* Roland Greene, Hans Ulrich Gumbrecht, José David Saldívar, Ramón Saldívar (also English)

*Earth Sciences, School of:* Rob Dunbar, Pamela Matson

*Economics:* Roger Noll (emeritus), Frank Wolak

*Education, Graduate School of:* Paulo Blikstein, Martin Carnoy, Amado Padilla, Guadalupe Valdés

*Engineering, School of:* Jenna Davis, Héctor García-Molina, Leonard Ortolano

*English:* Paula Moya, Ramón Saldívar (also Comparative Literature)

*Freeman Spogli Institute for International Studies:* Francis Fukuyama, Rosamond Naylor

*History:* Zephyr Frank, Ana Raquel Minian Andjel, Mikael Wolfe

*Hoover Institute:* Herbert Klein

*Human Biology:* Anne Firth Murray

*Iberian and Latin American Cultures:* Héctor Hoyos, Marília Librandi Rocha, Michael Predmore, Joan Ramon Resina, Jorge Ruffinelli, Lisa Surwillo, Yvonne Yarbrow-Bejarano

*Language Center:* Alice Miano, Marisol Necochea, Ana Sierra, Agripino Silveira, Lyris Wiedemann

*Law, School of:* James Cavallaro, Jonathan Greenberg, Thomas Heller (emeritus)

*Linguistics:* John Rickford

*Medicine, School of:* Jason Andrews, Michele Barry, Gabriel Garcia, Grant Miller, Paul Wise

*Political Science:* Bruce Cain, Alberto Díaz-Cayeros, Stephen Haber, Terry Karl (emerita), Beatriz Magaloni, Robert Packenham (emeritus), Michael Tomz

*Religious Studies:* Thomas Sheehan

*Sociology:* David Grusky, Tomás Jiménez, Michael Rosenfeld, Florencia Torché

*Stanford University Libraries:* Adán Griego, Vanessa Kam, Sergio Stone, Robert Trujillo

## Latin American Studies Related Courses

The following courses may be used to satisfy requirements for the M.A. in Latin American Studies or minor in Stanford Global Studies, Latin American Studies specialization. Consult the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site for full course descriptions and class schedules.

**Not all of these courses are offered every year.**

When selecting courses from this list, note the following:

1. Overseas Studies courses, denoted by the subject code OSPSANTG, apply only to the undergraduate minor program and are not options for M.A. students.
2. Courses with numbers ending in the letter N or Q are Introductory Seminars for undergraduates and are not options for M.A. students. Courses ending in N give preference to freshmen; courses ending in Q give preference to sophomores.
3. All courses to be counted toward the master's must be taken at the 100-level or higher.
4. All courses to be counted toward the master's must be taken for a letter grade.
5. For the M.A. degree, related courses must be taken for 5 units each. M.A. elective courses may be taken for 3-5 units each.
6. Some courses have prerequisites or special enrollment requirements. Students are responsible for making sure they have completed any prerequisites and/or secured an instructor's permission, as needed.

## Culture and Society

Courses related to the Culture and Society field of specialization include:

		Units
AMSTUD 271	Mexicans in the United States	5
ANTHRO 100D	Chavin de Huantar Research  Seminar	3-5
ANTHRO 102B	Aztec Language and Culture	3
ANTHRO 108A	The Formation of Political State in the Peruvian Andes	3-5
ANTHRO 122A	Race and Culture in Mexico and Central America	3-5
ANTHRO 124N	Maya Mythology and the Popol Vuh	3
ANTHRO 206A	Incas and their Ancestors: Peruvian Archaeology	3-5
ANTHRO 215B	Peoples and Cultures of Ancient Mesoamerica	5
ANTHRO 222A	Race and Culture in Mexico and Central America	3-5
ANTHRO 222C	Research in Maya Hieroglyphic Writing	1-2
ANTHRO 335A	Animism and Alter-Native Modernities	5
ARCHLGY 100D	Chavin de Huantar Research  Seminar	3-5
CHILATST 140	Migration in 21st Century Latin American Film	3-5
CSRE 126B	Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population	3-4
FILMSTUD 316	International Documentary	4
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 112	Medicine and Disease in the Ancient World	5
HISTORY 170C	Modern Latin America	3-5
HISTORY 273C	Caribbean Migration to the United States	4-5
HISTORY 274E	Urban Poverty and Inequality in Latin America	5
HISTORY 274G	Public Space, the Private Sphere, and Dictatorship in Latin America	5
HISTORY 275B	History of Modern Mexico	4-5
HISTORY 366B	Immigration Debates in America, Past and Present	3-5

HISTORY 371	Graduate Colloquium: Explorations in Latin American History and Historiography	4-5	ANTHRO 260	Social and Environmental Sustainability: The Costa Rican Case	3-5
HISTORY 373E	The Emergence of Nations in Latin America: Independence Through 1880	4-5	ANTHRO 262	Indigenous Peoples and Environmental Problems	3-5
HISTORY 375C	History of Modern Mexico	4-5	ANTHRO 278	Evolution and Conservation in Galapagos	5
HISTORY 379	Latin American Development: Economy and Society, 1800-2014	4-5	ANTHRO 337B	Anthropological Approaches to Health Issues in Contemporary Latin America	5
ILAC 110N	Brazil: Musical Culture and Films	3-5	BIO 234	Conservation Biology: A Latin American Perspective	3
ILAC 113Q	Borges and Translation	3-5	BIOE 371	Global Biodesign: Medical Technology in an International Context	3
ILAC 131	Introduction to Latin America: Cultural Perspectives	3-5	EARTHSYS 121	Building a Sustainable Society: New Approaches for Integrating Human and Environmental Priorities	3
ILAC 132E	Introduction to Global Portuguese: Cultural Perspectives	3-5	ETHICSOC 278M	Introduction to Environmental Ethics	4-5
ILAC 140	Migration in 21st Century Latin American Film	3-5	GEOPHYS 212	Topics in Climate Change	2
ILAC 161	Modern Latin American Literature	3-5	HISTORY 276K	The Nature State: Latin American Conservation in Global Perspective	4-5
ILAC 226	Impersonality and Anonymity in Contemporary Latin American Culture	3-5	HISTORY 278D	Race, Ethnicity, and the Environment in Latin America	4-5
ILAC 241	Fiction Workshop in Spanish	3-5	HISTORY 376K	The Nature State: Latin American Conservation in Global Perspective	4-5
ILAC 242	Poetry Workshop in Spanish	3-5	HISTORY 378D	Race, Ethnicity, and the Environment in Latin America	4-5
ILAC 243	Latin American Aesthetics	3-5	HUMBIO 129	Critical Issues in International Women's Health	4
ILAC 274	Aurality and Literature	3-5	HUMBIO 129S	Global Public Health	4
ILAC 277	Senior Seminar: Spanish and Society - Cultures of Salsa	3-5	OSPSANTG 58	Living Chile: A Land of Extremes	5
ILAC 278A	Senior Seminar: Cervantes's Novelas Ejemplares	3-5			
ILAC 336	One World or Many? Representing Distance, Time, and Place in Iberian Expansion	3-5			
ILAC 342	Meat	3-5			
ILAC 348	US-Mexico Border Fictions: Writing La Frontera, Tearing Down the Wall	3-5			
ILAC 363	Visions of the Andes	3-5			
ILAC 373	Baroque Brazil	3			
LATINAM 248	Racial and Gender Inequalities in Latin America	3-5			
LAW 5027	Social Conflict, Social Justice, and Human Rights in 21st Century Latin America	2			
LAW 5028	Regional Human Rights Protections: The Inter-American System	3			
OSPMADRD 55	Latin Americans in Spain: Cultural Identities, Social Practices, and Migratory Experience	4			
OSPMADRD 83	Narrating the Nation: National and Post-National Spanish and Latin American Literature	4			
OSPSANTG 14	Women Writers of Latin America in the 20th Century	4-5			
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	4-5			
OSPSANTG 30	Short Latin American Fiction of the 20th Century	4-5			
OSPSANTG 49	Chile - Another "End of the World"?	3-5			
OSPSANTG 68	The Emergence of Nations in Latin America	4-5			
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5			
OSPSANTG 129X	Latin America in the International System	4-5			
SOC 350W	Workshop: Migration, Ethnicity, Race and Nation	1-3			

## Environment, Ecology, and Sustainability

Courses related to the Environment, Ecology, and Sustainability field of specialization include:

		Units
ANTHRO 160	Social and Environmental Sustainability: The Costa Rican Case	3-5
ANTHRO 162	Indigenous Peoples and Environmental Problems	3-5

## Political Economy

Courses related to the Political Economy field of specialization include:

		Units
ECON 106	World Food Economy	5
ECON 129	Credit markets and development: Some evidence from Latin America and the World	5
EDUC 306A	Economics of Education in the Global Economy	5
EDUC 404	Topics in Brazilian Education: Public Policy and Innovation for the 21st Century	1-2
HISTORY 172A	Mexico: From Colony to Nation, or the History of an impossible Republic?	5
HISTORY 177D	U.S. Intervention and Regime Change in 20th Century Latin America	5
INTNLREL 141A	Camera as Witness: International Human Rights Documentaries	5
INTNLREL 179	Major Themes in U.S.-Latin America Diplomatic History	5
IPS 241	International Security in a Changing World	5
LATINAM 177	Mapping Poverty, Colonialism and Nation Building in Latin America	1-2
LAW 5017	Law in Latin America	2
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
POLISCI 244C	Political Change in Latin America: The contemporary challenge to democracy	5
POLISCI 247G	Governance and Poverty	5
POLISCI 248S	Latin American Politics	3-5
POLISCI 347G	Governance and Poverty	3-5
POLISCI 348S	Latin American Politics	3-5
POLISCI 440B	Comparative Political Economy	3-5

## Overseas Studies Courses in Latin American Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPMADR 22	Spain on Stage: Theater and Performance in 2018	5
OSPSANTG 14	Women Writers of Latin America in the 20th Century	4-5
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	4-5
OSPSANTG 30	Short Latin American Fiction of the 20th Century	4-5
OSPSANTG 58	Living Chile: A Land of Extremes	5
OSPSANTG 62	Topics in Chilean History	4-5
OSPSANTG 68	The Emergence of Nations in Latin America	4-5
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
OSPSANTG 118X	Artistic Expression in Latin America	5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5
OSPSANTG 129X	Latin America in the International System	4-5

# LINGUISTICS

Courses offered by the Department of Linguistics are listed under the subject code LINGUIST on the Stanford Bulletin's ExploreCourses web site.

Linguistics is the study of language as a fundamental human activity. Linguists consider language as a cultural, social, and psychological phenomenon and seek to determine what is universal to all languages and what is specific to individual languages, how language varies across individuals and communities, how it is acquired, how it changes, and how it is processed by humans and machines. Linguistics is an inherently interdisciplinary field that links the humanities, the social sciences, and the other cognitive sciences, as well as computer science, education, and hearing and speech sciences.

The department offers courses at the undergraduate and graduate levels. Some focus on analyzing structural patterns of sounds (phonetics and phonology), meanings (semantics and pragmatics), words (morphology), sentences (syntax). Others examine how these structures vary over time (historical linguistics), or over individuals and social groups (sociolinguistics), or how language is processed and learned by humans (psycholinguistics and language acquisition) or by computers (computational linguistics).

A variety of open forums provide for the discussion of linguistic issues, including colloquia and regularly scheduled workshops in child language, computational linguistics, phonetics and phonology, psycholinguistics, semantics and pragmatics, sociolinguistics, and syntax.

## Mission of the Undergraduate Program in Linguistics

The mission of the undergraduate program in Linguistics is to provide students with basic knowledge in the principal areas of linguistics (phonetics, phonology, morphology, syntax, semantics, pragmatics, historical linguistics, sociolinguistics, psycholinguistics, and computational linguistics) and the skills to do more advanced work in these subfields. Courses in the major also involve interdisciplinary work with connections to other programs including anthropology, communication, computer science, education, foreign languages, psychology, and symbolic systems. The program provides students with excellent preparation for further study in graduate or professional schools as well as careers in business, government agencies, social services, and teaching.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. By the end of the program, students are expected to be able to:

1. formulate theoretically interesting and tractable research questions;
2. find and collect information relevant to answering their research questions;
3. bring linguistic theory to bear in analyzing and evaluating information;
4. articulate the questions and outcomes of the process described in 1-3; and
5. engage with peers in an intellectual community around linguistic issues.

## Graduate Programs in Linguistics

The department offers an M.A., Ph.D., and Ph.D. minor in Linguistics.

## Learning Outcomes (Graduate)

The purpose of the master's program is to develop students' knowledge and skills in Linguistics and to prepare them for a professional career or doctoral studies. This is achieved through completion of courses, including course work in an area of specialization within the field, and experience with independent research.

The Ph.D. is conferred upon candidates who have demonstrated the ability to conduct substantive, independent research in Linguistics. Through completion of advanced coursework and rigorous methodological and analytical training, the doctoral program prepares students to make original contributions to knowledge in linguistics, to articulate the results of their work, and to demonstrate its significance to linguistics and related fields.

## Cognitive Science

Linguistics is participating with the departments of Philosophy and Psychology in an interdisciplinary program in Cognitive Science for doctoral students. The program is intended to provide an interdisciplinary education as well as a deeper concentration in linguistics. Students who complete the Linguistics and Cognitive Science requirements receive a special designation in Cognitive Science along with the Ph.D. in Linguistics.

To receive this designation, students must complete 30 units of approved course work. The 30 units cannot include courses counted elsewhere towards the Ph.D. Courses may be drawn from the participating departments, as well as from other departments, as long as their content is appropriate to the designation. At least 18 of the 30 units must be from outside the student's major department and must include course work in at least two other departments. Special topic seminars are excluded in favor of more foundational courses.

## Linguistics Course Catalog Numbering System

Courses numbered under 100 are designed primarily for pre-majors. Courses with 100-level numbers are designed for undergraduate majors and minors; a limited number of 100-level units may apply to a master's or Ph.D. minor. Those with numbers 200 and above are primarily for graduate students, but with consent of the instructor some of them may be taken for credit by qualified undergraduates. At all levels, the final two digits of the course number indicate a special area, as follows:

Number	Special Area
00-04	General
05-09	Phonetics
10-14	Phonology
15-19	Morphology
20-29	Syntax
30-39	Semantics, Pragmatics, Discourse
40-49	Language Acquisition, Psycholinguistics
50-62	Sociolinguistics, Language Variation, Change
63-73	Language and Culture, Structure of a Language
74-79	Methods, Mathematical Linguistics, Statistics
80-89	Computational Linguistics
90-99	Directed Work, Theses, Dissertations

## Bachelor of Arts in Linguistics

The undergraduate major stresses the study of language both as a fundamental human faculty and as a changing social institution. At

the core of the program is a set of departmental courses on the nature of human language; the major also draws on courses offered by other departments and programs.

The Linguistics major cuts across the humanities and the social and physical sciences. It provides a solid general education as a background for advanced studies in such disciplines as anthropology, cognitive science, communication, computer science, education (language, literacy, and culture), hearing and speech sciences, languages, law, linguistics, philosophy, and psychology.

## Degree Requirements

Requirements for the B.A. include at least 55 units of course work; at least 28 of these units must be in Linguistics. The remaining units may be in Linguistics or in related fields, and should form a coherent program of study. Majors should discuss this course work with faculty and get specific approval from the Linguistics undergraduate adviser for courses outside the department.

Of the 55 units required for the major, no more than 12 units may be below the 100-level and no more than two courses may be taken on a credit/no credit basis (CR/NC). All required courses must be taken for a letter grade of 'C-' or better.

## Required Courses:

### Gateway Course

LINGUIST 196 Introduction to Research for Undergraduates (to be taken Autumn Quarter, junior year) 1

### Capstone Course

LINGUIST 197A Undergraduate Research Seminar (to be taken Winter Quarter, senior year) 2-3

### Core Courses

Select at least one course each from two of the following three areas:

#### Phonetics and Phonology

LINGUIST 105 Phonetics 4  
or LINGUIST 205A Phonetics

LINGUIST 110 Introduction to Phonology 4

#### Morphology and Syntax

LINGUIST 120 Introduction to Syntax 4

LINGUIST 121A The Syntax of English 4

LINGUIST 121B Crosslinguistic Syntax 4

LINGUIST 222A Foundations of Syntactic Theory I 3-4

#### Semantics and Pragmatics

LINGUIST 130A Introduction to Semantics and Pragmatics 4  
or LINGUIST 230A Introduction to Semantics and Pragmatics

LINGUIST 130B Introduction to Lexical Semantics 3-4

LINGUIST 230B Semantics and Pragmatics I 2-4

LINGUIST 232A Lexical Semantics 2-4

### Breadth Courses

Select at least one course each from two of the following four areas:

#### Historical Linguistics and Language Change

LINGUIST 160 Introduction to Language Change 4

LINGUIST 260A Historical Morphology and Phonology 2-4

LINGUIST 260B Historical Morphosyntax 2-4

#### Sociolinguistics

LINGUIST 150 Language and Society 4

LINGUIST 156 Language and Gender 3-5

LINGUIST 157 Sociophonetics 1-4

or LINGUIST 257 Sociophonetics

LINGUIST 250 Sociolinguistic Theory and Analysis 3-4

#### Psycholinguistics

LINGUIST 35 Minds and Machines 4

LINGUIST 140 Learning to Speak: An introduction to child language acquisition 4

LINGUIST 145 Introduction to Psycholinguistics 4

#### Computational Linguistics

LINGUIST 180 From Languages to Information 3-4  
or LINGUIST 280 From Languages to Information

LINGUIST 188 Natural Language Understanding 3-4

or LINGUIST 288 Natural Language Understanding

LINGUIST 278 Programming for Linguists 1-4

LINGUIST 284 Natural Language Processing with Deep Learning 3-4

## Depth Courses

Select at least two 200-level Linguistics courses. See ExploreCourses for current options.

## Language Requirement

Linguistics majors must have competence in at least one language other than English as part of their understanding of the field of linguistics and its study. This requirement is fulfilled by completion of six quarters of language coursework at Stanford or by certification of equivalent proficiency through the Language Center (<https://web.stanford.edu/dept/lc/language>) or the relevant department (see University requirements). Majors may petition to be exempted from the language requirement if they have grown up speaking a language other than English and can use it for everyday purposes and for linguistic analysis.

## Honors Program

Students who wish to undertake a more intensive program of study, including independent research, should pursue departmental honors. Students should apply for honors by the end of Spring Quarter of their junior year. As part of the application, the student must write a research proposal describing the honors project, which must be approved by the faculty adviser. Approval is given only to students who have maintained a grade point average (GPA) of 3.3 (B+) or better in the courses required for the major.

Honors students complete a total of 65 units including the 55 units for the major, plus 10 additional units of Independent Study and Honors Research. In addition, they must complete an honors thesis based on research conducted with a principal adviser who must be a member of the Linguistics faculty, and a secondary faculty adviser who may, with the approval of the Linguistics Undergraduate Adviser, be a member of another department. In the Autumn Quarter of the senior year, honors students enroll in LINGUIST 199 Independent Study, to work closely with one of their advisers on the research project. In Winter and Spring quarters, honors students enroll in LINGUIST 198 Honors Research, with the student's principal adviser for close supervision of the honors thesis. The thesis must be submitted in final, acceptable, form by May 15. The thesis topic is presented orally at a department Honors Colloquium late in Spring Quarter.

## Joint Major Program in Linguistics and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

## Linguistics Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Program (p. 278)" section of this bulletin for details on Computer Science requirements.

All majors must take at least 50 units of course work in Linguistics and related fields, with no more than 12 units below the 100 level and at least 8 units above the 200 level. No more than two courses may be taken on a credit/no credit basis (CR/NC). All required courses must be taken for a letter grade of C- or better.

Students in the joint major must take LINGUIST 180/CS 124 as one of these breadth courses. Students may count LINGUIST 180/CS 124 towards both major requirements as long as the units are not double-counted. If LINGUIST 180/CS 124 is required for both Linguistics and a student's specific CS track, Linguistics works with the student to identify another course (possibly directed reading/independent study for 3-4 units) that would benefit the academic plan. (In this scenario, LINGUIST 180/CS 124 fulfills major requirements in both Linguistics and CS, but the units are only counted towards CS; additional units of work would be identified in Linguistics to meet the unit requirements.)

Within the 50-unit total, students in the joint major are encouraged to sign up for Directed Research units as part of completing the integrative capstone project. The expectation is that this project is supervised by a Linguistics faculty member. The specific number of units varies and is decided by the student and faculty adviser.

Different from Linguistics majors, CS + Linguistics joint majors are not required to display competence in a language other than English and therefore are not required to complete the equivalent of six quarters of language study.

## Required Courses for the Joint Major:

### Gateway Course

LINGUIST 196 Introduction to Research for Undergraduates (to be taken Autumn Quarter, junior year)

### Capstone Course

LINGUIST 197A Undergraduate Research Seminar (to be taken Winter Quarter, senior year)

### Core Courses

Select at least one course each from two of the following three areas:

#### Phonetics and Phonology

LINGUIST 105 Phonetics 4  
or LINGUIST 205A Phonetics

LINGUIST 110 Introduction to Phonology 4

#### Morphology and Syntax

LINGUIST 120 Introduction to Syntax 4

LINGUIST 121A The Syntax of English 4

LINGUIST 121B Crosslinguistic Syntax 4

LINGUIST 222A Foundations of Syntactic Theory I 3-4

#### Semantics and Pragmatics

LINGUIST 130A Introduction to Semantics and Pragmatics 4

or LINGUIST 230A Introduction to Semantics and Pragmatics

LINGUIST 130B Introduction to Lexical Semantics 3-4

LINGUIST 230B Semantics and Pragmatics I 2-4

LINGUIST 232A Lexical Semantics 2-4

### Breadth Courses

Select LINGUIST 180/280 plus at least one additional breadth course:

LINGUIST 180 From Languages to Information 3-4

or LINGUIST 280 From Languages to Information

### Historical Linguistics and Language Change

LINGUIST 160 Introduction to Language Change 4

LINGUIST 260A Historical Morphology and Phonology 2-4

LINGUIST 260B Historical Morphosyntax 2-4

### Sociolinguistics

LINGUIST 150 Language and Society 4

LINGUIST 156 Language and Gender 3-5

LINGUIST 157 Sociophonetics 1-4

or LINGUIST 257 Sociophonetics

LINGUIST 250 Sociolinguistic Theory and Analysis 3-4

### Psycholinguistics

LINGUIST 35 Minds and Machines 4

LINGUIST 140 Learning to Speak: An introduction to child language acquisition 4

LINGUIST 145 Introduction to Psycholinguistics 4

### Depth Courses

Select at least two 200-level Linguistics courses. See ExploreCourses for current options.

## Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

## Units Dropping a Joint Major Program

1 To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>). Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

Units

2-3

## Transcript and Diploma

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

Units

## Minor in Linguistics

Requirements for the minor include at least 28 units of course work in Linguistics and related fields, approved in advance by the Linguistics undergraduate adviser. All courses must be taken for at least 3 units. No more than two courses may be taken on a credit/no credit basis (CR/NC). All required courses must be taken for letter grade of 'C-' or better. The courses counting towards the minor must be units beyond those needed to satisfy the student's major course of study.

## Required Courses for the Minor:

LINGUIST 1 Introduction to Linguistics

Units  
4

Select one course each from two of the three areas below:

### Phonetics and Phonology

LINGUIST 105 Phonetics 4  
LINGUIST 110 Introduction to Phonology 4

### Morphology and Syntax

LINGUIST 120 Introduction to Syntax 4  
LINGUIST 121A The Syntax of English 4  
LINGUIST 121B Crosslinguistic Syntax 4

### Semantics and Pragmatics

LINGUIST 130A Introduction to Semantics and Pragmatics 4  
LINGUIST 130B Introduction to Lexical Semantics 3-4

Select one of the following:

LINGUIST 150 Language and Society 4  
or, in advance consultation with the Linguistics Undergraduate Adviser, a course in historical linguistics or the history of a language.

Units  
4

Remaining courses are to be determined in advance consultation with the Linguistics undergraduate adviser. Students are encouraged to take at least one 200-level Linguistics course. Students may also choose to do independent work with a faculty member of their choice.

## Master of Arts in Linguistics

The University's basic requirements for the master's degree are discussed in the "Graduate Degrees (p. 50)" section of this bulletin. The following are additional departmental requirements.

- Courses*—Individual programs should be worked out in advance with an adviser in Linguistics keeping the following requirements and guidelines in mind. The master's degree requires the completion of 45 units; at least 36 of these must be in Linguistics. The course work must include one introductory graduate-level course in each of the areas of syntax, semantics, and sound structure, as well as four courses in the student's area of specialization. If the student can make a compelling case, the department may allow up to 9 of the 45 units to be in a department other than Linguistics. Courses from outside the department must have clear linguistic content or contribute methodological knowledge that facilitates the thesis project; furthermore, if the student is simultaneously enrolled in a degree program in another department, not all of these 9 units can be earned in that department. No more than two courses should be at the 100 level. The majority of the courses taken towards the 45 units of degree program course work must be taken for a letter grade; these should include the three required introductory courses and the four courses constituting the specialization, which should all be completed with at least a 'B'. The overall course work grade point average (GPA) must be at least 3.0 (B).
- Thesis or Thesis Project*—A research paper supervised by a committee of three faculty (normally fulfilled by up to 6 units of LINGUIST 398 Directed Research).

## Coterminal Master's Degree Program in Linguistics

The Department of Linguistics admits a limited number of undergraduates to the coterminal degree program. Students are required to submit to the department a complete application, which includes a statement of purpose identifying a thesis topic, a Stanford transcript,

three letters of recommendation (at least one of which must be from a faculty member in Linguistics), and a proposed course of study (worked out in advance with a Linguistics adviser). Applicants for the coterminal degree may apply as early as their eighth quarter and no later than early in the eleventh quarter of undergraduate study. Decisions on admission to the coterminal degree program rest with the Graduate Admissions Committee of the Department of Linguistics.

Units

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Doctor of Philosophy in Linguistics

The following requirements are in addition to the basic University requirements for the degree sought; see the "Graduate Degrees (p. 50)" section of this bulletin. Students should review the department's Guidelines for the Degree of Ph.D. in Linguistics (<https://linguistics.stanford.edu/department-resources>) for further particulars concerning these requirements.

- Courses*—a minimum of 135 units of graduate work beyond the bachelor's degree, or 90 units beyond the master's degree. The core course requirements detailed in the Department of Linguistics Ph.D. Handbook guarantee that each student covers a sufficient set of subareas within the field. Students must maintain a satisfactory record in the number and distribution of units completed. The overall course work GPA must be at least 3.0 (B), and all core courses should be completed with at least a 'B'.
- Language*—each student must demonstrate an explicit in-depth knowledge of the structure of at least one language (normally neither the student's native language nor English) by writing a research paper on that language.
- Research*—each student is expected to complete two substantial qualifying papers. The deadline for completion of the first qualifying paper is the end of Autumn Quarter of the second year; the deadline for completion of the second qualifying paper is the end of Autumn Quarter of the third year. The subject matter of the two papers, although it may be related (for example, same language), must be clearly distinct. The requirement is fulfilled by one quarter of LINGUIST 395 Research Workshop (1-2 units), and by oral discussion of each paper with a committee of at least three faculty members selected by the faculty with input from the student.
- Candidacy*—each student must apply for candidacy for the Ph.D. by the end of the sixth academic quarter, normally the Spring Quarter of

the second year. Departmental prerequisites for candidacy include: (i) completion of a prescribed portion of the core course requirement (see item 1 above), (ii) completion of one qualifying paper (see item 3 above), and (iii) having an approved plan for completing the language requirement (see item 2 above).

Late in Spring Quarter, the department faculty reviews each applicant and votes on whether to admit that student to candidacy. A student is only admitted to candidacy if, in addition to the student's fulfilling the department prerequisites, the faculty makes the judgment that the student has the ability to complete the remaining stages of the Ph.D. program at a level of superior quality. Students who are not admitted to candidacy are terminated from the program; at the department's discretion, they may be allowed to complete any requirements that remain for the master's degree and receive this degree.

5. *Teaching*—at least three quarters serving as a teaching assistant in Linguistics courses.
6. *Dissertation*—
  - a. appointment of a dissertation committee.
  - b. an approved written dissertation proposal is required by the end of Autumn Quarter of the fourth year.
  - c. oral discussion of the dissertation proposal with an augmented dissertation committee by the end of Spring Quarter of the fourth year.
  - d. passing a University oral examination on the dissertation and related areas which includes a public presentation of the dissertation research.
  - e. dissertation (up to 15 units of LINGUIST 399 Dissertation Research).

*Professors:* Penelope Eckert, Daniel Jurafsky, Martin Kay, Paul Kiparsky, Beth Levin, Christopher Manning (on leave AY 17-18), Christopher Potts

*Associate Professors:* Arto Anttila (on leave AY 17-18), Meghan Sumner

*Assistant Professors:* Judith Degen, Vera Gribova, Boris Harizanov, Daniel Lassiter (on leave AY 17-18), Robert Podesva

*Professor (Research):* Cleo Condoravdi

*Courtesy Professors:* H. Samy Alim, Kenji Hakuta, Yoshiko Matsumoto, James McClelland, Chao Fen Sun

*Courtesy Associate Professors:* James A. Fox, Michael C. Frank, Noah Goodman, Miyako Inoue

*Courtesy Assistant Professor:* Jonathan Rosa

*Lecturers:* Rebekah Baglini, Philip L. Hubbard (Senior Lecturer, Language Center), Sarah Ogilvie (on leave AY 17-18)

*Adjunct Professors:* Jared Bernstein, Ronald Kaplan, Lauri Karttunen, Paul Kay, Annie Zaenen, Arnold Zwicky

## Ph.D. Minor in Linguistics

1. *Courses*—the student must complete 30 units of course work in Linguistics. The University requires that at least 20 of these units be at the 200 level or above; the remaining 10 units must be at the 100 level or above. The coursework for the minor must include one introductory course in each of sound structure, syntax, and semantics/pragmatics; this requirement is typically fulfilled by LINGUIST 105 Phonetics or LINGUIST 110 Introduction to Phonology, LINGUIST 121A The Syntax of English or LINGUIST 121B Crosslinguistic Syntax, LINGUIST 130A Introduction to Semantics and Pragmatics or LINGUIST 130B Introduction to Lexical Semantics or by 200-level introductory courses in the same areas. Courses submitted for the minor must be incremental units beyond those used to satisfy the major. Individual programs should be worked out in advance with the student's Ph.D. minor adviser in Linguistics. The majority of the courses taken towards the 30 units of coursework must be taken for a letter grade; these should include the three required introductory courses, which should all be completed with at least a 'B'. The overall course work grade point average (GPA) must be at least 3.0 (B).
2. *Research Project (optional)*—the student may elect to present a paper which integrates the subject matter of linguistics into the student's field of specialization.
3. The Linguistics minor adviser or designee serves on the student's University oral examination committee and may request that up to one-third of the examination be devoted to the minor subject.

## Faculty

*Emeriti:* (Professors) Joan Bresnan, Eve V. Clark, Shirley Brice Heath, William R. Leben, Stanley Peters, John R. Rickford, Elizabeth C. Traugott, Thomas A. Wasow

*Chair:* Daniel Jurafsky



# MATHEMATICAL AND COMPUTATIONAL SCIENCE

Courses offered by Mathematical and Computational Science program are listed under the subject code MCS on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) website.

This interdisciplinary undergraduate degree program in MCS is sponsored by Stanford's departments of Statistics, Mathematics, Computer Science, and Management Science & Engineering, providing students with a core of mathematics basic to all the mathematical sciences and an introduction to concepts and techniques of computation, optimal decision making, probabilistic modeling, and statistical inference.

Utilizing the faculty and courses of the departments listed above, this major prepares students for graduate study or employment in the mathematical and computational sciences or in those areas of applied mathematics which center around the use of computers and are concerned with the problems of the social and management sciences. A biology option is offered for students interested in applications of mathematics, statistics, and computer science to the biological sciences (bioinformatics, computational biology, statistical genetics, neurosciences); and in a similar spirit, an engineering and statistics option.

## Undergraduate Mission Statement for Mathematical and Computational Science

The mission of the Mathematical and Computational Science Program is to provide students with a core of mathematics basic to all the mathematical sciences and an introduction to concepts and techniques of computation, optimal decision making, probabilistic modeling and statistical inference. The program is interdisciplinary in its focus, and students are required to complete course work in mathematics, computer science, statistics, and management science and engineering. A computational biology track is available for students interested in biomedical applications. The program prepares students for careers in academic, financial and government settings as well as for study in graduate or professional schools.

## Learning Outcomes

The program expects undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to be able to demonstrate:

1. understanding of principles and tools of statistics.
2. command of optimization and its applications and the ability to analyze and interpret problems from various disciplines.
3. an understanding of computer applications emphasizing modern software engineering principles.
4. an understanding of multivariate calculus, linear algebra, and algebraic and geometric proofs.

## Bachelor of Science in Mathematical and Computational Science

### Suggested Preparation for the Major

Students ordinarily would have taken two of the required Math courses (MATH 51 Linear Algebra and Differential Calculus of Several Variables/MATH 52 Integral Calculus of Several Variables/MATH 53 Ordinary Differential Equations with Linear Algebra) and one of the required Statistics courses (STATS 116 Theory of Probability, STATS 191

Introduction to Applied Statistics) before declaring MCS during their freshman or sophomore year.

### How to Declare

To declare the major, a student must submit the Declaration of Major in Axess. Following a review of the student's transcript, a department adviser is assigned to the student upon declaration approval. It is recommended that students meet with their adviser at least once per quarter to discuss progress towards degree completion.

### Course Requirements for the MCS Bachelor's Degree (78-84 units)

	Units
<b>Mathematics (MATH)</b>	28
Single-variable calculus or AP credit. <sup>1</sup>	10
MATH 19      Calculus	
MATH 20      Calculus	
MATH 21      Calculus	
Students may choose one of the following sequences:	15
Multivariable Calculus and Linear Algebra	
MATH 51      Linear Algebra and Differential Calculus of Several Variables	
MATH 52      Integral Calculus of Several Variables	
MATH 53      Ordinary Differential Equations with Linear Algebra	
Modern Mathematics: Continuous Methods (a proof-oriented sequence)	
MATH 61CM    Modern Mathematics: Continuous Methods	
MATH 62CM    Modern Mathematics: Continuous Methods	
MATH 63CM    Modern Mathematics: Continuous Methods	
Modern Mathematics: Discrete Methods (a proof-oriented sequence)	
MATH 61DM    Modern Mathematics: Discrete Methods	
MATH 62DM    Modern Mathematics: Discrete Methods	
MATH 63DM    Modern Mathematics: Discrete Methods	
Select one of the following:	3
MATH 104     Applied Matrix Theory	
MATH 113     Linear Algebra and Matrix Theory	
<b>Computer Science (CS)</b>	22-24
CS 103            Mathematical Foundations of Computing	5
CS 106A          Programming Methodology	5
and either	
CS 106B          Programming Abstractions	5
or CS 106X        Programming Abstractions (Accelerated)	
Select two of the following:	7-9
CME 108      Introduction to Scientific Computing	
CS 107        Computer Organization and Systems	
CS 154        Introduction to Automata and Complexity Theory	
CS 161        Design and Analysis of Algorithms	
CS 181W      Computers, Ethics, and Public Policy	
<b>Management Science and Engineering (MS&amp;E)</b>	7-11
MS&E 211        Introduction to Optimization	4
MS&E 221        Stochastic Modeling	3
Or select three of the following:	
MS&E 111     Introduction to Optimization	
MS&E 121     Introduction to Stochastic Modeling	
MS&E 211     Introduction to Optimization	
MS&E 213     Introduction to Optimization Theory	
MS&E 221     Stochastic Modeling	

MS&E 251	Introduction to Stochastic Control with Applications	
<b>Statistics (STATS)</b>		11-12
STATS 116	Theory of Probability	5
STATS 200	Introduction to Statistical Inference	3
Select one of the following:		3-4
STATS 191	Introduction to Applied Statistics	
STATS 203	Introduction to Regression Models and Analysis of Variance	

<sup>1</sup> Students who scored a 5 on both the Calculus AB and BC advanced placement exams (total of 10 units) can be waived out of MATH 19 Calculus, MATH 20 Calculus, MATH 21 Calculus; See also the Registrar's Advanced Placement (<https://registrar.stanford.edu/students/transfer-credit/advanced-placement>) web site (AP (<https://registrar.stanford.edu/students/transfer-credit-and-advanced-placement/advanced-placement/ap-credit-chart>) or IB (<https://registrar.stanford.edu/students/transfer-credit-and-advanced-placement/advanced-placement/ib-credit-chart>) exams).

## Writing in the Major Requirement

The University requires students to complete at least one approved writing-intensive course in each of their majors. See the Hume Center for Writing and Speaking (<https://undergrad.stanford.edu/tutoring-support/hume-center/writing/writing-major>) web site for a full description of the WIM (<https://undergrad.stanford.edu/tutoring-support/hume-center/writing/writing-major/overview-wim-requirement>) requirement.

### Choose one from the MCS-designated WIM courses to fulfill the Writing in the Major requirement:

	Units	
MATH 109	Applied Group Theory	3-4
MATH 110	Applied Number Theory and Field Theory	units
MATH 120	Groups and Rings	
MATH 171	Fundamental Concepts of Analysis	
CS 181W	Computers, Ethics, and Public Policy	
STATS 155	Statistical Methods in Computational Genetics	

WIM courses offered by other majors may be used in cases of specific concentrations (e.g. biology, decision theory). Adviser approval required.

## Mathematical and Computational Science Approved Electives

Choose three courses in Mathematical and Computational Science 100-level or above, at least 3 units each from two different departments. At least one must be from following list:

### Choose three courses from the following:

	Units	
ECON 102C	Advanced Topics in Econometrics	9
ECON 140	Introduction to Financial Economics	units
ECON 160	Game Theory and Economic Applications	
ECON 179	Experimental Economics	
EE 261	The Fourier Transform and Its Applications	
EE 263	Introduction to Linear Dynamical Systems	
EE 278	Introduction to Statistical Signal Processing	
EE 282	Computer Systems Architecture	
EE 364A	Convex Optimization I	
EE 364B	Convex Optimization II	
MS&E 220	Probabilistic Analysis	

MS&E 223	Simulation	
MS&E 226	"Small" Data	
MS&E 251	Introduction to Stochastic Control with Applications	
MS&E 334	Topics in Social Data	
MCS 100	Mathematics of Sports	
MATH 104	Applied Matrix Theory	
MATH 106	Functions of a Complex Variable	
MATH 107	Graph Theory	
MATH 108	Introduction to Combinatorics and Its Applications	
MATH 113	Linear Algebra and Matrix Theory	
MATH 114	Introduction to Scientific Computing	
MATH 115	Functions of a Real Variable	
MATH 116	Complex Analysis	
MATH 131P	Partial Differential Equations	
MATH 136	Stochastic Processes	
MATH 158	Basic Probability and Stochastic Processes with Engineering Applications	
MATH 159	Discrete Probabilistic Methods	
MATH 171	Fundamental Concepts of Analysis	
MATH 172	Lebesgue Integration and Fourier Analysis	
PHIL 151	Metalogic	
STATS 202	Data Mining and Analysis	
STATS 206	Applied Multivariate Analysis	
STATS 207	Introduction to Time Series Analysis	
STATS 208	Introduction to the Bootstrap	
STATS 215	Statistical Models in Biology	
STATS 216	Introduction to Statistical Learning	
STATS 217	Introduction to Stochastic Processes I	
STATS 218	Introduction to Stochastic Processes II	
STATS 219	Stochastic Processes	
STATS 240	Statistical Methods in Finance	
STATS 270	A Course in Bayesian Statistics	

### For Computer Science (CS), electives can include courses not taken as units under the CS list above and the following:

CME 206	Introduction to Numerical Methods for Engineering	
CME 211	Software Development for Scientists and Engineers	
CME 302	Numerical Linear Algebra	
CS 108	Object-Oriented Systems Design	
CS 110	Principles of Computer Systems	
CS 140	Operating Systems and Systems Programming	
CS 143	Compilers	
CS 157	Logic and Automated Reasoning	
CS 161	Design and Analysis of Algorithms	
CS 194	Software Project	
CS 221	Artificial Intelligence: Principles and Techniques	
CS 223A	Introduction to Robotics	
CS 225A	Experimental Robotics	
CS 228	Probabilistic Graphical Models: Principles and Techniques	
CS 229	Machine Learning	
CS 243	Program Analysis and Optimizations	
CS 246	Mining Massive Data Sets	
CS 248	Interactive Computer Graphics	

Electives that are not offered this year, but may be offered in subsequent years, are eligible for credit toward the major.

With the adviser's approval, courses other than those offered by the sponsoring departments may be used to fulfill part of the elective requirement. Courses must provide skills relevant to the MCS degree and do not overlap courses in the student's program. Depending on student's interests, these may be in fields such as, biology, economics, electrical engineering, industrial engineering, and medicine, are otherwise relevant to a mathematical sciences major.

### Grade and Course Requirements:

- All courses used to fulfill major requirements must be taken for a letter grade with the exception of courses offered satisfactory/no credit only.
- The student must have a grade point average (GPA) of 3.0 or better in all course work used to fulfill the major requirement.
- Students who earn less than a 'B-' in STATS 116 Theory of Probability or STATS 200 Introduction to Statistical Inference must repeat the course.
- Only one MCS core course can be substituted by filing a petition with their adviser (with the exception of STATS 200 Introduction to Statistical Inference which cannot be substituted). The Course Substitution Form ([https://mcs.stanford.edu/sites/default/files/mcs-course-substitution\\_form\\_0.pdf](https://mcs.stanford.edu/sites/default/files/mcs-course-substitution_form_0.pdf)) must be submitted the quarter prior to enrolling in the course.
- Course transfer credit is subject to department evaluation and to the Office of the Registrar's external credit evaluation. These courses may result in a replacement course for MCS required course or may establish placement in a higher-level course. Transfer requests must first be submitted to Student Services Center prior to being evaluated by your adviser. Submit the MCS Program Transfer Credit Form ([https://mcs.stanford.edu/sites/default/files/mcs\\_ug\\_course\\_equiv\\_petition\\_1.pdf](https://mcs.stanford.edu/sites/default/files/mcs_ug_course_equiv_petition_1.pdf)) to the student services office.
- At least three quarters before graduation, majors must file with their adviser a plan for completing degree requirements.

## Mathematical and Computational Science Biology Track (Option)

Students in the Biology track take the introductory courses for the Mathematics and Computational Science major with the following allowable substitutions as electives.

	Units
STATS/BIO 141 Biostatistics <sup>1</sup>	3-5
<b>Allowable Elective Course Substitutions:</b>	
Take three courses from Foundational Biology Core:	10
BIO 82 Genetics	
BIO 83 Biochemistry & Molecular Biology	
BIO 84 Physiology	
BIO 85	
BIO 86 Cell Biology	
Or take two courses from the Biology core and one of the following:	3-4
BIO 104 Advanced Molecular Biology	
BIO 118 Genetic Analysis of Biological Processes	
BIO 133 Network analysis for community ecology and conservation research	
BIO 144 Conservation Biology: A Latin American Perspective	
BIO 183 Theoretical Population Genetics (offered alternate years)	
BIO 230 Molecular and Cellular Immunology	
Honors students select the following three courses:	1-4
STATS 155 Statistical Methods in Computational Genetics	
BIO 113 Fundamentals of Molecular Evolution	

## BIO 146 Population Studies

The following courses are no longer offered, but may be used by students who completed them in fulfillment of this requirement: BIO102, 160A & 160B

- <sup>1</sup> Can replace STATS 191 Introduction to Applied Statistics or STATS 203 Introduction to Regression Models and Analysis of Variance from the major's Statistics core requirement.

## Mathematical and Computational Science Engineering Track (Option)

Students in the Engineering track take the introductory courses for the Mathematics and Computational Sciences major with the following allowable substitutions.

	Units
With consent of an MCS adviser, MATH 51, MATH 52, MATH 53 series may be substituted for CME 100, CME 102, CME 104. Depending on the exact material taught in relevant years, an additional math course may be necessary <sup>1</sup>	15
CME 100 Vector Calculus for Engineers	
CME 102 Ordinary Differential Equations for Engineers	
CME 104/ ENGR 155B Linear Algebra and Partial Differential Equations for Engineers	
STATS 116 may be replaced by:	3-5
STATS 110 Statistical Methods in Engineering and the Physical Sciences	
STATS 191/STATS 203 may be replaced by:	3-4
STATS 202 Data Mining and Analysis	
<b>Allowable Elective Course Substitutions:</b>	9
Select one of the following:	3-4
MATH 106 Functions of a Complex Variable	
MATH 108 Introduction to Combinatorics and Its Applications	
MATH 116 Complex Analysis	
PHIL 151 Metalogic	
Select two of the following:	3-5
ENGR 15 Dynamics	
ENGR 20 Introduction to Chemical Engineering	
ENGR 25B Biotechnology	
ENGR 30	
ENGR 40 Introductory Electronics	
ENGR 50 Introduction to Materials Science, Nanotechnology Emphasis	
ENGR 105 Feedback Control Design	

- <sup>1</sup> Only M&CS majors pursuing the engineering track may petition their adviser to substitute the required Math series for CME courses listed above.

## Mathematical and Computational Science Statistics Track (Option)

Students in the Statistics track take the introductory courses for the Mathematics and Computational Sciences major with the following additional courses - (87 units total)

Required:	Units
<b>Additional Courses for the Statistics Track:</b>	9
STATS 217 Introduction to Stochastic Processes I	
Advanced CS, such as:	3
CS 246 Mining Massive Data Sets	

Advanced MS&E, such as:	3
MS&E 220 Probabilistic Analysis	

or

MS&E 223 Simulation	
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**Allowable Elective Course Substitutions:** 9

Select three of the following:

STATS 202 Data Mining and Analysis	
STATS 206 Applied Multivariate Analysis	
STATS 207 Introduction to Time Series Analysis	
STATS 208 Introduction to the Bootstrap	
STATS 216 Introduction to Statistical Learning	
STATS 219 Stochastic Processes	
STATS 270 A Course in Bayesian Statistics	

### Honors Program

The honors program is designed to encourage a more intensive study of mathematical sciences than the B.S. program. Students interested in honors should consult with their adviser no later than winter quarter of their junior year to prepare their program of study. Honors work may be concentrated in fields such as biological sciences, environment, physics, etc. Students are required to submit an outline describing the concentration for honors work, including the courses they intend to use two quarters prior to expected degree conferral. An MCS Honors Proposal Form is due no later than the Preliminary Study List deadline of the quarter in which the degree is expected to be conferred.

In addition to meeting all requirements for the B.S., the student must:

- Maintain an average letter grade equivalent to at least a 3.5 in all academic work.
- Complete at least 15 units in mathematical sciences in addition to the requirements for the major listed above. Include in these 15 units at least one of the following:
  - An approved upper-level or graduate course
  - Participation in a small group seminar
  - At least 3 units of directed reading
- Prepare a statement describing major area of concentration for honors work.
- Describe how each course selected added to the student's knowledge and understanding in area chosen for concentration.
- Honors statement should be submitted to the adviser by the late application deadline of the student's graduation quarter using the MCS Honors Approval form (<https://mcs.stanford.edu/academics/honors>).

**Suggested electives for students pursuing Honors:**

CME 206 Introduction to Numerical Methods for Engineering	3
CS/STATS 229 Machine Learning	3-4
CS 248 Interactive Computer Graphics	3-4
EE 364A Convex Optimization I	3
MATH 171 Fundamental Concepts of Analysis	3
MATH 172 Lebesgue Integration and Fourier Analysis	3
MATH 205A Real Analysis	3
STATS 202 Data Mining and Analysis	3
STATS 216 Introduction to Statistical Learning	3
STATS 217 Introduction to Stochastic Processes I	2-3

### Minor in Mathematical and Computational Science

The minor in Mathematical and Computational Science is intended to provide an experience of the four constituent areas: Computer Science,

Mathematics, Management Science and Engineering, and Statistics. Five basic courses are required:

Select one of the following: **Units 3-5**

MATH 51 Linear Algebra and Differential Calculus of Several Variables	
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or

MATH 104 Applied Matrix Theory	
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Select two of the following: **10**

CS 106A Programming Methodology	
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and either

CS 106B Programming Abstractions	
or CS 106X Programming Abstractions (Accelerated)	

Select one of the following: **3-4**

MS&E 211 Introduction to Optimization	
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or

MS&E 221 Stochastic Modeling	
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Select two of the following: **8**

STATS 116 Theory of Probability	5
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and either

STATS 191 Introduction to Applied Statistics	
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or

STATS 200 Introduction to Statistical Inference	
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In addition to the above, the minor requires three courses from the following, two of which must be in different departments:

Select three of the following: **Units 9**

CME 108 Introduction to Scientific Computing	
CS 103 Mathematical Foundations of Computing	
CS 107 Computer Organization and Systems	
CS 154 Introduction to Automata and Complexity Theory	
CS 161 Design and Analysis of Algorithms	
ECON 160 Game Theory and Economic Applications	
EE 261 The Fourier Transform and Its Applications	
MS&E 211 Introduction to Optimization	
MS&E 212 Mathematical Programming and Combinatorial Optimization	
MS&E 221 Stochastic Modeling	
MS&E 251 Introduction to Stochastic Control with Applications	
MATH 104 Applied Matrix Theory	
MATH 106 Functions of a Complex Variable	
MATH 108 Introduction to Combinatorics and Its Applications	
MATH 109 Applied Group Theory	
MATH 110 Applied Number Theory and Field Theory	
MATH 115 Functions of a Real Variable	
MATH 131P Partial Differential Equations	
MATH 171 Fundamental Concepts of Analysis	
PHIL 151 Metalogic	
STATS 191 Introduction to Applied Statistics	
STATS 200 Introduction to Statistical Inference	
STATS 202 Data Mining and Analysis	
STATS 203 Introduction to Regression Models and Analysis of Variance	
STATS 217 Introduction to Stochastic Processes I	

Other upper-division courses appropriate to the program major may be substituted with consent of MCS program director. Undergraduate majors in the constituent programs may not count courses in their own departments.

## **Faculty**

*Director:* Bradley Efron

*Faculty Advisers:* Assistant Professor John Duchi, Professor Bradley Efron, Associate Professor Ramesh Johari, Associate Professor David Rogosa, Professor Chiara Sabatti

*Steering Committee:* Takeshi Amemiya (Economics, emeritus), Emmanuel Candès (Mathematics, Statistics), Brian Conrad (Mathematics), Richard Cottle (Management Science and Engineering, emeritus), John Duchi (Electrical Engineering & Statistics), Darrel Duffie (Economics & GSB), Bradley Efron (Statistics), Peter Glynn (Management Science and Engineering), Ramesh Johari (Management Science and Engineering), Percy Liang (Computer Science & Statistics), Parviz Moin (Mechanical Engineering), George Papanicolaou (Mathematics), Eric Roberts (Computer Science, emeritus), David Rogosa (Education & Statistics), Tim Roughgarden (Computer Science), Chiara Sabatti (Biomedical Data Science & Statistics), David Siegmund (Statistics), Jonathan Taylor (Statistics), Brian White (Mathematics)

# MATHEMATICS

Courses offered by the Department of Mathematics are listed under the subject code MATH on the Stanford Bulletin's ExploreCourses web site.

The Department of Mathematics offers programs leading to the degrees of Bachelor of Science, Master of Science, and Doctor of Philosophy in Mathematics, and also participates in the program leading to the B.S. in Mathematical and Computational Science, and the M.S. and Ph.D. degree programs offered through the Institute for Computational & Mathematical Engineering.

## Mission of the Undergraduate Program in Mathematics

The mission of the undergraduate program in Mathematics is to provide students with a broad understanding of mathematics encompassing logical reasoning, generalization, abstraction, and formal proof. Courses in the program teach students to create, analyze, and interpret mathematical models and to communicate sound arguments based on mathematical reasoning and careful data analysis. The mathematics degree prepares students for careers in the corporate sector, tech industry, government agencies, and for graduate programs in mathematics.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. problem solving skills,
2. the ability to formulate proofs and to structure mathematical arguments,
3. the ability to communicate mathematical ideas via extended written presentation.

## Advanced Placement in Mathematics

Students can receive units of advanced placement credit for single-variable calculus, depending on their scores on the CEEB Advanced Placement Examination or the IB Exam. See the "Advanced Placement (p. 36)" section of this bulletin.

Those who have not studied single-variable calculus or have studied it partially but are not ready to begin with multivariable calculus (MATH 50-series) should begin at the single-variable course recommended by the math placement diagnostic.

Students who are ready to study multivariable calculus (based on prior coursework or exams, or recommended by the math placement diagnostic) should begin with one of the following courses:

		Units
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
MATH 52	Integral Calculus of Several Variables	5
MATH 53	Ordinary Differential Equations with Linear Algebra	5

The above sequence supplies the necessary mathematics background for most majors in science and engineering. It also provides a solid foundation for the major or minor in Mathematics, or in Mathematical and Computational Science.

## Bachelor of Science in Mathematical and Computational Science

The Department of Mathematics participates with the departments of Computer Science, Management Science and Engineering, and Statistics in a program leading to a B.S. in Mathematical and Computational Science. See the "Mathematical and Computational Science (p. 648)" section of this bulletin.

## Introductory and Undergraduate Courses

The department offers a year-long sequence in single-variable calculus: MATH 19, MATH 20, and MATH 21.

There are three options for studying multivariable mathematics:

1. MATH 51, MATH 52, and MATH 53 cover differential and integral calculus in several variables, linear algebra, and ordinary differential equations. These topics are taught in an integrated fashion and emphasize applications. MATH 51 covers differential calculus in several variables and introduces matrix theory and basic linear algebra; MATH 52 covers integral calculus in several variables and vector analysis; MATH 53 studies further topics in linear algebra and applies them to ordinary differential equations. This sequence is strongly recommended for incoming freshmen who have mastered single-variable calculus.
2. The sequence MATH 61CM, MATH 62CM, and MATH 63CM (Modern Mathematics: Continuous Methods) covers the material of the Math 50 series at a much more advanced level with an emphasis on rigorous proofs and conceptual arguments.
3. The sequence MATH 61DM, MATH 62DM, and MATH 63DM (Modern Mathematics: Discrete Methods) covers the same linear algebra material as the Math 60CM series and otherwise focuses on topics in discrete mathematics, algebra, and probability theory at an advanced level with an emphasis on rigorous proofs.

## Learning Outcomes (Graduate)

The master's degree is conferred upon candidates who have developed advanced knowledge and skills in Mathematics. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Mathematics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Mathematics and to interpret and present the results of such research.

## Bachelor of Science in Mathematics

The following department requirements are in addition to the University's basic requirements for the bachelor's degree.

Students wishing to major in Mathematics must satisfy the following requirements and complete a minimum of 64 units:

1. Department of Mathematics courses totaling at least 49 units credit; such courses must be taken for a letter grade. For the purposes of this requirement, STATS 116 Theory of Probability, PHIL 151 Metalogic, and PHIL 152 Computability and Logic count as Department of Mathematics courses.
2. Additional courses taken from Department of Mathematics courses numbered 101 and above or from approved courses in other disciplines with significant mathematical content, totaling at least 15 units credit. At least 9 of these units must be taken for a letter grade.

- The Department of Mathematics adviser can be any member of the department's faculty.
- To receive the department's recommendation for graduation, a student must have been enrolled as a major in the Department of Mathematics for a minimum of two full quarters, including the quarter immediately before graduation.

Students with an Advanced Placement score of 5 in BC math may receive 10 units credit and fulfill requirement '1' by taking at least 39 units of Department of Mathematics courses. Students with an Advanced Placement score of at least 4 in BC math or 5 in AB math may receive 8 units credit and fulfill requirement '1' by taking at least 41 units of Department of Mathematics courses.

Sophomore seminar courses may be counted among the choice of courses under item '1'. Other variations of the course requirements laid down above (under items '1' and '2') may, in some circumstances, be allowed. For example, students transferring from other universities may be allowed credit for some courses completed before their arrival at Stanford. However, at least 24 units of the 49 units under item '1' above and 9 of the units under item '2' above must be taken at Stanford. In all cases, approval for variations in the degree requirements must be obtained from the department's Director of Undergraduate Studies. The policy of the Mathematics Department is that no courses other than the MATH 60 series and below may be double-counted toward any other University major or minor.

## Proof Writing

For students who are not experienced with writing mathematical proofs, this crucial skill can be learned by taking any one of the following courses: MATH 104 Applied Matrix Theory, MATH 110 Applied Number Theory and Field Theory, MATH 113 Linear Algebra and Matrix Theory, or MATH 115 Functions of a Real Variable (after finishing the chosen calculus sequence).

## Preparation for Graduate School:

It is to be emphasized that the above regulations are minimum requirements for the major; students contemplating graduate work in mathematics are strongly encouraged to include the courses MATH 116 Complex Analysis, MATH 120 Groups and Rings, MATH 121 Galois Theory, MATH 147 Differential Topology or MATH 148 Algebraic Topology, and MATH 171 Fundamental Concepts of Analysis in their selection of courses, and in addition, take at least three Department of Mathematics courses over and above the minimum requirements laid out under items '1' and '2' above, including at least one 200-level course. Such students are also encouraged to consider the possibility of taking the honors program.

## Sample Course Plans

To help develop a sense of the type of course selection (under items '1' and '2' above) that would be recommended for math majors with various backgrounds and interests, see the following examples. These represent only a few of a very large number of possible combinations of courses that could be taken in fulfillment of the Mathematics major requirements:

### Example 1: for students with both pure and applied interests

	Units
Single-variable calculus: AP Credit, (MATH 19, MATH 20, MATH 21) or 8-10 (MATH 41, MATH 42)	
Multivariable calculus: (MATH 51, MATH 52, MATH 53)	15
MATH 104 Applied Matrix Theory	3
or MATH 113 Linear Algebra and Matrix Theory	
MATH 106 Functions of a Complex Variable	3
MATH 109 Applied Group Theory	3
MATH 110 Applied Number Theory and Field Theory	3
MATH 115 Functions of a Real Variable	3

Plus any selection of at least eight of the following courses, including three Department of Mathematics courses:

MATH 107	Graph Theory
MATH 108	Introduction to Combinatorics and Its Applications
MATH 131P	Partial Differential Equations
MATH 143	Differential Geometry
MATH 146	Analysis on Manifolds
MATH 147	Differential Topology
MATH 148	Algebraic Topology
MATH 152	Elementary Theory of Numbers
MATH 161	Set Theory
CME 108	Introduction to Scientific Computing
ECON 50	Economic Analysis I
PHYSICS 41	Mechanics
PHYSICS 43	Electricity and Magnetism
PHYSICS 45	Light and Heat
STATS 116	Theory of Probability
or MATH 151	Introduction to Probability Theory

Total Units 64-66

The courses from other departments are only meant as examples; there are many suitable courses in several departments that can be taken to fulfill part or all of requirement '2'.

### Example 2: for students with strong theoretical interest and considering graduate school in math

	Units
Single-variable calculus: AP Credit, (MATH 19, MATH 20, MATH 21) or 8-10 (MATH 41, MATH 42)	
Select one of the following multivariable calculus sequences:	15
Math 50 Series: (MATH 51, MATH 52, MATH 53). These courses are not proof-oriented.	
Math 60CM Series: (MATH 61CM, MATH 62CM, MATH 63CM). This proof-oriented sequence is called Modern Mathematics: Continuous Methods	
Math 60DM Series: (MATH 61DM, MATH 62DM, MATH 63DM). This proof-oriented sequence is called Modern Mathematics: Discrete Methods	
MATH 101 Math Discovery Lab	3
MATH 106 Functions of a Complex Variable	3
or MATH 116 Complex Analysis	
MATH 113 Linear Algebra and Matrix Theory	3
MATH 120 Groups and Rings	3
MATH 171 Fundamental Concepts of Analysis	3
Plus 24-26 units of math courses numbered 121 or higher (the logic courses PHIL 151 and PHIL 152 are considered to be such courses), including at least one algebra course, one analysis course, and one geometry/topology course. (See the description of the honors program below)	26

Total Units 64-66

In addition, those contemplating eventual graduate work in Mathematics should consider including at least one graduate-level math course such as MATH 205A Real Analysis, MATH 210A Modern Algebra I, or MATH 215A Algebraic Topology or MATH 215B Differential Topology. Such students should also consider the possibility of entering the honors program.

**Example 3: for students interested in applied math**

Students desiring significant computational and/or financial and/or statistical components are encouraged to also consider the Mathematics and Computational Science program.

	<b>Units</b>
Single-variable calculus: AP Credit, (MATH 19, MATH 20, MATH 21) or 8-10 (MATH 41, MATH 42)	
Select one of the following multivariable calculus sequences:	15
Math 50 Series (MATH 51, MATH 52, MATH 53). These courses are not proof-oriented.	
Math 60 Series (MATH 61DM, MATH 62DM, MATH 63DM). This proof-oriented sequence is called Modern Mathematics: Discrete Methods	
MATH 104 Applied Matrix Theory	3
MATH 106 Functions of a Complex Variable	3
MATH 107 Graph Theory	3
MATH 108 Introduction to Combinatorics and Its Applications	3
MATH 109 Applied Group Theory	3
MATH 110 Applied Number Theory and Field Theory	3
MATH 115 Functions of a Real Variable	3
MATH 131P Partial Differential Equations	3
STATS 116 Theory of Probability	3
or MATH 151 Introduction to Probability Theory	
Plus at least 12 units of additional courses in applied mathematics, including, for example, suitable courses from the departments of Physics, Computer Science, Economics, Engineering, and Statistics.	14
<b>Total Units</b>	<b>64-66</b>

**Honors Program**

This option is intended for students who have strong theoretical interests and abilities in mathematics. The goal is to give students a thorough introduction to the main branches of mathematics. The honors program requires a senior thesis, which can involve either original research or expository work on advanced topics in mathematics. This option provides an excellent background with which to enter a Master's or Ph.D. program in Mathematics. Students completing the honors program are awarded a B.S. in Mathematics with Honors.

It is recommended that either sequence (MATH 61CM, MATH 62CM, MATH 63CM) or (MATH 61DM, MATH 62DM, MATH 63DM) be taken in the freshman year. To graduate with a B.S. in Mathematics with Honors, the following conditions apply in addition to the usual requirements for math majors:

- The selection of courses under items '1' and '2' above must contain:

MATH 106 Functions of a Complex Variable	3
or MATH 116 Complex Analysis	
MATH 120 Groups and Rings	3
MATH 171 Fundamental Concepts of Analysis	3

And must also include seven additional 3-unit Math courses numbered 121 or higher. (The logic courses PHIL 151 Metalogic and PHIL 152 Computability and Logic can also be used.) These seven courses must include at least:

One Algebra Course:	
MATH 121 Galois Theory	3
MATH 122 Modules and Group Representations	3
MATH 152 Elementary Theory of Numbers	3
MATH 154 Algebraic Number Theory	3

One Analysis Course:

MATH 136 Stochastic Processes	3
MATH 151 Introduction to Probability Theory	3
MATH 155 Analytic Number Theory	3
MATH 172 Lebesgue Integration and Fourier Analysis	3
MATH 173 Theory of Partial Differential Equations	3
MATH 175 Elementary Functional Analysis	3

One Geometry/Topology Course:

MATH 143 Differential Geometry	3
MATH 145 Algebraic Geometry	3
MATH 146 Analysis on Manifolds	3
MATH 147 Differential Topology	3
MATH 148 Algebraic Topology	3

- All courses counting towards the honors requirements (MATH 106/MATH 116, MATH 120, MATH 171, all 7 additional Math courses used to fulfill the major requirement, and MATH 197) must be taken for a letter grade.
- Students must have an average GPA of at least a 3.0 across all math classes counting towards the major at the time of applying for honors to be eligible for acceptance into the honors program, as well as upon graduation to graduate with honors.
- Majors interested in honors can apply in winter quarter of their junior year at the earliest, and no later than the last day of classes in the spring quarter of junior year.
- Students in the honors program must write a senior thesis. In order to facilitate this, the student must, by the end of the junior year, choose an undergraduate thesis adviser from the Department of Mathematics faculty and map out a concentrated reading program under the direction and guidance of the adviser. This will occur when the student applies for honors. During the senior year, the student must enroll in MATH 197 Senior Honors Thesis with his/her adviser for a total of 6 units (recommended to be spread over three quarters), and work toward completion of the thesis under the direction and guidance of the thesis adviser. The thesis may contain original material, or be a synthesis of work in current or recent research literature. The 6 units of credit for MATH 197 Senior Honors Thesis are required in addition to the 64 units required of the major. (See the major requirements at the top of the page.)
- The deadline for the senior thesis final draft is the Monday of week 8 of the student's graduation quarter.

In addition to the minimum requirements laid out above, it is strongly recommended that students take at least one graduate-level course (that is, at least one course in the 200 plus range). MATH 205A Real Analysis, MATH 210A Modern Algebra I, and MATH 215A Algebraic Topology or MATH 215B Differential Topology are especially recommended in this context.

Students with questions about the honors program should see the department's director of undergraduate studies.

**Computer Science Theory/Discrete Mathematics Subplan**

There are two pathways to achieve a Mathematics B.S. degree:

- The Mathematics bachelor's degree, or
- The Mathematics bachelor's degree with the Computer Science Theory/Discrete Mathematics subplan.

The following requirements refer to the Mathematics Bachelor's degree with the Computer Science Theory/Discrete Mathematics Subplan.



Students who are interested in the Mathematics Bachelor's degree should see the Bachelor's tab (p. 653).

Computer Science Theory/Discrete Mathematics subplan is declared on Axxes; they appear on the transcript and the diploma.

## Computer Science Theory/Discrete Mathematics Subplan Description

This subplan is intended for students wishing for a strong and deep background in the area of computer science theory and mathematics. The subplan could prepare students for graduate work in either area, as well as for other careers requiring particular strength in this type of thinking. The emphasis of this subplan is on theory. Students interested in a combination of mathematics and computer science more generally should consider the Bachelor of Science in Mathematical and Computational Science. Depending on their interests, students are also encouraged to consider the regular Mathematics major, the Computer Science major, and in particular, the Computer Science Theory track of the Computer Science major.

## Course Requirements

The subplan requires a minimum of 64 units as outlined in requirements 1 and 2 of the Bachelor of Science in Mathematics; see the Bachelor's tab (p. 653). The 64 units must include specific courses as outlined below. It is highly recommended to complete the MATH 60DM sequence, although it is not required.

### Required Courses

Required Math Courses		
MATH 106	Functions of a Complex Variable	3
or MATH 116	Complex Analysis	
MATH 120	Groups and Rings	3
MATH 171	Fundamental Concepts of Analysis	3
Required CS Theory Courses		
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 161	Design and Analysis of Algorithms	3-5
Additional Math Courses		
Two of the following:		6-8
MATH 61DM	Modern Mathematics: Discrete Methods	
MATH 107	Graph Theory	
MATH 108	Introduction to Combinatorics and Its Applications	
One of the following:		3-5
MATH 151	Introduction to Probability Theory	
MATH 230A	Theory of Probability I	
STATS 116	Theory of Probability	
Two of the following:		6
MATH 113	Linear Algebra and Matrix Theory	
MATH 152	Elementary Theory of Numbers	
MATH 154	Algebraic Number Theory	
MATH 155	Analytic Number Theory	
MATH 159	Discrete Probabilistic Methods	
MATH 161	Set Theory	
Additional CS Theory Courses:		
Four of the following:		12-13
CS 167		
CS 168	The Modern Algorithmic Toolbox	
CS 254	Computational Complexity	
CS 255	Introduction to Cryptography	
CS 261	Optimization and Algorithmic Paradigms	
CS 265	Randomized Algorithms and Probabilistic Analysis	

CS 268	Geometric Algorithms	
Total Units		42-50

## Minor in Mathematics

To qualify for the minor in Mathematics, a student should complete, for a letter grade, at least six Department of Mathematics courses numbered 51 or higher, totaling a minimum of 24 units. For the purposes of this requirement, STATS 116 Theory of Probability, PHIL 151 Metalogic, and PHIL 152 Computability and Logic count as Department of Mathematics courses. No other courses from outside the Department of Mathematics may be used towards the minor in Mathematics.

It is recommended that these courses include:

Math Minor		Units
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
or MATH 61CM	Modern Mathematics: Continuous Methods	
or MATH 61DM	Modern Mathematics: Discrete Methods	
MATH 52	Integral Calculus of Several Variables	5
or MATH 62CM	Modern Mathematics: Continuous Methods	
or MATH 62DM	Modern Mathematics: Discrete Methods	
MATH 53	Ordinary Differential Equations with Linear Algebra	5
or MATH 63CM	Modern Mathematics: Continuous Methods	
or MATH 63DM	Modern Mathematics: Discrete Methods	
Plus three additional MATH courses		9
Total Units		24

At least 12 of the units applied toward the minor in Mathematics must be taken at Stanford. The policy of the Mathematics Department is that no courses other than the MATH 50/60 series and below may be double-counted toward any other University major or minor.

## Master of Science in Mathematics

The University's basic requirements for the master's degree are discussed in the "Graduate Degrees (p. 50)" section of this bulletin. Students should pay particular attention to the University's course requirements for graduate degrees.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree

Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

The following are specific departmental requirements:

Candidates must complete an approved course program of 45 units of courses beyond the department requirements for the B.S. degree, of which at least 36 units must be Mathematics Department courses, taken for a letter grade. The Mathematics Department courses must include at least 18 units numbered 200 or above. The candidate must have a grade point average (GPA) of 3.0 (B) over all course work taken in Mathematics, and a GPA of 3.0 (B) in the 200-level courses considered separately. Course work for the M.S. degree must be approved during the first quarter of enrollment in the program by the department's Director of Graduate Studies.

The Financial Mathematics M.S. degree program is no longer offered through the School of Humanities and Sciences. The Institute for Computational and Mathematical Engineering (ICME (<https://icme.stanford.edu>)) now offers a master's degree track in Mathematical and Computational Finance (p. 303).

## Doctor of Philosophy in Mathematics

The University's basic requirements for the doctorate (residence, dissertation, examinations, etc.) are discussed in the "Graduate Degrees (p. 50)" section of this bulletin. The following are specific departmental requirements.

To be admitted to candidacy, the student must have successfully completed 27 units of graduate courses (that is, courses numbered 200 and above). In addition, the student must pass qualifying examinations given by the department.

Beyond the requirements for candidacy, the student must complete a course of study approved by the Graduate Affairs Committee of the Department of Mathematics and submit an acceptable dissertation. In accordance with University requirements, Ph.D. students must complete a total of 135 course units beyond the bachelor's degree. These courses should be Department of Mathematics courses or approved courses from other departments. The course program should display substantial breadth in mathematics outside the student's field of application. The student must receive a grade point average (GPA) of 3.0 (B) or better in courses used to satisfy the Ph.D. requirement. In addition, the student must pass the Department area examination and the University oral examination.

Experience in teaching is emphasized in the Ph.D. program. Each student is required to complete nine quarters of such experience. The nature of the teaching assignment for each of those quarters is determined by the department in consultation with the student. Typical assignments include teaching or assisting in teaching an undergraduate course or lecturing in an advanced seminar.

For further information concerning degree programs, fellowships, and assistantships, inquire of the department's student services office.

## Ph.D. Minor in Mathematics

Requirements for the Ph.D. Minor in Mathematics are:

		Units
Complete both of the following Sequences: <sup>1,2</sup>		
<b>Sequence 1</b>		
MATH 106	Functions of a Complex Variable	3
or MATH 116	Complex Analysis	
MATH 131P	Partial Differential Equations	3
MATH 132		

<b>Sequence 2</b>		
MATH 113	Linear Algebra and Matrix Theory	3
MATH 120	Groups and Rings	3
or MATH 152	Elementary Theory of Numbers	
<b>Additional Courses</b>		
21 units of 200-level MATH courses <sup>3</sup>		21
<b>Total Units</b>		<b>33</b>

- <sup>1</sup> The 100-level courses may have been completed during undergraduate study, and their equivalents from other universities are acceptable.
- <sup>2</sup> A third coherent sequence designed by the student, subject to the approval of the graduate committee, may be considered as a substitute for Sequence 1 or 2.
- <sup>3</sup> The 200-level courses must be taken at Stanford and approved by the Department of Mathematics Ph.D. minor adviser.

*Emeriti:* Gregory Brumfiel, Gunnar Carlsson, Robert Finn, Yitzhak Katznelson, Harold Levine, Tai-Ping Liu, R. James Milgram, Donald Ornstein, Richard Schoen, Leon Simon

*Chair:* Eleny Ionel

*Professors:* Daniel Bump, Emmanuel Candès, Sourav Chatterjee, Ralph L. Cohen, Brian Conrad, Amir Dembo, Persi Diaconis (on leave Winter), Yakov Eliashberg, Jacob Fox, Søren Galatius, Eleny Ionel, Steven Kerckhoff (on leave Winter), Jun Li (on leave Autumn), Rafe Mazzeo, George Papanicolaou (on leave Spring), Lenya Ryzhik, Kannan Soundararajan, Ravi Vakil, András Vasy (on leave), Akshay Venkatesh (on leave), Brian White, Lexing Ying

*Professor (Teaching):* Tadashi Tokieda

*Associate Professor:* Jan Vondrák

*Assistant Professors:* Thomas Church, Jonathan Luk

*Acting Assistant Professor:* Alex Wright

*Courtesy Professors:* Moses Charikar, Renata Kallosh

*Adjunct Professors:* Brian Conrey, David Hoffman

*Szegő Assistant Professors:* Laura Fredrickson, Or Hershkovits, Vladimir Kazeev, Michael Kemeny, Frederick Manners, Christopher Ohrt, Cheng-Chiang Tsai, Jennifer Wilson, Xuwen Zhu

*Visiting Assistant Professor:* Stefan Müller

*Senior Lecturer:* Mark Lucianovic

*Lecturers:* Susie Kimport, George Schaeffer, Wojciech Wieczorek

# MEDIEVAL STUDIES

Stanford Center for Medieval and Early Modern Studies (CMEMS) is a multidisciplinary community working together to produce new perspectives on medieval and early modern studies. The mission of CMEMS is to promote innovative research and foster a lively dialogue among faculty, students, librarians, and research affiliates, to rethink the nature of the field across time, space, and disciplinary boundaries, and to explore the significance of these earlier periods for our understanding of today's world.

There are a number of programs and courses related to medieval and early modern studies. To learn more, see the center's web site (<http://cmems.stanford.edu>).

The Division of Literatures, Cultures, and Languages (p. 482) offers a Medieval Studies minor.

## Minor in Medieval Studies

Faculty Director: Marisa Galvez

The Division of Literatures, Cultures, and Languages offers an undergraduate minor in Medieval Studies. The minor in Medieval Studies:

- provides Stanford students with the historical knowledge and framework through which to view globalism;
- embeds the study of medieval culture in a coherent framework that resonates with contemporary issues of community building, the virtual world and mobility;
- and promotes an innovative cross-disciplinary and skill-based approach to Medieval Studies.

Students in any field qualify for the minor by meeting the following requirements:

Students complete a total of 25 units (including a core course) and 6 courses relevant to the major in departments across the University including, but not restricted to, English, East Asian Studies, History, Religious Studies, Music, and DLCL courses (Comparative Literature, German, French, Italian, Iberian and Latin American Cultures, and Slavic Languages and Literatures), and Classics.

One of the following three introductory core courses is required to be taken for 5 units. The core courses are offered on a regular basis by faculty across the University.

		Units
FRENCH 205	Songs of Love and War: Gender, Crusade, Politics (Counts as DLCL 121)	3-5
DLCL 122	Medieval Manuscripts, Digital Methodologies	3-5
HISTORY 115D	Europe in the Middle Ages, 300-1500 (Counts as DLCL 123)	3-5

Electives may be selected from a large number of offerings in a variety of disciplines according to student interests, but they must follow a coherent course of study. This course of study must be approved by the faculty director. Up to 5 units may be taken in a medieval language, such as (but not limited to) Old English, Old Norse, Medieval Latin, Old French, Middle High German, Classical Arabic. No transfer credit may be used toward the Medieval Studies minor. Appropriate courses offered through BOSP may count toward this minor.

Course work in this minor may not duplicate work counted toward other majors or minors. Advanced placement credit and transfer credit do not apply to this minor. All courses must be taken for a letter grade. By

University policy, no more than 36 units may be required in this minor. Students declare the Minor in Medieval Studies through Axess.

*Affiliated Faculty:* Cécile Alduy (French and Italian), Ted Andersson (German Studies, Emeritus) Jean Marie Apostolidès (French and Italian, Emeritus), Keith Baker (History), Vincent Barletta (Iberian and Latin American Cultures and Comparative Literature), Shahzad Bashir (Religious Studies), John Bender (English), Karol Berger (Music), Carl Bielefeldt (Religious Studies), George H. Brown (English, Emeritus), Steven Carter (East Asian Languages and Cultures), Terry Castle (English), Giovanna Ceserani (Classics), Carolyn Lougee Chappell (History), David Como (History), Graciela De Pierris (Philosophy) Dan Edelstein (French and Italian) Ronald Egan (Asian Languages), Fiona Griffiths (History), Paula Findlen (History), Charlotte Fonrobert (Religious Studies), James Fox (Anthropology), Michael Friedman (Philosophy), Marisa Galvez (Co-Director, CMEMS, French and Italian), Hester Gelber (Religious Studies), Denise Gigante (English), Roland Greene (Comparative Literature and English) Avner Greif (Economics), Fiona Griffiths (Co-Director, CMEMS, History) Hans Ulrich Gumbrecht (Comparative Literature and French and Italian), Heather Hadlock (Music), Morten Steen Hansen (Art and Art History), Paul Harrison (Religious Studies), Robert Harrison (French and Italian), Tamar Herzog (History), Blair Hoxby (English), Michelle Karnes (English), Amalis Kessler (Law School), Alexander Key (Comparative Literature), Nancy S. Kollmann (History), Mark E. Lewis (History), David Lummus (French and Italian), Ivan Lupic (English), William Mahrt (Music), Michael Marrinan (Art and Art History), Reviel Netz (Classics), Stephen Orgel (English), David Palumbo-Liu (Comparative Literature) Grant Parker (Classics) Patricia Parker (English), Bissera Pentcheva (Art and Art History), Jack Rakove (History), Jessica Riskin (History), Ian Robertson (Anthropology) Orrin W. Robinson (German Studies, Emeritus), David Riggs (English, Emeritus), Jesse Rodin (Music), Nancy Ruttenburg (English), Behnam Sadeki (Religious Studies), Londa Schiebinger (History), Krish Seetah (Anthropology), Matthew Sommer (History), Carolyn Springer (French and Italian), Kathryn Starkey (German Studies), Laura Stokes (History), Melinda Takeuchi (East Asian Languages and Cultures) Elaine Treharne (English), Blakey Vermuele (English), Richare Vinograd (Art and Art History), Richared White (History), Karen Wigen (History), Caroline Winterer (History), Bryan Wolf (Art and Art History), Allen Wood (Philosophy), Ali Yaycioglu (History), Lee H. Yearley (Religious Studies), Yiqun Zhou (East Asian Languages and Cultures)

# MODERN THOUGHT AND LITERATURE

Courses offered by the Program in Modern Thought and Literature are listed under the subject code MTL on the Stanford Bulletin's ExploreCourses web site.

The program in Modern Thought and Literature admits students for the Ph.D. and a limited number for a coterminal B.A./M.A. Program.

## Graduate Programs in Modern Thought and Literature

Modern Thought and Literature (MTL) is an interdisciplinary humanities graduate program advancing the study of critical issues in the modern world. Since 1971, MTL students have helped to redefine the cutting edge of many interdisciplinary fields and to reshape the ways in which disciplinary scholarship is understood and practiced. MTL graduates are leaders in fields such as American studies, ethnic studies, film studies, social and cultural studies, and women's studies, as well as English and comparative literature.

The program trains students to understand the histories and methods of disciplines and to test their assumptions. It considers how disciplines shape knowledge and, most importantly, how interdisciplinary methods reshape objects of study. MTL students produce innovative analyses of diverse texts, forms, and practices, including those of literature, history, philosophy, anthropology, law, and science; film, visual arts, popular culture, and performance; and material culture and technology.

Each student constructs a unique program of study suited to his or her research. Students have focused on such areas as gender and sexuality; race and ethnicity; science, technology, and medicine; media and performance; legal studies; and critical and social theory. The program's affiliated faculty is drawn from fields throughout the humanities and humanistic social sciences, as well as from education and law. As interdisciplinary study is impossible without an understanding of the disciplines under consideration, each student is expected to master the methods of literary analysis and to gain a foundation in a second field or discipline.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in interdisciplinary literary studies and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in interdisciplinary literary studies. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of interdisciplinary literary studies and to interpret and present the results of such research.

## Master of Arts

The Master of Arts is available to students who are admitted to the doctoral program and have not been awarded an M.A. previously. Students are not admitted into the program for the purpose of earning a terminal Master of Arts degree. Candidates for the Ph.D. who satisfy the committee of their progress and satisfactorily complete 45 units of course work forming a coherent program of study, may apply for an M.A. in Modern Thought and Literature.

## Coterminal Master's Program in Modern Thought and Literature

Each year, one or two undergraduates who are exceptionally well prepared in literature and whose undergraduate course work includes a strong interdisciplinary component, may petition to be admitted to the program for the purpose of completing a coterminal M.A. degree. Admission to this program is granted only on condition that in the course of working on their master's degrees they do not apply to enter the Ph.D. program in Modern Thought and Literature. The deadline for application is February 15 or the first business day following, if the 15th falls on a weekend or holiday.

To apply, applicants submit:

1. An unofficial grade transcript from Axess.
2. An Application for Admission to Coterminal Masters' Program (<http://registrar.stanford.edu/pdf/CotermApplic.pdf>).
3. A statement giving the reasons the student wishes to pursue this program and its place in his or her future plans. This statement should pay particular attention to the reasons why the student could not pursue the studies he or she desires in some other way.
4. An initial plan of study listing, quarter by quarter, each course by name, units, and instructor, to be taken in order to fulfill the requirements for the degree for a total of 45 units, including at least 20 units of advanced work in one literature, and at least 20 units of advanced work in a coherent interdisciplinary program of courses taken in non-literature departments. Students may include appropriate coursework taken during the two quarters prior to the quarter of expected matriculation in the program. Except in unusual cases, this will mean courses taken in the autumn and winter quarters of the year of application for admission. (Changes in the course list are to be expected.)
5. A writing sample of critical or analytical prose, 20 pages maximum.
6. Two letters of recommendation from members of the faculty who know the applicant well and who can speak directly to the question of his or her ability to do graduate-level work.
7. A designated adviser from among the Stanford faculty; normally one letter of recommendation will be from this faculty member.

## University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken two quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Degree Requirements

The candidate for the M.A. must complete at least 45 units of graduate work, to be divided in the following manner:

1. The introductory seminar, MTL 334A Concepts of Modernity I: Philosophical Foundations, 5 units; in the event of a scheduling conflict students may substitute MTL 334B Concepts of Modernity II: Culture, Aesthetics, and Society in the Age of Globalization, with the director's prior permission.
2. At least 20 units of advanced course work in literature, to be approved by the director.
3. At least 20 units of advanced course work in a coherent and individually arranged interdisciplinary program, to be approved by the director.

## Doctor of Philosophy in Modern Thought and Literature

University requirements for the Ph.D. are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

A candidate for the Ph.D. degree in Modern Thought and Literature must complete three years (nine quarters) of full-time work, or the equivalent, in graduate study beyond the B.A. degree. He or she is expected to complete at least 18 courses of graduate work in addition to the dissertation. Students may spend one year of graduate study abroad.

Requirements for the Ph.D. in Modern Thought and Literature are:

1.
 

MTL 334A	Concepts of Modernity I: Philosophical Foundations	5
MTL 334B	Concepts of Modernity II: Culture, Aesthetics, and Society in the Age of Globalization (Offered in 2016-17 as MTL 334)	5
MTL 299	Edgework: New Directions in the Study of Culture (Spring Quarter; required of all first-year students)	1-3
2. A coherent program of eight courses of advanced work in literary studies to be worked out with the adviser, of which at least six must be regularly scheduled courses in literature. Courses in the teaching of composition, independent study, or thesis registration may not be counted among these six courses; ENGLISH 396L Pedagogy Seminar I, MTL 399 Reading for Orals, MTL 802 TGR Dissertation may not be counted toward these requirements under any circumstances. Petitions to modify this requirement to substitute a course from a non-literature department for one or more of the required eight literature courses must be approved by the MTL Committee in Charge.
3. Eight courses of advanced work in non-literature departments, the core of which is completion of either a departmental minor or an interdepartmental concentration, typically consisting of six courses. Departmental minors are available from the departments of Anthropology, Art and Art History, Communication, History, Philosophy, Political Science, Religious Studies, and Sociology (see the relevant information in those sections of this bulletin). Individually designed concentrations may be approved by petition to the director. In addition to the required six courses in a minor or a concentration, two additional courses from non-literature departments are chosen in consultation with the student's academic adviser. At the end of the first year, each student must submit to the director a preliminary statement of approximately 1500 words outlining the scope and coherence of the interdisciplinary focus, either as it relates to the departmental minor or to the interdepartmental concentration. In either case, the student should note the relevance of any proposed coursework to the overall

program (see #7 below). Course restrictions noted above in item 2 also apply.

4. *Qualifying Paper*: This certifies that students are likely to be able to undertake the quality of research, sustained argumentation, and cogent writing demanded in a doctoral dissertation. The qualifying paper must be a substantial revision of a seminar paper written at Stanford during the first year and should embody a substantial amount of independent research, develop an intellectual argument with significant elements of original thinking, and demonstrate the ability to do interdisciplinary work. Each paper is evaluated by two or three readers (designated before the end of the first year of graduate study), one of whom must be a member of the Committee in Charge or have been a member within the previous five years. Qualifying papers must be submitted to the program office no later than the end of the third week of the fifth quarter of enrollment, normally, Winter Quarter of the second year.
5. *Teaching* is an essential part of the program. One quarter is normally undertaken in conjunction with the Department of English. The second quarter may be undertaken in conjunction with any department or program within the university.
6. Students must demonstrate, by the end of the third quarter of the first year, a reading knowledge of one foreign language and, by the beginning of the first quarter of the third year, a reading knowledge of one other foreign language. Reading knowledge means the ability to make a genuine scholarly use of the language: that is, to read prose of ordinary difficulty. Students may not take the University oral examination before completion of the foreign language requirement.
7. *Candidacy*: At the end of the second year, students apply for candidacy. The decision to advance a student to candidacy is a judgment of the faculty. The student is only admitted to candidacy if, in addition to the student's fulfilling departmental prerequisites, the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. The following qualifications are required before candidacy can be certified:
  - the earlier submission of a satisfactory qualifying paper;
  - demonstration of a reading knowledge of one foreign language;
  - satisfactory progress in course work;
  - a list of courses applicable to the degree, distinguishing between courses appropriate to the literary component and courses appropriate to the non-literary component;
  - designation of a departmental minor or an interdisciplinary concentration; and,
  - the submission of a statement outlining the scope and coherence of the interdisciplinary component of the program in relation to the literary component, and noting the relevance of the course work to that program.
8. *Annual Review*: The program and progress of each student must be approved by the Committee in Charge at the end of each academic year. First-year students will submit the preliminary interdisciplinary statement along with the first year-end report (see #3 above).
9. *University Oral Examination*: This examination, covering the student's areas of concentration, is normally taken in the third year of graduate study. It is a two-hour oral examination administered by four faculty members specializing in the student's areas of concentration, and a chair from another department. The exam is based on a substantial reading list prepared by the student in conjunction with the faculty committee and designed to cover the areas of expertise pertinent to the student's dissertation project.
10. *Dissertation Proposal and Colloquium*: Within one quarter after the University oral examination, the student writes up the dissertation proposal. The recommended length for the dissertation proposal is 5 pages double-spaced (with a maximum length of 8 pages). It should contain (additionally) a full bibliography. The proposal is submitted to the program director and the dissertation committee for approval.

### Units

After completion of the first chapter of the dissertation, the student sets up a meeting with the dissertation committee for one hour to discuss the work accomplished in the first chapter and plans for completing the rest of the dissertation.

11. *Dissertation*: The fourth and fifth years are devoted to the dissertation, which should be a substantial and original contribution acceptable to the Committee in Charge of Modern Thought and Literature. The subject is drawn from the literature of specialization and the area of nonliterary studies. The dissertation project will conclude with a two-hour defense. The first hour is open to the public and includes a brief presentation of the dissertation project on the part of the Ph.D. candidate. The second hour is reserved to the candidate and his/her Dissertation Committee.

## Ph.D. Minor in Feminist, Gender, and Sexuality Studies

The Program in Modern Thought and Literature sponsors a Ph.D. minor in Feminist, Gender, and Sexuality Studies. The Ph.D. minor is administered by the Program in Feminist, Gender, and Sexuality Studies. (p. 534)

*Director*: Michele Elam

*Committee in Charge*: Shelley Fisher Fishkin, Héctor Hoyos, Alvan Ikoku, Marci Kwon, Bernadette Meyler, Vaughn Rasberry, Thomas Mullaney, Karla Oeler, José David Saldívar

*Affiliated Faculty*: Lanier Anderson (*Philosophy*), Russell Berman (*German Studies*), Jennifer Brody (*Theater & Performance Studies*), Scott Bukatman (*Art & Art History*), Gordon Chang (*History*), Adrian Daub (*German Studies*), Jean-Pierre Dupuy (*French & Italian*), Paulla Ebron (*Anthropology*), Harry Elam (*Theater & Performance Studies*), Michele Elam (*English*), Amir Eshel (*German Studies, Comparative Literature*), Shelley Fisher Fishkin (*English*), Zephyr Frank (*History*), Estelle Freedman (*History*), Duana Fullwiley (*Anthropology*), Thomas Hansen (*Anthropology*), David Hills (*Philosophy*), Héctor Hoyos (*Iberian & Latin American Cultures*), Alvan Ikoku (*Comparative Literature*), Lochlain Jain (*Anthropology*), Tomas Jimenez (*Sociology*), Matthew Kohrman (*Anthropology*), Charles Kronengold (*Music*), Aishwary Kumar (*History*), Marci Kwon (*Art & Art History*), Joshua Landy (*French & Italian, Comparative Literature*), Pavle Levi (*Art & Art History*), Marilia Librandi-Rocha (*Iberian and Latin American Cultures*), Helen Longino (*Philosophy*), Douglas McAdam (*Sociology*), Mark McGurl (*English*), Alison McQueen (*Political Science*), Jisha Menon (*Theater & Performance Studies*), Lynn Meskell (*Anthropology*), Paula Moya (*English*), Thomas Mullaney (*History*), Alex Nemerov (*Art & Art History*), David Palumbo-Liu (*Comparative Literature*), Peggy Phelan (*Theater & Performance Studies*), Robert Proctor (*History*), Vaughn Rasberry (*English*), Robert Reich (*Political Science*), Jessica Riskin (*History*), José David Saldívar (*Comparative Literature*), Ramón Saldívar (*English, Comparative Literature*), Londa Schiebinger (*History*), Sharika Thiranagama (*Anthropology*), Fred Turner (*Communication*), Ban Wang (*East Asian Languages and Cultures*), Richard White (*History*), Gail Wight (*Art & Art History*), Alex Woloch (*English*)

# MUSIC

Courses offered by the Department of Music are listed under the subject code MUSIC on the Stanford Bulletin's ExploreCourses web site.

## Mission of the Department of Music

The Department of Music promotes the practice, understanding and enjoyment of music in the University, offering a broad array of educational opportunities with specialization in composition, performance, musicology, ethnomusicology, and music technology.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. select and outline a topic in tonal music analysis; choose methodologies for the explication of the topic.
2. demonstrate understanding of the underlying principles of tonal music analysis through the use of scholarly references and analytical tools and methodologies.
3. utilize primary source materials in written and oral presentations.
4. utilize secondary source materials in written and oral presentations.
5. demonstrate proficiency in academic writing on the subject of tonal music.
6. develop the skills to present a musical analysis to an audience.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Music, including concentration in the fields of Composition, Music History, Computer-Based Music Theory and Acoustics, or Music, Science, and Technology, and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge and practice of Music and to interpret and present the results of such work in appropriate venues and publications.

The Doctor of Philosophy (Ph.D.) is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in either Musicology or Computer-Based Music Theory and Acoustics, based at the Center for Computer Research in Music and Acoustics (CCRMA).

The Doctor of Musical Arts (D.M.A.) in Composition is conferred upon candidates who have demonstrated substantial abilities in creating new musical works as demonstrated by their completed works under the supervision of composition faculty.

## Bachelor of Arts in Music

The undergraduate major in Music is built around a series of foundational courses in theory, musicianship, and music history in addition to performance and the proficiency requirements outlined below. Majors must complete 68 units within the department to meet the general requirements for a Bachelor of Arts in Music, or 63 units for Bachelor of Arts in Music with a Concentration in Music, Science, and Technology. All required courses for the B.A. in Music must be taken for a letter grade, as must all courses taken toward concentration requirements. Electives may be taken credit/no credit.

## Suggested Preparation for the Major

Students should allow more than two years for completion of the major, in part because of sequential courses with prerequisite requirements. Early planning is especially important for students who plan to double-major, study abroad or pursue any of the concentrations described below. Music majors should attempt to complete MUSIC 21 Elements of Music I, MUSIC 22 Elements of Music II, and MUSIC 23 Elements of Music III in their freshman year; the series should be completed no later than Autumn Quarter of their junior year. It is recommended that majors complete MUSIC 40 Music History to 1600, MUSIC 41 Music History 1600-1830, and MUSIC 42 Music History Since 1830 in their sophomore year; the series should be completed by the end of their junior year.

Suggested Preparatory Course:		Units
MUSIC 19A	Introduction to Music Theory	3
MUSIC 19B	Intermediate Music Theory	3

## Fields of Study or Degree Options

### Concentrations

Concentrations (subplans) are offered in five areas: Performance; Conducting; Composition; History, Theory and Ethnomusicology; and Music, Science, and Technology. Subplans are declared in Axxess, and appear on the student's transcript and diploma. Guidelines and application information are explained the "Declare a Concentration (<https://music.stanford.edu/academic-programs/undergraduate/current-undergraduates/major/declare-concentration>)" pages of the department website. In order to complete requirements in a timely manner, students are urged to select this option no later than the end of the junior year for single-area concentrators and the middle of the sophomore year for multiple-area concentrators. Students pursuing multiple concentrations must fulfill all the requirements of each. Requests to declare a concentration must be approved by the undergraduate student services officer in Music.

### Departmental Honors

Honors in Music are awarded by the faculty to majors who have produced an independent project of exceptional quality through the concentration program. Students who wish to pursue honors must declare their concentration(s) by May 31 of their junior year (see the undergraduate student services officer for concentration-specific requirements). To receive honors, students must also have earned an overall GPA of 3.6 or higher and a GPA of 3.7 or higher in courses required for the Music major. Honors are conferred solely through faculty adjudication. For students concentrating in multiple areas, a single jury will be convened.

## Degree Requirements

Prospective majors are required to choose a faculty adviser and submit a course plan. (Course plans and adviser agreement forms are available from the undergraduate student services officer.) It is recommended that students schedule a consultation meeting with the undergraduate student services officer as early as possible to plan a program of study.

### Required Courses

The following courses are required of all majors.

#### 1. Theory

		Units
MUSIC 21	Elements of Music I	3
MUSIC 22	Elements of Music II	3
MUSIC 23	Elements of Music III	3
MUSIC 24A	Ear Training I	1
MUSIC 24B	Ear Training II	1
MUSIC 24C	Ear Training III	1

Students enrolled in 21, 22, or 23 must concurrently enroll in an ear-training and musicianship lab, MUSIC 24A, 24B, or 24C.

**Additional Music Theory Requirements**

- *Piano Proficiency:* Majors are required to pass a piano proficiency examination as part of the music theory core (MUSIC 21 Elements of Music I, MUSIC 22 Elements of Music II, MUSIC 23 Elements of Music III). The examination is given in the first two weeks of MUSIC 21. Students who do not pass the piano proficiency examination are required to enroll in either MUSIC 12A Introductory Piano Class, MUSIC 12B Introductory Piano Class, or MUSIC 12C Introductory Piano Class concurrently with the music theory core until they are able to pass the examination. The examination consists of scales and arpeggios, performance of a simple tune to be set by the examiner, sight-reading, and the performance of prepared pieces. Download additional information regarding the proficiency examination ([http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/music/pianoprofexaminfo\\_0.pdf](http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/music/pianoprofexaminfo_0.pdf)).
- *Ear Training Elective:* In addition to the theory requirements listed above, majors must successfully complete one unit of an ear training elective course from the list below:

		Units
MUSIC 65A	Voice Class I	1
MUSIC 126	Introduction to Thoroughbass	1-3
MUSIC 127	Instrumentation and Orchestration	3
Or any course, upon approval from Ear Training Advisor		

- *Ear Training Exit Exam:* in conjunction with the music theory series, majors are required to pass an aural skills proficiency examination administered at the end of their junior year. This assesses the ability to transcribe, represent, and reproduce music vocally and at the keyboard, and must be passed before June of the senior year.

**2. History**

		Units
MUSIC 40	Music History to 1600	4
MUSIC 41	Music History 1600-1830	4
MUSIC 42	Music History Since 1830	4

**3. Analysis**

		Units
MUSIC 122A	Counterpoint	4
MUSIC 122B	Analysis of Tonal Music	4
MUSIC 122C	Introduction to 20th-Century Composition	4

**4. Writing in the Major (WIM)**

Select three courses, including at least two at the 4-unit level, as follows:

**One course numbered 140, 141, or 142**

- MUSIC 140: Studies in Music of the Middle Ages  
Pre- or corequisites for WIM credit: MUSIC 21, MUSIC 40\*
- MUSIC 141: Studies in Music of the Renaissance  
Pre- or corequisites for WIM credit: MUSIC 21, MUSIC 40\*
- MUSIC 142: Studies in Music of the Baroque  
Pre- or corequisites for WIM credit: MUSIC 22, MUSIC 41\*

**One course numbered 143, 144, or 145**

- MUSIC 143: Studies in Music of the Classical Period  
Pre- or corequisites for WIM credit: MUSIC 22, MUSIC 41\*
- MUSIC 144: Studies in Music of the Romantic Period  
Pre- or corequisites for WIM credit: MUSIC 23, MUSIC 42\*
- MUSIC 145: Studies in Western Art Music Since 1900

Pre- or corequisites for WIM credit: MUSIC 23, MUSIC 42\*

**One course, numbered 146, 147, 148, or 251**

- MUSIC 146: Studies in Ethnomusicology  
Pre- or corequisites for WIM credit: MUSIC 22\*
- MUSIC 147: Studies in Music, Media, and Popular Culture  
Pre- or corequisites for WIM credit: MUSIC 22\*
- MUSIC 148: Studies in Performance Practice  
Pre- or corequisites for WIM credit: MUSIC 22\*
- MUSIC 251: Psychophysics and Music Cognition

\*For complete enrollment requirements, consult the course description in the "ExploreCourses (<http://explorecourses.stanford.edu>)" section of this bulletin.

**5. Applied**

- A minimum of five quarters totaling 15 units of private instruction in instrumental and/or vocal performance (MUSIC 172/272-177/277). Students who do not qualify for private instruction at the intermediate or advanced level, but who wish to pursue the major may take introductory voice (MUSIC 65A Voice Class I and MUSIC 73 Intermediate Voice Class), piano (MUSIC 12A Introductory Piano Class and MUSIC 72A Intermediate Piano Class), or guitar (MUSIC 74C Classical Guitar Class) to reach the minimum proficiency levels required to be accepted into a private studio and then complete their five quarters. Requirements for the minimum levels of proficiency in each instrument for private instruction are posted at: <http://music.stanford.edu/ensembles-lessons/lessons>.
- A minimum of five quarters totaling at least 5 units in one or more of the department's performance organizations or chamber groups. To fulfill the ensemble requirement, Music majors need at least three quarters of participation in the department's traditional large ensembles (MUSIC 159–167), with the exception of students whose primary instrument is guitar, harp, or keyboard, who need to participate at least one quarter in the ensembles above, but who may fulfill the rest of the requirement with chamber music (MUSIC 171 Chamber Music). MUSIC 156 "sic": Improvisation Collective may count for up to two of the ensemble-unit requirements for the Music major.

Note—The following courses do not satisfy this requirement:

		Units	Units
MUSIC 128	Stanford Laptop Orchestra: Composition, Coding, and Performance	1-5	
MUSIC 160B	Stanford New Ensemble		1
MUSIC 161D	Stanford Brass Ensemble		1
MUSIC 161C	(no longer offered)		1

**Concentration Requirements**

**A. Concentration in Performance**

In addition to the degree requirements for the general Music major described above, students in the Performance concentration must:

1. Complete at least 6 additional units for a letter grade in one area of performance. Acceptable courses are described under "Applied" in the section describing private instruction and ensemble course work above. Additional courses might include but are not limited to:

		Units
MUSIC 126	Introduction to Thoroughbass	1-3
MUSIC 154	History of Electronic Music	1-5
MUSIC 182	Diction for Singers	1
MUSIC 183A	German Art Song Interpretation	1
MUSIC 183B	French Art Song Interpretation	1
MUSIC 184A	Editing and Performing Early Music	1-3



MUSIC 184B	Topics in Opera Stagecraft	1-3
MUSIC 269	Research in Performance Practices	1-5

- Register for an independent project (MUSIC 198 Concentrations Project, 4 units) in the senior year under faculty supervision, leading to a faculty adjudicated senior recital with a writing component. In preparation for their senior recital, students should refer to the Recitals-at-a-Glance planning page (<https://sites.stanford.edu/music-dept/venues-spaces/reserve/recitals>) for calendar links and reservation deadlines.

### B. Concentration in Conducting

In addition to the degree requirements for the general Music major described above, students in the Conducting concentration must:

- Complete at least 6 additional units for a letter grade in conducting. Additional courses might include, but are not limited to:

MUSIC 127	Instrumentation and Orchestration	3
MUSIC 130A	Introduction to Conducting	3
MUSIC 130B	Elementary Orchestral Conducting	3
MUSIC 130C	Elementary Choral Conducting	3
MUSIC 230	Advanced Orchestral Conducting	2-4
MUSIC 231	Advanced Choral Conducting	2-4

- Register for an independent project (MUSIC 198 Concentrations Project, 4 units) in the senior year under faculty supervision, leading to a senior conducting project.

In preparation for their senior recital, students should refer to the Recitals-at-a-Glance planning page (<https://sites.stanford.edu/music-dept/venues-spaces/reserve/recitals>) for calendar links and reservation deadlines.

### C. Concentration in Composition

In addition to the degree requirements for the general Music major described above, students in the Composition concentration must:

- Complete MUSIC 127 Instrumentation and Orchestration and at least 2 quarters of individual study in MUSIC 125 Individual Undergraduate Projects in Composition. These may count as 3 of the 5 quarters of required applied music classes for the major. (The remaining two quarters of applied music must be taken in an instrumental or vocal area, as defined in the requirements for the music major.)
- Complete MUSIC 123A Undergraduate Seminar in Composition: Rhythmic Design and MUSIC 123B Undergraduate Seminar in Composition: Pitch Design.
- Complete at least 4 additional units for a letter grade in composition. Additional courses might include, but are not limited to:

MUSIC 124B	Songwriters Workshop	3
MUSIC 156	"sic": Improvisation Collective	1

Select one of the following Series:

#### Series A

MUSIC 220A	Fundamentals of Computer-Generated Sound	2-4
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music	2-4
MUSIC 220C	Research Seminar in Computer-Generated Music	2-4

#### Series B

Any of the series in computer-generated sound, music, and composition

- Register for an independent project (MUSIC 198 Concentrations Project, 4 units) in the senior year under faculty supervision, leading to a faculty-adjudicated composition project. In preparation for

their senior recital, students should refer to the Recitals-at-a-Glance planning page (<https://sites.stanford.edu/music-dept/venues-spaces/reserve/recitals>) for calendar links and reservation deadlines.

### D. Concentration in History, Theory, and Ethnomusicology

In addition to the degree requirements for the general Music major described above, students in the History, Theory, and Ethnomusicology concentration must:

- Complete at least 6 additional units for a letter grade in history and theory. Additional courses might include, but are not limited to:

Select any course not taken in fulfillment of the major requirement:

MUSIC 140: Studies in Music of the Middle Ages
MUSIC 141: Studies in Music of the Renaissance
MUSIC 142: Studies in Music of the Baroque
MUSIC 143: Studies in Music of the Classical Period
MUSIC 144: Studies in Music of the Romantic Period
MUSIC 145: Studies in Western Art Music Since 1900
MUSIC 146: Studies in Ethnomusicology
MUSIC 147: Studies in Music, Media, and Popular Culture
MUSIC 148: Studies in Performance Practice

- Register for an independent project (MUSIC 198 Concentrations Project 4 units) in the senior year under faculty supervision, leading to a senior research paper.

### E. Concentration in Music, Science, and Technology

Requires completion of 63 units. Some of these differ from the general Music major, and are delineated below. This field of study is designed for students interested in the musical ramifications of rapidly evolving computer technology and digital audio, and in the acoustic and psychoacoustic foundations of music. This program can serve as a complementary major to students in the sciences and engineering. Students in the program are required to fulfill the following requirements:

- Theory and Analysis

MUSIC 21	Elements of Music I	3
MUSIC 22	Elements of Music II	3
MUSIC 23	Elements of Music III (includes passing the piano and ear-training proficiency examinations, as described for the major)	3
MUSIC 24A	Ear Training I	1
MUSIC 24B	Ear Training II	1
MUSIC 24C	Ear Training III	1
MUSIC 122B	Analysis of Tonal Music	4
MUSIC 150	Musical Acoustics	3
MUSIC 220A	Fundamentals of Computer-Generated Sound	4
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music	4
MUSIC 220C	Research Seminar in Computer-Generated Music	4
MUSIC 220D	Research in Computer-Generated Music	4
MUSIC 250A	Physical Interaction Design for Music	4
MUSIC 251	Psychophysics and Music Cognition	4

- Piano Proficiency. Majors are required to pass a Piano Proficiency examination as part of the music theory core as described above in "Degree Requirements," "Additional Music Theory Requirements." Download additional information regarding the proficiency examination (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/music/pianoprofexaminfo.pdf>).

Units

Units

Units

Units

3. Ear Training. In addition to the three ear training courses above, MST students are also required to take an elective course in ear training, and pass an aural skills proficiency examination at the end of the junior year. This examination tests the ability to accurately transcribe, represent, and reproduce music vocally and at the keyboard.

#### 4. Applied

- Individual studies in performance, MUSIC 172/272-177/277 (6 units) or MUSIC 192A Foundations of Sound-Recording Technology and MUSIC 192B Advanced Sound Recording Technology (6 units)
- A minimum of five quarters totaling at least 5 units of work in one or more of the department's performance organizations or chamber groups, or 5 units of MUSIC 192C Session Recording. To fulfill the ensemble requirement, Music majors need at least three quarters of participation in the department's traditional large ensembles (MUSIC 159–167), with the exception of students whose primary instrument is harp, keyboard, or guitar, who need to participate at least one quarter in the ensembles above, but who may fulfill the rest of the requirement with chamber music (MUSIC 192C Session Recording). MUSIC 156 "sic": Improvisation Collective may count for up to two of the ensemble-unit requirements for the Music major.

#### 5. History

Select two of the following:

MUSIC 40	Music History to 1600	4
MUSIC 41	Music History 1600-1830	4
MUSIC 42	Music History Since 1830	4

#### 6. Research Project

The program requires a senior research project (4 units) completed under faculty guidance. May be completed in conjunction with enrollment in any of the following:

MUSIC 220D	Research in Computer-Generated Music	4
MUSIC 198	Concentrations Project	4
MUSIC 199	Independent Study	4

## Overseas Study or Study Abroad

Courses in Music are often available at Stanford overseas programs, especially in Berlin, Paris, Florence, and Oxford. See the "Overseas Studies Program" section of this bulletin for this year's listings. Music majors and minors should talk to the Department of Music undergraduate administrator prior to going overseas.

## Joint Major Program in Music and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

## Music Major Requirements in the Joint Major Program

Because the Joint Major Program is new and experimental, some changes to the following may occur. Questions concerning a concentration project in addition to the basic requirements for a Joint Major in Music and Computer Science should be directed to the Department of Music student services office in Braun Music Center, Room 101.

See the "Computer Science Joint Major Program (p. 278)" section of this bulletin for details on Computer Science requirements.

Students majoring in the joint major program in Computer Science and Music must complete the following:

### 1. Music Theory

		Units
MUSIC 21	Elements of Music I	3
MUSIC 22	Elements of Music II	3
MUSIC 23	Elements of Music III	3
MUSIC 24A	Ear Training I	1
MUSIC 24B	Ear Training II	1
MUSIC 24C	Ear Training III	1
Total Units		12

#### Units

Students enrolled in 21, 22, or 23 must concurrently enroll in an ear-training and musicianship lab, MUSIC 24A, 24B, or 24C.

#### Additional Music Theory Requirements

- *Piano Proficiency*: Majors are required to pass a piano proficiency examination as part of the music theory core (MUSIC 21 Elements of Music I, MUSIC 22 Elements of Music II, MUSIC 23 Elements of Music III). The examination is given in the first two weeks of MUSIC 21. Students who do not pass the piano proficiency examination are required to enroll in either MUSIC 12A Introductory Piano Class, MUSIC 12B Introductory Piano Class, or MUSIC 12C Introductory Piano Class concurrently with the music theory core until they are able to pass the examination. The examination consists of scales and arpeggios, performance of a simple tune to be set by the examiner, sight-reading, and the performance of prepared pieces. For additional information about this requirement, see Piano Proficiency Examination ([http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/music/pianoprofexaminfo\\_0.pdf](http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/music/pianoprofexaminfo_0.pdf)).

#### Units

- *Ear Training Elective*: In addition to the theory requirements listed above, majors must successfully complete one unit of an ear training elective course from the list below:

		Units
MUSIC 65A	Voice Class I	1
MUSIC 126	Introduction to Thoroughbass	1
MUSIC 127	Instrumentation and Orchestration	3
Or any course upon approval of the Ear Training adviser		

- *Ear Training Exit Exam*: in conjunction with the music theory series, majors are required to pass an aural skills proficiency examination administered at the end of their junior year. This assesses the ability to accurately transcribe, represent, and reproduce music vocally and at the keyboard, and must be passed before June of the senior year.

### 2. Music History

		Units
Select 2 of 3 from the list below		8
MUSIC 40	Music History to 1600	4
MUSIC 41	Music History 1600-1830	4
MUSIC 42	Music History Since 1830	4

### 3. Analysis

MUSIC 122B Analysis of Tonal Music

### 4. Computing and Music

MUSIC 220A Fundamentals of Computer-Generated Sound

MUSIC 256A Music, Computing, Design I: Art of Design for Computer Music

Total Units

Units

4

Units

4

4

8

### 5. WIM

One WIM-designated course must be taken for a minimum of 4 units. The course below is recommended, but can be replaced with any Music WIM course depending on student's area of interest.

MUSIC 251 Psychophysics and Music Cognition 4

Total Units 4

### 6. Electives

Students must submit 12 unit elective course plan to the JMP faculty adviser for approval no later than the beginning of the junior year. MUSIC 220B and MUSIC 250A are recommended, but elective course plan can consist of any courses from list below, or other Music department course(s) with permission of adviser.

MUSIC 122A Counterpoint 4

MUSIC 122C Introduction to 20th-Century Composition 4

MUSIC 128 Stanford Laptop Orchestra: Composition, Coding, and Performance 4

MUSIC 150 Musical Acoustics 3

MUSIC 220B Compositional Algorithms, Psychoacoustics, and Computational Music 4

MUSIC 220C Research Seminar in Computer-Generated Music 4

MUSIC 250A Physical Interaction Design for Music 4

MUSIC 256B Music, Computing, Design II: Virtual and Augmented Reality for Music 4

### 7. Applied Music

Students may elect to take either of the following to fulfill the applied music requirement:

#### 7.1 Lesson and Ensemble Study

- 6 units of individual studies in performance, MUSIC 172/272-177/277 and
- 5 quarters totaling 5 units of work in one or more of the department's ensembles or chamber music groups. To fulfill the ensemble requirement, Music majors need at least three quarters of participation in the department's traditional large ensembles (MUSIC 159-167) with the exception of students whose primary instrument is guitar, harp, or keyboard, who need to participate at least one quarter in the ensembles above, but who may fulfill the rest of the requirement with chamber music.

#### 7.2 Sound Recording

- 1 quarter (3 units) of MUSIC 192A Foundations of Sound-Recording Technology
- 1 quarter (3 units) of MUSIC 192B Advanced Sound Recording Technology
- 5 units of MUSIC 192C Session Recording

### 8. Capstone Project

Units

4

MUSIC 220D Research in Computer-Generated Music (3 units taken in conjunction with CS Capstone) 3

Units

3

### 9. Optional Concentrations

Students who would also like to complete an additional capstone project in Performance, Conducting, Composition, Music History and Theory, or Music, Science, and Technology must consult the Department of Music student services office in Braun Music Center, Room 101 to submit a proposal for an optional concentration.

### Declaring a Joint Major Program

Units

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

### Dropping a Joint Major Program

Units

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) . Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

### Transcript and Diploma

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

### Minor in Music

The Music minor provides students with a core of essential Music courses in the disciplines that establish both a foundation for informed appreciation of music and a basis for more advanced study, should the student wish to pursue it. Two options are available for the minor: General Music and Music, Science, and Technology.

### Degree Requirements

Total of 36 units required course work as delineated in each of the two options below, and passage of the piano proficiency and ear training examinations. To fulfill Music minor requirements, courses must be taken for a letter grade.

- **Piano Proficiency:** minors are required to pass a piano proficiency examination as part of the music theory core (MUSIC 21 Elements of Music I, MUSIC 22 Elements of Music II, MUSIC 23 Elements of Music III). The examination is given in the first two weeks of MUSIC 21. Students who do not pass the piano proficiency examination are required to enroll in either MUSIC 12A Introductory Piano Class, MUSIC 12B Introductory Piano Class, or MUSIC 12C Introductory Piano Class concurrently with the music theory core until they are able to pass the examination. The examination consists of scales and arpeggios, performance of a simple tune to be set by the examiner, sight-reading, and the performance of prepared pieces. Download additional information regarding the proficiency examination ([http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/music/pianoprofexaminfo\\_0.pdf](http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/music/pianoprofexaminfo_0.pdf)).
- **Ear Training Exit Exam:** in conjunction with the music theory series, minors are required to pass an aural skills proficiency examination administered at the end of their junior year. This examination tests the ability to accurately transcribe, represent, and reproduce music

vocally and at the keyboard, and must be passed before June of the senior year.

## Required Courses: General Music

### 1. Theory

		Units
MUSIC 21	Elements of Music I	3
MUSIC 22	Elements of Music II	3
MUSIC 23	Elements of Music III	3
MUSIC 24A	Ear Training I	1
MUSIC 24B	Ear Training II	1
MUSIC 24C	Ear Training III	1

Students enrolled in 21, 22, or 23 must concurrently enroll in an ear-training and musicianship lab, MUSIC 24A, 24B, or 24C.

### 2. History

		Units
MUSIC 40	Music History to 1600	4
MUSIC 41	Music History 1600-1830	4
MUSIC 42	Music History Since 1830	4

### 3. Applied: Ensemble

Two quarters, 2 units total.

### 4. Applied: Individual

Two quarters at 3 units per quarter, 6 units total.

### 5. WIM, 4 units

4 units in any course numbered Music 140-149, except MUSIC 140G, or MUSIC 251. Offerings in 2017-2018 include:

		Units
MUSIC 140J		4
MUSIC 141J		2-4
MUSIC 143J	Studies in Music of the Classical Period: Franz Joseph Haydn	4
MUSIC 144J	Studies in Music of the Romantic Period: Faust in 19th-century Music	4
MUSIC 145J	Studies in Western Art Music Since 1900: The Music & Ideas of Charles Ives	4
MUSIC 146J	Studies in Ethnomusicology: Listening to the Local: Music Ethnography of the Bay Area	4
MUSIC 147J	Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music	4
MUSIC 147K	Studies in Music, Media, and Popular Culture: Music and Urban Film	4
MUSIC 147L	Studies in Music, Media, and Popular Culture: Latin American Music and Globalization	4
MUSIC 148J	Studies in Perf Practice: Reactions to the Record: Early Recordings, Lost Styles, and Music's Future	4
MUSIC 251	Psychophysics and Music Cognition	4

## Required Courses: Music, Science and Technology

### 1. Theory

		Units
MUSIC 21	Elements of Music I	3
MUSIC 22	Elements of Music II	3
MUSIC 23	Elements of Music III	3
MUSIC 24A	Ear Training I	1
MUSIC 24B	Ear Training II	1
MUSIC 24C	Ear Training III	1
MUSIC 150	Musical Acoustics	3
MUSIC 220A	Fundamentals of Computer-Generated Sound	2-4

MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music	2-4
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### 2. Applied

		Units
MUSIC 192A	Foundations of Sound-Recording Technology	3
MUSIC 192B	Advanced Sound Recording Technology	3
MUSIC 192C	Session Recording (two quarters, 3 units total)	1-2

Alternatively, students pursuing the MST minor may elect to fulfill the applied music requirement with ensemble units and individual lessons as described in the Applied requirements for the General Music minor above.

### 3. WIM, 4 units

		Units
MUSIC 251	Psychophysics and Music Cognition	4

## Performance Certificate Program for Non Music Majors

As a locus of great academic and artistic depth and diversity, the Department of Music's performance programs have long engaged students who, even though they are not music majors, are serious and dedicated to furthering their skills in music performance. The Certificate in Music Performance program provides a select cohort of these students the opportunity for further recognition of their artistic achievement.

This program is open by audition to undergraduate students who already demonstrate a high degree of accomplishment in their area of music performance, study privately with one of the Department of Music's faculty, and who wish to bolster their performance studies with coursework that may be drawn from the Department of Music's other areas of academic focus: history, theory, computer music, and composition. The Certificate in Music Performance is issued by the Department of Music and will not appear on any University record, including the student's transcript.

### Admission

Students are admitted to the Certificate in Music Performance program based on an audition adjudicated by Department of Music faculty at the beginning of Winter Quarter. To request an audition, the student should speak with the private lesson instructor and the Department of Music's undergraduate student services officer. Email [ugmusicinquiries@lists.stanford.edu](mailto:ugmusicinquiries@lists.stanford.edu) for additional information. At the time of the audition, students must have already declared a major outside of music.

### Requirements

Once admitted into the program, students must complete a course plan to be approved by department faculty based on the requirements below.

#### 1. Performance

- A minimum of six quarters of individual lessons of private instruction and/or vocal performance (MUSIC 172/272-177/277). Any quarters of instruction taken prior to admission into the program may also count towards these requirements. Requirements for the minimum levels of proficiency in each instrument for private instruction are posted on the department's web site (<https://music.stanford.edu/ensembles-lessons/lessons>). All six quarters of lesson study must be in the same instrument area.
- A minimum of six quarters of ensemble experience in the Department of Music's ensembles and chamber groups. For students whose primary instrument area is guitar, keyboard or harp, at least one quarter of ensemble experience must be in one of the department's traditional large ensembles (MUSIC 159-167, MUSIC 184). The remaining ensemble requirements may be filled with chamber music

(MUSIC 171). Keyboard students may also take MUSIC 171 Chamber Music, MUSIC 171 Chamber Music, and MUSIC 171 Chamber Music to fulfill this requirement. All non-keyboard, guitar or harp students must successfully complete three quarters in the department's traditional large ensembles (MUSIC 159-167, MUSIC 184), and three quarters in conductor-less, small ensembles such as chamber music or jazz combos MUSIC 171 Chamber Music. MUSIC 156 "sic": Improvisation Collective may count for up to two of the ensemble unit requirements. Any quarters of ensemble taken prior to admission into the program may also count towards these requirements.

## 2. Music Theory

Students are required to complete one course in music theory (MUSIC 21 Elements of Music I, MUSIC 22 Elements of Music II, or MUSIC 23 Elements of Music III). For the purposes of the Performance Certificate, the student may elect to take these courses on a Credit/No Credit grading basis. However, students must also pass the associated piano proficiency exam ([http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/music/pianoprofexaminfo\\_0.pdf](http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/music/pianoprofexaminfo_0.pdf)) and take one course in ear training.

## 3. Elective Courses

Six or more total units in Music, dependent upon course plan document submitted following acceptance into the program.

## 4. Final Project

To complete the Performance Certificate, students must enroll in a 4-unit MUSIC 199 Independent Study or 4-unit MUSIC 198 Concentrations Project and complete a final, performance-based capstone project. Students must pass faculty adjudication, and, in addition, complete a writing project (essay or program notes) pre-approved by the lesson instructor. Students should refer to the Department of Music website's Recitals-at-a-Glance (<https://sites.stanford.edu/music-dept/venues-spaces/reserve/recitals>) page for reservation deadlines and calendar links.

# Master of Arts in Music

University requirements for the M.A. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

None of Stanford's required undergraduate courses may be credited toward an advanced degree unless specifically required for both degrees. Graduate credit in Music that is recognized as fulfilling the advanced-degree requirements is awarded only in courses numbered 100 or higher taken for a letter grade, and only for work that receives a grade of 'A,' 'B,' or 'Satisfactory' (a passing grade in an instructor-mandated credit/no credit course). Courses numbered 100 or higher taken as electives in other departments may be taken for credit or letter grade. Students may need to devote more than the minimum time in residence if preparation for graduate study is inadequate.

## Admission

Applicants are required to submit evidence of accomplishment (scores, recordings, and/or research papers) when they complete the application form. Applicants should arrange to take the Graduate Record Examination (GRE) well in advance of the second Tuesday in December application deadline. All components of the application are due by the second Tuesday in December. International students whose first language is not English are also required to take the TOEFL exam (with certain exceptions: see the Office of Graduate Admissions (<http://studentaffairs.stanford.edu/gradadmissions>) web site).

## Degree Options

All of the following fields of study are declarable as subplans in Axess via the "Declaration or Change to a Field of Student" form; they appear on the transcript and the diploma:

- Master of Arts degree (M.A.) in Music—Composition subplan.
- Master of Arts degree (M.A.) in Music—Music History subplan.
- Master of Arts degree (M.A.) in Music—Computer-Based Music Theory and Acoustics subplan.
- Master of Arts degree (M.A.) in Music—Music, Science, and Technology subplan
  - Note: The M.A./M.S.T. program is the only terminal master's degree; it is two years in duration. It is available to current Stanford undergraduates as a coterminal MA, current Stanford graduates, and external applicants.

## Degree Requirements

A minimum of 45 academic units is required for the master's degree in Music. The Department of Music does not accept students for study only towards the M.A. degree except in the Music, Science, and Technology program, described below.

### 1. Composition

Students are not admitted into the M.A. as a terminal degree for composition: rather, students in the D.M.A. program in composition who enter directly from the bachelor's level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in composition.

### 2. Music History

Students are not admitted into the M.A. as a terminal degree for music history: rather, students in the Ph.D. program in musicology who enter directly from the bachelor's level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in music history.

### 3. Computer-Based Music Theory and Acoustics

Students are not admitted into the M.A. as a terminal degree for computer-based music theory and acoustics: rather, students in the Ph.D. program in computer-based music theory and acoustics who enter directly from the bachelor's level may, upon completing 45 graduate-level units and advancing to candidacy by passing the qualifying examination, be recommended for the M.A. degree in computer-based music theory and acoustics.

### 4. Music, Science, and Technology (M.S.T.)

The M.A. in Music, Science, and Technology is the department's only terminal master's degree. This is a two-year program of 45 graduate-level units focusing on the integration of music perception, music-related signal processing and controllers, synthesis, performance, and composition. The program is designed for students who have an undergraduate music, engineering, or science degree.

## University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor.

No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

Required course work is listed below. A complete program with an individually-tailored list of electives will be formed in consultation with the student's adviser.

#### Required Courses

MUSIC 201	CCRMA Colloquium
MUSIC 220A	Fundamentals of Computer-Generated Sound
MUSIC 251	Psychophysics and Music Cognition
MUSIC 255	Intermedia Workshop
MUSIC 256A	Music, Computing, Design I: Art of Design for Computer Music
MUSIC 320A	Introduction to Audio Signal Processing Part I: Spectrum Analysis
MUSIC 320B	Introduction to Audio Signal Processing Part II: Digital Filters

#### Electives

The remaining units of graduate level work are determined in consultation with the student's adviser and include CCRMA electives, and may include courses taken outside the department.

## Doctor of Musical Arts (D.M.A.) and Doctor of Philosophy (Ph.D.) in Music

University requirements for the D.M.A. and Ph.D. are described in the "Graduate Degrees" section of this bulletin. The following statements apply to all the graduate degrees described below, unless otherwise indicated.

### Admission

Applicants are required to submit evidence of accomplishment (scores, recordings, and/or research papers, according to the proposed field of concentration) when they complete the application form. Applicants should arrange to take the Graduate Record Examination (GRE) well in advance of the application deadline of the second Tuesday in December. All components of the application are due by the second Tuesday in December. International students whose first language is not English are also required to take the TOEFL exam (with certain exceptions: see the Office of Graduate Admissions (<http://studentaffairs.stanford.edu/gradadmissions>) web site).

### Department Examinations

All entering doctoral graduate students are required to take:

1. a diagnostic examination testing the student in theory (counterpoint, harmony, and analysis), a proficiency examination in sight-singing; and,
2. for musicologists and composers only, a proficiency examination in piano sight-reading; and
3. for musicologists only, the history of Western art music.

These exams are given the week before classes begin in September each year. Teaching Assistant assignments and the funding associated with

this portion of a graduate student's financial aid package are determined based upon successful completion of these exams.

### Graduate Credit

None of Stanford's required undergraduate courses may be credited toward an advanced degree unless specifically required for both degrees. Only work that receives a grade of 'A,' 'B,' or 'S' (a passing grade in an instructor-mandated credit/no credit course) in music courses numbered 100 or higher taken as a graduate student is recognized as fulfilling the advanced-degree requirements. Students may need to devote more than the minimum time in residence if preparation for graduate study is inadequate.

The following may be taken as electives for graduate credit:

1. any course in another department numbered 100 or over (with adviser's consent)
2. any course in the Music department numbered 100 or over except those required for the B.A. degree. A letter grade of 'A,' 'B,' or 'S' (a passing grade in an instructor-mandated credit/no credit course) is required.
3. Music department group instruction (enroll in MUSIC 199 Independent Study after speaking with instructor):

		Units
MUSIC 72A	Intermediate Piano Class	1
MUSIC 72C	Harpsichord Class	1
MUSIC 72D	Jazz Piano Class	1
MUSIC 73	Intermediate Voice Class	1
MUSIC 74C	Classical Guitar Class	1
MUSIC 74D	Harp Class	1
MUSIC 75B	Renaissance Wind Instruments Class	1
MUSIC 76	Brass Instruments Class	1
MUSIC 77	Percussion Class	1

### Degree Options

All of the following fields of study are declarable as subplans in Axess via the "Declaration or Change to a Field of Study for Graduate Students" form; they appear on the transcript and the diploma:

- **Doctor of Musical Arts degree (D.M.A.) in Composition**

The D.M.A. is offered to a limited number of students who demonstrate substantial training in the field and high promise of attainment as composers. Students may work in acoustic and/or electronic forms. Breadth is given through studies in other branches of music and in relevant fields outside music, as desirable. The final project for this degree is a large-scale composition.

- **Doctor of Philosophy degree (Ph.D.) in Musicology**

- **Doctor of Philosophy degree (Ph.D.) in Computer-Based Music Theory and Acoustics**

The Ph.D. is offered in areas of the research of Stanford's graduate faculty: Musicology, and Computer-Based Music Theory and Acoustics (CBMTA) at the Center for Computer Research in Music and Acoustics (CCRMA). The department seeks students who demonstrate substantial scholarship, high promise of attainment, and the ability to do independent investigation and present the results of such research in a dissertation.

### Degree Requirements

#### Residence

The candidate must complete a minimum of 135 academic units (see Residency under the Graduate Degrees (p. 50) section of this bulletin). Doctoral candidates working on Ph.D. dissertations or Doctor of Musical Arts (D.M.A.) final projects that require consultation with faculty members continue enrollment in the University under Terminal Graduate

Registration (TGR), after they have reached the required 135 academic units and have completed their Special Area Examinations.

### Qualifying Examination

A written and oral examination given just prior to the fourth quarter of residence for D.M.A. students and Ph.D. students in the Computer-Based Music Theory and Acoustics programs; for Ph.D. students in Musicology, the exams are given just prior to the eighth quarter of residence. For D.M.A. students a *Special Area Examination* topic proposal is due at the time of the *Qualifying Examination*.

### Admission to Candidacy

Upon successful completion of the Qualifying Examination and 45 units of graduate level work, faculty consider the student's overall progress and academic achievement and determines if the student has the potential to successfully complete the requirements of the degree program. If a student's progress and potential are deemed sufficient to continue in the degree program, the student is directed to complete the Application for Candidacy for Doctoral Degree (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/appcanddoct.pdf>). Failure to advance to candidacy will result in the dismissal of the student from the program.

### Teaching

All students in the Ph.D. or D.M.A. degree programs, regardless of sources of financial support, are required to complete six quarters of supervised teaching (Teaching Assistantship) at half time. MUSIC 280 TA Training Course (offered in Spring Quarter and taken at the end of the first year) is a required course for Teaching Assistants. Additional quarters of teaching may be offered by the department.

## I. Composition

The Doctor of Musical Arts (D.M.A.) degree in Composition is given breadth through collateral studies in other branches of music and in relevant studies outside music as seems desirable. In addition to degree requirements required of all doctoral graduate students and listed above, students must complete the following required courses:

Required Courses		Units
MUSIC 280	TA Training Course	1
MUSIC 305C	Analysis and Repertoire: Late-Romantic to Contemporary	4
MUSIC 305D	Analysis from a Compositional Perspective	4
MUSIC 323	Doctoral Seminar in Composition (4 quarters within the first two years of study)	3-4
MUSIC 324	Graduate Composition Forum*	1
MUSIC 325	Individual Graduate Projects in Composition <sup>†</sup>	1-5
One elective course from the Ph.D. CBMTA curricula chosen from the following:		
MUSIC 220A	Fundamentals of Computer-Generated Sound	
MUSIC 251	Psychophysics and Music Cognition	
MUSIC 255	Intermedia Workshop	
MUSIC 256A	Music, Computing, Design I: Art of Design for Computer Music	
MUSIC 320A	Introduction to Audio Signal Processing Part I: Spectrum Analysis	
MUSIC 320B	Introduction to Audio Signal Processing Part II: Digital Filters	

\* The requirement is for all six quarters during years 1 & 2, and 6 quarters during years 3-5 with no three consecutive quarters unenrolled.

† Two or more quarters per year are required until advancement to candidacy; by the end of the second year the student shall have enrolled with a minimum of two different faculty members; but the end of the third year the student shall have enrolled with a minimum of three different faculty.

- Besides those requirements listed above, candidates are expected to produce a number of works demonstrating their ability to compose in a variety of forms and for the common media: vocal, instrumental, and electronic music. If possible, the works submitted are presented in public performance prepared by the composer. Annual progress is reviewed by the composition faculty with a major portfolio review conducted during the Fall Quarter of the third year.
- Foreign Language Requirement*—At the time of advancement to candidacy, all D.M.A. students are required to have demonstrated a reading knowledge of one language other than English and the ability to translate it into idiomatic English.
- Special-Area Examination*—A written examination in the candidate's field of concentration, one-hour presentation followed by questions in MUSIC 324 Graduate Composition Forum, sample course syllabus, and final project proposal are required to be completed during the Winter Quarter of the fourth year of study, no later than the ninth week of classes.
- Final Project Presentation*—Required during the last quarter of residence, no later than the ninth week of classes, the purpose of the presentation is to demonstrate the ability of the candidate to organize and present the topic of the final project for public review. It should be one hour in length, followed by questions, treating aspects of the final project. Details regarding the D.M.A. final project presentation may be found in the Department of Music Graduate Handbook.
- Final Project*—Candidate's work culminates in a required Final Project. The final project in composition must be a substantial composition, the scope of which shall be agreed upon by the members of the committee. Typically, work on the final project encompasses several quarters. Usually, smaller works, for specific performances, are composed at the same time.
- Reading Committee*—The membership of the reading committee is the principal final project adviser and a minimum of two additional members. The notice of appointment of a D.M.A. Final Project Reading Committee should be submitted to the department at the same time as the approved final project proposal and the completion of the Special Area Exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee. Download the D.M.A. reading committee form (<https://stanford.box.com/v/MusicDMARReadingCommitteeForm>); fill it out; obtain committee members' signatures; return to the graduate administrator.

## II. Musicology

In addition to degree requirements required of all doctoral graduate students and listed above, students must complete the following required courses:

Required Courses		Units
MUSIC 200A	Proseminar in Musicology and Music Bibliography (required of all entering students)	3-4
MUSIC 200B	Proseminar in Ethnomusicology	3-5
MUSIC 280	TA Training Course	1
MUSIC 300A	Medieval Notation	3-4
MUSIC 300B	Renaissance Notation	4
MUSIC 305A	Analysis and Repertoire: Medieval and Renaissance	4

MUSIC 305B	Analysis and Repertoire: Baroque to Early Romantic	4
MUSIC 305C	Analysis and Repertoire: Late-Romantic to Contemporary	4
MUSIC 310	Research Seminar in Musicology *	3-5
MUSIC 312A	Aesthetics and Criticism of Music, Ancients and Moderns: Plato to Nietzsche	4
MUSIC 312B	Aesthetics and Criticism of Music, Contemporaries: Heidegger to Today	4
MUSIC 330	Musicology Dissertation Colloquium †	1

One elective course from the D.M.A. Composition or Ph.D. CBMTA curricula chosen from the following (or other, by instructor and advisor consent):

MUSIC 220A	Fundamentals of Computer-Generated Sound	
MUSIC 251	Psychophysics and Music Cognition	
MUSIC 253	Symbolic Musical Information	
MUSIC 254	Music Query, Analysis, and Style Simulation	
MUSIC 323	Doctoral Seminar in Composition	
MUSIC 324	Graduate Composition Forum	

\* The requirement is for eight seminars of 3-5 units each. Up to two graduate seminars in other departments may be counted toward this requirement, pending adviser's approval.

† The requirement is for enrollment each quarter offered beginning in year four and continuing to graduation.

1. **Foreign Language Requirement**—At the time of advancement to candidacy, all Ph.D. students in Musicology must have passed a Ph.D. Language examination in German and in a second language, chosen from French, Italian, or Latin (or, on a case-by-case basis, another language, if it has significant bearing on the candidate's field of study). If one of these languages is the student's native language, the student may be exempted from an examination.
2. **Special-Area Examination**—A written and oral examination testing the student's knowledge of music and research in the student's field of concentration is completed during the fourth year of study, no later than the last day of classes in Autumn Quarter of that year. This includes an oral defense of the dissertation proposal. The examining committee comprises prospective readers of the dissertation.
3. **University Oral Examination**—Taken once the dissertation is substantially under way; an oral presentation is a defense of dissertation research methods and results.
4. **Dissertation**—After the first two years of graduate study, the student concentrates on research and writing of the dissertation. The dissertation demonstrates the student's ability to work systematically and independently to produce an essay of competent scholarship.
5. **Reading Committee**—The minimum membership of the reading committee is 1) the principal dissertation adviser, 2) a second member from the department, and 3) a third member from the major department or another department. A non-Academic Council member (including former Academic Council members) may replace only one of the three required members of dissertation reading committees. If the reading committee has four or five members, at least three members (comprising the majority) must be current or emeritus members of the Academic Council. See the GAP for additional information: <http://gap.stanford.edu/4-8.html>. The notice of appointment of a Reading Committee should be submitted to the department at the same time as the approved dissertation proposal and the completion of the Special-Area Exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee.

### III. Computer-Based Music Theory and Acoustics

In addition to degree requirements required of all doctoral graduate students and listed above, students must complete the following required courses:

#### Required Courses

MUSIC 220A	Fundamentals of Computer-Generated Sound <sup>1</sup>	4
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music <sup>1</sup>	4
MUSIC 220C	Research Seminar in Computer-Generated Music <sup>1</sup>	2-4
MUSIC 220D	Research in Computer-Generated Music <sup>2</sup>	1-10
MUSIC 251	Psychophysics and Music Cognition	1-5
MUSIC 280	TA Training Course	1
MUSIC 305C	Analysis and Repertoire: Late-Romantic to Contemporary	4
MUSIC 305D	Analysis from a Compositional Perspective <sup>3</sup>	4
MUSIC 320A	Introduction to Audio Signal Processing Part I: Spectrum Analysis	3-4
MUSIC 320B	Introduction to Audio Signal Processing Part II: Digital Filters	3-4

<sup>1</sup> Recommend taking in first year

<sup>2</sup> The requirement is for 12 units.

<sup>3</sup> Must take in first year

1. **Foreign Language Requirement**—At the time of advancement to candidacy, all Ph.D. students in computer-based music theory and acoustics are required to have demonstrated a reading knowledge of one language other than English and the ability to translate it into idiomatic English.
2. **Special-Area Examination**—A written and oral examination testing the student's knowledge of music and research in the student's field of concentration is completed during the fourth year of study, no later than the last day of classes in Autumn Quarter of that year. This includes an oral defense of the dissertation proposal. The examining committee comprises prospective readers of the dissertation.
3. **University Oral Examination**—Taken once the dissertation is substantially under way; an oral presentation is a defense of dissertation research methods and results.
4. **Dissertation**—After the first two years of graduate study, the student concentrates on research and writing of the dissertation. The dissertation demonstrates the student's ability to work systematically and independently to produce an essay of competent scholarship.
5. **Reading Committee**—The minimum membership of the reading committee is 1) the principal dissertation adviser, 2) a second member from the department, and 3) a third member from the major department or another department. If a third member is from another institution, a fourth member must be appointed from the department. The principal dissertation adviser and all other members of the committee must belong to the Academic Council. The notice of appointment of a Reading Committee should be submitted to the department at the same time as the approved dissertation proposal and the completion of the Special-Area Exam. It is the responsibility of the student, with the advice of his or her adviser, to approach appropriate faculty members and obtain their consent to serve on the reading committee.

*Emeriti: (Professors)* John M. Chowning, Albert Cohen, William H. Ramsey; *(Professors, Performance)* Arthur P. Barnes, Marie Gibson

*Chair:* Jaroslaw Kapuscinski

*Professors:* Mark Applebaum, Jonathan Berger, Karol Berger, Chris Chafe, Brian Ferneyhough, Thomas Grey, Stephen Hinton, Julius O. Smith



*Associate Professors:* Heather Hadlock, Jaroslaw Kapuscinski, William P. Mahrt, Jesse Rodin (on leave), Anna Schultz, Ge Wang

*Assistant Professors:* Takako Fujioka (on leave Spring), Charles Kronengold (on leave Autumn)

*Professors (Teaching):* George Barth (Piano), Stephen M. Sano (Director of Choral Studies)

*Associate Professor (Teaching):* Paul Phillips (Director of Orchestral Studies)

*Courtesy Professors:* Paul DeMarinis, Doug L. James

*Senior Lecturers:* Giancarlo Aquilanti (Director of Theory; Wind Ensemble), Talya Berger (Theory), Stephen Harrison (Cello), François Rose (Theory and Composition), Thomas Schultz (Piano), Gregory A. Wait (Voice; Director of Vocal Studies), Frederick R. Weldy (Piano; on leave Autumn)

*Lecturers:* Akwasi Papa Abrefah (Steelpan), Kumaran Arul (Piano), Erika Arulanantham (Theory), Mark Brandenburg (Clarinet), Marie-Louise Catsalis (Voice), Marjorie Chauvel (Harp), Tony Clements (Tuba), Laura Dahl (Resident Collaborative Pianist), Anthony Doheny (Violin), John Dornenburg (Viola da Gamba), Greer Ellison (Flute, Baroque Flute), Charles A. Ferguson (Guitar), Debra Fong (Violin), Michael Galisatus (Jazz Ensemble), Claire Giovannetti (Voice), Dawn Harms (Violin, Viola), Alexandra Hawley (Flute), David Henderson (Classical Saxophone), Wendy Hillhouse (Voice), Melody Holmes-Vedder (Flute), Kathryn Jennings (Voice), Nova Jiménez (Voice), McDowell Kenley (Trombone), Jay LeBeouf (CCRMA), Joo-Mee Lee (Violin), Mary Linduska (Voice, Summer), Murray Low (Jazz & Jazz Piano), Adam Luftman (Trumpet), Loren Mach (Percussion), Anthony Martin (Baroque Violin), Robin May (Oboe), Charles McCarthy (Jazz Saxophone), Robert Huw Morgan (University Organist, Organ), Bruce Moyer (Contrabass), Herbert Myers (Early Winds), James Nadel (Jazz), Bryan Nies (Musical Theater), (Rufus Olivier (Bassoon), Lawrence Ragent (French Horn), David Rokeach (Drum Set), Kelly Savage (Theory), Robin Sharp (Violin), Livia Sohn (Violin), Elaine Thornburgh (Harpichord), Erik Ulman (Composition, Theory), Linda Uyechi (Taiko), Rick Vandivier (Jazz Guitar), John Worley (Jazz Trumpet), Hui (Daisy) You (Gu-Zheng), Timothy Zerlang (University Carillonneur, Piano)

*Adjunct Professors:* Jonathan Abel (CCRMA), David Berners (CCRMA), Marina Bosi (CCRMA), Poppy Crum (CCRMA), Pierre Divenyi (CCRMA), Walter Hewlett (Computer-Assisted Research in the Humanities), Gautham Mysore (CCRMA), Thomas Rossing (CCRMA), Craig Sapp (Computer-Assisted Research in the Humanities), Eleanor Selfridge-Field (Computer-Assisted Research in the Humanities), Malcolm Slaney (CCRMA)

*Artists-in-Residence (St. Lawrence String Quartet):* Geoff Nuttall (Violin), Owen Dalby (Violin), Lesley Robertson (Viola), Christopher Costanza (Cello)

# PHILOSOPHY

Courses offered by the Department of Philosophy are listed under the subject code PHIL on the Stanford Bulletin's ExploreCourses web site.

Philosophy concerns itself with fundamental problems. Some are abstract and deal with the nature of truth, justice, value, and knowledge; others are more concrete, and their study may help guide conduct or enhance understanding of other subjects. Philosophy also examines the efforts of past thinkers to understand the world and people's experience of it.

Although it may appear to be an assortment of different disciplines, there are features common to all philosophical inquiry. These include an emphasis on methods of reasoning and the way in which judgments are formed, on criticizing and organizing beliefs, and on the nature and role of fundamental concepts.

Students of almost any discipline can find something in philosophy which is relevant to their own specialties. In the sciences, it provides a framework within which the foundations and scope of a scientific theory can be studied, and it may even suggest directions for future development. Since philosophical ideas have had an important influence on human endeavors of all kinds, including artistic, political, and economic, students of the humanities and social sciences should find their understanding deepened by acquaintance with philosophy.

## Mission of the Undergraduate Program in Philosophy

The mission of the undergraduate program in Philosophy is to train students to think clearly and critically about the deepest and broadest questions concerning being, knowledge, and value, as well as their connections to the full range of human activities and interests. The Philosophy major presents students with paradigms and perspectives of past thinkers and introduces students to a variety of methods of reasoning and judgment formation. Courses in the major equip students with core skills involved in critical reading, analytical thinking, sound argumentation, and the clear, well-organized expression of ideas. Philosophy is an excellent major for those planning a career in law, medicine, business, or the non-profit sector. It provides analytical skills and a breadth of perspective helpful to those called upon to make decisions about their own conduct and the welfare of others. Philosophy majors who have carefully planned their undergraduate program have an excellent record of admission to professional and graduate schools.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. the ability to communicate philosophical ideas effectively orally and in writing.
2. close reading, argument evaluation, and analytical writing.
3. dialectical ability to identify strengths and weaknesses of an argument and devise appropriate and telling responses.
4. the ability to think critically and demonstrate clarity of conceptualization.
5. the ability to differentiate good from unpromising philosophical questions.
6. the ability to sustain an argument of substantial scope, showing control over logical, argumentative, and evidential relations among its parts.

## Special and Joint Majors

The Special Program in the History and Philosophy of Science enables students to combine interests in science, history, and philosophy. Students interested in this program should see the special adviser.

The Special Option in Philosophy and Literary Thought enables students to combine interests in philosophy and literary studies. Interested students should see the Director of Undergraduate Studies for Philosophy and Literature.

The combined major in Philosophy and Religious Studies joins courses from both departments into a coherent theoretical pattern.

The joint major in Philosophy and Computer Science provides opportunities for the systematic study of computation together with philosophy in the broadest sense.

## Graduate Program in Philosophy

The Department of Philosophy offers an M.A. and a Ph.D. degree. The University's basic requirements for the M.A. and Ph.D. degrees are discussed in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

## Learning Outcomes (Graduate)

The purpose of the master's program is to develop knowledge and skills in Philosophy and to prepare students for a professional career or doctoral studies. This is achieved through completion of core courses, with an option for further specialization. (See below for details.)

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Philosophy. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Philosophy and to interpret and present the results of such research.

## Library and Associations

The Tanner Memorial Library of Philosophy contains an excellent working library and ideal conditions for study. Graduate students and undergraduate majors in philosophy have formed associations for discussion of philosophical issues and the reading of papers by students, faculty, and visitors.

## Bachelor of Arts in Philosophy

There are three ways of majoring in Philosophy:

- The General Program
- The Special Program in the History and Philosophy of Science
- The Special Option in Philosophy and Literature.

A student completing any of these receives a B.A. degree in Philosophy. There is also a major program offered in Philosophy and Religious Studies. To declare a major, a student should consult with the Director of Undergraduate Study and see the undergraduate student services administrator to be assigned an adviser and work out a coherent plan. The department recommends proficiency in at least one foreign language.

## General Program

1. Course requirements, minimum 55 units:
  - a. preparation for the major: an introductory course (under 100) and PHIL 80 Mind, Matter, and Meaning. (PHIL 80 should normally be taken no later than the first quarter after declaring the major.) Students taking a Philosophy Thinking Matters course may count 4 units toward the introductory Philosophy requirement.

Students who took the Winter/Spring Philosophy Introduction to the Humanities (IHUM) track may count 5 units toward the Introductory Philosophy requirement. (IHUM courses are no longer offered).

- b. the core: 24 additional Philosophy units as follows:
- i Logic: Select one of the following. More advanced logic courses may also be counted for this requirement by petition.

Select one of the following:

PHIL 49	Survey of Formal Methods	4
PHIL 150	Mathematical Logic	4
PHIL 151	Metalogic	4
PHIL 154	Modal Logic	4

- ii Philosophy of science: This requirement may be satisfied by PHIL 60, PHIL 61, or an intermediate philosophy of science course numbered between PHIL 160 - 169.

- iii Moral and political philosophy: This requirement may be satisfied by PHIL 2 or any intermediate course devoted to central topics in moral and political philosophy numbered between PHIL 170 - 172 or 174-176.

- iv Contemporary theoretical philosophy: This requirement may be satisfied by any intermediate course numbered between PHIL 180 - 189.

- v History of philosophy:

Select both of the following

PHIL 100	Greek Philosophy	4
PHIL 102	Modern Philosophy, Descartes to Kant	4

- c. one undergraduate philosophy seminar from the PHIL 194 series.
- d. electives: courses numbered 10 or above, at least 9 units of which must be in courses numbered above 99.

- Units for Tutorial, Directed Reading (PHIL 196 Tutorial, Senior Year, PHIL 197 Individual Work, Undergraduate, PHIL 198 The Dualist Undergraduate Journal), The Dualist (PHIL 198 The Dualist Undergraduate Journal), Honors Seminar (PHIL 199 Seminar for Prospective Honors Students), or affiliated courses may not be counted in the 55-unit requirement. No more than 10 units completed with grades of 'satisfactory' and/or 'credit' may be counted in the 55-unit requirement. Any courses taken for a letter grade in fulfillment of the core requirements listed under 1.b. must be taken for a minimum of 3 units and completed with a grade of 'C-' or higher.
- A maximum of 10 transfer units or two courses can be used for the departmental major. In general, transfer courses cannot be used to satisfy the six area requirements or the undergraduate seminar requirement. Students may not substitute transfer units for the PHIL 80 requirement.

## Special Program in History and Philosophy of Science

Undergraduates may major in Philosophy with a field of study in History and Philosophy of Science. This field of study is declared on Axess and is printed on the transcript. Each participating student is assigned an adviser who approves the course of study. A total of 61 units are required for the sub-major, to be taken according to requirements 1 through 5 below. Substitutions for the listed courses are allowed only by written consent of the undergraduate adviser for History and Philosophy of Science. Students are encouraged to consider doing honors work with an emphasis on the history and philosophy of science. Interested students should see the description of the honors thesis in Philosophy and consult their advisers for further information.

- Three science courses (for example, biology, chemistry, physics) for 12 units.
- The following Philosophy (PHIL) core courses must be completed with a letter grade by the end of the junior year:

a.	Select one of the following:	3
	PHIL 49 Survey of Formal Methods	4
	PHIL 150 Mathematical Logic	4
	PHIL 151 Metalogic	4
	PHIL 154 Modal Logic	4

- b. either PHIL 60 Introduction to Philosophy of Science or PHIL 61 Philosophy and the Scientific Revolution.
  - c. PHIL 80 Mind, Matter, and Meaning.
- Three history of science courses.
  - Three philosophy of science courses, of which one must be PHIL 164 Central Topics in the Philosophy of Science: Theory and Evidence.
  - Three additional courses related to the major, in philosophy or history, to be agreed on by the adviser.
  - At least six courses in the major must be completed at Stanford with a letter grade. Units for Tutorial, Directed Reading, or The Dualist (PHIL 196 Tutorial, Senior Year, PHIL 197 Individual Work, Undergraduate, PHIL 198 The Dualist Undergraduate Journal) may not be counted in the 61-unit requirement. No more than 10 units completed with grades of 'satisfactory' and/or 'credit' may be counted in the 61-unit requirement. Courses taken in fulfillment of the philosophy requirements under 2. must be taken for a minimum of 3 units and completed with a grade of 'C-' or higher.
  - Transfer units must be approved in writing by the Director of Undergraduate Study at the time of declaring a major. Transfer courses are strictly limited when used to satisfy major requirements.

## Special Option in Philosophy and Literature

Undergraduates may major in Philosophy through a special track in Philosophy and Literature. This field of study is declared on Axess and is printed on the transcript. Students should also meet with the DUS of Philosophy and the DUS of the Philosophy and Literature initiative to receive advising about course planning. The special track requires at least 65 units, and it consists of three main parts: a) core requirements in Philosophy (requirements 1, 4, and 6 below), b) a dedicated program of study in a single national literature, approved by the DUS for Philosophy and Literature (requirement 3 below), and c) a group of courses exploring the interdisciplinary connections between philosophy and literature (requirements 2, 5, and 7 below). Students are encouraged to do honors work with an emphasis on philosophy and literature through the Philosophy honors program. (See the description of the honors thesis in Philosophy and consult advisers for further information.)

### Requirements:

- Core requirements for the major in Philosophy, including:
  - a. an introductory course
  - b. PHIL 80 Mind, Matter, and Meaning
  - c. the core distribution requirements listed in section 1b of the general program above.
- All courses taken for a letter grade in fulfillment of the philosophy core requirements (under 1., above) must be taken for a minimum of 3 units and completed with a grade of 'C-' or higher.
- Gateway course in philosophy and literature (PHIL 81 Philosophy and Literature). This course should be taken as early as possible in the student's career, normally in the sophomore year.
- Three courses in a single national literature, chosen by the student in consultation with the adviser and the program director of

undergraduate studies. This normally involves meeting the language proficiency requirements of the relevant literature department.

5. Electives within Philosophy beyond the core requirements totaling at least 5 units, and drawn from courses numbered 100 or higher.
6. Two upper division courses of special relevance to the study of philosophy and literature, as identified by the committee in charge of the program. A list of approved courses is available from the program director of undergraduate studies, and is published on the web at <http://philit/programs/relevance.html>
7. Capstone seminar in the PHIL 194 series.
8. Capstone seminar of relevance to the study of philosophy and literature, as approved by the program committee. In some cases, with approval of the Philosophy Director of Undergraduate Study and the Philosophy and Literature Director of Undergraduate Studies, the same course may be used to meet requirements 6 and 7 simultaneously.

The following rules also apply to the special option:

1. Units for Honors Tutorial, Directed Reading (PHIL 196 Tutorial, Senior Year, PHIL 197 Individual Work, Undergraduate, PHIL 198 The Dualist), The Dualist (PHIL 198 The Dualist), Honors Seminar (PHIL 199 Seminar for Prospective Honors Students) may not be counted toward the 65-unit requirement. No more than 10 units with a grade of 'satisfactory' or 'credit' may be counted toward the unit requirement.
2. A maximum of 15 transfer units may be counted toward the major, at most 10 of which may substitute for courses within Philosophy. Transfer credits may not substitute for PHIL 80 or PHIL 81, and are approved as substitutes for the five area requirements or PHIL 194 only in exceptional cases.
3. Courses offered in other departments may be counted toward requirements 3, 5 and 7, but such courses, including affiliated courses, do not generally count toward the other requirements. In particular, such courses may not satisfy requirement 4.
4. Units devoted to meeting the language requirement are not counted toward the 65-unit requirement.

## Honors Program

Students who wish to undertake a more intensive and extensive program of study, including seminars and independent work, are invited to apply for the honors program during Winter Quarter of the junior year. Admission is selective on the basis of demonstrated ability in Philosophy, including an average grade of at least 'A' in a substantial number of Philosophy courses and progress towards satisfying the requirements of the major.

With their application, candidates should submit an intended plan of study for the remainder of the junior and the senior years. It should include at least 5 units of Senior Tutorial (PHIL 196 Tutorial, Senior Year) during Autumn and/or Winter quarter(s) of the senior year. Students who are applying to Honors College may use the same application for philosophy honors. In the quarter preceding the tutorial, students should submit an essay proposal to the Philosophy undergraduate director and determine an adviser.

Students applying for honors should enroll in Junior Honors Seminar (PHIL 199 Seminar for Prospective Honors Students) during the Spring Quarter of the junior year.

The length of the honors essay may vary considerably depending on the problem and the approach; usually it falls somewhere between 7,500 and 12,500 words. This essay may use work in previous seminars and courses as a starting point, but it cannot be the same essay that has been used, or is being used, in some other class or seminar. It must be

a substantially new and different piece of work reflecting work in the tutorials.

A completed draft of the essay is submitted to the adviser at the end of the Winter Quarter of the senior year. Any further revisions must be finished by the fifth full week of the Spring Quarter, when three copies of the essay are to be given to the undergraduate secretary. The honors essay is graded by the adviser together with a second reader, chosen by the adviser in consultation with the student. The student also provides an oral defense of the thesis at a meeting with the adviser and second reader. The essay must receive a grade of 'A-' or better for the student to receive honors.

Honors tutorials represent units in addition to the 55-unit requirement.

For further information, contact the Honors' Director.

## Philosophy and Religious Studies Combined Major

The undergraduate major in Philosophy and Religious Studies consists of 60 units of course work with approximately one third each in the philosophy core, the religious studies core, and either the general major or the special concentration. Affiliated courses cannot be used to satisfy this requirement.

No courses in either the philosophy or religious studies core may be taken satisfactory/no credit or credit/no credit.

In general, transfer units cannot be used to satisfy the core requirements. Transfer units and substitutions must be approved by the director of undergraduate studies in the appropriate department.

### Core Requirements

1. Philosophy (PHIL) courses:
  - a. Required course: PHIL 80 Mind, Matter, and Meaning
  - b. 16 units, including at least one Philosophy course from each of the following areas:
    - i Logic and philosophy of science: Students take either one from this list or an intermediate philosophy of science course numbered PHIL 160-169.
  - ii Ethics and value theory: This requirement may be satisfied by PHIL 2 or any intermediate course devoted to central topics in moral and political philosophy numbered between PHIL 170 – 172 or 174-176.
  - iii Contemporary theoretical philosophy: Take either PHIL 1 Introduction to Philosophy or an intermediate course numbered PHIL 180-189.
  - iv History of philosophy: Select one of

PHIL 49	Survey of Formal Methods	4
PHIL 60	Introduction to Philosophy of Science	5
PHIL 61	Philosophy and the Scientific Revolution	5
PHIL 150	Mathematical Logic	4
PHIL 151	Metalogic	4
PHIL 154	Modal Logic	4

PHIL 100	Greek Philosophy	4
PHIL 101	Introduction to Medieval Philosophy	4
PHIL 102	Modern Philosophy, Descartes to Kant	4
PHIL 103	19th-Century Philosophy	4

- c. All philosophy courses taken for a grade in fulfillment of requirements under 1.a. and 1.b. must be taken for a minimum of 3 units and completed with a grade of 'C-' or higher.
2. Religious Studies (RELIGST) courses: 20 units, chosen in consultation with the student's adviser, including:
    - a. RELIGST 290 Majors Seminar (5 units; Winter Quarter; recommended junior year; fulfills WIM requirement)
    - b. at least one course in philosophy of religion, broadly construed, chosen in consultation with, and approved by, the Religious Studies Director of Undergraduate Studies.
    - c. diversity requirement: Students may not take all their religion courses in one religious tradition.

## General Major Requirements

Five additional courses (approximately 20 units) divided between the two departments. No more than 5 of these units may come from courses numbered under 99 in either department. Each student must also take at least one undergraduate seminar in religious studies and one undergraduate seminar in philosophy.

## Special Concentration

With the aid of an adviser, students pursue a specialized form of inquiry in which the combined departments have strength; for example, American philosophy and religious thought, philosophical and religious theories of human nature and action, philosophy of religion. Courses for this concentration must be approved in writing by the adviser.

## Directed Reading and Satisfactory/No Credit Units

Units of directed reading for fulfilling requirements of the combined major are allowed only with special permission. No more than 10 units of work with a grade of 'satisfactory' count toward the combined major.

## Honors Program

Students pursuing a major in Philosophy and Religious Studies may also apply for honors by following the procedure for honors in either of the departments.

## Joint Major Program in Philosophy and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

The joint major in Philosophy and Computer Science provides opportunities for the systematic study of computation together with philosophy in the broadest sense.

The joint major is appropriate for three distinct groups of students:

1. students with separate interests in the two fields who wish to begin thinking about their interaction (or else applications of one set to the other);
2. students interested in exploring philosophical issues in, and foundations of, computing;

3. students who would like to pursue philosophical investigations using computational methods.

## Philosophy Major Requirements in the Joint Major Program

See the "Computer Science Joint Major Program (p. 278)" section of this bulletin for details on Computer Science requirements.

Students in the joint major are required to complete the same introductory and core requirements as other Philosophy majors, with the exception of a more demanding logic requirement. In addition, joint majors must complete a senior capstone seminar in Philosophy (PHIL 194), and are normally expected to complete (separately from PHIL 194) an integrative senior capstone project, developed with faculty adviser(s) in CS and/or Philosophy, and approved in writing by the joint major's faculty adviser in Philosophy. Students may register for 5-10 units Individual Work, Undergraduate (PHIL 197) in association with the integrative capstone. These units may be taken across one or two quarters, and must be taken for a letter grade. Such projects must integrate the student's CS and philosophical learning.

In recognition of the student's work in the CS side of the joint major, the normal elective units required for Philosophy majors are reduced by 5 units for joint majors. Thus, the joint major requires 50 units within Philosophy.

Because logic is a core area of intersection between Philosophy and CS, students are in the best position to leverage the intersection of their work in the two fields if they develop a strong background in logical methods, and have a clear understanding of the way those formal methods are or can be used within Philosophy. Joint majors are therefore required to complete training in logic at least through successful completion of PHIL 150.

Thus, the Philosophy requirements of the joint major are:

1. An Introductory course (numbered under 100)
2. PHIL 80 (writing in the major)
3. Core requirements in philosophy
  - a. One course in logic (PHIL 150 or higher);
  - b. One course in philosophy of science;
  - c. One course in moral or political philosophy (normally PHIL 2 or PHIL 170s)
  - d. One course in contemporary theoretical philosophy (PHIL 180s)
  - e. Two courses in the history of philosophy, namely
    - i PHIL 100 (ancient philosophy)
    - ii PHIL 102 (modern philosophy)
4. Capstone seminar within philosophy (PHIL 194s)
5. Expected integrative independent capstone project
6. Electives sufficient to bring the student's overall program up to a minimum total of 50 units in Philosophy.

Units for Independent Work, Directed Reading, the Dualist, and Honors Seminar (PHIL 196, 197, 198, 199) do not count toward the overall requirement of 50 units within Philosophy. No more than 10 units of courses completed with grades of 'Satisfactory' or 'Credit' may be counted toward the 50-unit requirement. Units taken for a letter grade in fulfillment of the core requirements listed under 3. must be completed with a grade of 'C-' or higher.

Students in the joint major should register their major declaration not only with the Director of Undergraduate Study (DUS) of Philosophy but also with the joint major's faculty adviser in Philosophy. In consultation with the faculty adviser (ideally beginning in the sophomore year), each joint major should work out an individualized program of courses to

develop her/his philosophical interests and to explore the connections between them and her/his interests in computation. Each student should meet with the faculty adviser quarterly for a program update, during which there is discussion of opportunities for integrating the ongoing work in Philosophy and CS through course work, employment, projects, or other extracurricular activities. The faculty adviser assists students to develop coherent programs of study leading toward integrative senior experiences. If the normal expectation of a senior project turns out not to be suitable in individual cases, the student must obtain approval in writing from the faculty adviser of the substitute integrative activities and the faculty advisor of the joint major.

## Learning Objectives

Because the joint major seeks to develop deep disciplinary knowledge within Philosophy, the learning objectives of the general philosophy major also apply in the case of the joint major. In this aspect, students are expected to demonstrate:

1. the ability to communicate philosophical ideas effectively orally and in writing.
2. close reading, argument evaluation, and analytical writing.
3. dialectical ability to identify strengths and weaknesses of an argument and devise appropriate and telling responses.
4. the ability to think critically and demonstrate clarity of conceptualization.
5. the ability to differentiate good from unpromising philosophical questions.
6. the ability to sustain an argument of substantial scope, showing control over logical, argumentative, and evidential relations among its parts.

In addition, the joint major has the ambition to develop key knowledge and capacities that are relevant to the intersection of Philosophy and CS. In this domain, students in the joint major are expected to:

1. develop problem solving skills suitable to their work in the Computer Science side of the major, in accordance with learning goals specified for the joint major by Computer Science.
2. develop mastery of logical and formal methods adequate to support their work at the intersection of computing and philosophy.
3. demonstrate a deep understanding of at least one particular area of intersection between the two fields, or of how methods and ideas from one of the disciplines can inform or be applied to the other.

## Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axxess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

## Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) . Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

## Transcript and Diploma

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

## Minor in Philosophy

A minor in Philosophy consists of at least 30 units of Philosophy courses satisfying the following conditions:

1. Students taking a Philosophy Thinking Matters course may count it as equivalent to a maximum of 4 units of Philosophy courses under 100. Students who took the Winter/Spring Philosophy Introduction to the Humanities (IHUM) track may count these courses as equivalent to a maximum of 5 units of Philosophy courses under 100. (IHUM courses are no longer offered).
2. The 30 units must include one of:
  - a. a history of philosophy course numbered 100 or above
  - b. one quarter of Philosophy Thinking Matters (THINK)
  - c. two quarters of IHUM (only 5 of the 10 units can count towards 30-unit requirement). IHUM courses are no longer offered.
3. Minors must take one course from any two of the following three areas (PHIL):
  - a. Philosophy of Science and Logic: For philosophy of science, either PHIL 60, PHIL 61, or an intermediate philosophy of science courses numbered between PHIL 160 - 169; or else, for logic, one of:
 

PHIL 49	Survey of Formal Methods	4
PHIL 150	Mathematical Logic	4
PHIL 151	Metalogic	4
PHIL 154	Modal Logic	4
  - b. Logic
  - c. Moral and political philosophy: This requirement may be satisfied by PHIL 2 or any intermediate course devoted to central topics in moral and political philosophy numbered between PHIL 170 - 172, or 174-176.
  - d. Contemporary theoretical philosophy: This requirement may be satisfied by most intermediate courses numbered between PHIL 180 - 189.
4. At least 10 units must be from courses numbered 100 or above.
5. Transfer units must be approved in writing by the Director of Undergraduate Study at the time of declaring. The number of transfer units is generally limited to a maximum of 10.
6. No more than 6 units completed with grades of 'satisfactory' or 'credit' count towards the 30-unit requirement.
7. Any courses taken for a letter grade in fulfillment of the 30-unit requirement must be taken for a minimum of 3 units and completed with a grade of 'C-' or higher.
8. Units for tutorials, directed reading, and affiliated courses may not be counted.

Students must declare their intention to minor in Philosophy in a meeting with the Director of Undergraduate Study. This formal declaration must be made no later than the last day of the quarter two quarters before degree conferral. The Permission to Declare a Philosophy Minor (signed by the Director of Undergraduate Study) lists courses taken and to be taken to fulfill minor requirements. This permission is on file in the department office. Before graduation, a student's record is checked to see that requirements have been fulfilled, and the results are reported to the University Registrar.

## Master of Arts in Philosophy

University requirements for the M.A. are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

Three programs lead to the M.A. in Philosophy. One is a general program providing a grounding in all branches of the subject. The others provide special training in one branch.

## Coterminal Bachelor's and Master's Degrees in Philosophy

It is possible to earn an M.A. in Philosophy while earning a B.A. or B.S. This can usually be done by the end of the fifth undergraduate year, although a student whose degree is not in Philosophy may require an additional year. Standards for admission to, and completion of, this program are the same as for M.A. applicants who already have the bachelor's degree when matriculating. Applicants for the coterminal program are not, however, required to take the Graduate Record Exam.

University requirements for the coterminal M.A. are described in the "Coterminal Bachelor's and Master's Degrees (p. 46)" section of this bulletin. See also the Registrar's Coterminal Degree Programs (<https://registrar.stanford.edu/students/coterminal-degree-programs>) web site.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

### Admissions

All prospective master's students, including those currently enrolled in other Stanford programs, must apply for admission to the program. No fellowships are available. Entering students must meet with the director of the master's program and have their advisor's approval, in writing, of program proposals. The master's program should not be considered a stepping stone to the doctoral program; these two programs are separate and distinct.

### Unit Requirements

Each program requires a minimum of 45 units in philosophy. Students in a special program may be allowed or required to replace up to 9 units of philosophy by 9 units in the field of specialization. Although the requirements for the M.A. are designed so that a student with the equivalent of a strong undergraduate philosophy major at Stanford might complete them in one year, most students need longer. Students should also keep in mind that although 45 units is the minimum required by the University, quite often more units are necessary to complete department requirements. Up to 6 units of directed reading in philosophy may be allowed. There is no thesis requirement, but an optional master's thesis

or project, upon faculty approval, may count as the equivalent of up to 8 units. A special program may require knowledge of a foreign language. At least 45 units in courses numbered 100 or above must be completed with a grade of 'B-' or better at Stanford. Students are reminded of the University requirements for advanced degrees, and particularly of the fact that for the M.A., students must complete three full quarters as measured by tuition payment.

## General Program

The General Program requires a minimum of 45 units in Philosophy courses numbered above 99. These courses must be taken for a letter grade, and the student must receive at least a 'B-' in the course. Courses taken to satisfy the undergraduate core or affiliated courses may not be counted in the 45 units. The requirement has three parts:

### 1. Undergraduate Core

Students must have when they enter, or complete early in their program, the following undergraduate courses (students entering from other institutions should establish equivalent requirements with a master's adviser upon arrival or earlier):

#### a. Logic:

Select one of the following:

PHIL 49	Survey of Formal Methods	4
PHIL 150	Mathematical Logic	4
PHIL 151	Metalogic	4
PHIL 154	Modal Logic	4

- b. Philosophy of science: This requirement may be satisfied by PHIL 60, PHIL 61, or any intermediate philosophy of science course numbered between PHIL 160 - 169.
- c. Moral and political philosophy: This requirement may be satisfied by any intermediate course devoted to central topics in moral and political philosophy numbered between PHIL 170 - 172, or PHIL 174-176.
- d. Contemporary theoretical philosophy: This requirement may be satisfied by any intermediate course numbered between PHIL 180 - 189.
- e. History of philosophy: two history of philosophy courses numbered 100 or above

### 2. Graduate Core

Students must take at least one course numbered over 105 from three of the following five areas (courses used to satisfy the undergraduate core cannot also be counted toward satisfaction of the graduate core). Crosslisted and other courses taught outside the Department of Philosophy do not count towards satisfaction of the core.

- a. Logic and semantics
- b. Philosophy of science and history of science
- c. Ethics, value theory, and moral and political philosophy
- d. Metaphysics, epistemology, philosophy of mind, and philosophy of language
- e. History of philosophy

### 3. 200-Level Course Requirement

Each master's candidate must take at least two courses numbered above 200; these cannot be graduate sections of undergraduate courses.

### 4. Specialization

Students must take at least three courses numbered over 105 in one of the five areas.

Units

## Special Program in Symbolic Systems

Students should have the equivalent of the Stanford undergraduate major in Symbolic Systems. Students who have a strong major in one of the basic SSP disciplines (philosophy, psychology, linguistics, computer science) may be admitted, but are required to do a substantial part of the undergraduate SSP core in each of the other basic SSP fields. This must include the following philosophy courses:

		Units
PHIL 80	Mind, Matter, and Meaning	5
PHIL 151	Metalogic	4
And one of the following:		
PHIL 181	Philosophy of Language	4
PHIL 184	Epistemology	4
PHIL 186	Philosophy of Mind	4
PHIL 187	Philosophy of Action	4

This work does not count towards the 45-unit requirement.

### Course Requirements

- Four courses in philosophy at the graduate level (numbered 200 or above), including courses from three of the following five areas:
  - Philosophy of language
  - Logic
  - Philosophy of mind
  - Metaphysics and epistemology
  - Philosophy of science

At most two of the four courses may be graduate sections of undergraduate courses numbered 100 or higher.

- Three courses numbered 100 or higher from outside Philosophy, chosen in consultation with an advisor. These courses should be from two of the following four areas:
  - Psychology
  - Linguistics
  - Computer Science
  - Education

Remaining courses are chosen in consultation with and approved by an advisor.

## Special Program in the Philosophy of Language

Admission is limited to students with substantial preparation in philosophy or linguistics. Those whose primary preparation has been in linguistics may be required to satisfy all or part of the undergraduate core requirements as described in the "General Program" subsection above. Those whose preparation is primarily in philosophy may be required to take additional courses in linguistics.

### Course Requirements

- Philosophy of language: two approved courses in the philosophy of language numbered 180 or higher.
- Syntactic theory and generative grammar:

PHIL 384	Seminar in Metaphysics and Epistemology	4
LINGUIST 230A	Introduction to Semantics and Pragmatics	4

- Logic: at least two approved courses numbered PHIL 151 Metalogic or higher.
- An approved graduate-level course in mathematical linguistics or automata theory.

## Doctor of Philosophy in Philosophy

Prospective graduate students should see the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site for information and application materials. Applicants should take the Graduate Record Examination by October of the year the application is submitted.

The University's basic requirements for the Ph.D. degree including residence, dissertation, and examination are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

The requirements detailed here are department requirements. These requirements are meant to balance structure and flexibility in allowing students, in consultation with their advisers, to take a path through the program that gives them a rigorous and broad philosophical education, with room to focus on areas of particular interest, and with an eye to completing the degree with an excellent dissertation and a solid preparation for a career in academic philosophy.

Normally, all courses used to satisfy the distribution requirements for the Philosophy Ph.D. are Stanford courses taken as part of a student's graduate program. In special circumstances, a student may petition to use a very small number of graduate-level courses taken at other institutions to satisfy a distribution requirement. To be approved for this purpose, the student's work in such a graduate-level course would need to involve an appropriate subject matter and would need to be judged by the department to be at the level of an 'A' in a corresponding graduate-level course at Stanford.

Courses used to satisfy any course requirement in Philosophy (except Teaching Methods and the summer Dissertation Development Seminar) must be passed with a letter grade of 'B-' or better (no satisfactory/no credit), except in the case of a course/seminar used to satisfy the third-year course/seminar requirement and taken for only 2 units. Such a reduced-unit third-year course/seminar must be taken credit/no credit.

At the end of each year, the department reviews the progress of each student to determine whether the student is making satisfactory progress, and on that basis to make decisions about probationary status and termination from the program where appropriate.

Any student in one of the Ph.D. programs may apply for the M.A. when all University and department requirements have been met.

### Proficiency Requirements

- First-year Ph.D. Proseminar*: a one quarter, topically focused seminar offered in Autumn Quarter, and required of all first-year students.
- Distribution requirements during the first six quarters*. Intended to ensure a broad and substantial exposure to major areas of philosophy while allowing for considerable freedom to explore.

- six courses, each taken for the full unit load for the course, distributed across three areas as follows:
  - two courses in value theory including ethics, aesthetics, political philosophy, social philosophy, philosophy of law. At least one of the courses satisfying this distribution requirement must be in ethics or political philosophy.
  - Two courses in language, mind, and action. One course satisfying this requirement must be drawn from the language related courses, and one from mind and action related courses.
  - two courses in metaphysics and epistemology (including metaphysics, epistemology, philosophy of science). At least one of the courses satisfying this requirement must be drawn from either metaphysics or epistemology.
  - Instructors indicate which courses may satisfy particular requirements. If a course potentially satisfies more than one

Units



requirement the student may use it for only one of those area requirements; no units may be double-counted. Students must develop broad competencies in all these areas. Those without strong backgrounds in these areas would normally satisfy these distribution requirements by taking more basic courses rather than highly specialized and focused courses. Students should consult with their adviser in making these course decisions, and be prepared to explain these decisions when reviewed for candidacy; see requirement 6 below.

- b. Logic requirement: PHIL 150 Mathematical Logic or equivalent.
- c. History/logic requirement. One approved course each in ancient and modern philosophy, plus either another approved history of philosophy course or PHIL 151 Metalogic.
- d. Students should normally take at least 64 graduate level units at Stanford during their first six quarters (in many cases students would take more units than that) and of those total units, at least 49 units of course work are to be in the Philosophy department. These courses must be numbered above 110, but not including Teaching Methods (PHIL 239 Teaching Methods in Philosophy) or affiliated courses. Units of Individual Directed Reading are normally not to be counted toward this 49-unit requirement unless there is special permission from the student's adviser and the Director of Graduate Studies.

### 3. *Writing Requirement*

A qualifying paper of professional quality and approximately 8000 words. Students must complete a version of the paper, which is itself likely to be a revision of a paper written during the first year of course work, by the first day of their fourth quarter. The paper is read by a committee of two faculty who make suggestions for additional revision. The final version must be submitted by the first day of the sixth quarter, normally Spring Quarter of the second year.

### 4. *Teaching Assistancy*

A minimum of five quarters of teaching assistancy are required for the Ph.D. Normally one of these quarters is as a teaching assistant for the Philosophy Department's Writing in the Major course, PHIL 80 Mind, Matter, and Meaning. It is expected that students not teach in their first year and that they teach no more than two quarters in their second year. Students are required to take PHIL 239 Teaching Methods in Philosophy during Spring Quarter of their first year and during Autumn Quarter of their second year. Teaching is an important part of students' preparation to be professional philosophers.

### 5. *Review at the End of the Second Year for Advancement to Candidacy*

The faculty's review of each student includes a review of the student's record, an assessment of the qualifying paper, and an assessment of the student's preparation for work in her/his intended area of specialization, as well as recommendations of additional preparation, if necessary.

### 6. *Candidacy*

To continue in the Ph.D. program, each student must apply for candidacy during the sixth academic quarter, normally the Spring Quarter of the student's second year. Students may be approved for or denied candidacy by the end of that quarter by the department.

In some cases, where there are only one or two outstanding deficiencies, the department may defer the candidacy decision and require the student to re-apply for candidacy in a subsequent quarter.

In such cases, definite conditions for the candidacy re-application will be specified, and the student must work with his/her adviser and the DGS to meet those conditions in a timely fashion. A failure to maintain timely progress in satisfying the specified conditions will constitute grounds for a denial of advancement to candidacy.

- 7. Dissertation Development Seminar in the summer after the second year. This is the point at which students are expected to transition from spending much of their time on coursework to focusing on their

thesis project. By the end of the summer, students are expected to have a plan for moving forward with the project in the third year; they should have formed advising relationships with faculty and should have made headway towards identifying a specific topic.

- 8. Upon completion of the summer dissertation development seminar, students will sign up for independent study credit, PHIL 240 Individual Work for Graduate Students, with their respective advisers each quarter. A plan at the beginning, and a report at the end of each quarter will be signed by both student and adviser and submitted to the Graduate Administrator for inclusion in the student's file. This will be the process every quarter up until the completion of the departmental oral.
- 9. In autumn and winter quarters of the third year, students will register in and satisfactorily complete PHIL 301 Dissertation Development Proseminar. Students meet to present their work in progress and discuss their thesis project. Participation in these seminars is required.
- 10. During the third and fourth years in the program, a student should complete at least three graduate-level courses/seminars, at least two of them in philosophy (a course outside philosophy can be approved by the adviser), and at least two of them in the third year. The three seminars can be taken credit/no-credit for reduced (2) units. Courses required for candidacy are not counted toward satisfaction of this requirement. This light load of courses allows students to deepen their philosophical training while keeping time free for thesis research.
- 11. *Dissertation Work and Defense*

The third and following years are devoted to dissertation work. The few requirements in this segment of the program are milestones to encourage students and advisers to ensure that the project is on track.

- a. *Dissertation Proposal*—By Spring Quarter of the third year, students should have selected a dissertation topic and committee. A proposal sketching the topic, status, and plan for the thesis project, as well as an annotated bibliography or literature review indicating familiarity with the relevant literature, must be received by the committee one week before the meeting on graduate student progress late in Spring Quarter. The dissertation proposal and the reading committee's report on it will constitute a substantial portion of the third year review.
- b. *Departmental Oral*—During Autumn Quarter of the fourth year, students take an oral examination based on at least 30 pages of written work, in addition to the proposal. The aim of the exam is to help the student arrive at an acceptable plan for the dissertation and to make sure that student, thesis topic, and advisors make a reasonable fit. It is an important chance for the student to clarify their goals and intentions with the entire committee present.
- c. *Fourth-Year Colloquium*—No later than Spring Quarter of the fourth year, students present a research paper in a 60-minute seminar open to the entire department. This paper should be on an aspect of the student's dissertation research. This is an opportunity for the student to make their work known to the wider department, and to explain their ideas to a general philosophical audience.
- d. *University Oral Exam*—Ph.D. students must submit a completed draft of the dissertation to the reading committee at least one month before the student expects to defend the thesis in the University oral exam. If the student is given consent to go forward, the University oral can take place approximately two weeks later. A portion of the exam consists of a student presentation based on the dissertation and is open to the public. A closed question period follows. If the draft is ready by Autumn Quarter of the fourth year, the student may request that the University oral count as the departmental oral.

## Interdisciplinary Study

The department supports interdisciplinary study. Courses in Stanford's other departments and programs may be counted towards the degree, and course requirements in Philosophy are designed to allow students considerable freedom in taking such courses. Dissertation committees may include members from other departments. Where special needs arise, the department is committed to making it possible for students to obtain a philosophical education and to meet their interdisciplinary goals. Students are advised to consult their advisers and the department's student services office for assistance.

## Interdepartmental Programs

### Graduate Program in Cognitive Science

Philosophy participates with the departments of Computer Science, Linguistics, and Psychology in an interdisciplinary program in Cognitive Science. It is intended to provide an interdisciplinary education, as well as a deeper concentration in philosophy, and is open to doctoral students. Students who complete the requirements within Philosophy and the Cognitive Science requirements receive a special designation in Cognitive Science along with the Ph.D. in Philosophy. To receive this field designation, students must complete 30 units of approved courses, 18 of which must be taken in two disciplines outside of philosophy. The list of approved courses can be obtained from the Cognitive Science program located in the Department of Psychology.

### Special Track in Philosophy and Symbolic Systems

Students interested in interdisciplinary work relating philosophy to artificial intelligence, cognitive science, computer science, linguistics, or logic may pursue a degree in this program.

*Prerequisites*—Admitted students should have covered the equivalent of the core of the undergraduate Symbolic Systems Program requirements as described in the "Symbolic Systems (p. 760)" section of this bulletin, including courses in artificial intelligence (AI), cognitive science, linguistics, logic, and philosophy. The graduate program is designed with this background in mind. Students missing part of this background may need additional course work. In addition to the required course work below, the Ph.D. requirements are mostly the same as for the regular program, with the exceptions noted below.

*Courses of Study*—The program consists of three years of courses and two years of dissertation work. Students are required to take the following philosophy courses in the first two years:

1. Proseminar
2. Two courses in Language/Mind/Action
3. Two courses in Metaphysics/Epistemology/Science
4. Two courses in Value Theory
5. One course each in Ancient and Modern  
*Among the eight courses required by 2-5, students in the program may omit two, in any two of the four categories. The two omitted courses may not come from the same category.*
6. One advanced course in logic, at the level of Phil 151 or higher
7. Two graduate courses in cognitive psychology
8. Two graduate courses in computer science, one of which must be either CS 221 Artificial Intelligence: Principles and Techniques or a more advanced course in AI.
9. Two graduate courses in linguistics.  
*From categories 7-9, at least one of these courses must significantly engage with experimental literature.*
10. 64 graduate-level units, 49 of which are units in philosophy, during the first six quarters.
11. A second-year paper, which need not be on a topic in symbolic systems, but could be on any philosophical topic.  
*After the first 2 years, the requirements are mostly the same as for the standard track:*

12. Three graduate-level seminars in the third and fourth year, at least two of which are taught in the Philosophy department, and at least two of which are in the third year. [All can be taken credit/no credit for reduced (2) units.]
13. Three advanced seminars in symbolic systems. Double counting: at most one of these could be a course satisfying one of 1-5; at most one could be a course satisfying one of 6-9; and at most one could be a course satisfying 11. At least one must not be counted for any other requirement. (In other words, at most two of these courses could count toward other requirements.) These may be completed any time before the fourth year.
14. Five quarters serving as a course TA, and taking the Teaching Methods in Philosophy (PHIL 239) course.
15. Dissertation Development Seminar in the summer after the second year.
16. The usual requirements for the dissertation (proposal, oral, 4th year talk, etc.).
17. The dissertation committee must include at least one member of the Department of Philosophy and one member of the Program in Symbolic Systems outside the Department of Philosophy.

### Joint Program in Ancient Philosophy

This program is jointly administered by the Departments of Classics and Philosophy and is overseen by a joint committee composed of members of both departments. It provides students with the training, specialist skills, and knowledge needed for research and teaching in ancient philosophy while producing scholars who are fully trained as either philosophers with a strong specialization in ancient languages and philology, or classicists with a concentration in philosophy.

Students are admitted to the program by either department. Graduate students admitted by the Philosophy department receive their Ph.D. from the Philosophy department; those admitted by the Classics department receive their Ph.D. from the Classics department. For Philosophy graduate students, this program provides training in classical languages, literature, culture, and history. For Classics graduate students, this program provides training in the history of philosophy and in contemporary philosophy.

Each student in the program is advised by a committee consisting of one professor in each department.

*Requirements for Philosophy Graduate Students:* These are the same as the proficiency requirements for the Ph.D. in Philosophy.

One year of Greek is a requirement for admission to the program. If students have had a year of Latin, they are required to take 3 courses in second- or third-year Greek or Latin, at least one of which must be in Latin. If they have not had a year of Latin, they are then required to complete a year of Latin, and take two courses in second- or third-year Greek or Latin.

Students are also required to take at least three courses in ancient philosophy at the 200 level or above, one of which must be in the Classics department and two of which must be in the Philosophy department.

### Ph.D. Subplan in History and Philosophy of Science

Graduate students in the Philosophy Ph.D. program may pursue a Ph.D. subplan in History and Philosophy of Science. The subplan is declared in Axx and subplan designations appear on the official transcript, but are not printed on the diploma. Students must fulfill Departmental degree requirements and the following requirements:

1. Attendance at the HPS colloquium series.
2. Philosophy of Science courses:

Select one of the following:

PHIL 263	Significant Figures in Philosophy of Science: Einstein	4	<i>Associate Professors:</i> Mark Crimmins, Graciela De Pierris, David Hills (Teaching)(on leave), Nadeem Hussain
PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence	4	<i>Assistant Professors:</i> Juliana Bidadanure, Rosa Cao, Jorah Dannenberg, Thomas Icard, Barry Maguire, Anna-Sara Malmgren
PHIL 264A		4	
PHIL 265	Philosophy of Physics: Philosophical Issues in Quantum Mechanics	4	<i>Courtesy Professors:</i> Eamonn Callan, Reviel Netz, Josiah Ober, Rob Reich, Thomas Sheehan
PHIL 265C	Philosophy of Physics: Probability and Relativity	4	<i>Visiting Professor:</i> Kendall Walton (Spring)
PHIL 266	Probability: Ten Great Ideas About Chance	4	<i>Visiting Assistant Professor:</i>
PHIL 267A	Philosophy of Biology	4	<i>Consulting Professor:</i> Paul Skokowski
PHIL 267B	Philosophy, Biology, and Behavior	4	

3. One elective seminar in the history of science.

4. One elective seminar (in addition to the course satisfying requirement 2) in philosophy of science.

## Ph.D. Minor in Philosophy

To obtain a Ph.D. minor in Philosophy, students must follow these procedures:

1. Consult with the Director of Graduate Study to establish eligibility, and select a suitable adviser.
2. Give to the graduate administrator a signed copy of the program of study (designed with the adviser) which offers:
  - a. 30 units of courses in the Department of Philosophy with a letter grade of 'B-' or better in each course. No more than 3 units of directed reading may be counted in the 30-unit requirement.
  - b. At least one course or seminar numbered over 99 to be taken in each of these six areas:
    - i Logic
    - ii Philosophy of science
    - iii Ethics, value theory, and moral and political philosophy
    - iv Metaphysics and epistemology
    - v Language, mind and action
    - vi History of philosophy
  - c. Two additional courses numbered over 199 to be taken in one of those (b) six areas.
3. A faculty member from the Department of Philosophy (usually the student's adviser) serves on the student's doctoral oral examination committee and may request that up to one third of this examination be devoted to the minor subject.
4. Paperwork for the minor must be submitted to the department office before beginning the program.

*Emeriti (Professors):* Dagfinn Føllesdal, John Perry, Thomas Wasow, Allen Wood, Rega Wood, Denis Phillips (Courtesy Professor)

*Chair:* Mark Crimmins

*Director of Graduate Study:* Michael Bratman

*Director of Undergraduate Study:* Nadeem Hussain

*Honors Director and Undergraduate Outreach Coordinator:* Nadeem Hussain

*Faculty Advisor for Joint Major with Computer Science:* Thomas Icard

*Professors:* R. Lanier Anderson, Chris Bobonich, Michael Bratman, Rachael Briggs, Alan Code, John Etchemendy, Michael Friedman, Krista Lawlor (on leave), Helen Longino, Thomas Ryckman (Teaching), Debra Satz (on leave), Brian Skyrms (Spring), Kenneth Taylor, Johan van Benthem (Spring)

### Cognate Courses

The following courses have substantial philosophical content. However, in the absence of special permission these courses cannot generally be used to satisfy requirements for the Philosophy major or graduate degrees in Philosophy.

		<b>Units</b>
CLASSICS 181	Classical Seminar: Origins of Political Thought	4-5
ETHICSOC 136R	Introduction to Global Justice	4
ETHICSOC 185M	Contemporary Moral Problems	4-5
MATH 161	Set Theory	3
OSPPARIS 77	Literature and Philosophy of Place	4-5
RELIGST 183	Atheism: Hegel to Heidegger	5
RELIGST 279	After God: Why religion at all?	4

# PHYSICS

Courses offered by the Department of Physics are listed under the subject code PHYSICS on the Stanford Bulletin's ExploreCourses web site.

## Mission of the Undergraduate Program in Physics

The mission of the undergraduate program in Physics is to provide students with a strong foundation in both classical and modern physics. The goal of the program is to develop both quantitative problem solving skills and the ability to conceive experiments and analyze and interpret data. These abilities are acquired through both course work and opportunities to conduct independent research. The program prepares students for careers in fields that benefit from quantitative and analytical thinking, including physics, engineering, teaching, medicine, law, science writing, and science policy, in government or the private sector. In some cases, the path to this career will be through an advanced degree in physics or a professional program.

## Learning Outcomes (Undergraduate)

Students develop an understanding of the fundamental laws that govern the universe, and a strong foundation of mathematical, analytical, laboratory, and written communication skills. They will also be presented with opportunities for learning through research. Upon completion of the Physics degree, students should have acquired the following knowledge and skills:

1. a thorough quantitative and conceptual understanding of the core areas of physics, including mechanics, electricity and magnetism, thermodynamics, statistical physics, and quantum mechanics, at a level compatible with admission to graduate programs in physics at peer institutions.
2. the ability to analyze and interpret quantitative results, both in the core areas of physics and in complex problems that cross multiple core areas.
3. the ability to apply the principles of physics to solve new and unfamiliar problems. This ability is often described as "thinking like a physicist."
4. the ability to use contemporary experimental apparatus and analysis tools to acquire, analyze and interpret scientific data.
5. the ability to communicate scientific results effectively in written papers and presentations or posters.

## Course Work

The course work is designed to provide students with a sound foundation in both classical and modern physics. Students who wish to specialize in astronomy, astrophysics, or space science should also consult the "Astronomy Program (p. 406)" section of this bulletin.

Three introductory series of courses include labs in which undergraduates carry out individual experiments. The Intermediate and Advanced Physics Laboratories offer facilities for increasingly complex individual work, including the conception, design, and fabrication of laboratory equipment. Undergraduates are also encouraged to participate in research; most can do this through the senior thesis and/or the summer research program.

The study of physics is undertaken by three principal groups of undergraduates: those including physics as part of a general education; those preparing for careers in professional fields that require a knowledge of physics, such as medicine or engineering; and those preparing for careers in physics or related fields, including teaching and research in colleges and universities, research in federally funded laboratories and industry, and jobs in technical areas. Physics courses

numbered below 100 are intended to serve all three of these groups. The courses numbered above 100 mainly meet the needs of the third group, but also of some students majoring in other branches of science and engineering.

## Entry-Level Sequences in Physics

The Department of Physics offers three year-long, entry-level physics sequences, the PHYSICS 20, 40, and 60 series. The first of these (the 20 series) is non-calculus-based, and is intended primarily for those who are majoring in biology. Students with AP Physics credit, particularly those who are considering research careers, may wish to consider taking the PHYSICS 40 series, rather than using AP placement. These introductory courses provide a depth and emphasis on problem solving that has significant value in biological research, given today's considerable physics-based technology.

For those intending to major in engineering or the physical sciences, or simply wanting a stronger background in physics, the department offers the PHYSICS 40 and 60 series. Either of these satisfies the entry-level physics requirements of any Stanford major. The 60 series is intended for those who have already taken a Physics course at the level of the 40 series, or at least have a strong background in mechanics, some background in electricity and magnetism, and a strong background in calculus.

The PHYSICS 40 series begins with PHYSICS 41 Mechanics in Winter Quarter, PHYSICS 43 Electricity and Magnetism in Spring Quarter, and PHYSICS 45 Light and Heat in Autumn Quarter. While it is recommended that most students begin the sequence with PHYSICS 41 in Winter Quarter, those who have had strong physics preparation in high school (such as a score of at least 4 on the Physics AP C exam) may start the sequence with PHYSICS 45 in Autumn Quarter.

PHYSICS 41A and PHYSICS 43A are optional 1 unit companion courses to PHYSICS 41 and PHYSICS 43 respectively. They provide additional problem solving for students with less preparation in math and physics.

The Physics Tutoring Center offers help to students in the Entry-Level courses. It is staffed Monday through Friday.

## Entry-Level Course List

One course from the following is recommended for the humanities or social science student who wishes to become familiar with the methodology and content of modern physics:

		Units
PHYSICS 15	Stars and Planets in a Habitable Universe	3
PHYSICS 16	The Origin and Development of the Cosmos	3
PHYSICS 17	Black Holes and Extreme Astrophysics	3
PHYSICS 19	How Things Work: An Introduction to Physics (not offered 2017-18)	3

The 20 series (below) is recommended for general students and for students preparing for medicine or biology:

		Units
PHYSICS 21	Mechanics, Fluids, and Heat	4
PHYSICS 22	Mechanics, Fluids, and Heat Laboratory	1
PHYSICS 23	Electricity, Magnetism, and Optics	4
PHYSICS 24	Electricity, Magnetism, and Optics Laboratory	1
PHYSICS 25	Modern Physics	4
PHYSICS 26	Modern Physics Laboratory	1

The 40 series (below) is for students majoring in engineering, chemistry, earth sciences, mathematics, or physics:

PHYSICS 41	Mechanics	4
PHYSICS 42	Classical Mechanics Laboratory	1
PHYSICS 43	Electricity and Magnetism	4
PHYSICS 44	Electricity and Magnetism Lab	1
PHYSICS 45	Light and Heat	4
PHYSICS 46	Light and Heat Laboratory	1

The 60 series (below), or advanced freshman series, is for students who have had strong preparation in physics and calculus in high school. Students who have had the appropriate background and wish to major in physics should take this introductory series:

PHYSICS 61	Mechanics and Special Relativity	4
PHYSICS 62	Mechanics Laboratory	1
PHYSICS 63	Electricity, Magnetism, and Waves	4
PHYSICS 64	Electricity, Magnetism and Waves Laboratory	1
PHYSICS 65	Quantum and Thermal Physics	4
PHYSICS 67	Introduction to Laboratory Physics	2

### Physics Placement Diagnostic

Students who are planning to take either of the calculus-based sequences (PHYSICS 40 or 60 sequence) are advised to take the Physics Placement Diagnostic (<https://web.stanford.edu/group/canvas/cgi-bin/www/discovery.php>) that is offered twice at the beginning of the school year: during New Student Orientation and on the evening of the first day of instruction in the Autumn Quarter. Advice will be sent to each student with guidance on placement in the 40 or 60 sequence. See the department's Placement Diagnostic (<https://physics.stanford.edu/academics/undergraduate-students/placement-diagnostic>) page for details. Students who do not plan to take the 40 or 60 sequence do not need to take the Placement Diagnostic.

## Graduate Programs in Physics

Graduate students find opportunities for research in the fields of astrophysics, particle astrophysics, cosmology, experimental particle physics, particle theory, string theory, intermediate energy physics, low temperature physics, condensed matter physics, materials research, atomic physics, laser physics, quantum electronics, coherent optical radiation, novel imaging technologies, and biophysics. Faculty advisers are drawn from many departments, including Physics, Applied Physics, Materials Science and Engineering, Electrical Engineering, and Biology. Opportunities for research are also available with the faculty at SLAC in the areas of theoretical and experimental particle physics, particle astrophysics, cosmology, accelerator design, and photon science.

The number of graduate students admitted to the Department of Physics is strictly limited. Students should submit applications by Tuesday, December 12, 2017 for matriculation the following Autumn Quarter. Graduate students may normally enter the department only at the beginning of Autumn Quarter.

### Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in physics and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis using the tools of Physics. Through completion of advanced course work and rigorous skills training, the doctoral program

**Units** prepares students to make original contributions to the knowledge of physics and to interpret and present the results of such research.

### Fellowships and Assistantships

The Department of Physics makes an effort to support all its graduate students through fellowships, teaching assistantships, research assistantships, or a combination of sources. More detailed information is provided with the offer of admission.

## Laboratories and Institutes

The Russell H. Varian Laboratory of Physics, the Physics and Astrophysics Building, the W. W. Hansen Experimental Physics Laboratory (HEPL), the E. L. Ginzton Laboratory, the Center for Nanoscale Science and Engineering and the Geballe Laboratory for Advanced Materials (GLAM) together house a range of physics activities from general courses through advanced research. Ginzton Lab houses research on optical systems, including quantum electronics, metrology, optical communication and development of advanced lasers. GLAM houses research on novel and nanopatterned materials, from high-temperature superconductors and magnets to organic semiconductors, subwavelength photon waveguides, and quantum dots. GLAM also supports the materials community on campus with a range of characterization tools: it is the site for the Stanford Nanocharacterization Lab (SNL) and the NSF-sponsored Center for Probing the Nanoscale (CPN). The SLAC National Accelerator Laboratory is just a few miles from the Varian Laboratory. SLAC is a national laboratory funded by the Offices of Basic Energy Sciences and High Energy Physics of the Department of Energy. Scientists at SLAC conduct research in photon science, accelerator physics, particle physics, astrophysics and cosmology. The laboratory hosts a two-mile-long linear accelerator that can accelerate electrons and positrons. The Stanford Synchrotron Radiation Light Source (SSRL) uses intense x-ray beams produced with a storage ring on the SLAC site. The Linac Coherent Light Source (LCLS), completed in 2009, is the world's first x-ray free-electron laser and has opened new avenues of research in ultra-fast photon science.

The Kavli Institute for Particle Astrophysics and Cosmology (KIPAC), formed jointly with the SLAC National Accelerator Laboratory, provides a focus for theoretical, computational, observational, and instrumental research programs. A wide range of research areas in particle astrophysics and cosmology are investigated by students, postdocs, research staff and faculty. The two major projects with which KIPAC is heavily involved are the Fermi Gamma-Ray Space Telescope (FGST) and the Large Synoptic Survey Telescope (LSST). KIPAC members also participate fully in the Cryogenic Dark Matter Search (CDMS), the Solar Dynamics Observatory (SDO), the EXO-200 double beta decay experiment, the Dark Energy Survey (DES), the NuSTAR and Astro-H X-ray satellites, and several cosmic microwave background experiments (BICEP, KECK, QUIET and POLAR-1).

The Ginzton Laboratory, HEPL, GLAM, KIPAC, SLAC, and SSRL are listed in the "Centers, Laboratories, and Institutes (p. 846)" section of this bulletin. Students may also be interested in research and facilities at two other independent labs: the Center for Integrated Systems, focused on electronics and nanofabrication; and the Clark Center, an interdisciplinary biology, medicine, and bioengineering laboratory.

The Stanford Institute for Theoretical Physics is devoted to the investigation of the basic structure of matter (particle theory, string theory, M-theory, quantum cosmology, condensed matter physics).

## Physics Course Numbering System

Course numbers beyond 99 are numbered in accordance with a three-digit code. The first digit indicates the approximate level of the course:

Digit	Description
100	intermediate and advanced undergraduate courses
200	first-year graduate courses
300	more advanced courses
400	research, special, or current topics

The second digit indicates the general subject matter:

Digit	Description
00	laboratory
10,20,30	general courses
40	nuclear physics, nuclear energy, energy
50	elementary particle physics
60	astrophysics, cosmology, gravitation
70	condensed matter physics
80	optics and atomic physics
90	miscellaneous courses

## Bachelor of Science in Physics

To help in deciding which introductory sequence is most suitable, students considering a major in Physics may contact the undergraduate program coordinator ([elva@stanford.edu](mailto:elva@stanford.edu)) to arrange an advising appointment. Also see the Physics Placement Diagnostic web site (<https://physics.stanford.edu/undergraduate-program/placement-test>). Although it is possible to complete the Physics major in three years, students who contemplate starting the major during sophomore year should make an advising appointment to map out their schedule. Students who have had previous college-level courses (including EPGY) should make an advising appointment for placement and possible transfer credit. For advanced placement advice, see the Registrar's web site (<http://studentaffairs.stanford.edu/registrar/students/ap>).

Prospective Physics majors are advised to take PHYSICS 59 Frontiers of Physics Research in their freshman or sophomore year.

### Required Courses for Majors

All courses for the Physics major must be taken for a letter grade, and a grade of 'C-' or better must be received for all units applied toward the major.

For sample schedules illustrating how to complete the Physics major, see the Department of Physics (<https://physics.stanford.edu/undergraduate-program/four-year-plans>) web site.

Introductory Sequence		Units
Complete either the 40 Series or the 60 Series		16-20
40 Series (19-20 units):		
PHYSICS 41	Mechanics	
PHYSICS 42	Classical Mechanics Laboratory	
PHYSICS 43	Electricity and Magnetism	
PHYSICS 44	Electricity and Magnetism Lab or PHYSICS 67 Introduction to Laboratory Physics	
PHYSICS 45	Light and Heat	
PHYSICS 46	Light and Heat Laboratory	
PHYSICS 70	Foundations of Modern Physics	
60 Series (16 units):		
PHYSICS 61	Mechanics and Special Relativity	
PHYSICS 62	Mechanics Laboratory	

PHYSICS 63	Electricity, Magnetism, and Waves	
PHYSICS 64	Electricity, Magnetism and Waves Laboratory	
PHYSICS 65	Quantum and Thermal Physics	
PHYSICS 67	Introduction to Laboratory Physics	
<b>Required Math Courses (21-24 units)</b>		
MATH 51	Linear Algebra and Differential Calculus of Several Variables <sup>3</sup>	5
or MATH 61CM	Modern Mathematics: Continuous Methods	
MATH 52	Integral Calculus of Several Variables <sup>3</sup>	5
or MATH 62CM	Modern Mathematics: Continuous Methods	
MATH 53	Ordinary Differential Equations with Linear Algebra <sup>3</sup>	5
or MATH 63CM	Modern Mathematics: Continuous Methods	
PHYSICS 111	Partial Differential Equations of Mathematical Physics	4
or MATH 131P	Partial Differential Equations	
or MATH 173	Theory of Partial Differential Equations	
Plus one advanced mathematics elective (3-5 units)		3-5
Select one of the following:		
Any MATH (101 or higher)		
PHYSICS 112	Mathematical Methods for Physics	
STATS 116	Theory of Probability	
EE 261	The Fourier Transform and Its Applications	
<b>Intermediate Sequence</b>		
PHYSICS 105	Intermediate Physics Laboratory I: Analog Electronics	4
PHYSICS 107	Intermediate Physics Laboratory II: Experimental Techniques and Data Analysis	4
PHYSICS 112	Mathematical Methods for Physics (recommended) <sup>1</sup>	
PHYSICS 113	Computational Physics (recommended) <sup>2</sup>	
PHYSICS 120	Intermediate Electricity and Magnetism I	4
PHYSICS 121	Intermediate Electricity and Magnetism II	4
<b>Advanced Sequence</b>		
PHYSICS 108	Advanced Physics Laboratory: Project	4
PHYSICS 110	Advanced Mechanics	4
PHYSICS 130	Quantum Mechanics I	4
PHYSICS 131	Quantum Mechanics II	4
PHYSICS 134	Advanced Topics in Quantum Mechanics (recommended) <sup>2</sup>	
PHYSICS 170	Thermodynamics, Kinetic Theory, and Statistical Mechanics I	4
PHYSICS 171	Thermodynamics, Kinetic Theory, and Statistical Mechanics II	4

<sup>1</sup> Those wishing to pursue theoretical physics in graduate school may wish to take a collection of courses in the Department of Mathematics rather than or in addition to PHYSICS 112 Mathematical Methods for Physics.

<sup>2</sup> These courses are not required. PHYSICS 113 Computational Physics is recommended for students planning to work in technical fields. Both PHYSICS 113 Computational Physics and PHYSICS 134 Advanced Topics in Quantum Mechanics are recommended for students who intend to complete a Ph.D. in Physics.

<sup>3</sup> MATH 51H, 52H and/or 53H, offered prior to 2016-17, may be substituted for the MATH 50 and/or 60CM series. CME courses may not be substituted.

<sup>4</sup> In years when MATH 173 Theory of Partial Differential Equations is not offered, MATH 220 Partial Differential Equations of Applied Mathematics is a recommended alternative.

To prepare for physics research and careers in science and technology, Physics majors are advised to take at least one course in statistics (e.g., STATS 116) and at least one programming course (e.g., CS 106A, B or X). PHYSICS 113 and 91SI offer opportunities to develop proficiency in applying numerical techniques and computational skills. Physics majors who wish to prepare for more data-intensive work could consider a minor in Computer Science.

### Concentrations in Physics

The primary purpose of concentrations in the Physics major is to provide consistent and more formal advising to students who want to concentrate in a particular area of physics during their undergraduate education, or prepare for future graduate studies in a particular area of physics. Physics majors are not required to choose a concentration and a concentration does not add any formal requirements to the Physics major. Upon graduation, students receive a certificate of completion of a concentration.

Students seeking further advice on a given concentration should contact the professor whose name appears next to the respective title of each section below. Within the chosen concentration below, complete at least four courses from the list or three courses plus a senior thesis. No more than one of the courses can be taken for CR/NC.

#### A. Applied Physics ( Hari Manoharan (manoharan@stanford.edu))

Solid State		Units
PHYSICS 172	Solid State Physics	3
APPPHYS 270	Magnetism and Long Range Order in Solids	3
MATSCI 195	Waves and Diffraction in Solids	3-4
Lasers		Units
EE 236A	Modern Optics	3
EE 236C	Lasers	3
Lab Methods		Units
APPPHYS 207	Laboratory Electronics	4

#### B. Astrophysics ( Bruce Macintosh (bmacintosh@stanford.edu))

		Units
PHYSICS 100	Introduction to Observational Astrophysics	4
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 161	Introduction to Cosmology and Extragalactic Astrophysics	3
Select one of the following:		3
PHYSICS 211	Continuum Mechanics	3
PHYSICS 262	General Relativity	3
GS 122	Planetary Systems: Dynamics and Origins	3-4

PHYSICS 160 and PHYSICS 161 are jointly taught to undergraduates and graduate students (PHYSICS 260 and PHYSICS 261 are for graduate students). Undergraduates must register for 160/161 not 260/261.

#### C. Biophysics and Medical Physics ( Surya Ganguli (SXDWC@SLAC.Stanford.Edu))

		Units
BIOC 202	Biochemistry Bootcamp	1
BIO 141	Biostatistics	3-5
BIOE 221	Physics and Engineering of Radionuclide-based Medical Imaging	3
BIOE 222	Instrumentation and Applications for Multi-modality Molecular Imaging of Living Subjects	4
BIOE 279	Computational Biology: Structure and Organization of Biomolecules and Cells	3

It is recommended that Physics majors interested in pursuing a career in biophysics consider a minor in Biology.

#### D. Geophysics ( Simon Klemperer (sklemp@stanford.edu))

		Units
GEOPHYS 118		3-5
GEOPHYS 122	Planetary Systems: Dynamics and Origins	2-4
Select one of the following:		
GEOPHYS 130	Introductory Seismology (Not given this year)	3
GEOPHYS 141	Remote Sensing of the Oceans	3-4
GEOPHYS 146A		3
GEOPHYS 150	Geodynamics: Our Dynamic Earth (Offered occasionally)	3
GEOPHYS 181	Fluids and Flow in the Earth: Computational Methods (Not offered this year)	3
GEOPHYS 183	Reflection Seismology Interpretation	1-4
GEOPHYS 185	Rock Physics for Reservoir Characterization (Not offered this year)	3
GEOPHYS 186	Tectonophysics (Not given this year)	3
GEOPHYS 188	Basic Earth Imaging	2-3
GEOPHYS 190	Near-Surface Geophysics (Not given this year)	3
GEOPHYS 281	Geophysical Inverse Problems (Not given this year)	3

Some classes taught alternate years only. If the class you need or want is not taught in your senior year, contact Prof. Klemperer for alternatives.

#### E. Theoretical Physics ( Andrei Linde (alinde@stanford.edu))

		Units
PHYSICS 152	Introduction to Particle Physics I	3
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 161	Introduction to Cosmology and Extragalactic Astrophysics	3
PHYSICS 262	General Relativity	3
PHYSICS 330	Quantum Field Theory I	3
PHYSICS 331	Quantum Field Theory II	3
PHYSICS 332	Quantum Field Theory III	3
PHYSICS 351	Standard Model of Particle Physics	3
PHYSICS 450	Advanced Theoretical Physics I: String Theory with Applications to Cosmology and Black Hole Physics	3
PHYSICS 451	Advanced Theoretical Physics II: Quantum Information Theory, Complexity, Gravity and Black Holes	3
PHYSICS 470	Topics in Modern Condensed Matter Theory I: Topological States of Matter	3
PHYSICS 471	Topics in Modern Condensed Matter Theory II: Physics of the Quantum Hall Regime	3

Notes to students taking this concentration:

1. Students should discuss the choice of courses with members of the Institute for Theoretical Physics and/or their major adviser.
2. Students may attend PHYSICS 330 Quantum Field Theory I after taking PHYSICS 130 Quantum Mechanics I, PHYSICS 131 Quantum Mechanics II and PHYSICS 134 Advanced Topics in Quantum Mechanics.
3. Students who took PHYSICS 362 or PHYSICS 364 in previous years may also count these towards fulfillment of this requirement.

## Senior Thesis

The department offers Physics majors the opportunity to complete a senior thesis. These are the guidelines:

1. Students must submit a Senior Thesis Application form once they identify a physics project, either theoretical or experimental, in consultation with individual faculty members. Proposal forms are available from the undergraduate coordinator and must be submitted by the week prior to the Thanksgiving break of the academic year in which the student plans to graduate.
2. Credit for the project is assigned by the adviser within the framework of PHYSICS 205 Senior Thesis Research. A minimum of 3 units of PHYSICS 205 Senior Thesis Research must be completed for a letter grade during the senior year. Work completed in the senior thesis program may not be used as a substitute for regular required courses for the Physics major.
3. A written report and a presentation of the work at its completion are required for the senior thesis. By mid-May, the senior thesis candidate is required to present the project at the department's Senior Thesis Presentation Program. This event is publicized and open to the general public. The expectation is that the student's adviser, second reader, and all other senior thesis candidates attend.

## Honors Program

Physics majors are granted a Bachelor of Science in Physics with Honors if they satisfy these three requirements beyond the general Physics major requirements:

1. The student files for entry into the honors program by completing an Honors Program Application (available from the undergraduate coordinator) by the same deadline as the Senior Thesis Application. Eligibility is confirmed by the department.
2. The student completes a senior thesis by meeting the deadlines and requirements described above.
3. The student completes course work with an overall GPA of 3.30 or higher, and a GPA of 3.50 or higher in courses required for the Physics major.

## Minor in Physics

The Physics minor allows the student to select a concentration in Physics or Astronomy. The Astronomy concentration has a technical and non-technical option.

All courses for the minor must be taken at Stanford University for a letter grade, and a grade of 'C-' or better must be received for all units applied toward the minor except as noted in the following paragraph.

Students who take the PHYSICS 20, 40, or 60 series at Stanford in support of their major may count those units towards the minor. Those who have fulfilled Physics requirements at the 20 or 40 level by enrollment at another accredited university, or through advanced placement credits, may count credits towards PHYSICS 21, PHYSICS 23, and PHYSICS 24, or PHYSICS 41/PHYSICS 42 and PHYSICS 43/PHYSICS 44.

PHYSICS 25/PHYSICS 26, or PHYSICS 45 /PHYSICS 46 for a minor in Physics or the technical minor concentration in Astronomy, must be taken at Stanford even if similar material has been covered elsewhere.

The minor declaration deadline is three quarters before graduation, typically the beginning of Autumn Quarter if the student is graduating at the end of Spring Quarter.

## Concentration in Physics

An undergraduate minor in Physics requires a minimum of 25 units with the following course work:

Select one of the following Series:	<b>Units</b>
Series A (19 units)	16-19

PHYSICS 41 & PHYSICS 42	Mechanics and Classical Mechanics Laboratory	
PHYSICS 43 & PHYSICS 44	Electricity and Magnetism and Electricity and Magnetism Lab <sup>1</sup>	
PHYSICS 45 & PHYSICS 46	Light and Heat and Light and Heat Laboratory	
PHYSICS 70	Foundations of Modern Physics	
Series B (16 units)		
PHYSICS 61 & PHYSICS 62	Mechanics and Special Relativity and Mechanics Laboratory	
PHYSICS 65 & PHYSICS 67	Quantum and Thermal Physics and Introduction to Laboratory Physics	
PHYSICS 63 & PHYSICS 64	Electricity, Magnetism, and Waves and Electricity, Magnetism and Waves Laboratory	
At least three PHYSICS courses numbered 100 or above from the following courses: PHYSICS 100, 105, 107, 108, 110, 111, 112, 113, 120, 121, 130, 131, 134, 152, 160, 161, 170, 171, 172, 199, 211, 212, 216, 220, 230, 231, or 262.		9-12
Total Units		25-31

<sup>1</sup> PHYSICS 67 Introduction to Laboratory Physics may be substituted for PHYSICS 44 Electricity and Magnetism Lab.

## Minor in Physics with Concentration in Astronomy

Students wishing to pursue advanced work in astrophysical sciences should major in Physics (p. 685) and concentrate in astrophysics. However, students outside of Physics with a general interest in astronomy may organize their studies by completing one of the following Physics minor concentration programs.

Students who take the 20, 40, or 60 series at Stanford in support of their major may count those units towards the minor.

An undergraduate Physics minor with a concentration in Astronomy requires the following courses:

### Non-Technical

For students whose majors do not require the PHYSICS 40 or 60 series:

	<b>Units</b>	
PHYSICS 21	Mechanics, Fluids, and Heat	4
PHYSICS 23	Electricity, Magnetism, and Optics	4
PHYSICS 25 & PHYSICS 26	Modern Physics and Modern Physics Laboratory	5
PHYSICS 50 or PHYSICS 100	Astronomy Laboratory and Observational Astronomy or Introduction to Observational Astrophysics	3-4
Select two of the following:		6
PHYSICS 15	Stars and Planets in a Habitable Universe	
PHYSICS 16	The Origin and Development of the Cosmos	
PHYSICS 17	Black Holes and Extreme Astrophysics	

### Technical

For students whose majors require the PHYSICS 40 or 60 series:

Select one of the following Series:	<b>Units</b>
Series A	14-17
PHYSICS 41	Mechanics
PHYSICS 43	Electricity and Magnetism



PHYSICS 45	Light and Heat	
& PHYSICS 46	and Light and Heat Laboratory	
PHYSICS 70	Foundations of Modern Physics	
Series B		
PHYSICS 61	Mechanics and Special Relativity	
PHYSICS 63	Electricity, Magnetism, and Waves	
PHYSICS 65	Quantum and Thermal Physics	
PHYSICS 67	Introduction to Laboratory Physics	
And take the following three courses:		
PHYSICS 100	Introduction to Observational Astrophysics	4
PHYSICS 160	Introduction to Stellar and Galactic Astrophysics	3
PHYSICS 161	Introduction to Cosmology and Extragalactic Astrophysics	3
Total Units		24-27

Students are also encouraged to take the electricity and magnetism/optics lab of the appropriate PHYSICS series, PHYSICS 24, PHYSICS 44 or PHYSICS 64 for 1 additional unit.

## Master of Science

The department does not offer a coterminal degree program, or a separate program for the M.S. degree, but this degree may be awarded for a portion of the Ph.D. degree work.

University requirements for the master's degree, discussed in the "Graduate Degrees (p. 50)" section of this bulletin, include completion of 45 units of unduplicated course work after the bachelor's degree. Course taken to fulfill the degree requirements below must be taken for a letter grade. Among the department requirements are a grade point average (GPA) of at least 3.0 (B) for the following required courses (or their equivalents):

PHYSICS 212	Statistical Mechanics	3
PHYSICS 220	Classical Electrodynamics	3
Plus one of the following courses:		
PHYSICS 230	Graduate Quantum Mechanics I	3
PHYSICS 231	Graduate Quantum Mechanics II	3
PHYSICS 234	Advanced Topics in Quantum Mechanics	3
PHYSICS 330	Quantum Field Theory I	3
PHYSICS 331	Quantum Field Theory II	3
PHYSICS 332	Quantum Field Theory III	3
Plus two 3 unit graduate level courses in Physics or Applied Physics.		6

Up to 6 of these required units may be waived on petition if a thesis is submitted.

## Doctor of Philosophy in Physics

The University's basic requirements for the Ph.D. are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

The minimum department requirements for the Ph.D. degree in Physics consist of completing all courses listed below and at least one course from each of two subject areas outside the student's primary area of research (among biophysics, condensed matter, quantum optics and atomic physics, astrophysics and gravitation, and nuclear and particle physics). For this requirement students must choose from courses numbered above PHYSICS 234, excluding 290 and 294. All courses taken to fulfill the Physics Ph.D. degree requirements must be taken for a letter grade, except for PHYSICS 290 and PHYSICS 294 which are only offered for Satisfactory/No Credit.

The requirements in the following list may be fulfilled by passing the course at Stanford or passing an equivalent course elsewhere:

PHYSICS 212	Statistical Mechanics	3
PHYSICS 220	Classical Electrodynamics	3
PHYSICS 290	Research Activities at Stanford	1
PHYSICS 294	Teaching of Physics Seminar	1
Plus one of the following courses:		
PHYSICS 230	Graduate Quantum Mechanics I	3
PHYSICS 231	Graduate Quantum Mechanics II	3
PHYSICS 234	Advanced Topics in Quantum Mechanics	3
PHYSICS 330	Quantum Field Theory I	3
PHYSICS 331	Quantum Field Theory II	3
PHYSICS 332	Quantum Field Theory III	3

A grade point average (GPA) of at least 3.0 (B) is required for courses taken toward the degree.

All Ph.D. candidates must have math proficiency equivalent to the following Stanford MATH courses:

MATH 106	Functions of a Complex Variable	3
MATH 113	Linear Algebra and Matrix Theory	3
MATH 116	Complex Analysis	3
PHYSICS 111	Partial Differential Equations of Mathematical Physics	4
PHYSICS 112	Mathematical Methods for Physics	4

Prior to making an application for candidacy, each student is required to pass a comprehensive oral qualifying examination. A thesis proposal must be submitted during the third year. In order to assess the direction and progress toward a thesis, an oral report and evaluation are required during the fourth year. After completion of the dissertation, each student must take the University oral examination (defense of dissertation).

Three quarters of teaching (including a demonstrated ability to teach) are a requirement for obtaining the Ph.D. in Physics.

Students interested in applied physics and biophysics research should also take note of the Ph.D. granted independently by the Department of Applied Physics and by the Biophysics Program. Students interested in astronomy, astrophysics, or space science should also consult the "Astronomy Course Program (p. 406)" section of this bulletin.

## Ph.D. Minor in Physics

Doctoral students seeking a minor in Physics must take at least six courses from the following list: 210, 211, 212, 216, 220, 230, 231, and 234 among the 20 required units. Courses must be taken for a letter grade.

All prospective minors must obtain approval of their Physics course program from the Physics Graduate Study Committee at least one year before conferral of the Ph.D.

*Emeriti:* (Professors) Alexander L. Fetter, William A. Little, Douglas D. Osheroff, David M. Ritson, H. Alan Schwettman, Robert V. Wagoner, John Dirk Walecka, Stanley G. Wojcicki, Mason R. Yearian; (Professors, Research) John A. Lipa, Todd I. Smith, John P. Turneaure; (Professors, Courtesy) Peter A. Sturrock (Applied Physics), Richard Taylor (SLAC National Accelerator Laboratory)

*Chair:* Peter F. Michelson

*Associate Chair:* TBD

*Professors:* Tom Abel, Steven Allen, Roger Blandford, Phil Bucksbaum, Patricia Burchat, Blas Cabrera, Steven Chu, Sarah Church, Persis Drell, Savas G. Dimopoulos, Sebastian Doniach, David Goldhaber-Gordon, Giorgio Gratta, Patrick Hayden, Kent Irwin, Shamit Kachru, Steven Kahn, Renata E. Kallosh, Aharon Kapitulnik, Mark Kasevich, Steven A. Kivelson, Robert B. Laughlin, Andrei D. Linde, Bruce Macintosh, Kathryn Moler, Peter F. Michelson, Vahe Petrosian, Roger W. Romani, Zhi-Xun Shen, Stephen Shenker, Eva Silverstein, Leonard Susskind, Carl Wieman, Shoucheng Zhang

*Associate Professors:* Peter Graham, Sean Hartnoll, Chao-Lin Kuo, Benjamin Lev, Hari Manoharan, Xiao-liang Qi, Srinivas Raghu, Leonardo Senatore, Risa Wechsler

*Assistant Professors:* Benjamin Feldman, Jason Hogan, Monika Schleier-Smith, Douglas Stanford, Lauren Tompkins

*Professors (Research):* Leo Hollberg, Phillip H. Scherrer

*Courtesy Professors:* Daniel Akerib, Rhiju Das, Craig Levin, Stephen Quake, Thomas Shutt, Richard N. Zare

*Lecturers:* Ryan Hazelton, Chaya Nanavati, Rick Pam, Timothy Wisner

*Adjunct Professor:* Ralph DeVoe, Steve Yellin

# POLITICAL SCIENCE

Courses offered by the Department of Political Science are listed under the subject code POLISCI on the Stanford Bulletin's ExploreCourses web site.

## Mission of the Undergraduate Program in Political Science

The mission of the undergraduate program in Political Science is to provide students with a solid grasp of the American political system and other political systems within the context of global forces, international conflicts, social movements, ideological systems and diversity. Courses in the major are designed to help students gain competency in the primary subfields of political science including American and comparative politics, international relations, and the theory/philosophy of politics; to introduce students to a variety of research methodologies and analytical frameworks; and to develop students' written and oral communication skills. Students in the program have excellent preparation for further study in graduate or professional schools as well as careers in government, business, and not-for-profit organizations.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of political science.
2. the ability to communicate ideas clearly and persuasively in writing.
3. the ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. the ability to evaluate theory and critique research within the discipline of Political Science.

## Graduate Programs in Political Science

The Department of Political Science offers two types of advanced degrees:

- the Doctor of Philosophy
- the Master of Arts in Political Science which is available to Stanford students who are currently enrolled in other advanced degree programs.

The department does not have a terminal M.A. program for external applicants.

The principal goal of the Stanford Ph.D. program in Political Science is the training of scholars. Most students who receive doctorates in the program do research and teach at colleges or universities. The department offers courses and research opportunities in a wide variety of fields in the discipline, including American politics, comparative politics, international relations, political theory, and political methodology. The program is built around small seminars that analyze critically the literature of a field or focus on a research problem. These courses prepare students for the Ph.D. comprehensive exam requirement within a two-year period and for work on the doctoral dissertation.

Admission to the graduate program in Political Science is highly selective. Approximately 14-18 students, chosen from a large pool of applicants, enter the program each year. The small size of the student body allows more individual work with members of the faculty than most

graduate programs. It also makes possible financial assistance to most students admitted to the Ph.D. program.

Additional information on the admissions process is available on the Department of Political Science website (<https://politicalscience.stanford.edu/graduate-program/prospective-students/phd-admissions>).

## Learning Outcomes (Graduate)

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Political Science. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Political Science and to interpret and present the results of such research.

Pursued in combination with a doctoral degree, the master's program furthers students' knowledge and skills in Political Science. This is achieved through completion of courses in three subfields, and experience with independent work and specialization.

## Bachelor of Arts in Political Science

To receive a B.A. in Political Science, a student must:

1. Submit a Political Science major proposal during a meeting with the undergraduate administrator and declare on Axess. Forms are available in Encina Hall West, room 100, or at the Department of Political Science web site (<https://politicalscience.stanford.edu/undergraduate-major/major>). For additional information, students may visit the Political Science office or phone (650) 723-1608.
2. Complete 70 units including:
  - a. 5 unit introductory class, POLISCI 1 The Science of Politics, preferably taken before the end of sophomore year.
  - b. 40 Political Science course units in a primary and secondary track combined. Each major must declare a primary track and take at least 25 units in this track. The secondary track must be completed with at least 15 units. The five track options include:
    - i. Justice and Law

POLISCI 29N	Mixed-Race Politics and Culture	3
POLISCI 31N	Political Freedom: Rights, Justice, and Democracy in the Western Tradition	3
POLISCI 31Q	Justice and the City	3
POLISCI 102	Politics and Public Policy	4-5
POLISCI 103	Justice	4-5
POLISCI 114D	Democracy, Development, and the Rule of Law	5
POLISCI 122	Introduction to American Law	3-5
POLISCI 124R	The Federal System: Judicial Politics and Constitutional Law	5
POLISCI 125P	The First Amendment: Freedom of Speech and Press	4-5
POLISCI 126P	Constitutional Law	3
POLISCI 127A	Finance and Society for non-MBAs	4
POLISCI 128S	The Constitution: A Brief History	5
POLISCI 130	20th Century Political Theory: Liberalism and its Critics	5
POLISCI 131A	The Ethics and Politics of Collective Action	3-4
POLISCI 131L	Modern Political Thought: Machiavelli to Marx and Mill	5
POLISCI 132A	The Ethics of Elections	5
POLISCI 133	Ethics and Politics of Public Service	3-5
POLISCI 134L	Introduction to Environmental Ethics	4-5

POLISCI 134P	Contemporary Moral Problems	4-5
POLISCI 135D	The Ethics of Democratic Citizenship	5
POLISCI 136R	Introduction to Global Justice	4
POLISCI 137A	Political Philosophy: The Social Contract Tradition	4
POLISCI 213S	A Post American Century? American Foreign Policy in a Uni-Multi-unipolar World	5
POLISCI 221A	American Political Development, 1865-present	3-5
POLISCI 225C	Fixing US Politics: Political Reform in Principle and Practice	5
POLISCI 226	Race and Racism in American Politics	5
POLISCI 230A	Classical Seminar: Origins of Political Thought	3-5
POLISCI 231	High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests	3-5
POLISCI 232T	The Dialogue of Democracy	4-5
POLISCI 233	Justice and Cities	5
POLISCI 234	Democratic Theory	5
POLISCI 234P	Deliberative Democracy and its Critics	3-5
POLISCI 235J	Creative Political Thinking: From Machiavelli to Madison	4-5
POLISCI 236	Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector	5
POLISCI 236S	Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector	5
POLISCI 314D	Democracy, Development, and the Rule of Law	5
POLISCI 327C	Law of Democracy	3-5
POLISCI 330A	Classical Seminar: Origins of Political Thought	3-5
POLISCI 331	High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests	3-5
POLISCI 332T	The Dialogue of Democracy	4-5
POLISCI 333M	Research and Methods in Political Theory	3-5
POLISCI 334P	Deliberative Democracy and its Critics	3-5
POLISCI 335A	Adam Smith: From Moral Philosophy to Political Economy	3-5
POLISCI 335J	Creative Political Thinking: From Machiavelli to Madison	4-5
POLISCI 337A	Political Philosophy: The Social Contract Tradition	4
ii International Relations		
POLISCI 10N	International Organizations and the World Order	3
POLISCI 11N	The Rwandan Genocide	3
POLISCI 18N	Civil War and International Politics: Syria in Context	3
POLISCI 43Q	Immigration Crisis? Policy Dilemmas in the US and Europe	3
POLISCI 45N	Civil War Narratives	3
POLISCI 101	Introduction to International Relations	5
POLISCI 110C	America and the World Economy	5
POLISCI 110D	War and Peace in American Foreign Policy	5
POLISCI 110G	Governing the Global Economy	5
POLISCI 110X	America and the World Economy	5
POLISCI 110Y	War and Peace in American Foreign Policy	5
POLISCI 114D	Democracy, Development, and the Rule of Law	5
POLISCI 114S	International Security in a Changing World	5
POLISCI 115A	The Rise of Asia	3-5
POLISCI 115E	Japan & the World: Innovation, Economic Growth, Globalization, and Int'l Security Challenges	3-5
POLISCI 116	The International History of Nuclear Weapons	5
POLISCI 116A	European Security Since World War Two	4-5
POLISCI 118P	U.S. Relations in Iran	5
POLISCI 136R	Introduction to Global Justice	4
POLISCI 147	Comparative Democratic Development	5
POLISCI 149S	Islam, Iran, and the West	5
POLISCI 210A	Special Topics: Solving Global Challenges	5
POLISCI 211N	Nuclear Politics	3-5
POLISCI 212A	Special Topics: EGYPT: Politics, Terror and Society: From Vision to Reality	5
POLISCI 212C	Civil War and International Politics: Syria in Context	5
POLISCI 212X	Civil War and International Politics: Syria in Context	5
POLISCI 213A	Russia and the West	5
POLISCI 213E	Introduction to European Studies	5
POLISCI 213R	Political Economy of Financial Crisis	5
POLISCI 213S	A Post American Century? American Foreign Policy in a Uni-Multi-unipolar World	5
POLISCI 214R	Challenges and Dilemmas in American Foreign Policy	5
POLISCI 215A	Special Topics: State-Society Relations in the Contemporary Arab World-Key Concepts and Debates	5
POLISCI 216	State Building	5
POLISCI 216G	International Organizations and Institutions	5
POLISCI 217A	American Foreign Policy: Interests, Values, and Process	5
POLISCI 240T	Democracy, Promotion, and American Foreign Policy	5
POLISCI 311N	Nuclear Politics	3-5
POLISCI 314D	Democracy, Development, and the Rule of Law	5
POLISCI 314R	Challenges and Dilemmas in American Foreign Policy	5
POLISCI 315A	The Rise of Asia	3-5
POLISCI 316S	Decision Making in U.S. Foreign Policy	5
Units		
iii Elections, Representation, and Governance		
POLISCI 20Q	Democracy in Crisis: Learning from the Past	3
POLISCI 23Q	Analyzing the 2016 Elections	3
POLISCI 25N	The US Congress in Historical and Comparative Perspective	3
POLISCI 27N	Thinking Like a Social Scientist	3
POLISCI 28N	The Changing Nature of Racial Identity in American Politics	3
POLISCI 29N	Mixed-Race Politics and Culture	3

POLISCI 31N	Political Freedom: Rights, Justice, and Democracy in the Western Tradition	3	POLISCI 241B	Special Topics: Comparative Political Economy	5
POLISCI 72	Policy, Politics, and the Presidency: Understanding the 2016 Campaign from Start to Finish	2	POLISCI 244	An Introduction to Political Development	5
POLISCI 102	Politics and Public Policy	4-5	POLISCI 244A	Authoritarian Politics	3-5
POLISCI 104	Introduction to Comparative Politics	5	POLISCI 244U	Political Culture	3-5
POLISCI 110D	War and Peace in American Foreign Policy	5	POLISCI 245R	Politics in Modern Iran	5
POLISCI 110Y	War and Peace in American Foreign Policy	5	POLISCI 246A	Paths to the Modern World: Islam and the West	5
POLISCI 120B	Campaigns, Voting, Media, and Elections	4-5	POLISCI 246P	The Dynamics of Change in Africa	4-5
POLISCI 120C	American Political Institutions in Uncertain Times	5	POLISCI 247G	Governance and Poverty	5
POLISCI 120Z	What's Wrong with American Government? An Institutional Approach	4	POLISCI 248S	Latin American Politics	3-5
POLISCI 121	Political Power in American Cities	5	POLISCI 311E	Political Economy I	2-5
POLISCI 121L	Racial-Ethnic Politics in US	5	POLISCI 316S	Decision Making in U.S. Foreign Policy	5
POLISCI 124L	The Psychology of Communication About Politics in America	4-5	POLISCI 322A	Advances in Political Psychology	3-5
POLISCI 124R	The Federal System: Judicial Politics and Constitutional Law	5	POLISCI 324	Graduate Seminar in Political Psychology	1-3
POLISCI 125M	Latino Social Movements	5	POLISCI 326T	The Politics of Education	3-5
POLISCI 125P	The First Amendment: Freedom of Speech and Press	4-5	POLISCI 327C	Law of Democracy	3-5
POLISCI 125S	Chicano/Latino Politics	5	POLISCI 344	Politics and Geography	3-5
POLISCI 125V	The Voting Rights Act	5	POLISCI 344A	Authoritarian Politics	3-5
POLISCI 126P	Constitutional Law	3	POLISCI 344U	Political Culture	3-5
POLISCI 128S	The Constitution: A Brief History	5	POLISCI 346P	The Dynamics of Change in Africa	4-5
POLISCI 130	20th Century Political Theory: Liberalism and its Critics	5	POLISCI 348	Chinese Politics	3-5
POLISCI 131A	The Ethics and Politics of Collective Action	3-4	POLISCI 348S	Latin American Politics	3-5
POLISCI 131L	Modern Political Thought: Machiavelli to Marx and Mill	5	POLISCI 355A	Data Science for Politics	5
POLISCI 132A	The Ethics of Elections	5			
POLISCI 134L	Introduction to Environmental Ethics	4-5	iv Political Economy and Development		
POLISCI 134P	Contemporary Moral Problems	4-5	POLISCI 11N	The Rwandan Genocide	3
POLISCI 135D	The Ethics of Democratic Citizenship	5	POLISCI 18N	Civil War and International Politics: Syria in Context	3
POLISCI 140P	Populism and the Erosion of Democracy	5	POLISCI 25N	The US Congress in Historical and Comparative Perspective	3
POLISCI 143S	Comparative Corruption	3	POLISCI 28N	The Changing Nature of Racial Identity in American Politics	3
POLISCI 147	Comparative Democratic Development	5	POLISCI 31Q	Justice and the City	3
POLISCI 147P	The Politics of Inequality	5	POLISCI 43Q	Immigration Crisis? Policy Dilemmas in the US and Europe	3
POLISCI 148	Chinese Politics	3-5	POLISCI 45N	Civil War Narratives	3
POLISCI 149T	Middle Eastern Politics	5	POLISCI 101	Introduction to International Relations	5
POLISCI 150A	Data Science for Politics	5	POLISCI 102	Politics and Public Policy	4-5
POLISCI 213E	Introduction to European Studies	5	POLISCI 103	Justice	4-5
POLISCI 217A	American Foreign Policy: Interests, Values, and Process	5	POLISCI 104	Introduction to Comparative Politics	5
POLISCI 220	Place-Making Policies	5	POLISCI 110C	America and the World Economy	5
POLISCI 220R	The Presidency	3-5	POLISCI 110G	Governing the Global Economy	5
POLISCI 222	The Political Psychology of Intolerance	5	POLISCI 110X	America and the World Economy	5
POLISCI 223A	Public Opinion and American Democracy	5	POLISCI 114D	Democracy, Development, and the Rule of Law	5
POLISCI 223B	Money, Power, and Politics in the New Gilded Age	5	POLISCI 115A	The Rise of Asia	3-5
POLISCI 225C	Fixing US Politics: Political Reform in Principle and Practice	5	POLISCI 116	The International History of Nuclear Weapons	5
POLISCI 226T	The Politics of Education	3-5	POLISCI 118P	U.S. Relations in Iran	5
POLISCI 234	Democratic Theory	5	POLISCI 120B	Campaigns, Voting, Media, and Elections	4-5
POLISCI 240A	Democratic Politics	5	POLISCI 121	Political Power in American Cities	5
POLISCI 241A	An Introduction to Political Economy of Development	5	POLISCI 121L	Racial-Ethnic Politics in US	5
			POLISCI 122	Introduction to American Law	3-5
			POLISCI 124L	The Psychology of Communication About Politics in America	4-5
			POLISCI 125M	Latino Social Movements	5
			POLISCI 125S	Chicano/Latino Politics	5

POLISCI 125V	The Voting Rights Act	5
POLISCI 127A	Finance and Society for non-MBAs	4
POLISCI 137A	Political Philosophy: The Social Contract Tradition	4
POLISCI 141A	Immigration and Multiculturalism	5
POLISCI 143S	Comparative Corruption	3
POLISCI 146A	African Politics	4-5
POLISCI 147	Comparative Democratic Development	5
POLISCI 148	Chinese Politics	3-5
POLISCI 149S	Islam, Iran, and the West	5
POLISCI 149T	Middle Eastern Politics	5
POLISCI 153	Thinking Strategically	5
POLISCI 153Z	Thinking Strategically	4
POLISCI 212C	Civil War and International Politics: Syria in Context	5
POLISCI 212X	Civil War and International Politics: Syria in Context	5
POLISCI 213E	Introduction to European Studies	5
POLISCI 213R	Political Economy of Financial Crisis	5
POLISCI 216	State Building	5
POLISCI 220	Place-Making Policies	5
POLISCI 220R	The Presidency	3-5
POLISCI 221A	American Political Development, 1865-present	3-5
POLISCI 223B	Money, Power, and Politics in the New Gilded Age	5
POLISCI 231	High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests	3-5
POLISCI 232T	The Dialogue of Democracy	4-5
POLISCI 234P	Deliberative Democracy and its Critics	3-5
POLISCI 236	Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector	5
POLISCI 236S	Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector	5
POLISCI 240T	Democracy, Promotion, and American Foreign Policy	5
POLISCI 241A	An Introduction to Political Economy of Development	5
POLISCI 241B	Special Topics: Comparative Political Economy	5
POLISCI 241S	Spatial Approaches to Social Science	5
POLISCI 241T	Political Economy of Gender	5
POLISCI 244	An Introduction to Political Development	5
POLISCI 244A	Authoritarian Politics	3-5
POLISCI 244U	Political Culture	3-5
POLISCI 245R	Politics in Modern Iran	5
POLISCI 246A	Paths to the Modern World: Islam and the West	5
POLISCI 246P	The Dynamics of Change in Africa	4-5
POLISCI 247A	Games Developing Nations Play	5
POLISCI 247G	Governance and Poverty	5
POLISCI 248S	Latin American Politics	3-5
POLISCI 311E	Political Economy I	2-5
POLISCI 314D	Democracy, Development, and the Rule of Law	5
POLISCI 315A	The Rise of Asia	3-5
POLISCI 327C	Law of Democracy	3-5
POLISCI 331	High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests	3-5
POLISCI 332T	The Dialogue of Democracy	4-5
POLISCI 334P	Deliberative Democracy and its Critics	3-5
POLISCI 337A	Political Philosophy: The Social Contract Tradition	4
POLISCI 344	Politics and Geography	3-5
POLISCI 344A	Authoritarian Politics	3-5
POLISCI 344U	Political Culture	3-5
POLISCI 346P	The Dynamics of Change in Africa	4-5
POLISCI 347A	Games Developing Nations Play	5
POLISCI 348	Chinese Politics	3-5
POLISCI 348S	Latin American Politics	3-5
POLISCI 352	Introduction to Game Theoretic Methods in Political Science	3-5
v Data Science		
POLISCI 27N	Thinking Like a Social Scientist	3
POLISCI 141A	Immigration and Multiculturalism	5
POLISCI 147P	The Politics of Inequality	5
POLISCI 150A	Data Science for Politics	5
POLISCI 150B	Machine Learning for Social Scientists	5
POLISCI 150C	Causal Inference for Social Science	5
POLISCI 153	Thinking Strategically	5
POLISCI 153Z	Thinking Strategically	4
POLISCI 155	Political Data Science	5
POLISCI 241S	Spatial Approaches to Social Science	5
POLISCI 247A	Games Developing Nations Play	5
POLISCI 343A	Field Methods	3-5
POLISCI 347A	Games Developing Nations Play	5
POLISCI 352	Introduction to Game Theoretic Methods in Political Science	3-5
POLISCI 354	Thinking Strategically	5
POLISCI 355A	Data Science for Politics	5
POLISCI 355B	Machine Learning for Social Scientists	5
POLISCI 355C	Causal Inference for Social Science	5
POLISCI 356A	Formal Theory I: An Introduction to Game Theory	3-5
POLISCI 356B	Formal Theory II: Models of Politics	3-5
POLISCI 358	Data-driven Politics	3-5
c. A 5-unit methods requirement satisfied by:		
Select one of the following:		5
POLISCI 150A	Data Science for Politics	5
POLISCI 155	Political Data Science	5
STATS 60	Introduction to Statistical Methods: Precalculus	5
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
CS 106A	Programming Methodology	3-5
d. 20 additional Political Science units including no more than 5 units of directed reading.		
e. No more than two 3 unit Stanford Introductory Seminar courses can be applied toward the 70 unit major requirement.		
3. Demonstrate the capacity for sustained research and writing in the discipline. This requirement is satisfied by taking a Political Science		

course designated as a Writing in the Major (WIM) course and does not need to be taken in your primary track.

Select one of the following approved Writing in the Major (WIM) courses:

POLISCI 103	Justice	4-5
POLISCI 110C	America and the World Economy	5
POLISCI 110D	War and Peace in American Foreign Policy	5
POLISCI 120C	American Political Institutions in Uncertain Times	5
POLISCI 121	Political Power in American Cities	5
POLISCI 212C	Civil War and International Politics: Syria in Context	5
POLISCI 236S	Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector	5
POLISCI 299A	Research Design	5

- Take at least one 5-unit, 200-level or 300-level undergraduate seminar in Political Science. This course may be taken within any part of the major, including the primary or secondary track.
- Students may count up to 25 units of course work from outside the Political Science department toward their Political Science major. This related course work is intended to supplement your learning within the Political Science major.

Designated cognate courses are listed on the Approved Cognate Courses (<https://politicalscience.stanford.edu/undergraduate-major/major/cognatesrelated-courses>) list and can be applied directly to the major, without a petition. Cognate courses may be applied in any of the following ways:

- Up to one cognate course in your primary track
  - Up to one cognate course in your secondary track
  - Methods course requirement
  - Additional related course work requirement
- Courses not on the Approved Cognate Courses (<https://politicalscience.stanford.edu/undergraduate-major/major/cognatesrelated-courses>) list may be petitioned toward the major. Course petitions are reviewed and approved by the Director of Undergraduate Studies. Petitions ([https://files-politicalscience-stanford-edu.s3.amazonaws.com/s3fs-public/political\\_science\\_course\\_petitionfillable.pdf](https://files-politicalscience-stanford-edu.s3.amazonaws.com/s3fs-public/political_science_course_petitionfillable.pdf)) must be submitted to the undergraduate administrator within one quarter of course completion or within one quarter of declaring the major.
  - Directed reading and Oxford tutorial units require a petition and may only be applied towards related course work units. These units may not be used in the concentrations, and no more than 10 combined units of directed reading and Oxford tutorial units may count toward the required 70 Political Science units.
  - All courses for the major must be completed with a letter grade of 'C' or better.

## Minor in Political Science

Students must complete their declaration of the minor on Axxess no later than Autumn of their senior year. They must submit the minor declaration form to the undergraduate administrator in Encina Hall West 100. This form can be found in Encina Hall West 100 or on the Political Science web site (<https://politicalscience.stanford.edu/undergraduate-program/political-science-minor>).

To receive a minor in Political Science, a student must complete a minimum of 30 unduplicated units. All units must be in Political Science courses or related courses. All courses for the minor must be taken for

a letter grade. Students must receive a minimum letter grade of 'C' in all courses for the minor.

### Units

#### Introductory Course

The student should enroll in POLISCI 1 The Science of Politics preferably in their freshman or sophomore year.

#### Track

The student selects a track in which four courses are taken. These courses are at a more advanced level (numbered above 100) and should follow enrollment in POLISCI 1. There are five track options: Justice and Law, International Relations, Data Science, Political Economy and Development, and Elections, Representation, and Governance.

#### Additional Course Work

This may include courses within any of the five tracks or a directed reading, Stanford in Washington, Bing Overseas courses, or cognate courses from the Approved Cognate Course (<https://politicalscience.stanford.edu/undergraduate-major/major/approved-cognate-courses>) list. A maximum of 5 units of directed reading may count if supervised by a member of the Political Science department. Cognate courses may be applied only to additional course work.

#### Transfer Work

A maximum of 10 units of work completed outside Stanford may be given Political Science credit toward the minor for transfer students. All such cases must be individually reviewed and approved by the Director of Undergraduate Studies.

## Master of Arts in Political Science

The Political Science department does not offer a terminal M.A. degree. An M.A. degree may only be pursued in combination with a doctoral degree from another department within the University or with an advanced degree from one of the University's professional schools. Students interested in pursuing the M.A. should discuss the application requirements with the graduate administrator in Political Science.

The department does not offer a coterminal master's degree.

Students from within the department and from other degree programs who have applied to the M.A. program may elect to take the M.A. degree in Political Science when they have met the following requirements:

- Completion of at least three quarters of residency as a graduate student with 45 units of credit of which at least 25 units must be taken in Political Science graduate seminars of 300 level and above. Not more than 25 units of the 45-unit requirement may be taken in a single field.
- At least two graduate seminars (10 units) in each of two fields and at least one graduate seminar (5 units) in a third field.

The Political Science fields that students may choose from are: International Relations, Comparative Politics, American Politics, Political Theory and Political Methodology.

- The remaining 20 units must come from courses numbered above 100. Of those 20 units, not more than 10 units of work from related departments may be accepted in lieu of a portion of the work in Political Science. Not more than 10 units may be taken as directed reading.
- A grade point average (GPA) of 2.7 (B-) or better must be attained for directed readings and all course work. No thesis is required.

Political Science doctoral candidates may pursue master's degrees from other departments. Recent examples include but are not restricted to master's degrees in Statistics and Economics. Students interested in

this option should consult the relevant sections of this bulletin for both University and department requirements for master's degrees.

## Doctor of Philosophy in Political Science

The University's basic requirements for the Ph.D. degree are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

Programs of study leading to the Ph.D. degree are designed by the student, in consultation with advisers and the Director of Graduate Studies, to serve his or her particular interests as well as to achieve the general department requirements. A student is recommended to the University Committee on Graduate Studies to receive the Ph.D. degree in Political Science when the following program of study has been completed:

1. **Statement of Purpose:** By the beginning of the fourth quarter in residence, each graduate student submits a statement of purpose to the student's adviser. This statement indicates the student's proposed major fields of study, the courses taken and those planned to be taken to cover those fields, the student's plan for meeting language and/or skill requirements, plans for scheduling of comprehensive examinations and/or research papers, and, where possible, dissertation ideas or plans. This statement is discussed with, and must be approved by, the student's adviser. In the Autumn Quarter following completion of their first year, students are reviewed at a regular meeting of the department faculty. The main purposes of this review are, in order of importance: to advise and assist the student to realize his or her educational goals; to provide an opportunity for clarifying goals and for identifying ways to achieve them; and to facilitate assessment of progress toward the degree.
2. **Two Major Fields:** The candidate for the Ph.D. degree must demonstrate proficiency in two major fields: American politics, comparative politics, international relations, methodology, and political theory. Students demonstrate proficiency by fulfilling, depending on the field, combinations of the following: written qualifying examinations, research papers, or course work. Each field offers a series of three or four courses designed to familiarize students with the literature of that field. In addition, a field may require that students take one or more elective courses covering a specific aspect of the field. All courses that a student uses to fulfill a major field requirement must be taken for a letter grade of 'B' or better. Specific requirements for completing each field can be found on the field statements (<https://politicalscience.stanford.edu/academics/graduate-programs/resources-current-students>), available on the Political Science department website.
3. **Third Minor Field:** The candidate for the Ph.D. degree must also complete a third minor field. The third field requirement is usually satisfied by taking two courses for at least three units each from among courses approved by the field convener. All courses used to fulfill the third minor field requirement must be taken for a letter grade of 'B' or better. The third field cannot be satisfied by courses taken as a requirement for a major field. A third field in political theory requires two courses in addition to the five units necessary to fulfill the political theory program requirement (see item 4). A third concentration in methodology requires 10 units in addition to the 10 units necessary to fulfill the quantitative methods program requirement (see item 5).
4. **Political Theory Requirement:** Every Ph.D. candidate must complete at least one quarter of graduate-level instruction in political theory. All courses used to fulfill the political theory requirement must be taken for a letter grade of 'B' or better.
5. **Quantitative Methods Requirement** Every Ph.D. candidate must take POLISCI 450A Political Methodology I: Regression and POLISCI 450B Political Methodology II: Causal Inference in order to fulfill the quantitative methods requirement. Credit for equivalent classes is at the discretion of the political methodology field convener. All courses used to fulfill the quantitative methods requirement must be taken for a letter grade of 'B' or better.
6. **Competence in a Language and/or Skill:** The Ph.D. candidate is required to demonstrate competence in a language and/or skill that is likely to be relevant to the dissertation research. The level of competence needed for completion of the research is determined by the student's adviser. Previous instruction can be counted towards this requirement only if approved by the Director of Graduate Studies.
7. **Comprehensive Exams:** Students must take a comprehensive exam in their primary field by the end of their second year in the program. Students are expected to have passed this examination by the end of their second year.
8. **Second-year Research Paper:** Prior to being advanced to candidacy, each student must produce a research paper (field paper) demonstrating the capacity to produce research at a level expected of students preparing to write a high quality Ph.D. dissertation. The second-year research paper is given considerable weight as the faculty consider an application for candidacy. Students are advised to begin work on their second-year research papers in the summer between their first and second years in the program, and to submit a first draft to their advisers sometime in the Autumn Quarter of their second year. Second-year research papers are considered incomplete until approved by the two faculty readers. Students are expected to have submitted an approved field paper by the end of their second year.
9. **Advancement to candidacy:** In accordance with University guidelines, Ph.D. students are expected to advance to candidacy by the end of their sixth quarter in the program (i.e., by the end of their Spring Quarter in their second year in the program). It is the department's practice that all students in their sixth quarter be considered for candidacy at a special meeting of the faculty (typically in Week 10 of Spring Quarter). All the requirements for advancing to candidacy listed below must be completed by this meeting. Should a student not be advanced to candidacy by the end of the sixth quarter, the student is at risk of being dismissed from the Ph.D. program. To be eligible for advancement to candidacy, students must complete the requirements listed below.
  - a. two major fields
  - b. a third minor field
  - c. the political theory requirement
  - d. the quantitative methods requirement
  - e. the second-year research paper
  - f. Advancement to candidacy is not automatic upon completion of these requirements. Advancement to candidacy is an expression by the faculty of their confidence that the student can successfully complete the Ph.D. program, and in particular, complete a doctoral dissertation that is an original contribution to scholarship that exemplifies the highest standard of the discipline.
10. **Dissertation Prospectus:** During the third year, a formal dissertation prospectus must be submitted to and approved by the student's dissertation adviser and the Director of Graduate Studies. The dissertation prospectus must be approved by the end of the third year. Students must also make a dissertation prospectus presentation in the third year.
11. **TA Requirement:** A candidate for the Ph.D. in Political Science is required to serve as a teaching assistant (TA) in the department for a minimum of three quarters. Many students need to TA for up to five quarters as part of their funding package.
12. **Oral Examination:** The candidate must pass the University oral examination on the area of the dissertation at a time, after the passing of the written comprehensive examinations, suggested by the candidate's dissertation committee.



13. Dissertation: The candidate must complete a dissertation satisfactory to the dissertation reading committee.
14. Adequate Progress In addition to the specific program requirements listed above, at each stage of the Ph.D. program, the department has the following minimum standards for adequate academic progress:
- Except in rare circumstances, no more than two of the following on the transcript at any given time: incomplete ('I'); grade not reported ('GNR'); not passed or no credit ('NP' or 'NC'); or withdraw ('W').
  - Adequate grades in all courses taken each term ('B-' and below are regarded as inadequate).
  - Graduate students in the first year must enroll for at least 15 units and must pass at least 8 units per term by the end of the term. Graduate students in years 2, 3 and 4 must register for at least 8 units and must pass at least 6 units by the end of each term.
  - Advance to candidacy by close of sixth quarter (i.e., for most students, the end of their second academic year in the Ph.D. program);
  - Dissertation prospectus presentation made and approval of dissertation prospectus on file by the end of the third year.
  - Dissertation reading committee formed by end of the fourth year.
  - Advance to TGR status by end of the fourth year.
  - Substantial progress toward completion of the dissertation in fourth and fifth years.

## Ph.D. Minor in Political Science

Candidates in other departments which accept a minor in Political Science select two concentrations in political science in consultation with the Director of Graduate Studies and submit to her or him a program of study for approval. Written approval for the program must be obtained from the Director of Graduate Studies before application for doctoral candidacy. Students are required to complete at least 20 units in Political Science courses. Courses must be 300 level and above. Grades must be a GPA of 3.0 (B) or better.

*Emeriti:* (Professors) David B. Abernethy, Lucius J. Barker, Richard A. Brody, Joshua Cohen, David Danielski, Charles Drekmeier, Richard R. Fagen, John A. Ferejohn, Terry L. Karl, John W. Lewis, John Manley, James March, Daniel Okimoto, Robert A. Packenham, Philippe Schmitter, Hans N. Weiler

*Chair:* Judith L. Goldstein

*Professors:* David W. Brady, Bruce E. Cain, Gary W. Cox, James D. Fearon (on leave, Autumn), Morris P. Fiorina, Judith L. Goldstein, Stephen H. Haber (on leave, Spring), Jens Hainmueller (on leave, Fall), David J. Holloway (on leave, Autumn), Shanto Iyengar (on leave, Autumn), Stephen D. Krasner, Jon A. Krosnick, David D. Laitin (on leave), Margaret Levi, Michael A. McFaul, Terry M. Moe, Josiah Ober, Jean C. Oi, Jack N. Rakove (on leave, Autumn and Spring), Rob Reich, Condoleezza Rice, Douglas Rivers, Jonathan A. Rodden, Scott D. Sagan, Kenneth F. Scheve Jr., Kenneth A. Schultz, Paul M. Sniderman, Michael R. Tomz, Barry R. Weingast (on leave Autumn), Jeremy M. Weinstein

*Associate Professors:* Lisa Blaydes, Beatriz Magaloni (on leave)

*Assistant Professors:* Avidit Acharya, Adam Bonica (on leave, Autumn), Emilee Chapman (on leave Autumn and Winter), Lauren Davenport (on leave), Vasiliki Fouka, Saad Gulzar, Andrew B. Hall (on leave, Winter), Karen L. Jusko, Phillip Y. Lipsky, Alison McQueen (on leave), Clayton Nall

*Lecturers:* Brian Coyne, Abbas Milani, Bruce Sievers, Yuki Takagi, Patricia Young

*Courtesy Professors:* Jonathan B. Bendor, Coit D. Blacker, Steven Callander, Martha Crenshaw, Larry Diamond, Jean-Pierre Dupuy, James

Fishkin, Lawrence Friedman, Francis Fukuyama, Keith Krehbiel, Neil Malhotra, Nathaniel Persily, Debra M. Satz, Ken Shotts, Stephen J. Stedman, Andrew Walder, Amy Zegart

*Courtesy Associate Professor:* Alberto Diaz-Cayeros, Saumitra Jha

*Courtesy Assistant Professor:* Juliana Bidadanure, Jennifer Pan

### Cognate Courses

1. Students may count up to twenty-five units of coursework from outside the Political Science department toward their Political Science major. This related coursework is intended to supplement your learning within the Political Science major.

Designated cognate courses are listed on the Approved Cognate Courses (<https://politicalscience.stanford.edu/undergraduate-major/major/cognatesrelated-courses>) list and can be applied directly to the major, without a petition. Cognate courses may be applied in any of the following ways:

- a. Up to one cognate course in your primary track
- b. Up to one cognate course in your secondary track
- c. Methods course requirement
- d. Additional related coursework requirement

		<b>Units</b>
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	3-5
AFRICAST 112	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 138	Conflict and Reconciliation in Africa: International Intervention	3-5
AFRICAST 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AFRICAST 211	Education for All? The Global and Local in Public Policy Making in Africa	3-5
AFRICAST 212	AIDS, Literacy, and Land: Foreign Aid and Development in Africa	5
AFRICAST 238	Conflict and Reconciliation in Africa: International Intervention	3-5
AFRICAST 242	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5
AFRICAST 301A	The Dynamics of Change in Africa	4-5
AMSTUD 116	American Economic History	5
ANTHRO 138A	Conflict and Reconciliation in Africa: International Intervention	3-5
ANTHRO 337	The Politics of Humanitarianism	5
COMM 106	Communication Research Methods	4-5
COMM 130N	The idea of a free press	3-4
COMM 206	Communication Research Methods	4-5
CSRE 145	Race and Ethnic Relations in the USA	4
EARTHSYS 106	World Food Economy	5
EARTHSYS 206	World Food Economy	5
ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I	5
ECON 51	Economic Analysis II	5
ECON 52	Economic Analysis III	5
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
ECON 102B	Applied Econometrics	5
ECON 106	World Food Economy	5
ECON 113	Economics of Innovation	5

ECON 121	Social Science Field Research Methods and Applications	5	IPS 219	Intelligence and National Security	3
ECON 154	Law and Economics	4-5	IPS 244	U.S. Policy toward Northeast Asia	5
ECON 155	Environmental Economics and Policy	5	IPS 246	China on the World Stage	4
ECON 180	Honors Game Theory	5	JEWISHST 18N	Religion and Politics: Comparing Europe to the U.S.	3-4
ECON 206	World Food Economy	5	JEWISHST 282	Circles of Hell: Poland in World War II	5
EDUC 178	Latino Families, Languages, and Schools	3-5	JEWISHST 382	Circles of Hell: Poland in World War II	5
EDUC 197	Gender and Education in Global and Comparative Perspectives	4	LAW 2519	Water Law	3
EDUC 220D	History of School Reform: Origins, Policies, Outcomes, and Explanations	3-5	MS&E 93Q	Nuclear Weapons, Energy, Proliferation, and Terrorism	3
EDUC 270	Latino Families, Languages, and Schools	3-5	MS&E 180	Organizations: Theory and Management	4
ESS 106	World Food Economy	5	MS&E 193	Technology and National Security	3
ESS 206	World Food Economy	5	MS&E 293	Technology and National Security	3
ETHICSOC 20	Introduction to Moral Philosophy	5	OSPBER 115X	The German Economy: Past and Present	4-5
FEMGEN 297	Gender and Education in Global and Comparative Perspectives	4	OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
HISTORY 4	Introduction to Geospatial Humanities	3-5	OSPCPTWN 31	Political Economy of Foreign Aid	3
HISTORY 102	History of the International System	5	OSPCPTWN 69	Comparatively Assessing South Africa's Transition to Democracy: Past, Present and Future	3
HISTORY 104	Introduction to Geospatial Humanities	3-5	OSPFLOR 43	Machiavelli	3-4
HISTORY 106A	Global Human Geography: Asia and Africa	5	OSPFLOR 78	The Impossible Experiment: Politics and Policies of the New European Union	5
HISTORY 106B	Global Human Geography: Europe and Americas	5	OSPOXFRD 18	Making Public Policy: An Introduction to Political Philosophy, Politics, and Economics	4-5
HISTORY 152	History of American Law	5	OSPOXFRD 22	British Politics Past and Present	4-5
HISTORY 153	CREATION OF THE CONSTITUTION	5	OSPOXFRD 82	Politics of Inequality: Implications of Electoral Geography for Democratic Representation Quality	5
HISTORY 156	American Economic History	5	OSPPARIS 32	French History and Politics: Understanding the Present through the Past	5
HISTORY 172A	Mexico: From Colony to Nation, or the History of an impossible Republic?	5	OSPPARIS 45	Comparative Politics in the Contemporary Arab World	4
HISTORY 181B	Formation of the Contemporary Middle East	5	OSPPARIS 122X	Challenges of Integration in the European Union	4-5
HISTORY 201C	The U.S., U.N. Peacekeeping, and Humanitarian War	5	OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
HISTORY 228	Circles of Hell: Poland in World War II	5	OSPSANTG 129X	Latin America in the International System	4-5
HISTORY 246	The Dynamics of Change in Africa	4-5	PHIL 2	Introduction to Moral Philosophy	5
HISTORY 258E	History of School Reform: Origins, Policies, Outcomes, and Explanations	3-5	PHIL 20S	Introduction to Moral Philosophy	3
HISTORY 261G	Presidents and Foreign Policy in Modern History	5	PSYCH 10	Introduction to Statistical Methods: Precalculus	5
HISTORY 279	Latin American Development: Economy and Society, 1800-2014	4-5	PUBLPOL 106	Law and Economics	4-5
HISTORY 328	Circles of Hell: Poland in World War II	5	PUBLPOL 120	Social Science Field Research Methods and Applications	5
HISTORY 346	The Dynamics of Change in Africa	4-5	PUBLPOL 132	The Politics of Policy Making	3
HISTORY 352B	History of American Law	5	PUBLPOL 135	Regional Politics and Decision Making in Silicon Valley and the Greater Bay Area	4
HISTORY 379	Latin American Development: Economy and Society, 1800-2014	4-5	PUBLPOL 154	Politics and Policy in California	5
HUMBIO 120	Health Care in America: An Introduction to U.S. Health Policy	4	PUBLPOL 156	Health Care Policy and Reform	5
HUMBIO 120A	American Health Policy	3	PUBLPOL 206	Law and Economics	4-5
HUMBIO 129S	Global Public Health	4	PUBLPOL 220	Social Science Field Research Methods and Applications	5
HUMBIO 143	Adolescent Sexuality	4	PUBLPOL 232	The Politics of Policy Making	3
HUMBIO 172B	Children, Youth, and the Law	5	PUBLPOL 354	Economics of Innovation	5
HUMBIO 173	Science, Innovation and the Law	5	REES 320	State and Nation Building in Central Asia	3-5
INTNLREL 102	History of the International System	5	RELIGST 18N	Religion and Politics: Comparing Europe to the U.S.	3-4
INTNLREL 123	The Future of the European Union: Challenges and Opportunities	5	SIW 103	Economic Growth and Development Patterns, Policies, and Prospects	5
INTNLREL 140A	International Law and International Relations	5	SIW 105	Education Policy	5
INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War	5	SIW 106	Criminal Justice Policy	5
INTNLREL 142	Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice	3-5	SIW 107	Civil Rights Law	5
INTNLREL 173	Presidents and Foreign Policy in Modern History	5			
INTNLREL 182	The Great War	5			

SIW 124	The American Presidency: From TR to Nixon	5	OSPFLOR 78	The Impossible Experiment: Politics and Policies of the New European Union	5
SIW 131	United States and Europe in Comparative Perspective	5	OSPOXFRD 24		4-5
SIW 146	Diplomacy in Practice: Security Issues in the South Caucasus	5	OSPPARIS 32	French History and Politics: Understanding the Present through the Past	5
SIW 156	Washington Policymaking: A New Era? Advocacy and Strategy at the Federal Level	5	OSPPARIS 122X	Challenges of Integration in the European Union	4-5
SLAVIC 120	Hacking Russia: Technological Dreams and Nightmares of Russian Culture	3-5	OSPSANTG 116X	Modernization and its Discontents: Chilean Politics at the Turn of the Century	5
SOC 117A	China Under Mao	5			
SOC 118	Social Movements and Collective Action	4			
SOC 134	Gender and Education in Global and Comparative Perspectives	4			
SOC 135	Poverty, Inequality, and Social Policy in the United States	4			
SOC 136	Sociology of Law	4			
SOC 140	Introduction to Social Stratification	3			
SOC 145	Race and Ethnic Relations in the USA	4			
SOC 149	The Urban Underclass	4			
SOC 217A	China Under Mao	5			
SOC 218	Social Movements and Collective Action	4			
SOC 235	Poverty, Inequality, and Social Policy in the United States	4			
SOC 236	Sociology of Law	4			
SOC 240	Introduction to Social Stratification	3			
SOC 245	Race and Ethnic Relations in the USA	4			
SOC 249	The Urban Underclass	4			
STATS 60	Introduction to Statistical Methods: Precalculus	5			
STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5			
STATS 160	Introduction to Statistical Methods: Precalculus	5			
THINK 5	Justice and the Constitution	4			
THINK 19	Rules of War	4			
THINK 42	Thinking Through Africa: Perspectives on Health, Wealth, and Well-Being	4			
THINK 47	Inventing Government: Ancient and Modern	4			
URBANST 112	The Urban Underclass	4			

## Overseas Studies Courses in Political Science

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		Units
OSPBER 15		4-5
OSPBER 37		4-5
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
OSPCPTWN 31	Political Economy of Foreign Aid	3

# PSYCHOLOGY

Courses offered by the Department of Psychology are listed under the subject code PSYCH on the Stanford Bulletin's ExploreCourses web site.

The department, housed in Jordan Hall, maintains many computer-equipped laboratories and the Stanford Center for Cognitive and Neurobiological Imaging (CNI). Bing Nursery School, located on campus at 850 Escondido Road, provides a laboratory for child observation, training in nursery school teaching, and research. It was constructed with funding from the National Science Foundation and a special grant from Mrs. Anna Bing Arnold and Dr. Peter Bing.

The department provides

- courses designed for the general student
- a major program leading to the degree of Bachelor of Arts, including options for honors and a specialization in one of four content area tracks
- an undergraduate minor program
- programs of graduate study and research leading to the degree of Doctor of Philosophy
- a Ph.D. minor

Applications are not accepted for the master's degree except as noted below.

## Mission of the Undergraduate Program in Psychology

The mission of the undergraduate program in Psychology is to introduce students to the theories and empirical studies of human behavior. This includes the study of aging, achievement, child development, cognitive processes, conflict, culture, decision making, emotion, group behavior, health, identity, infancy, language, learning and memory, morality, motivation, personality, psychopathology, race, self, social perception, visual perception, and other related topics. The major provides students with knowledge and skills relevant to professional careers in technology, business, counseling, education, public policy, law, and medicine, as well as graduate studies in Psychology.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of psychology including relevant theory and research.
2. the ability to analyze a problem correctly using discipline specific methodology.
3. the ability to draw sound inferences and conclusions from data.
4. the ability to write and communicate ideas clearly.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Psychology and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization. The master's program is available only to Ph.D. students in Psychology and, under special circumstances, students enrolled in other graduate programs offered through the University.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research

and analysis in Psychology. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Psychology and to disseminate this knowledge.

## Bachelor of Arts in Psychology

### Major Requirements

Students declaring a major in Psychology must complete a minimum of 70 units of course work in Psychology, 60 of which must be taken in the Psychology department. The remaining 10 units can be taken outside of the Psychology department but must be pre-approved by the student services office or faculty adviser. These courses should represent a coherent thematic focus. One way to achieve this focus is through a field of study. Courses taken to satisfy the 70-unit requirement must be taken for a grade of C- or better (except for courses offered only on a satisfactory/no credit basis). Majors must take PSYCH 1 Introduction to Psychology, and PSYCH 10 Introduction to Statistical Methods: Precalculus. Advanced placement (AP) credit may not be used toward the Psychology major requirements. Beyond these two required courses, students must complete at least five of the following eleven core Psychology courses, with a minimum of two from each area A and B:

		Units
<b>Area A</b>		
PSYCH 30	Introduction to Perception	3
PSYCH 35	Minds and Machines	4
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
<b>Area B</b>		
PSYCH 60	Introduction to Developmental Psychology	3
PSYCH 70	Self and Society: Introduction to Social Psychology	4
PSYCH 75	Introduction to Cultural Psychology	5
PSYCH 80	Introduction to Personality and Affective Science	3
PSYCH 90	Introduction to Clinical Psychology	3
PSYCH 95	Introduction to Abnormal Psychology	3

Students must take one Writing in the Major (WIM) course in Psychology, and should check the Stanford Bulletin yearly as these courses may change. The department also strongly recommends that all majors take at least one advanced seminar.

Students may count up to 10 units of research, independent study, and practica (including but not limited to PSYCH 194 Reading and Special Work, PSYCH 195 Special Laboratory Projects, PSYCH 281 Practicum in Teaching) toward the Psychology major. Students who are teaching assistants for a Psychology course or are enrolled in the senior honors program are allowed up to 15 units in independent study and research. Any units beyond the limit of 10 or 15 may be counted toward the 180 units required for graduation.

Students who are double majoring or completing a minor degree in another department may not overlap (double-count) courses, unless the overlapping courses constitute introductory skill requirements, such as PSYCH 10 Introduction to Statistical Methods: Precalculus. In this instance, while the course requirement would be satisfied, the units for the course can only be applied to one program of study, not both. Consult the student services office for further clarification.

Summer Quarter Psychology courses are not equivalent to courses given during the regular academic year and, while applicable toward the 70 units needed for the major, may not be used to fulfill core course requirements. Therefore, PSYCH 1, PSYCH 10, and the Area A and B courses cannot be taken during Summer Quarter to fulfill the major requirements. Additionally, a course taken during the Summer Quarter

cannot be used to replace the grade of a non-Summer Quarter course, even if the title and units of the two courses are the same.

## Beyond the Minimal Requirements

The following recommendations may be helpful to students who wish to plan a program that goes beyond the minimal requirements listed above:

1. Within the general major, the student may take advanced undergraduate or graduate courses (although some require the consent of the instructor), including seminars. The student may also take advantage of widespread opportunities for directed research, working closely with individual faculty and graduate students.
2. The student may apply to the senior honors program, described below.
3. The student may elect to pursue one of four specialization tracks of study: Cognitive Sciences; Health and Development; Mind, Culture, and Society; or Neuroscience, described below.

The training obtained from the pursuit of any of these options is valuable not only for students considering graduate work in Psychology, but also for those thinking of professional careers outside of Psychology in fields such as technology, business, counseling, education, law, public policy or medicine.

## Credit from Outside the Department

Psychology majors must complete at least 60 units of course work toward their major at Stanford within the Psychology department. Psychology majors may count no more than a total of 10 units credit from outside the department toward the major. Both majors and minors, under extenuating circumstances, may use one course from outside the department to fulfill core course requirements. Additional courses may be used to fulfill the 70-unit major requirement, but may not be counted as core courses. Please see the student services office for further clarification.

Petition for transfer of credit is rarely granted. In cases where petitioning is necessary, there are two types of credit from outside the department: external transfer credit for courses taken at institutions other than Stanford and credit for courses in other Stanford departments. A student must have already declared Psychology as a major or minor in order to submit a petition for transfer credit. Stanford credit for courses completed at other institutions must have been granted by the External Credit Evaluation section of the Registrar's Office; those units may be applied toward the 180 units required for graduation. To have credit from outside the department evaluated to fulfill requirements toward the Psychology major or minor, students must complete an Undergraduate Petition form, available from the student services office, and submit it with a course syllabus. Students requesting external transfer credit must also submit a copy of the signed transcript from the External Credit Evaluation section of the Registrar's Office showing the number of Stanford units granted for the course. The Psychology department then evaluates external credit courses and courses from other Stanford departments to determine if they can be applied toward Psychology major or minor requirements.

## Specialization Tracks

Students in the major program, including those in the senior honors program, may elect to specialize in one of four specialization tracks:

- Cognitive Sciences
- Health and Development
- Mind, Culture, and Society
- Neuroscience

These tracks consist of a coherent set of courses leading to advanced undergraduate or even graduate-level courses in an area. In the ideal case, the student who specializes would acquire an understanding

of a range of psychological processes, as well as an appreciation of the significance of these processes in the chosen area of application. Specialization in one of the tracks can facilitate preparation for a professional career as well as for graduate work in Psychology.

Participation in a specialization track is optional, although students who do not wish to complete all the requirements for a track may still want to use the track as a guideline for an integrated program in Psychology. Students who choose to complete a specialization track must meet the requirements for the major plus the additional requirements designated for the track. Typically, the courses required for a track include one or two required courses, four to six recommended courses in Psychology, one or two advanced seminars, and three or four courses in related disciplines. Psychology courses completed for the track count toward satisfying the major requirements. Courses from other departments listed for the track may count toward the 10 outside units for the major requirement, but must be pre-approved by the student services office or faculty adviser.

These specialization tracks are declared on Axxess upon approval of faculty adviser. They appear on the transcript but not on the diploma.

## Honors Program

The senior honors program is designed for exceptional Psychology majors who wish to pursue a year of intensive supervised independent research. Admission to the program is made at the end of the student's junior year on the basis of:

- excellent academic performance
- previous research experience
- two letters of recommendation by faculty and/or graduate students

Applications are available in April and are to be submitted to the department's student services office with a current transcript and recommendations prior to the student's senior year.

Students interested in the program should involve themselves in research as early as possible and should acquire a broad general background in Psychology, including statistics, and a deep background in their chosen area. Typically, students work in their honor thesis adviser's lab for at least one quarter. The honors program is particularly appropriate for students planning to go to graduate school in Psychology or in other social sciences, as well as in computer science, business, counseling education, law, public policy and medicine.

During Autumn Quarter of their senior year, honors program students participate in a weekly seminar and meet with their advisers to develop their experimental program and begin data collection. Winter and Spring Quarters are devoted to completing the research, analyzing the data, and writing the thesis, which is submitted mid-May. Students give oral presentations of their projects at the annual Honors Convention. This convention is attended by undergraduates, graduate students, and faculty.

## Minor in Psychology

### Declaration

Students who wish to declare a minor field of concentration in Psychology must do so no later than the deadline for their application to graduate.

### Degree Requirements

Completion of a minimum of 35 units in Psychology is required for the minor, including PSYCH 1 Introduction to Psychology and PSYCH 10 Introduction to Statistical Methods: Precalculus, or a comparable statistics course. Advanced placement (AP) credit may not be used towards the Psychology minor.

The minor must include three of ten core courses with a minimum of one from each of two areas and elective Psychology courses of at least three units each, totaling 35 units:

#### Area A

Select a minimum of one of the following:

PSYCH 30	Introduction to Perception
PSYCH 35	Minds and Machines
PSYCH 45	Introduction to Learning and Memory
PSYCH 50	Introduction to Cognitive Neuroscience

#### Area B

Select a minimum of one of the following:

PSYCH 60	Introduction to Developmental Psychology
PSYCH 70	Self and Society: Introduction to Social Psychology
PSYCH 75	Introduction to Cultural Psychology
PSYCH 80	Introduction to Personality and Affective Science
PSYCH 90	Introduction to Clinical Psychology
PSYCH 95	Introduction to Abnormal Psychology

#### Elective Psychology Courses

Students who declared a Psychology minor prior to the 2005-06 academic year may choose to complete seven total courses:

		Units
PSYCH 1	Introduction to Psychology	5
PSYCH 10	Introduction to Statistical Methods: Precalculus	5

Three core courses

Two elective courses

Independent study, research, and practica cannot be counted toward the minor. Summer Quarter Psychology courses are not applicable toward the 35 units needed for the minor.

All courses used to fulfill the requirements of the minor must be passed with a grade of C- or better, except for courses offered only on a satisfactory/no credit basis.

## Master of Arts in Psychology

The Department of Psychology offers a master of arts degree only to students concurrently enrolled in other Stanford graduate programs.

A master of arts degree is available to students enrolled in the Department's Ph.D. program. For such students, the requirements of the M.A. degree are listed in the "Doctoral" tab of this section.

In exceptional cases, students concurrently enrolled in another doctoral or professional program at Stanford may also apply for the M.A. degree. In such cases, the applicable admissions and degree requirements are determined on a case by case basis. Such applicants should consult with the student services office in the Department of Psychology.

All applicants must satisfy University residency requirements for the degree and are responsible for consulting with their primary departments or the Financial Aid Office about the effects of the proposed program on their current funding. General University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

## Coterminal Master's Program

The Psychology department no longer offers a coterminal master's program. Students who were admitted to the coterminal program

in earlier years should refer to the Bulletin of their entering year for applicable policy information.

## Units Doctor of Philosophy in Psychology

There are no specific course requirements for admission to the doctoral program. However, an applicant should have research experience as an undergraduate, as well as the equivalent of an undergraduate major in Psychology. The major focus of the doctoral program is on research training, and admission is highly selective.

Applicants for admission must submit their scores on the general Graduate Record Examination as part of the application.

General University requirements for the Ph.D. are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

In addition to fulfilling Stanford University requirements for the degree, the following departmental requirements are stipulated.

### First-Year Course Requirements

During the first year of graduate study, the student should take PSYCH 207 Professional Seminar for First-Year Ph.D. Graduate Students, at least one approved graduate statistics course, and at least two core courses from the following list:

		Units
PSYCH 202	Cognitive Neuroscience	3
PSYCH 205	Foundations of Cognition	1-3
PSYCH 211	Developmental Psychology	1-3
PSYCH 212	Classic and contemporary social psychology research	1-3
or PSYCH 215	Mind, Culture, and Society	
PSYCH 213	Affective Science	3

Students in each area may be required to take up to two additional non-core graduate courses in their area of specialization.

The student is expected to spend at least half of the time in research from the beginning of the first year of graduate study to the completion of the Ph.D., taking no more than 10 units of course work each quarter. At the end of the first year of graduate study, the student must file with the department a written report of the first-year research activities.

### Second-Year Course Requirements

By the end of the second year of graduate study, the student should complete at least one additional core course for a total of three taken from the list above, and take a second approved graduate course in statistics as well as other courses contributing toward completion of the advanced course or minor requirement described below.

*Optional Application for Conferral of the M. A. Degree:* Graduate students, who have completed (a) the first-year and second-year course requirements, and (b) at least 45 units of Psychology courses, may apply for conferral of the M.A. degree. This application should be discussed with the Student Services office in the Department of Psychology.

### Third-Year and Beyond

By the end of the third year the student should complete all of the required core courses listed above and should be well on the way toward completion of the advanced course or minor requirement.

Students are expected to form a research committee, which must include the dissertation reading committee, before the initiation of the dissertation research. The research committee includes the dissertation adviser and consists of at least three faculty members, at least two of

whom should have primary appointments in the Psychology department. For University guidelines for the composition of the dissertation reading committee, see the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

The research committee should meet no later than the last day of classes of Spring Quarter of the third year, and determines the timeline for further development of the dissertation research project. Subsequent meetings are triggered by the completion of one of two documents: a dissertation proposal (DP) or a conceptual analysis of the dissertation area (CADA). The timing and sequencing of the DP and CADA are developed by the student in consultation with the committee. As a general guide, one of the two preliminary elements (CADA or DP) should be completed by the end of the third Summer Quarter and the second should be completed by the end of the fourth Spring Quarter. Students are free to alter the membership of the committee at any time during the process, subject to consultation with the adviser.

The DP should be a description of the proposed research. The CADA provides a framework for the research topic of the dissertation, addresses the central issues within the specialty area, and reviews the pertinent literature.

## Advanced Course or Minor Requirements

The candidate must complete 12 units of advanced graduate course work or a Ph.D. minor in another department. If a student waives the minor requirement in favor of the 12 advanced units, the student must fulfill the advanced course requirement by taking (a) non-core graduate courses, and/or (b) graduate-level courses in other departments comparable in quality to Psychology's graduate courses. If there is any question about comparability, the student should consult the adviser, student services, and, in some cases, the graduate program committee chair before taking the course.

## Orals

The candidate must pass the University oral examination, which also serves as a dissertation defense. A committee is formed to review the oral examination, including the dissertation reading committee, an additional faculty member, and one oral examination committee chair from outside the Psychology department. The oral examination consists of a 40-45-minute presentation to the department of the completed dissertation research. Parents and friends are welcome to attend. Following the presentation, the student and the committee convene for a discussion of the dissertation and the presentation.

## Dissertation Requirements

The candidate must complete a dissertation satisfactory to the dissertation reading committee prior to the oral examination. Minor revisions to formatting may be made after the oral examination.

Ph.D. candidacy expires five years after admission to candidacy at the end of the second year of study. Reapplication requires department reexamination.

## Student Evaluations

*First-Year Evaluation:* It is the department's policy to evaluate the progress of each graduate student at the end of the first year of graduate study. As part of the procedure, each student is required to file with the department a report of the first-year research activities.

Students should discuss this report and the evaluation procedures with their adviser as early as possible in their first year. If the student fulfills the academic promise displayed upon entrance, he or she is invited to continue working towards the doctorate.

The first-year evaluation is primarily based on three factors:

1. quality of research carried out in the first year

2. performance in courses (especially required courses)
3. recommendations of the adviser (including a commitment on the part of that adviser to continue in that role).

*Second-Year and Beyond Evaluation:* A similar evaluation is conducted at the end of each year of graduate training involving the same criteria as the first year; however, the student is not required to submit a paper. Students who are not making satisfactory progress may be dropped from the program.

## The Doctoral Training Program

As indicated by the requirements described above, a student concentrates in any one of several areas within Psychology. Regardless of area, however, the training program places emphasis on the development of research competence, and students are encouraged to develop those skills and attitudes that are appropriate to a career of continuing research productivity.

Two kinds of experience are necessary for this purpose. One is the learning of substantial amounts of technical information. A number of courses and seminars are provided to assist in this learning, and a student is expected to work out a program, with his or her adviser, to attain this knowledge in the most stimulating and economical fashion.

A second aspect of training is one that cannot be gained from the courses or seminars. This is firsthand knowledge of, and practical experience with, the methods of psychological investigation and study. These methods include ways of behaving with the subjects being studied. Students are provided with whatever opportunities they need to reach those levels of competence representative of doctoral standing. Continuing research programs, sponsored by members of the faculty, offer direct opportunities for experience in fields represented by the faculty's many research interests.

Each student achieves competence in unique ways and at different rates. Each student and adviser share in planning a program leading to the objectives discussed. The student is expected to spend half of his or her time on research and takes no more than 10 units of course work per quarter. For further information please contact the student services office and the department graduate guide.

## Teaching Requirement

The department views experience in supervised teaching as an integral part of its graduate program. Regardless of the source of financial support, all students serve as teaching assistants for at least five Psychology courses during their graduate study. Of these five teaching occasions, two must involve PSYCH 1, or either two Statistics courses (i.e., PSYCH 10, PSYCH 252, PSYCH 253, and PSYCH 254), or one Statistics course and one other course the department may designate as a service course.

		Units
PSYCH 1	Introduction to Psychology	5
or PSYCH 10	Introduction to Statistical Methods: Precalculus	
PSYCH 252	Statistical Methods for Behavioral and Social Sciences	1-6
or PSYCH 253	High-Dimensional Methods for Behavioral and Neural Data	
or PSYCH 251	Lab in Experimental Methods	

Students are discouraged from participating in teaching during the first year of graduate study. However, all first and second year students are strongly encouraged to attend a one-day TA Training Workshop offered in September before the autumn quarter. Students typically progress from closely supervised teaching to more independent work. Some students

may be invited to offer a supervised, but essentially independent, seminar during their final year of graduate study.

## Psychology Colloquium

The Psychology Colloquium meets on most Wednesday afternoons at 3:45 p.m. Speakers from Stanford and other institutions present topics of current interest. Graduate students are expected to attend. Additional announcements may be found at the Colloquium Schedule (<http://www.stanford.edu/dept/psychology/colloquium>) web site.

## Ph.D. Minor in Psychology

Candidates for the Ph.D. degree in other departments may elect a minor in Psychology. To obtain a minor, the student must complete 20 units of course work at the graduate level in the Department of Psychology, excluding PSYCH 275 Graduate Research. Crosslisted graduate courses can be used to satisfy this requirement. All courses counting toward the Ph.D. minor must be passed with a grade of 'B-' or better, unless the course is offered only on a credit/no credit basis.

*Emeriti: (Professors)* Albert Bandura, Gordon H. Bower, Herbert H. Clark, John H. Flavell, Leonard M. Horowitz, Mark R. Lepper, Eleanor Maccoby, Roger N. Shepard, Claude M. Steele, Ewart A. C. Thomas, Barbara Tversky, Philip G. Zimbardo

*Chair:* Ian H. Gotlib

*Professors:* Laura L. Carstensen, Geoffrey Cohen, Carol Dweck, Jennifer L. Eberhardt, Ian H. Gotlib, Kalanit Grill-Spector, James J. Gross, Brian Knutson, Ellen M. Markman, Hazel R. Markus, James L. McClelland, Dale Miller, Benoit Monin, Russell A. Poldrack, Lee D. Ross, Jeanne L. Tsai, Anthony D. Wagner, Brian Wandell, Jeffrey J. Wine

*Professor (Research):* Anthony Norcia

*Associate Professors:* Anne Fernald, Michael C. Frank, Noah Goodman, Gregory M. Walton

*Associate Professor (Teaching):* Catherine Heaney

*Assistant Professors:* Alia Crum, Justin Gardner, Hyowon Gweon, Steven Roberts, Daniel Yamins, Jamil Zaki

*Lecturers:* Parul Chandra, Amie Haas, Mary Peck Peters, Jennifer Winters, Beth Wise

*Courtesy Professors:* William C. Dement, Gary H. Glover, Jon Krosnick, Fei-Fei Li, Tanya Luhmann, Robert MacCoun, Bruce McCandliss, William T. Newsome, Robb Willer



# PUBLIC POLICY

Courses offered by the Public Policy Program are listed under the subject code PUBLPOL on the Stanford Bulletin's ExploreCourses website.

The Public Policy program offers a Bachelor of Arts, an honors program, a minor for undergraduates, a coterminal M.A. in Public Policy, a two-year professional Master of Public Policy (M.P.P.) degree, and a one-year non-professional Master of Arts in Public Policy (M.A.).

Admission to the M.P.P. and M.A. programs is restricted to current Stanford undergraduates and graduate students, Stanford alumni (who have graduated within the past 5 years), and external applicants seeking a joint graduate degree.

## Mission of the Undergraduate Program in Public Policy

The mission of the undergraduate program in Public Policy is to provide students with the concepts and tools used in evaluating policy options and outcomes, and to prepare students for entry-level positions in organizations concerned with such analysis. The focus is chiefly on issues such as health, education, environmental, regulation, and science and technology policy, applicable anywhere in the world.

Courses in the major provide students with a background in economics and quantitative methods, political science, law, philosophy, ethics, organizational behavior, and social psychology. Economics and quantitative analyses are central to but not sufficient for modern public policy analysis; political science, law, philosophy, organizational behavior, and psychology are among other necessary disciplinary perspectives. Political science offers insights into the decision-making process and information needs of a democracy. Political philosophy and ethics form the foundations of public policy. Organizational behavior focuses on the decisions made outside the market environment in hierarchies, bureaucracies, and teams.

Seniors have a research capstone requirement consisting either of an honors thesis or participation in a team practicum project, conducting applied policy research for an outside client, typically a nonprofit or government agency. Students majoring in Public Policy are prepared for careers in a wide variety of fields, including elected or appointed public office; business, law, and governmental agencies; research institutes; or for further study in graduate programs.

## Learning Outcomes (Undergraduate)

The Public Policy Program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the program. Students are expected to:

1. Demonstrate knowledge and understanding of public policy analytical tools.
2. Evaluate applied theoretical and empirical work in policy-relevant research.
3. Apply skills and knowledge acquired in the curriculum to analyze policy issues and make policy recommendations.
4. Communicate complex ideas clearly and persuasively in written and oral forms.
5. Demonstrate mastery of the above outcomes in the senior capstone project.

## Mission of the Graduate Program in Public Policy

The mission of the graduate program in Public Policy is to provide students with the advanced skills necessary to assess the performance of alternative approaches to policy making and implementation, evaluate program effectiveness, understand the political constraints faced by policy-makers, and appreciate the conflicts in fundamental human values that often animate policy debate. After completing the graduate core curriculum, students apply these skills by focusing their studies in a three-quarter, 10-unit practicum for the M.P.P. degree or a 5-unit master's thesis for the M.A. degree. Each student in the M.P.P. program also completes at least one concentration tailored to the student's primary degree program or the student's interests and skills. Current concentrations include:

- Education Policy
- Health Care Policy
- International and National Security Policy
- Legal and Regulatory Intervention
- Political and Moral Philosophy
- Resources, Environment, and Energy Policy
- Science and Technology Policy
- Self-designed (requires detailed statement of study goals, relationship of each proposed course to those goals, and commitment by a supervising faculty member)
- Urban and Regional Policy

## Graduate Degrees Offered

The graduate program in Public Policy offers two master's degrees:

- Master of Public Policy (M.P.P.), a two-year professional degree program; available to current Stanford students and Stanford alumni (who have graduated within the past five years)
- Master of Arts (M.A.), a one-year program, not intended as a professional degree; available to current Stanford students

## Joint Degree Programs

The following joint degree programs, which permit students to complete requirements for two degrees with a reduced number of total residency units, are also offered:

- Juris Doctor with a Master of Public Policy (J.D./M.P.P.)
- Juris Doctor with an M.A. in Public Policy (J.D./M.A.)
- Doctor of Medicine with a Master of Public Policy (M.D./M.P.P.)
- Doctor of Philosophy in Economics, Education, Management Science and Engineering, Psychology, Sociology or Structural Biology with a Master of Public Policy (Ph.D./M.P.P.)
- Master of Business Administration with a Master of Public Policy (M.B.A./M.P.P.)
- Master of Arts in Education (Policy, Organization, and Leadership subplan) with a Master of Public Policy (M.A./M.P.P.)
- Master of Arts in International Policy Studies with a Master of Public Policy (M.A./M.P.P.)
- Master of Science in Management Science and Engineering with a Master of Public Policy (M.S./M.P.P.)

Requirements for the joint degrees differ from the requirements of completing the two degrees separately. See the "Master's Degrees in Public Policy (<http://exploreddegrees.stanford.edu/schoolofhumanitiesandsciences/publicpolicy/#masterstext>)" section for more details.

University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this Bulletin.

## Learning Outcomes (Graduate)

The purpose of the master's program is to develop knowledge and skills in public policy and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The M.P.P. or M.A. degree is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in public policy. Through completion of advanced course work and rigorous skills training, the graduate program prepares students to make original contributions to the knowledge of public policy and to interpret and present the results of such research.

## Bachelor of Arts in Public Policy

The Public Policy undergraduate major develops the skills necessary for understanding the political constraints faced by policy makers, assessing the performance of alternative approaches to policy implementation, evaluating the effectiveness of policies, and appreciating the sharp conflicts in fundamental human values that often animate the policy debate.

There are four course elements to the major: preparatory, core, concentration, and senior capstone. Freshman and sophomore years are generally devoted to completing preparatory courses offered in economics, math, and psychology. After completing core courses primarily during the sophomore and junior years, students apply these skills by focusing their studies in one of several areas of concentration. The areas of concentration address a specific field of public policy, various types of institutions, or a deeper development of the tools of policy analysis. Seniors may complete the senior capstone either by participating in a practicum, a team policy research project for an outside client, and/or by writing an honors thesis.

Completion of the Bachelor of Arts degree in Public Policy requires a minimum of 77 units of course work.

Students must complete the Public Policy core, concentration, and the senior capstone requirement for a letter grade and with an overall grade point average of 2.3 (C+) or higher.

Public Policy students are encouraged to secure a faculty adviser within the first two quarters in the major, and must secure a faculty adviser no later than the end of Winter Quarter of the junior year. The director, student services staff, and peer advisers can assist by suggesting suitable faculty advisers. Advisers must be approved by the program director. The adviser need not be affiliated with the Public Policy program, but does need to be a member of Stanford's Academic Council.

The Public Policy program encourages students to attend the Bing Stanford in Washington Program (<http://bsiw.stanford.edu>) and to participate in appropriate Stanford internship programs, especially those available through the Haas Center for Public Service (<http://haas.stanford.edu>) and Stanford in Government (<http://sig.stanford.edu>).

## Preparatory Courses (34 units)

		Units
ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I	5
Select one of the following:		5
PUBLPOL 51	Microeconomics for Policy	
or ECON 51	Economic Analysis II	

ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
ECON 102B	Applied Econometrics	5
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
Select one of the following:		4
MS&E 180	Organizations: Theory and Management	4
or PSYCH 70	Self and Society: Introduction to Social Psychology	
or PSYCH 138	Wise Interventions	
or PUBLPOL 305B	Public Policy and Social Psychology: Implications and Applications	

At most 10 units of preparatory course work may be taken as credit/no credit. Between ECON 50 and ECON 51/ PUBLPOL 51, no more than 5 units can be taken for credit/no credit. Between ECON 102A and ECON 102B, no more than 5 units can be taken for credit/no credit.

## Core Courses (23-25 units)

All core courses must be completed for a letter grade. Variable unit courses must be taken for 5 units.

		Units
PUBLPOL 101	Politics and Public Policy	5
PUBLPOL 104	Economic Policy Analysis	5
Select one of the following ethics courses:		5-6
PUBLPOL 103C Justice		
PUBLPOL 103D Ethics and Politics of Public Service		
PUBLPOL 134	Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals (Students who take PUBLPOL 134 must also take PUBLPOL 103E Ethics on the Edge Public Policy Core Seminar or PUBLPOL 103F Ethics of Truth in a Post-Truth World)	
Select one of the following WIM courses:		5
PUBLPOL 106	Law and Economics	
or PUBLPOL 154	Politics and Policy in California	
or PUBLPOL 156	Health Care Policy and Reform	
Select one of the following advanced empirical methods courses:		3-5
PUBLPOL 105	Empirical Methods in Public Policy (preferred course)	
or ECON 102C	Advanced Topics in Econometrics	
or PUBLPOL 303	Applied Econometrics for Public Policy	
or STATS 202	Data Mining and Analysis	

## Concentration (15 units)

Majors must complete at least 15 units of course work for a letter grade in an area of concentration. This post-core course work must be approved by the student's faculty adviser and the program director no later than the end of Spring Quarter of the junior year. Any subsequent changes made to a student's concentration must be approved by the student's faculty adviser. Students select their concentration in Axess as a degree subplan. Subplans are printed on transcripts and diplomas. Areas of concentration include, but are not limited to:

- Advanced Policy Analysis
- Design of Public Institutions
- Development and Growth Policies
- Discrimination, Crime, and Poverty Policy
- Education Policy
- Health Care Policy
- International and National Security Policy

- Law and the Legal System
- Political and Moral Philosophy
- Resources, Environment, and Energy Policy
- Science and Technology Policy
- Urban and Regional Policy

## Capstone Research Requirement

Seniors are required to demonstrate competency in applied policy research. This requirement is fulfilled either by participating in a practicum project in which small student teams analyze real world policy problems faced by a government or nonprofit organization and produce a report for use by the client or by writing an honors thesis. A seminar for honors students is offered Autumn Quarter (PUBLPOL 200H Senior Honors Seminar, 3 units). The Practicum is offered Autumn, Winter and Spring quarters (PUBLPOL 200A Senior Practicum, 5 units; PUBLPOL 200B Senior Practicum, 5 units; and PUBLPOL 200C Senior Practicum, 5 units). The capstone research requirement must be completed for a letter grade.

## Honors Program

The Public Policy Program offers students the opportunity to pursue honors work during the senior year. The honors thesis must address a policy issue and demonstrate mastery of relevant analytical tools.

### Eligibility and Preparation

In order to be eligible to write an honors thesis, students must achieve a grade point average (GPA) of 3.5 or above in the Public Policy core courses and concentration courses taken by the time of application for the honors program. If accepted, the student must maintain a GPA of 3.5 in the course requirements for a B.A.H. in Public Policy (Public Policy core courses, concentration courses, PUBLPOL 200H Senior Honors Seminar and PUBLPOL 199 Senior Research). Please note that courses not taken at Stanford are not included in calculating the GPA.

Students who intend to pursue honors work should plan their academic schedules so that most of the core courses are completed before the beginning of the senior year, and all of the core and concentration courses are completed by the end of Winter Quarter of senior year. It is strongly encouraged that students pursuing honors work complete their advanced empirical methods course (PUBLPOL 105, ECON 102C, PUBLPOL 303D, or STATS 202) by the end of Spring Quarter of the junior year. All students pursuing honors are required to take PUBLPOL 200H Senior Honors Seminar during Autumn Quarter of their senior year. This scheduling gives students both the time and the necessary course background to complete their honors thesis during senior year. In addition, prospective honors students are encouraged to enroll in the PUBLPOL 197 Junior Honors Seminar and attend Bing Honors College. PUBLPOL 197 focuses on developing a research plan and learning the skills necessary to complete an honors thesis.

### Application Process

A student must submit a completed application to the Public Policy Program office with a brief description of the thesis no later than the Wednesday of the third week of Autumn Quarter. Honors applications are found online (<https://publicpolicy.stanford.edu/academics/undergraduate/forms>). Prior to submitting an application to the honors program, the student must meet with the director of the honors program and obtain the sponsorship of a faculty member who approves the thesis description and agrees to serve as a thesis adviser. Students intending to write a thesis involving more than one discipline may wish to have two advisers, at least one of whom is affiliated with the Public Policy Program. Staff, executive committee members, lecturers, and affiliated faculty in Public Policy are available to provide assistance in selecting a thesis topic and adviser. At least one of the faculty advisers must be a

member of Stanford's Academic Council. A student's proposal must be approved by the thesis adviser and the director of the honors program.

## Enrollment and Milestones

During senior year, the student must enroll in at least 8 but no more than 15 units of PUBLPOL 199 Senior Research. One of these units should be taken with the director of the honors program in Winter Quarter to account for a series of biweekly check ins. The rest should be taken with the thesis adviser. The student needs to contact the program office to have his or her thesis adviser listed as a 199 instructor. An 'N' grade is given by the adviser in quarters prior to Spring when the thesis is completed and presented. All PUBLPOL 199 units must receive a final grade of at least a 'B+' in order to graduate with honors. In addition, the student must maintain a GPA of 3.5 in the course requirements for a B.A.H. in Public Policy (Public Policy core courses, concentration courses, PUBLPOL 200H Senior Honors Seminar and PUBLPOL 199 Senior Research). Courses not taken at Stanford are not included in calculating the GPA in order to graduate with honors from the Public Policy Program.

	Units
Public Policy Core Courses	23-25
Concentration	15
PUBLPOL 200H Senior Honors Seminar	3
PUBLPOL 199 Senior Research	8-15

A set of preliminary results on the research question is due to the thesis adviser and the honors program director by February 15. A first draft of the thesis is due to the thesis adviser and honors program director by April 1. The thesis adviser sets the deadline for receiving the final draft of the thesis. The final draft of the honors thesis must be submitted electronically and in a bound copy to the thesis adviser, the director of the honors program and the Public Policy Program office. In order to be considered for University and department awards, the final thesis must be submitted to the program office no later than the second Wednesday in May. All other theses must be submitted by the last Friday in May. Each student will give an oral presentation of their thesis.

Graduation with honors requires that the thesis be approved by both the adviser and the honors program director. The role of the honors program director is to assure that the thesis addresses an issue of public policy and satisfies the program's standards of excellence. However, the grade for the honors thesis (PUBLPOL 199 Senior Research units) is determined by the adviser.

## Minor in Public Policy

The Public Policy Program offers a minor that is intended to provide undergraduates in other majors with interdisciplinary training in applied social sciences.

Students who pursue the minor are required to take the courses listed below for a total of 35 units in Public Policy and its supporting disciplinary departments. Because University rules prohibit double-counting courses, the requirements for a minor differ according to the student's major requirements. It is required that students review their course plans with a program administrator. *Note:* Economics majors are permitted to double-count ECON 1 Principles of Economics, ECON 50 Economic Analysis I, and ECON 51 Economic Analysis II because such courses satisfy introductory skill requirements for the Economics major.

Public Policy students are never required to take a course that duplicates material they have already mastered. Students may, by petition, substitute a different course for a requirement whose material would be duplicative. This flexibility does not reduce the number of units required for the minor.

Students who pursue the minor must complete the Multiple Major/Minor Form ([http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin\\_MultMaj.pdf](http://studentaffairs.stanford.edu/sites/default/files/registrar/files/MajMin_MultMaj.pdf)) and have it reviewed by all applicable departments/programs the beginning of the quarter in which the degree is conferred.

## Required Course Work

		Units
ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I	5
Select one of the following:		5
PUBLPOL 51 or ECON 51	Microeconomics for Policy Economic Analysis II	
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
ECON 102B	Applied Econometrics	5
PUBLPOL 104	Economic Policy Analysis	5
Select one of the following depending on major requirements:		5-6
PUBLPOL 101	Politics and Public Policy	
PUBLPOL 103C	Justice	
PUBLPOL 106	Law and Economics	
PUBLPOL 154	Politics and Policy in California	
PUBLPOL 156	Health Care Policy and Reform	
PUBLPOL 134	Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals (Students who take PUBLPOL 134 must also take PUBLPOL 103E Ethics on the Edge Public Policy Core Seminar or PUBLPOL 103F Ethics of Truth in a Post-Truth World)	

At most, 10 units of course work may be taken as credit/no credit. Between ECON 50 and ECON 51/ PUBLPOL 51, no more than 5 units can be taken for credit/no credit. Between ECON 102A and ECON 102B, no more than 5 units can be taken for credit/no credit.

Students who satisfy major requirements by taking ECON 50 and an introductory course in statistics such as ECON 102A or STATS 60 complete these requirements instead:

- PUBLPOL 105 Empirical Methods in Public Policy or
- ECON 102C Advanced Topics in Econometrics

## Coterminal M.A. in Public Policy

The coterminal M.A. in Public Policy is a degree program designed to impart the basic analytical tools of public policy analysis, or to permit Public Policy majors to specialize in an applied field of policy analysis. Most students complete their M.A. in a fifth year at Stanford; occasionally, students may be able to complete both their B.A. and coterminal M.A. in the fourth year.

Undergraduates with strong academic records may apply for admission upon completion of 120 units, but no later than the quarter prior to the expected completion of the undergraduate degree. The University requires that units for a given course may not be counted to meet the requirements of more than one degree; that is, no units may be double-counted. However, Public Policy students are never required to take a course which duplicates material they have already mastered. Students may, by petition, substitute a different course for a requirement whose material would be duplicative. This flexibility does not reduce the number of units required for the coterminal M.A.

The coterminal M.A. is also a gateway to the M.P.P. degree program. Stanford undergraduates may apply to the coterminal M.A. in Public Policy and then, after one quarter in the M.A. program, apply to the

M.P.P. program by submitting an application. Students accepted into the M.P.P. program must confer their bachelor's degree, submit the Graduate Authorization Petition in Axess, withdraw from the M.A. degree program, and complete the requirements for the 90-unit M.P.P. degree. This does not reduce the total number of units required for the bachelor's or master's degree. Earning the B.A. and M.P.P. typically takes at least five years. Students considering this option should be familiar with the University's coterminal degree policies and procedures and should consult the director and staff of the Public Policy Program early in their planning. There is a \$125 fee for submitting the Graduate Authorization Petition to change the M.A. to the M.P.P. degree.

## University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken two quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

All courses counting towards the master's degree not considered core requirements must be approved by petition by the Public Policy Program.

## Degree Requirements

All applicants should have completed, or currently be enrolled in, the required preparatory course work prior to applying. These courses do not count towards the 45-unit M.A. requirement:

		Units
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
ECON 1	Principles of Economics	5
ECON 50	Economic Analysis I	5
ECON 51 or ECON 52 or PUBLPOL 51	Economic Analysis II Economic Analysis III Microeconomics for Policy	4-5
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists (or equivalent)	5
ECON 102B	Applied Econometrics	5

To graduate with a coterminal M.A. in Public Policy, students must:

1. Follow one of three tracks (A, B, or C) through the program, as described below.
2. Take all courses applied to the coterminal master's degree for a letter grade (with the exception of PUBLPOL 311 Public Policy Colloquium which is only offered S/NC). For courses with variable

units, coterminal students should, in their graduate career, enroll in the course for 4 units. Courses offered only for C/NC or other non-letter grade system may be applied upon approval of a petition to the program director.

- Secure a faculty adviser by the end of the first quarter enrolled in the coterminal M.A. degree program. The director and student services staff can assist by suggesting suitable faculty advisers. The adviser need not be affiliated with the Public Policy Program, but does need to be a member of Stanford's Academic Council.
- Achieve a cumulative grade point average (GPA) of 3.0 (B) or better for all courses taken towards the M.A.
- Coterminal M.A. students who are admitted to the M.P.P. must transfer all applicable M.A. units to the M.P.P. degree.
- Comply with all relevant University and program deadlines and policies.

### Track A

Public Policy majors follow Track A, which consists of at least 45 units of course work, including:

- 29 or more units in an area of concentration. The concentration is referred to as a degree subplan. Subplans are printed on the transcript and diploma and are elected via the Declaration or Change to a Field of Study form (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/grad-subplan-change.pdf>). Each concentration includes a set of gateway courses and a variety of electives. Gateway courses may vary year to year based on availability. Check each concentration page (<https://publicpolicy.stanford.edu/academics/graduate/concentrations>) to see the list of gateway courses. Students must present a coherent written study plan to support concentration course choices, designed in consultation with a faculty adviser and approved by the program director. At least one faculty adviser must be a member of the Academic Council.  
Current concentrations include:
  - Education Policy
  - Health Care Policy
  - International and National Security Policy
  - Legal and Regulatory Intervention
  - Political and Moral Philosophy
  - Resources, Environment, and Energy Policy
  - Science and Technology Policy
  - Self-designed (requires detailed statement of study goals, relationship of each proposed course to those goals, and commitment by a supervising faculty member)
  - Urban and Regional Policy
- Decision-Making Component - select one of the following courses\*:
  - LAW 7508 Problem Solving and Decision Making for Public Policy and Social Change
  - ECON 137 Decision Modeling and Information
  - GSBGEN 646 Behavioral Decision Making

\* Note that the decision-making requirement for Track A applies to coterminal students admitted in 2017-18, and does not apply to students previously admitted.

- All Public Policy graduate students are required to attend and enroll in three quarters of PUBLPOL 311 Public Policy Colloquium (3 units). Attendance and participation are mandatory.
- Completion of PUBLPOL 309 Practicum or PUBLPOL 310 faculty-supervised internship or thesis (5-10 units).
- All 45 units must be taken in upper division (100-level) courses, and at least 25 of those units must be at the graduate level (200-level and above).

### Track B

Economics majors typically follow the requirements detailed below in Track C; however, some Economics majors take courses for their major that also satisfy the content requirements of the Public Policy coterminal M.A. The following Economics courses, if taken for the undergraduate degree, can be used to fulfill content requirements, but not unit requirements, for the Public Policy coterminal M.A. In place of these courses, students may take advanced policy skills courses, or an approved (by petition) policy-related elective.

		Units
ECON 150	Economic Policy Analysis (fulfills the PUBLPOL 204 or PUBLPOL 301B requirement)	4-5
ECON 154	Law and Economics (fulfills the PUBLPOL 206 or PUBLPOL 302B requirement)	4-5
ECON 102C	Advanced Topics in Econometrics (fulfills the ECON 102C, PUBLPOL 205, PUBLPOL 303D, or STATS 202 requirement)	5

### Track C

Students who are not pursuing a major in Public Policy or Economics follow Track C, which consists of at least 45 units of course work in the analysis of public policy.

- The following core courses are required and count toward the required minimum 45 units:

		Units
PUBLPOL 201	Politics and Public Policy	4
or PUBLPOL 308	Political Analysis for Public Policymakers	
PUBLPOL 302B	Economic Analysis of Law (preferred course)	3-4
or PUBLPOL 206	Law and Economics	
PUBLPOL 301B	Economic Policy Analysis for Policymakers	4
or PUBLPOL 204	Economic Policy Analysis	
PUBLPOL 307	Justice	4
Select one of the following courses:		2-5
LAW 7508	Problem Solving and Decision Making for Public Policy and Social Change (preferred course)	
or ECON 137	Decision Modeling and Information	
or GSBGEN 64	Behavioral Decision Making	
Select one of the following courses:		4
MS&E 280	Organizational Behavior: Evidence in Action	
or PSYCH 138	Wise Interventions	
or PUBLPOL 31	Public Policy and Social Psychology: Implications and Applications	
Select one of the following advanced empirical methods courses:		3-5
PUBLPOL 205	Empirical Methods in Public Policy (preferred course)	
or ECON 102C	Advanced Topics in Econometrics	
or PUBLPOL 31	Applied Econometrics for Public Policy	
or STATS 202	Data Mining and Analysis	

- Complete a concentration of at least 15 units, under the guidance of a faculty adviser and the Public Policy program director.
- All Public Policy graduate students are required to attend and enroll in three quarters of PUBLPOL 311 Public Policy Colloquium (3 units total). Attendance and participation are mandatory.
- Students must petition to count additional advanced policy skills courses (if needed) to meet the 45-unit degree requirement. All 45 units must be taken in upper division (100-level) courses and at least 25 of those units must be taken at the graduate level (200-level and above).

Coterminal M.A. students must select a faculty adviser by the end of their first quarter in the program. Students may refer to the Concentrations Page (<https://publicpolicy.stanford.edu/academics/coterminal-degree/requirements/requirements-public-policy-majors>) for Track A coterm students, for a selection of pre-approved elective courses. Public Policy student services staff can verify scheduling of courses. At least one faculty adviser must be a member of the Academic Council.

## Application and Admission

There are two coterminal degree application deadlines for the 2017-18 academic year: November 16, 2017 and February 22, 2018. Applicants may be contacted for an interview. A \$125 fee is charged when adding the M.A. degree program in Axess.

To apply for admission to the Public Policy coterminal M.A. program, students should submit the following materials online by the appropriate deadline:

1. The Coterminal Online Application (<https://applyweb.com/stanterm>).
2. Statement of purpose, 500 words maximum (indicate interest in M.P.P. degree, if applicable)
3. One-page resume
4. GRE Scores; official GRE scores sent to Stanford University and an unofficial copy submitted with the application
5. A preliminary program proposal
6. A current unofficial undergraduate transcript
7. Two confidential letters of recommendation from Stanford faculty members familiar with the student's academic work
8. Coterm Program Approval from undergraduate department

## Financial Aid

The Public Policy Program does not provide financial assistance to coterminal students. For information on student loans and other sources of support, consult the Stanford Financial Aid Office (<http://financialaid.stanford.edu>). Students who enter public service employment with local, state, or federal agencies; schools; or certain not-for-profit organizations may obtain forgiveness for educational loans, based on years of public service employment.

## Master's Degrees in Public Policy

The program offers two master's degrees in Public Policy. The Master of Public Policy (M.P.P.) is a two-year professional degree, and the Master of Arts in Public Policy (M.A.) is a one-year non-professional degree.

At this time, eligibility for admission to the M.P.P. and M.A. programs is restricted to current Stanford undergraduate and graduate students, Stanford alumni (who have graduated within the past 5 years), and external applicants seeking a joint graduate degree. If you do not meet these criteria, you are not eligible for admission to the M.A. or the M.P.P. degree programs.

1. Public Policy Joint Degrees. Students enrolled in or applying to certain degree programs in the Schools of Business, Education, Engineering, Humanities and Sciences, Law, and Medicine are eligible to apply for Public Policy joint degrees. For further information, see the "Joint Degree Programs (p. 54)" section of this Bulletin and the University Registrar's site (<http://studentaffairs.stanford.edu/registrar/students/jdp-information>). All Public Policy joint degree programs, with the exception of the J.D./M.A., require at least one year of study at Stanford beyond the requirements for the other joint or dual degree.
  - Juris Doctor and Master of Public Policy (J.D./M.P.P.)
  - Juris Doctor and Master of Arts of Public Policy (J.D./M.A.)
  - Doctor of Medicine and Master of Public Policy (M.D./M.P.P.)

- Doctor of Philosophy in Education and Master of Public Policy (Ph.D./M.P.P.)
  - Doctor of Philosophy in Economics and Master of Public Policy (Ph.D./M.P.P.)
  - Doctor of Philosophy in Management Science & Engineering and Master of Public Policy (Ph.D./M.P.P.)
  - Doctor of Philosophy in Psychology and Master of Public Policy (Ph.D./M.P.P.)
  - Doctor of Philosophy in Sociology and Master of Public Policy (Ph.D./M.P.P.)
  - Doctor of Philosophy in Structural Biology and Master of Public Policy (Ph.D./M.P.P.)
  - Master of Business Administration and Master of Public Policy (M.B.A./M.P.P.)
  - Master of Arts in Education: Policy, Organization, and Leadership subplan and Master of Public Policy (M.A./M.P.P.)
  - Master of Arts in International Policy Studies and Master of Public Policy (M.A./M.P.P.)
  - Master of Science in Management Science & Engineering and Master of Public Policy (M.S./M.P.P.)
2. Dual Degrees. Any other Stanford graduate student (i.e., not covered in '1' above), Stanford senior, or Stanford alumnus/a (who has graduated within the past 5 years) is eligible to apply for a Public Policy dual degree. Stanford graduate students may subsequently withdraw from their original degree programs, if desired.
    - Master of Public Policy (M.P.P.)
    - Master of Arts in Public Policy (M.A.): Available only to current Stanford graduate students

## Prerequisites

Graduate students in Public Policy are expected to be literate in mathematics and microeconomics at a level equivalent to MATH 51 Linear Algebra and Differential Calculus of Several Variables and ECON 50 Economic Analysis I before beginning the curriculum. A no-credit refresher course in mathematics and economics is offered in the two weeks preceding the start of Autumn Quarter. Attendance is strongly encouraged.

## M.P.P. and M.A. Degree Requirements

1. All graduate degree candidates must submit a Master's Degree Program Proposal (<https://stanford.app.box.com/v/progpropma>) to the Public Policy office by the end of Autumn Quarter and must amend this proposal formally if plans for meeting the degree requirements change.
2. Public Policy students are never required to take a course which duplicates material they have already mastered. Students may petition a different course for a core requirement whose material would be duplicative. This flexibility does not reduce the unit requirements for any degree. If a student wishes to count a class he or she is currently enrolled in, petitions must be submitted, at the latest, by Friday of the first week of classes.
3. All Public Policy graduate students must secure a faculty adviser within the first quarter they are enrolled in the M.A. or M.P.P. degree program. The director and student services staff can assist by suggesting suitable faculty advisers. The adviser need not be affiliated with the Public Policy Program, but does need to be a member of Stanford's Academic Council.
4. M.P.P. degree students are not permitted to enroll in PUBLPOL 309 Practicum, without having completed the following core courses: PUBLPOL 301A Microeconomics for Policy, PUBLPOL 301B Economic Policy Analysis for Policymakers, ECON 102A Introduction to Statistical Methods (Postcalculus) for Social

Scientists, PUBLPOL 303D Applied Econometrics for Public Policy, and PUBLPOL 306 Writing and Rhetoric for Policy Audiences.

## Curriculum Requirements

		Units
PUBLPOL 301A	Microeconomics for Policy	4
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists (or equivalent)	5
PUBLPOL 301B	Economic Policy Analysis for Policymakers	4
PUBLPOL 303D	Applied Econometrics for Public Policy (preferred course)	4
or PUBLPOL 206	Law and Economics	
Select one of the following courses:		2-5
LAW 7508	Problem Solving and Decision Making for Public Policy and Social Change (preferred course)	
or ECON 137	Decision Modeling and Information	
or GSBGEN 646	Behavioral Decision Making	
PUBLPOL 306	Writing and Rhetoric for Policy Audiences (requirement for M.P.P. students only. M.A. students may take as an elective)	4
PUBLPOL 307	Justice	4
PUBLPOL 308	Political Analysis for Public Policymakers	4

All core courses listed above must be taken for a letter grade (with the exception of PUBLPOL 311 Public Policy Colloquium which is only offered S/NC). Students must maintain a 3.0 (B) grade point average overall in courses applicable to the degree.

1. Core Curriculum (shown above)
2. At least two electives are taken during the first year. At least one must be from the Concentration Electives List (<https://publicpolicy.stanford.edu/academics/graduate/concentrations>).
3. Colloquium: All Public Policy graduate students are required to attend and enroll in three quarters of PUBLPOL 311 Public Policy Colloquium (3 units) during their first year of the program. Attendance and participation are mandatory.
4. Practicum (M.P.P. and Track A coterminal M.A. students): Completion of the practicum course, PUBLPOL 309 Practicum (10 units, Autumn and Winter quarters), in which interdisciplinary student teams analyze real-world policy issues for outside clients.
5. Master's Thesis (non-coterminal M.A. students): Completion of a 5-unit master's thesis, written under the guidance of a Public Policy-affiliated faculty adviser who is a member of Academic Council on a topic approved in advance by the program director. Students give the program office the name of their thesis adviser and enroll in PUBLPOL 310 Master of Arts Thesis units during quarter(s) of their choosing. The 5 units may be spread over multiple quarters, and an 'N' (continuing course) grade is given during any quarters prior to degree conferral. The thesis must be submitted to the Public Policy program office in both electronic and printed form no later than the last Friday before the end of the quarter. The final grade for PUBLPOL 310 is determined by the thesis adviser.
6. Concentration (M.P.P. students only): Advanced course work in a specialized field, chosen from the approved list of concentration courses (<https://publicpolicy.stanford.edu/academics/graduate/concentrations>) with the prior approval of the student's faculty adviser and the program director. The Registrar refers to such a concentration as a degree subplan. Public Policy subplans are printed on the transcript and diploma and are elected by the student via the Declaration or Change to a Field of Study form (<https://stanford.box.com/grad-subplan-change>). Current concentrations include:

- Education Policy
- Health Care Policy
- International and National Security Policy
- Legal and Regulatory Intervention
- Political and Moral Philosophy
- Resources, Environment, and Energy Policy
- Science and Technology Policy
- Self-designed (requires detailed statement of study goals, relationship of each proposed course to those goals, and commitment by a supervising faculty member)
- Urban and Regional Policy

## Public Policy Joint Degree Requirements

1. A joint degree (p. 54) is regarded by the University as distinct from either of its component degrees, and requirements for the joint degree differ from the sum of the requirements for the individual degrees.
2. Up to a maximum of 45 units, or one year, of the University residency requirement can be credited toward both graduate degree programs (i.e., the joint degree requirements may contain up to 45 units less than the sum of each program separately). For example, a J.D./M.P.P. has a four-year residency requirement, one year less than the sum of the requirements for the separate degrees. This recognizes that there is a subject matter overlap between the fields comprising the joint degree.
3. The Public Policy Program strives to encourage an intellectual, professional, and social community among its students. For this reason, joint degree students are strongly encouraged to devote one year of full-time study at Stanford entirely to the Public Policy Program rather than spacing Public Policy courses throughout their graduate careers. For joint degree Ph.D. students, the core requirements of the M.P.P. should be completed over two contiguous years of study, during which students may also be enrolled in courses from their Ph.D. program. Exceptions to this structure must be approved in advance by petition.
4. Joint degree students are expected to have and to consult regularly with an academic adviser. The adviser is generally a member of the faculty of both degree programs and must be a member of Academic Council. The program director and staff are available to make adviser recommendations.
5. In order to take advantage of the reduced residency requirement, joint M.P.P. students must define their area of concentration from among courses offered in their non-Public Policy program. Students wishing to concentrate in another field should apply for a dual, rather than a joint, M.P.P. degree.

## Application and Admissions

Applications for graduate study in Public Policy are only accepted from:

1. Students currently enrolled in any Stanford graduate or undergraduate degree program
2. External applicants seeking a joint degree, or
3. Stanford alumni (who have graduated within the past 5 years).

External applicants for joint degrees must apply to the department or school offering the other graduate degree (i.e., Ph.D., M.D., M.A., M.S., M.B.A., or J.D.), indicating an interest in the joint degree program; applicants admitted to the other degree program are then evaluated for admission to the M.P.P. or M.A. program.

To be considered for matriculation beginning in the Autumn Quarter 2018-19, all application materials must be submitted no later than April 10, 2018. The early deadline for applications is January 23, 2018 with a final deadline on April 10, 2018. Early submission of M.P.P. applications

is encouraged. Admission notifications will be sent to applicants by May 1, 2018. Admitted students are required to respond to offers of admission by May 15, 2018.

## Stanford Alumni and Current Stanford Seniors

Visit the Stanford Office of Graduate Admissions (<http://studentaffairs.stanford.edu/gradadmissions>). The online application for the M.P.P. is available beginning in mid-September 2017. The application fee is \$125. The program is unable to refund an application fee, so prospective applicants are advised to refer to eligibility requirements before submitting an application.

Only complete applications submitted by the deadline are reviewed. A complete application includes the following:

1. Application (<http://studentaffairs.stanford.edu/gradadmissions>).
2. Official transcripts. Copies of student transcripts must bear the official seal of the institution and the signature of the registrar. Upload transcripts to the online application.
3. GRE scores.
4. Letters of recommendation: Three confidential letters of recommendation from a Stanford faculty member or an employer should be submitted electronically via the online application. See the Stanford Office of Graduate Admissions web site regarding letters of recommendation (<https://gradadmissions.stanford.edu/applying/starting-your-application/required-application-documents/letters-recommendation>). At least two letters must be from Stanford faculty members.
5. Statement of purpose (not to exceed two pages; upload to the online application).
6. Academic writing sample (upload to the online application): This can be on any topic and may be either something previously written or something written specifically for the application. It should be 6-10 pages (double-spaced) and should showcase academic writing ability.
7. Resume or curriculum vitae (upload to the online application).

## Stanford Current Graduate Students

1. Application for Current Stanford Graduate Students (<https://publicpolicy.stanford.edu/academics/graduate/admissions/current-graduate-students>).
2. Two confidential letters of recommendation, one of which must be from a Stanford faculty member familiar with applicant's academic work.
3. Undergraduate and graduate transcripts.
4. GRE, GMAT, LSAT or MCAT test scores.
5. Statement of purpose, not to exceed two pages.
6. Resume or curriculum vitae.
7. Preliminary program proposal.
8. Prerequisite completion statement, demonstrating completion of required prerequisite course work in multivariate calculus and intermediate microeconomics.

Applicants may be interviewed. If admitted, students will submit a Graduate Authorization Petition (<https://registrar.stanford.edu/students/graduate-degree-progress/graduate-program-authorization-petition>) through AxBSS. A \$125 fee is charged when adding the M.A. or M.P.P. degree program in AxBSS.

## Gateway and Elective Courses for Master's Programs

### Education Policy Concentration

#### Education Policy Concentration Gateway Courses

ECON 146	Economics of Education	5
EDUC 220A	Introduction to the Economics of Education	4
EDUC 220B	Introduction to the Politics of Education	4
EDUC 222	Resource Allocation in Education	4-5
EDUC 271	Education Policy in the United States	3
EDUC 306A	Economics of Education in the Global Economy	5
EDUC 347	The Economics of Higher Education	3-4

#### Foundations - take at least two courses from this list

EDUC 201	History of Education in the United States	3-5
EDUC 212	Urban Education	3-5
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
EDUC 220C	Education and Society	4-5
EDUC 220D	History of School Reform: Origins, Policies, Outcomes, and Explanations	3-5
EDUC 276	Educational Assessment	3
EDUC 310	Sociology of Education: The Social Organization of Schools	4

#### Organizational Studies - take at least one course from this list

EDUC 288	Organizational Analysis	4
EDUC 316	Social Network Methods	4-5
EDUC 377	Comparing Institutional Forms: Public, Private, and Nonprofit	4
PUBLPOL 317	Comparing Institutional Forms: Public, Private, and Nonprofit	4

SOC 369	Social Network Methods	4-5
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#### Remaining units can be taken from the course lists below

EDUC 117	Research and Policy on Postsecondary Access	3
EDUC 202	Introduction to Comparative and International Education	4
EDUC 202I	International Education Policy Workshop	2-4
EDUC 205	Biosocial Medicine: The Social, Psychological, and Biological Determinants of Behavior and Wellbeing	2-3
EDUC 221A	Policy Analysis in Education	4-5
EDUC 265	History of Higher Education in the U.S.	3-5
EDUC 273	Gender and Higher Education: National and International Perspectives	4
EDUC 306A	Economics of Education in the Global Economy	5
EDUC 306B	Global Education Policy & Organization	3-5
EDUC 306D	World, Societal, and Educational Change: Comparative Perspectives	4-5
EDUC 306Y	Economic Support Seminar for Education and Economic Development	1
EDUC 323A	The Practice of Education Policy Analysis	3-5
EDUC 347	The Economics of Higher Education	3-4
EDUC 355	Higher Education and Society	3
EDUC 376	Higher Education Leadership Colloquium	2-3
EDUC 417	Research and Policy on Postsecondary Access	3
POLISCI 326T	The Politics of Education	3-5
SOC 273	Gender and Higher Education: National and International Perspectives	4

## Health Care Policy Concentration

### Health Care Policy Gateway Courses

BIOMEDIN 251	Outcomes Analysis	4
BIOMEDIN 432	Analysis of Costs, Risks, and Benefits of Health Care	4
ECON 126	Economics of Health and Medical Care	5



HRP 210	Health Law and Policy	3
HRP 211	Law and the Biosciences: Neuroscience	3
LAW 3003	Health Law: The FDA	3
MS&E 292	Health Policy Modeling	3
PUBLPOL 156	Health Care Policy and Reform	5
PUBLPOL 222	Biosecurity and Bioterrorism Response	4-5
PUBLPOL 231	Health Law: Finance and Insurance	3
<b>Health Care Policy Elective Courses</b>		
ANTHRO 179	Cultures of Disease: Cancer and HIV/AIDS	5
BIOE 390	Introduction to Bioengineering Research	1-2
CEE 265D	Water and Sanitation in Developing Countries	1-3
CEE 274D	Pathogens and Disinfection	3
ECON 118	Development Economics	5
ECON 127	Economics of Health Improvement in Developing Countries	5
ECON 147	The Economics of Labor Markets	5
ECON 214	Development Economics I	2-5
HRP 207	Introduction to Concepts and Methods in Health Services and Policy Research I	2
HRP 208	Introduction to Concepts and Methods in Health Services and Policy Research II	2
HRP 211	Law and the Biosciences: Neuroscience	3
HRP 225	Design and Conduct of Clinical and Epidemiologic Studies	3-4
HRP 226	Intermediate Epidemiologic and Clinical Research Methods	3
HRP 231	Epidemiology of Infectious Diseases	3
HRP 236	Epidemiology Research Seminar	1
HUMBIO 120	Health Care in America: An Introduction to U.S. Health Policy	4
HUMBIO 120A	American Health Policy	3
HUMBIO 122	Beyond Health Care: the effects of social policies on health	3
HUMBIO 122S	Social Class, Race, Ethnicity, and Health	4
HUMBIO 126	Promoting Health Over the Life Course: Multidisciplinary Perspectives	3
HUMBIO 129	Critical Issues in International Women's Health	4
HUMBIO 129S	Global Public Health	4
HUMBIO 153	Parasites and Pestilence: Infectious Public Health Challenges	4
HUMBIO 157	The Biology of Stem Cells	3
HUMBIO 173	Science, Innovation and the Law	5
MS&E 252	Decision Analysis I: Foundations of Decision Analysis	3-4
MS&E 256	Technology Assessment and Regulation of Medical Devices	3
MS&E 352	Decision Analysis II: Professional Decision Analysis	3-4
PSYCH 101	Community Health Psychology	4
PSYCH 102	Longevity	4

## International and National Security Policy Concentration

### International and National Security Policy Gateway Courses

IPS 241	International Security in a Changing World	5
POLISCI 114S	International Security in a Changing World	5

### International and National Security Elective Courses

IPS 210	The Politics of International Humanitarian Action	3-5
IPS 211	The Transition from War to Peace: Peacebuilding Strategies	3-5

IPS 219	Intelligence and National Security	3
IPS 230	Democracy, Development, and the Rule of Law	5
IPS 241	International Security in a Changing World	5
IPS 244	U.S. Policy toward Northeast Asia	5
IPS 250	International Conflict Resolution	2
MED 262	Economics of Health Improvement in Developing Countries	5
MS&E 243	Energy and Environmental Policy Analysis	3
POLISCI 336	Introduction to Global Justice	4

## Legal and Regulatory Intervention Concentration

### Legal and Regulatory Intervention Gateway Courses

ECON 157	Imperfect Competition	5
LAW 7001	Administrative Law	4,3
LAW 7001	Administrative Law	4,3
NBIO 201	Social and Ethical Issues in the Neurosciences	2-4

### Legal and Regulatory Intervention Elective Courses

BIOMEDIN 432	Analysis of Costs, Risks, and Benefits of Health Care	4
CEE 171	Environmental Planning Methods	3
CEE 175A	California Coast: Science, Policy, and Law	3-4
ECON 111	Money and Banking	5
ECON 126	Economics of Health and Medical Care	5
ECON 250	Environmental Economics	2-5
ECON 251	Natural Resource and Energy Economics	2-5
LAW 1001	Antitrust	4
LAW 2505	Land Use Law	3
LAW 3003	Health Law: The FDA	3
MS&E 243	Energy and Environmental Policy Analysis	3
MS&E 256	Technology Assessment and Regulation of Medical Devices	3
MS&E 330	Law, Order & Algorithms	3
PSYCH 152	Mediation for Dispute Resolution	3
PSYCH 232	Brain and Decision Making	3
PUBLPOL 231	Health Law: Finance and Insurance	3

## Political and Moral Philosophy Concentration

### Policy and Moral Philosophy Electives

ANTHRO 318	Democracy and Political Authority	5
ARTHIST 442	Looking at Violence	5
BIOS 224	Big Topics in Stem Cell Ethics	2
DLCL 325	Modern Seminar	3-5
EDUC 247	Moral and Character Education	3
ETHICSOC 278M	Introduction to Environmental Ethics	4-5
GSBGEN 208	Ethics in Management	2
HISTORY 208S	Facing the Past: The Politics of Retrospective Justice	5
HUMBIO 174	Foundations of Bioethics	3
LAW 3502	Art and the Law	2
LAW 5802	Modern American Legal Thought	3
NBIO 201	Social and Ethical Issues in the Neurosciences	2-4
PEDS 251A	Medical Ethics I	2
PEDS 251B	Medical Ethics II	2
PHIL 225	Kant's First Critique	4
PHIL 270	Ethical Theory	4
PHIL 272	History of Modern Moral Philosophy	4
PHIL 272B	Recent Ethical Theory: Moral Obligation	4

PHIL 274B	Universal Basic Income: the philosophy behind the proposal	4	ECON 127	Economics of Health Improvement in Developing Countries	5
PHIL 275B	Philosophy of Public Policy	4	ECON 147	The Economics of Labor Markets	5
PHIL 276	Political Philosophy: The Social Contract Tradition	4	ENERGY 101	Energy and the Environment	3
PHIL 317	Topics in Plato: Middle and Late Ethics & Politics	2-4	ENERGY 102	Fundamentals of Renewable Power	3
PHIL 372	Topics in Kantian Ethics	4	ENERGY 104	Sustainable Energy for 9 Billion	3
PHIL 374F	Science, Religion, and Democracy	3-5	HUMBIO 130	Human Nutrition	4
POLISCI 131L	Modern Political Thought: Machiavelli to Marx and Mill	5	IPS 266	Managing Nuclear Waste: Technical, Political and Organizational Challenges	3
POLISCI 134P	Contemporary Moral Problems	4-5	LAW 2505	Land Use Law	3
POLISCI 230A	Classical Seminar: Origins of Political Thought	3-5	LAW 7001	Administrative Law	4,3
POLISCI 231	High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests	3-5	LAW 7001	Administrative Law	4,3
POLISCI 236	Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector	5	ME 370A	Energy Systems I: Thermodynamics	3
POLISCI 332	Topics in Political Philosophy	5	ME 370B	Energy Systems II: Modeling and Advanced Concepts	4
POLISCI 351C	Institutions and Bridge-Building in Political Economy	4	MS&E 201	Dynamic Systems	3-4
POLISCI 434	Egalitarianism	5	MS&E 211	Introduction to Optimization	3-4
			MS&E 246	Financial Risk Analytics	3
			MS&E 251	Introduction to Stochastic Control with Applications	3
			MS&E 293	Technology and National Security	3
			MS&E 294	Systems Modeling for Climate Policy Analysis	3

## Resources, Environment, and Energy Policy Concentration

### Resources, Environment, and Energy Policy Gateway Courses

ECON 250	Environmental Economics	2-5
ECON 251	Natural Resource and Energy Economics	2-5
LAW 2504	Environmental Law and Policy	3
MS&E 243	Energy and Environmental Policy Analysis	3

### Resources, Environment, and Energy Policy Electives

ANTHRO 155	Research Methods in Ecological Anthropology	5
ANTHRO 162	Indigenous Peoples and Environmental Problems	3-5
ANTHRO 302	History of Anthropological Theory, Ecology and Environment	5
BIOHOPK 263H	Oceanic Biology	4
BIOHOPK 266H	Molecular Ecology	5
BIOHOPK 272H	Marine Ecology: From Organisms to Ecosystems	5
CEE 162E	Rivers, Streams, and Canals	3-4
CEE 166A	Watersheds and Wetlands	4
CEE 166B	Floods and Droughts, Dams and Aqueducts	4
CEE 171	Environmental Planning Methods	3
CEE 172	Air Quality Management	3
CEE 176B	Electric Power: Renewables and Efficiency	3-4
CEE 207A	Understanding Energy	3-5
CEE 262B	Transport and Mixing in Surface Water Flows	3-4
CEE 262D	Introduction to Physical Oceanography	4
CEE 263A	Air Pollution Modeling	3-4
CEE 263B	Numerical Weather Prediction	3-4
CEE 265A	Sustainable Water Resources Development	3
CEE 265D	Water and Sanitation in Developing Countries	1-3
CEE 271B	Environmental Biotechnology	4
CEE 272	Coastal Contaminants	3-4
CEE 274D	Pathogens and Disinfection	3
CEE 274P	Environmental Health Microbiology Lab	3-4
CEE 275A	California Coast: Science, Policy, and Law	3-4
CEE 278A	Air Pollution Fundamentals	3
EARTHSYS 111	Biology and Global Change	4
EARTHSYS 281	Urban Agriculture in the Developing World	3-4
ECON 106	World Food Economy	5

## Science and Technology Policy Concentration

### Science and Technology Policy Gateway Courses

ECON 113	Economics of Innovation	5
MS&E 231	Introduction to Computational Social Science	3
MS&E 250A	Engineering Risk Analysis	3
MS&E 293	Technology and National Security	3
PSYCH 232	Brain and Decision Making	3
PUBLPOL 354	Economics of Innovation	5

### Science and Technology Elective Courses

CEE 207A	Understanding Energy	3-5
CEE 275A	California Coast: Science, Policy, and Law	3-4
EARTHSYS 232	Evolution of Earth Systems	4
ECON 126	Economics of Health and Medical Care	5
ECON 250	Environmental Economics	2-5
EDUC 348	Policy and Practice in Science Education	3-4
ENERGY 253	Carbon Capture and Sequestration	3-4
LAW 2504	Environmental Law and Policy	3
LAW 2519	Water Law	3
LAW 3004	Law and Biosciences: Genetics	2
LAW 4005	Introduction to Intellectual Property	4
LAW 4005	Introduction to Intellectual Property	4
MS&E 184	Future of Work: Issues in Organizational Learning and Design	4
MS&E 243	Energy and Environmental Policy Analysis	3
MS&E 244	Economic Growth and Development	3
MS&E 254	The Ethical Analyst	1-3
MS&E 256	Technology Assessment and Regulation of Medical Devices	3
MS&E 270	Strategy in Technology-Based Companies	3-4
MS&E 284	Designing Modern Work Organizations	3
MS&E 292	Health Policy Modeling	3
MS&E 294	Systems Modeling for Climate Policy Analysis	3
MS&E 295	Energy Policy Analysis	3
MS&E 330	Law, Order & Algorithms	3

PUBLPOL 222 Biosecurity and Bioterrorism Response 4-5

## Urban Policy

### Urban Policy Gateway Courses

PUBLPOL 133 Political Power in American Cities 5

PUBLPOL 174 The Urban Economy 4

SOC 229X Urban Education 3-5

SOC 235 Poverty, Inequality, and Social Policy in the United States 4

URBANST 162 Managing Local Governments 4

### Urban Policy Elective Courses

ANTHRO 355 Cities in Global Perspective 5

CEE 131B Financial Management of Sustainable Urban Systems 3

CEE 172 Air Quality Management 3

CEE 249 Labor and Industrial Relations: Negotiations, Strikes, and Dispute Resolution 2

CEE 277L Smart Cities & Communities 3

COMM 264 The Psychology of Communication About Politics in America 4-5

EARTHSYS 238 Land Use Law 3

EARTHSYS 281 Urban Agriculture in the Developing World 3-4

ECON 145 Labor Economics 5

ECON 146 Economics of Education 5

EDUC 271 Education Policy in the United States 3

EDUC 277 Education of Immigrant Students: Psychological Perspectives 4

EDUC 323A The Practice of Education Policy Analysis 3-5

EDUC 337 Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices 3-5

EDUC 447 Leading Change in Public Education 2

ESS 218 Disasters, Decisions, Development in Sustainable Urban Systems 3-5

HISTORY 274E Urban Poverty and Inequality in Latin America 5

IPS 274 International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development 4-5

LAW 7071 Philanthropy and Civil Society 1

POLISCI 326T The Politics of Education 3-5

PUBLPOL 107 Public Finance and Fiscal Policy 5

PUBLPOL 135 Regional Politics and Decision Making in Silicon Valley and the Greater Bay Area 4

PUBLPOL 137 Innovations in Microcredit and Development Finance 3

PUBLPOL 143 Finance and Society for non-MBAs 4

PUBLPOL 225 Place-Making Policies 5

PUBLPOL 364 The Future of Finance 2

SOC 249 The Urban Underclass 4

SOC 340W CPI Seminar 1-2

SOC 341W Workshop: Inequality 1-2

STRAMGT 537 Leading Change in Public Education 2

URBANST 107 Introduction to Urban and Regional Planning 3

URBANST 113 Introduction to Urban Design: Contemporary Urban Design in Theory and Practice 5

URBANST 128 Community Mapping Practicum 4

URBANST 132 Concepts and Analytic Skills for the Social Sector 4

URBANST 160 Environmental Policy and the City in U.S. History 5

URBANST 163 Land Use Control 4

URBANST 164 Sustainable Cities 4-5

URBANST 165 Sustainable Urban and Regional Transportation Planning 4-5

URBANST 167 Green Mobilities for the Suburbs of the Future 3

URBANST 168 Housing & Community Development—Policy and Practice 3

*Director:* Gregory L. Rosston (Stanford Institute for Economic Policy Research)

*Directors of Graduate Practicum Program and Professor of the Practice of Public Policy:* Joe Nation (Public Policy) and Christine Pal Chee (Public Policy)

*Director of Domestic Policy Studies and Lecturer:* Lanhee J. Chen (Public Policy and Hoover Institution)

*Director of Honors Program and Lecturer:* Marcelo Clerici-Arias (Economics and Public Policy)

*Executive Committee Chair:* Mark Duggan (Economics, SIEPR)

*Executive Committee:* Laurence Baker (Medicine), Jonathan Bendor (Graduate School of Business), David Brady (Political Science, Hoover Institution, Graduate School of Business, SIEPR), Paul Brest (Law), Bruce Cain (Political Science, Bill Lane Center for the American West), Samuel Chiu (Management Science and Engineering), Thomas Dee (Education), David Grusky (Sociology), Deborah Hensler (Law), Roger Noll (Economics, emeritus, SIEPR), Bruce Owen (Public Policy, emeritus, SIEPR), Madhav Rajan (Graduate School of Business), Gregory Rosston (SIEPR), Debra Satz (Philosophy), John Shoven (SIEPR, Economics)

*Affiliated Faculty:* William Abrams (Human Biology), Donald Barr (Medicine), Jonathan Bendor (Graduate School of Business), Eric Bettinger (Education), Jayanta Bhattacharya (Medicine), Coit Blacker (Freeman Spogli Institute for International Studies), Lisa Blaydes (Political Science), Adam Bonica (Political Science), Michael J. Boskin (Economics, Hoover Institution), Paul Brest (Law), Jeremy Bulow (Graduate School of Business), M. Kate Bundorf (Medicine), Bruce Cain (Political Science, Bill Lane Center for the American West), Eamonn Callan (Education), Martin Carnoy (Education), John Cogan (Hoover Institution), Larry Diamond (Freeman Spogli Institute for International Studies, Hoover Institution), Lawrence Friedman (Law), Francis Fukuyama (Freeman Spogli Institute for International Studies), Lawrence Goulder (Economics, Freeman Spogli Institute for International Studies), Justin Grimmer (Political Science), Stephen Haber (Political Science, Hoover Institution), Deborah Hensler (Law), Pamela Hinds (Management Science and Engineering), Daniel Ho (Law), Nicholas Hope (Stanford Center for International Development), Caroline Hoxby (Economics, Hoover Institution, SIEPR), Daniel Kessler (Law, Hoover Institution, Graduate School of Business), Pete Klenow (Economics), Stephen Krasner (Political Science, Freeman Spogli Institute for International Studies, Hoover Institution), Jon A. Krosnick (Communication, Political Science), Mark Lemley (Law), Susanna Loeb (Education), Thomas MaCurdy (Economics, Hoover Institution), David Magnus (Medicine), Milbrey McLaughlin (Education), Terry Moe (Political Science, Hoover Institution), Joan Petersilia (Law), A. Mitchell Polinsky (Law), Walter Powell (Education), Robert Reich (Political Science), Lee Ross (Psychology), Baba Shiv (Graduate School of Business), Ken Shotts (Graduate School of Business), Stephan Seiler (Graduate School of Business), Stephan Stedman (Freeman Spogli Institute for International Studies), Jeff Strnad (Law), Barton Thompson (Law, Woods Institute, Freeman Spogli Institute for International Studies), Michael Tomz (Political Science, SIEPR), Milana Trounce (Medicine), Michael Wald (Law), Greg Walton (Psychology), Barry Weingast (Political Science, Hoover Institution), John Weyant (Management Science and Engineering), Frank Wolak (Economics, Freeman Spogli Institute for International Studies), Cristobal Young (Sociology)

*Lecturers:* Newsha Ajami (Woods Institute), Tanya Beder (Law), Frank Benest (Public Policy), David Crane (Public Policy, SIEPR), Dennis Gale (Urban Studies), Jonathan D. Greenberg (Law), Russell Hancock (Public Policy), Preeti Hehmeyer (Public Policy, Bill Lane Center for the American West), Adrienne Jamieson (Bing Stanford in Washington), Lawrence Litvak (Public Policy, Urban Studies), Susan Liautaud (Public Policy), Eva Meyersson Milgrom (SIEPR, Sociology), Christine Pal Chee (Public Policy), John Peterson (Public Policy, Program in Writing and Rhetoric), Mary Stroud (Public Policy, Program in Writing and Rhetoric), Patrick Windham (Public Policy)

## Overseas Studies Courses in Public Policy

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPCPTWN 31	Political Economy of Foreign Aid	3
OSPFLOR 78	The Impossible Experiment: Politics and Policies of the New European Union	5
OSPFLOR 85	Bioethics: the Biotechnological Revolution, Human Rights and Politics in the Global Era	4
OSPKYOTO 45	Japan's Energy-Environment Conundrum	4
OSPOXFRD 18	Making Public Policy: An Introduction to Political Philosophy, Politics, and Economics	4-5
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
OSPSANTG 119X	The Chilean Economy: History, International Relations, and Development Strategies	5

# RELIGIOUS STUDIES

Courses offered by the Department of Religious Studies are listed under the subject code RELIGST on the Stanford Bulletin's ExploreCourses web site.

## Mission of the Department

The Department of Religious Studies brings a variety of disciplinary perspectives to bear on the phenomenon of religion for the purpose of understanding and interpreting the history, literature, thought, social structures, and practices of the religious traditions of the world. Comprised of a dozen regular faculty with particular strengths in the study of Buddhism, Christianity, Islam, and Judaism, it enrolls about thirty graduate students (mostly doctoral) and roughly as many undergraduate majors, minors, and joint majors.

Religious Studies works closely with several related programs at Stanford: the Department of Philosophy, with which it offers a combined undergraduate major; the Ho Center for Buddhist Studies; the Taube Center for Jewish Studies; the Abbasi Program in Islamic Studies; the McCoy Center for Ethics in Society; and the Center for Medieval and Early Modern Studies.

While some undergraduates continue their study of religion in a graduate or professional program, most pursue meaningful and successful careers in business, government, the nonprofit sector, and medicine. In this respect, Religious Studies is an ideal interdisciplinary major in the liberal arts. Graduates of the department's doctoral program generally pursue academic careers and are routinely placed in the best universities and colleges in the country and overseas.

## Undergraduate Programs in Religious Studies

The department offers a Bachelor of Arts major, minor, and honors program in Religious Studies, and a combined major with the Philosophy Department in Philosophy and Religious Studies. Undergraduate courses in Religious Studies are designed to engage students existentially and to assist them in thinking about intellectual, ethical, and sociopolitical issues in the world's religions. The department's faculty seek to provide tools for understanding the complex encounters among religious ideas, practices, and communities, and the past and present cultures that have shaped and been shaped by religion. Courses therefore expose students to: leading concepts in the field of religious studies such as god(s), sacrifice, ritual, scripture, prophecy, and priesthood; approaches developed over the past century, including the anthropological, historical, psychological, philosophical, and phenomenological, that open religion to closer inspection and analysis; and major questions, themes, developments, features, and figures in the world's religious traditions. The department encourages and supports the acquisition of languages needed for engagement with sacred texts and interpretive traditions as well as study abroad at Stanford's overseas centers where religions can be observed and experienced in their contemporary contexts.

## Major in Philosophy and Religious Studies

The departments of Philosophy and Religious Studies jointly nominate for the B.A. in Philosophy and Religious Studies those students who have completed a major in the two disciplines. See a description of this combined major under the "Bachelor's" tab of the "Religious Studies" section of this bulletin (p. 716), in the "Philosophy" section of this bulletin (p. 673), or in the guidelines available from the undergraduate director of either department.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to:

1. demonstrate familiarity with a variety of methods used analytically in the field of Religious Studies.
2. demonstrate proficiency in writing papers in the style of academic writing in the field of Religious Studies.
3. demonstrate the ability to engage peer scholars' research in constructive and critical ways, and communicate feedback effectively.
4. demonstrate individual expertise through oral presentation of one's advanced research to peers.
5. complete an advanced research project consistent with standards for papers in the field of Religious Studies.

## Graduate Programs in Religious Studies

The graduate mission of the department is to provide students with an interdisciplinary setting of study within which to focus on their respective areas of specialization. The department offers an internal M.A. and a Ph.D. degree in Religious Studies. The master's program is restricted to current Stanford students.

## Learning Outcomes (Graduate)

*Master's Program:* The purpose of the Master's program is to develop knowledge and skills in Religious Studies. For some students this will serve as preparation for applications to Ph.D. programs. For others it will serve as a further capstone experience for their undergraduate program of study. The goals are achieved through the completion of courses, in the primary field as well as related areas, and experience with independent work and specialization. For some it will involve an optional Master's thesis.

*Doctoral Program:* The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Religious Studies. Through completion of advanced coursework and rigorous skills training, the doctoral program prepares students to make original contributions to the field of Religious Studies and to interpret and present the results of such research through teaching and publication.

## Bachelor of Arts in Religious Studies

### Suggested Preparation for the Major

There is no prescribed route or prerequisite to the major or minor in Religious Studies or the combined major in Philosophy and Religious Studies. Students typically find themselves selecting one of these paths after taking elective courses in the department and becoming acquainted with the faculty.

Students contemplating the major, the minor, or the Philosophy and Religious Studies major are invited to consult with the Director of Undergraduate Studies. The undergraduate student services associate in Building 70 can also field questions regarding the declaration procedure within the department.

### Degree Requirements

The curriculum for majors is designed to move students sequentially from foundational courses, through deeper investigations, culminating in integrative research courses. Thus, the introductory sequence is designed to lead to courses which build on this foundation with topics including: particular traditions such as Judaism or Buddhism; comparative studies such as nonviolence in Hinduism and Buddhism, or

Muslim and Christian interpretations of scripture; specific topics such as mysticism, gender and religion, or theodicy; and distinctive approaches such as the philosophy of religion or ritual studies. Majors complete their careers with integrative courses that afford opportunity for research and consolidation of the knowledge and skills gained earlier.

## Required Courses

A Bachelor of Arts in Religious Studies requires 60 units of course work, distributed as follows:

- Two courses (at least 3 units each) from courses numbered 1-49, including approved Thinking Matters or Introductory Seminars. Successful completion of SLE may count as one of these two courses. IHUM courses with Religious Studies content taught prior to 2012-13 also fulfill this requirement.
- Two courses (at least 3 units each) from courses numbered 50-99.
- Three integrative courses (at least five units each) as follows:

### Majors' Seminar (5)

RELIGST 290	Majors Seminar (Winter Quarter of junior year; fulfills WIM requirement; letter grade only)	5
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### Senior Essay or Honors Thesis Research (5)

RELIGST 297	Senior Essay/Honors Essay Research (minimum 5 units; up to 10 units over two quarters; graded 'N' until completion of essay or thesis)	3-5
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### Senior Majors' Colloquium (5)

RELIGST 298	Senior Colloquium (Spring Quarter; grading option S/NC)	5
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- At least 24 of the remaining units should be in courses numbered 100-289. At least two of these courses should be 200-level seminar courses.

## Additional Regulations

- Variations to the required distribution of courses under 1 and 2 above may be approved by the Director of Undergraduate Studies on an individual basis.
- All units must be in Religious Studies courses unless an exception is made by the Director of Undergraduate Studies.
- With the approval of the Director of Undergraduate Studies, up to two language courses relating to the student's program of study (such as Arabic, Biblical Hebrew, New Testament Greek, Chinese, Persian, or Japanese), but not counted towards the University language requirement, may be counted toward the major.
- No more than ten units of the total 60 (excluding RELIGST 298) may be taken for the grade of 'S/NC' or 'CR/NC.'
- Students may not take all courses in one religious tradition.

## Senior Essay

A 25-30 page essay on a topic chosen by the student and approved by the adviser upon receipt of a student's proposal by the end of the third quarter prior to expected graduation. The character and content of the essay, which is meant to allow the student to call into play knowledge and skills learned in the course of the major, may take several forms. For example, a student may return to a subject studied earlier but now pursued in more depth or from a new perspective, research a recent or new topic of interest in the field, or offer a carefully framed critical assessment of what has been learned in the major based on review of influential sources, theories, and methods of studying religion. The senior essay is read and graded by the student's adviser and one other member of the Religious Studies faculty.

## Honors Thesis

A 40-80 page research paper on a topic chosen by the student and approved by the adviser upon receipt of a proposal in the fourth quarter prior to expected graduation. The paper, supported by mastery of primary and secondary scholarship, advances a well-reasoned, supportable thesis. Writers of honors theses must have a grade point average (GPA) of 3.5 in Religious Studies courses, and at least 3.2 overall, and are expected to have already demonstrated success in writing research papers. The honors thesis is read and graded by the student's adviser and one other member of the Religious Studies faculty. Theses earning a grade of 'B+' or above receive honors.

## Philosophy and Religious Studies Combined Major

The undergraduate major in Philosophy and Religious Studies consists of 60 units of course work with approximately one third each in the philosophy core, the religious studies core, and either the general major or the special concentration. Affiliated courses cannot be used to satisfy this requirement.

No courses in either the philosophy or religious studies core may be taken satisfactory/no credit or credit/no credit.

In general, transfer units cannot be used to satisfy the core requirements. Transfer units and substitutions must be approved by the director of undergraduate studies in the appropriate department.

Please see a detailed description of the major in the "Philosophy" section of this Bulletin (p. ).

## Core Requirements

- Philosophy (PHIL) courses:
  - Required course: PHIL 80 Mind, Matter, and Meaning
  - 16 units, including at least one Philosophy course from each of the following areas:
    - logic and philosophy of science
    - ethics and value theory
    - epistemology, metaphysics, and philosophy of language
    - history of philosophy
- Religious Studies (RELIGST) courses: 20 units, chosen in consultation with the student's adviser, including:
  - Required Course: RELIGST 290 Majors Seminar (5 units; Winter Quarter; recommended junior year; fulfills WIM requirement).
  - At least one course in philosophy of religion, broadly construed, to be approved by the Director of Undergraduate Studies for Religious Studies.
  - Diversity requirement: Students may not take all their religion courses in one religious tradition.

## General Major Requirements

Five additional courses (approximately 20 units) divided between the two departments. No more than five of these units may come from courses numbered under 99 in either department. Each student must also take at least one undergraduate seminar in religious studies and one undergraduate seminar in philosophy.

## Special Concentration

With the aid of an adviser, students pursue a specialized form of inquiry in which the combined departments have strength; for example, American philosophy and religious thought, philosophical and religious theories of human nature and action, philosophy of religion. Courses for this concentration must be approved in writing by the adviser.

## Directed Reading and Satisfactory/No Credit Units

Units of directed reading for fulfilling requirements of the major are allowed only with special permission. No more than 10 units of work with a grade of 'satisfactory' count toward the Philosophy and Religious Studies major.

## Honors Program

Students pursuing a major in Philosophy and Religious Studies may also apply for honors by following the procedure for honors in either of the departments.

## Minor in Religious Studies

A Religious Studies minor is a complement to many majors throughout the University. Students contemplating the minor are invited to consult with the Director of Undergraduate Studies. The undergraduate student services associate in Bldg. 70 can also field questions regarding the declaration procedure within the department.

## Degree Requirements

A minor in Religious Studies requires a minimum of 30 units. Students are encouraged to focus their program of study either on a religious tradition or on a theme that cuts across traditions. In consultation with their advisers, students may design the minor in Religious Studies to complement their major. The minor must be declared no later than the last day of the quarter, two quarters before degree conferral.

### Required Courses for the Minor

1. One course (at least 3 units) from courses numbered 1-49, including approved Thinking Matters or Introductory Seminars. IHUM courses with Religious Studies content taught prior to 2012-13 also fulfill this requirement.
2. One course (at least 3 units) from courses numbered 50-99.
3. At least 14 of the remaining units should be at the intermediate and advanced level (above 100), including at least one 200-level seminar course.

### Additional Regulations

1. All units must be in Religious Studies courses unless an exception is made by the Director of Undergraduate Studies.
2. With the approval of the Director of Undergraduate Studies, one language course relating to the student's program of study (such as Arabic, Biblical Hebrew, New Testament Greek, Chinese, Persian, or Japanese), but not counted towards the University language requirement, may be counted toward the minor.
3. No course may be taken on a 'S/NC' or 'CR/NC' basis.
4. Students may not take all courses in one religious tradition.
5. One course in directed reading (RELIGST 199 Individual Work) may be counted towards the minor.

## Master of Arts in Religious Studies

University requirements for the M.A. are described in the "Graduate Degrees (p. 50)" section of this bulletin. The department offers a one-year terminal M.A. program. Students can also earn their M.A. degree as part of their coterminal degree program.

The M.A. program serves two groups of students:

1. those who wish to prepare for a doctoral program in Religious Studies
2. those who wish to further deepen their knowledge in an area in which they have acquired some expertise during their undergraduate work.

At this time, eligibility for admission to the master's program is restricted to current Stanford undergraduates and graduate students.

## Degree Requirements

The following requirements are in addition to the University's basic requirements (p. 50).

The student completes at least 45 units of graduate work at Stanford beyond the B.A. degree, including RELIGST 300 Theory in the Study of Religion or RELIGST 290 Majors Seminar. Students who have taken this course as part of the B.A. need not take it again.

Residence may be completed by three quarters of full-time work or the equivalent.

The student's plan of courses is subject to approval by the Graduate Director. No field of specialization is expected, but students may focus work in particular areas. Advanced and graduate courses in other departments may be taken in consultation with the adviser. No thesis is required; a thesis, if elected, may count for as many as 9 units.

Each student demonstrates reading knowledge of at least one foreign language.

The department allows coterminals to count courses as early as their first quarter of sophomore year toward their master's degree. Course transfers require department approval and cannot be processed after the bachelor's degree has been conferred. All University coterminal policies apply.

## Application and Admissions

At this time, eligibility for admission to the master's program is restricted to current Stanford undergraduates and graduate students.

### Current Stanford Undergraduates

Religious Studies accepts coterminal applications in Winter Quarter (due end of the second week of classes) for admission starting Spring Quarter. Only complete applications submitted by the deadline are reviewed. A complete application includes the following:

- Complete Coterminal Application
- Two confidential letters of recommendation, one of which must be from a Stanford faculty member familiar with applicant's academic work
- Statement of purpose, not to exceed two pages
- Undergraduate transcript(s)
- Preliminary program proposal

### Current Stanford Graduate Students

- Application for Current Stanford Graduate Students
- Two confidential letters of recommendation, one of which must be from a Stanford faculty member familiar with applicant's academic work
- Undergraduate and graduate transcripts
- Statement of purpose, not to exceed two pages
- Preliminary program proposal

## University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer

of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Financial Aid

The Religious Studies department does not provide financial assistance to coterminal or master's students. For information on student loans and other sources of support, consult the Financial Aid Office (<http://financialaid.stanford.edu>).

## Doctor of Philosophy in Religious Studies

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin. The Ph.D. in Religious Studies signifies special knowledge of an interdisciplinary field of study and potential mastery of an area of specialization within it. The faculty of the department have established certain fields of study in which the department's strengths and those of other Stanford departments cohere. They are: Buddhist studies, Islamic studies, Jewish studies, and modern religious thought, ethics, and philosophy. Students who wish to specialize in other fields must obtain early approval by the faculty. Each of these areas of specialization follows a shared structure of study.

## Degree Requirements

The following requirements are in addition to the University's basic requirements.

### 1. Residence

Each student completes three years (nine quarters) of full-time study, or the equivalent, in graduate work beyond the B.A. degree, and a minimum of 135 units of graduate course work (excluding the dissertation).

### 2. Required Courses

The 135 units of graduate course work must include the following:

a.			
	RELIGST 304A	Theories and Methods	4
	RELIGST 304B	Theories and Methods	4
	RELIGST 391	Teaching Religious Studies	3

b. Two courses in an area outside the student's field.

c. The remainder of the course work is individually designed, in consultation with the adviser.

### 3. Languages

Each student demonstrates a reading knowledge of two foreign languages, including French or German. One of those language requirements should be fulfilled by the time of advancing to candidacy at the end of the second year. Competence in the second language must be demonstrated at the time of the qualifying examination. Each student also demonstrates reading knowledge of other ancient or modern languages necessary for the field of study, area of specialization, and dissertation topic.

### 4. Candidacy

At the end of each academic year, the department's faculty recommend second-year students for candidacy on the basis of all relevant information, and especially on the student's candidacy dossier that includes the approved declaration of an area of specialization, certification for one foreign language, and two substantial papers written for courses during the previous two years. Students are required to take RELIGST 304A Theories and Methods, RELIGST 304B Theories and Methods, and RELIGST 391 Teaching Religious Studies prior to candidacy.

### 5. Paper-in-Field

During the third year, under the supervision of their advisers, students prepare a paper suitable for submission to an academic journal in their field. The paper is read and approved by at least two faculty members in the department. Students are encouraged to register for RELIGST 392 Paper in the Field while working on the paper.

### 6. Teaching Internship

At least one teaching internship under the supervision of faculty members is undertaken at a time negotiated with the Graduate Director. Students receive academic credit for the required internship, which is a part of academic training and not of employment.

### 7. Qualifying Examination

To qualify for writing a dissertation, the student must pass a comprehensive examination in the chosen field and the area of specialization, typically during the first quarter of their fourth year. The student must complete the second language requirement before taking the qualifying examination. The qualifying examination is normally conducted by a committee of at least three Academic Council members of the department, one of whom is the adviser. One faculty member may be from outside the department with permission of the Director of Graduate Studies.

### 8. Dissertation

The dissertation contributes to the humanistic study of religion and is written under the direction of the candidate's dissertation adviser and at least two other members of the Academic Council. The University Oral examination is a defense of a completed draft of the dissertation.

- Dissertation Committee*—The dissertation committee is formed after successful completion of the qualifying examinations. It is normally composed of the dissertation adviser and at least two Academic Council members of the Religious Studies department. One non-departmental faculty member may serve as a reader when approved by the Director of Graduate Studies.
- Dissertation Proposal*—Candidates submit their dissertation proposal in consultation with their advisers. It is read and approved by the three members of the dissertation committee.

### 9. University Oral Examination

This examination, required by the University of Ph.D. students, is a defense of a completed draft of the dissertation. The composition of the examination committee is set by University regulation: five or more faculty, normally all of whom are members of the Academic Council, one of whom must be outside the department to serve as chair of the committee. Normally, the examining committee includes all members of the dissertation committee. A majority of those voting must be Academic Council faculty from within the department.

## Ph.D. Minor in Religious Studies

Candidates for the Ph.D. in other departments may select a Ph.D. minor in Religious Studies.

### Degree Requirements

The minor requires at least 24 units in Religious Studies at the 200 level or above. Four of the 24 units should be in:

RELIGST 304A Theories and Methods

Units

4



RELIGST 304B Theories and Methods 4

**Optional Courses for the Minor**

The student should choose any of the courses offered in the department at the 200 level or above, for the equivalent of at least 24 units. Other courses can be chosen in consultation with the Graduate Director.

**Faculty**

*Emeriti: (Professors)* Carl W. Bielefeldt, Arnold Eisen, Bernard Faure, Hester G. Gelber, Robert C. Gregg, Van Harvey

*Chair:* John Kieschnick

*Director of Graduate Study:* Paul Harrison

*Director of Undergraduate Study:* Brent Sockness

*Professors:* Paul Harrison, John Kieschnick, Michael Penn, Jane Shaw, Thomas Sheehan, Lee Yearley

*Associate Professors:* Charlotte Fonrobert (on leave), Brent Sockness

*Assistant Professors:* Elaine Fisher, Kathryn Gin Lum, Ariel Mayse, Michaela Mross

*Senior Lecturer:* Barbara Pitkin

*Lecturers:* Manuel de Oliveira, Eric Huntington, Alaina Morgan, Sarah Wilburn

*Courtesy Professor:* Mark Lewis

*Courtesy Associate Professor:* Ari Y. Kelman

*Affiliated Faculty:* Fiona Griffiths

**Cognate Courses**

The following courses in other departments/programs have been approved by the Chair as fulfilling requirement 2 (p. ) for the bachelor's degree.

	<b>Units</b>
POLISCI 149S Islam, Iran, and the West	5
HISTORY 293E Female Divinities in China	4-5

**Overseas Studies Courses in Religious Studies**

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

	<b>Units</b>
OSPKYOTO 13 Contemporary Religion in Japan's Ancient Capital: Sustaining and Recasting Tradition	4
OSPMADRD 74 Islam in Spain and Europe: 1300 Years of Contact	4

# RUSSIAN, EAST EUROPEAN AND EURASIAN STUDIES

Courses offered by the Center for Russian, East European and Eurasian Studies are listed under the subject code REES on the Stanford Bulletin's ExploreCourses web site.

The Center for Russian, East European and Eurasian Studies (CREEES) coordinates the University's teaching, research, and extracurricular activities related to Russia, Eastern Europe, Central Asia, and the Caucasus and administers a one-year interdisciplinary M.A. graduate degree program. Information on the center's degree programs and other activities is available at the CREEES (<http://CREEES.stanford.edu>) web site. CREEES and its degree programs are directed by the CREEES Steering Committee, composed of faculty members associated with the Center. The program draws on the strengths of nationally recognized area faculty and research affiliates and significant library and archival collections at Stanford. The Center is a U.S. Department of Education Title VI National Resource Center for Russia, East Europe, and Eurasia.

## Undergraduate Programs in Russian, East European and Eurasian Studies

Students interested in a minor should consult the Director of Undergraduate Studies in the Department of Slavic Languages and Literatures which offers the following relevant minors:

- Russian, East European and Eurasian Studies
- Russian Language
- Russian Language, Literature and Culture
- Russian Culture

## Slavic Theme House

Slavianskii Dom (SlavDom), at 650 Mayfield Avenue, is an undergraduate residence which houses 50 students and offers a wide variety of opportunities to expand knowledge, understanding and appreciation of Russia and the nations of East Europe, the Caucasus and Central Asia.

## Overseas Studies Programs

Undergraduates interested in the study of languages, history, culture and social organization of the countries of Russia, Eurasia and East Europe may apply to study at the Stanford centers in Istanbul and Berlin. Information about these programs is available at the Bing Overseas Studies Program (<http://bossp.stanford.edu>) at web site.

## Graduate Programs in Russian, East European and Eurasian Studies

The center offers an M.A. in Russian, East European and Eurasian Studies, a coterminal M.A. in Russian, East European and Eurasian Studies, and a joint M.A./J.D. in conjunction with the Stanford Law School.

## Learning Outcomes (Graduate)

The purpose of the master's program and the joint M.A./J.D. program is to further develop knowledge and skills in Russian, East European and Eurasian Studies and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

## Financial Aid

Subject to funding, CREEES may have a limited number of Foreign Language and Area Studies (FLAS) fellowships for U.S. citizens or permanent residents. Additional financial aid may also be available from CREEES. Applicants to the M.A. program have priority in the annual FLAS competition; in recent years CREEES has also awarded FLAS fellowships to students enrolled in the School of Education and the School of Law. Consult the CREEES associate director for further information about the application and award process. Applications for FLAS fellowships can be obtained at the CREEES (<http://CREEES.stanford.edu/grants>) web site.

## Doctoral Programs

Since the University does not offer a Ph.D. in Russian, East European and Eurasian Studies, students wishing to pursue a REEES-related doctoral program must apply to one of the departments offering a Ph.D. with an emphasis on Russia, Eurasia, or Eastern Europe, such as the departments of History, Anthropology, Political Science, or Slavic Languages and Literatures.

## Undergraduate Minor in Russian, East European, and Eurasian Studies

Students interested in a minor should consult the "Minors in Slavic Languages and Literatures (p. 739)" section of this bulletin which describes the following relevant minors:

- Russian, East European, and Eurasian Studies
- Russian Language
- Russian Language, Literature, and Culture
- Russian Culture

## Master of Arts in Russian, East European and Eurasian Studies

CREEES offers a one-year interdisciplinary master's degree program in Russian, East European and Eurasian Studies for students with a strong prior language and area studies background.

The program structure allows students the flexibility to pursue their particular academic interests, while providing intellectual cohesion through a required core curriculum that addresses historical and contemporary processes of change in the Russian Federation, Eastern Europe, the Caucasus, and Central Asia.

The core curriculum consists of three courses (one each quarter), the REES 200 Current Issues in Russian, East European, and Eurasian Studies seminar series in Autumn and Winter quarters, and REES 300 MA Capstone Seminar in Spring Quarter. The program may be taken separately or coterminal with a bachelor's degree program.

The interdisciplinary M.A. program typically serves three types of students:

1. Those who intend to apply to a Ph.D. program involving Russian, East European and Eurasian studies and who need to enhance their academic skills and credentials
2. Those who intend to pursue careers and/or advanced degrees in such fields as journalism, education, business, government, law, or medicine, and who wish to establish competence in Russian, East European and Eurasian studies.
3. Those who are mid-career professionals and/or students interested in gaining competence or continuing their interest in and wish to gain competence in Russian, East European and Eurasian studies.

## Advising

The advising structure is two-tiered: each M.A. candidate works with the CREEES associate director who advises on the program of course work and monitors the student's progress toward completing the degree. Candidates are also assigned a faculty adviser from the Academic Council faculty, who provides intellectual and academic guidance.

## Admission

Applicants apply electronically; see the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site for a link to the electronic application and general information regarding graduate admission. In addition, prospective applicants may consult with the CREEES associate director regarding the application process.

To qualify for admission to the program, the following apply:

1. Applicants must have earned a B.A. or B.S. degree, or the equivalent.
2. At least three years of college-level language study in Russian, an East European or Central Asian language is preferred. Candidates with fewer years of area language study will be considered.
3. A one-page statement of purpose that explains how the program would advance the applicant's academic or career goals.
4. Applicants must include the following additional materials in their online application: a writing sample of 20 pages or less in English on an academic topic in Russian, East European, or Eurasian studies and a resume of college-level courses taken that are relevant to Russian, East European & Eurasian Studies, including language courses, with self-reported final grades. These additional materials may be uploaded as "Additional Materials" in a single file along with the application.
5. Applicants must send official transcripts from all post-secondary institutions attended to CREEES.
6. All applicants must take the General Test of the Graduate Record Examination (GRE) and have the results sent to Graduate Admissions, Office of the University Registrar.
7. Applicants whose native language is not English and do not possess a U.S. bachelor's degree are expected to take the Test of English as a Foreign Language (TOEFL) and have the results sent to Graduate Admissions, Office of the University Registrar.

The deadline for submission of applications for admission and for financial aid is January 9, 2018. Admission is normally granted for Autumn quarter, but requests for exceptions are considered.

The successful applicant generally demonstrates the following strengths: requisite foreign language study, significant course work in Russian, East European and Eurasian studies in multiple disciplines, outstanding grades in previous academic work, strong analytical writing skills, high GRE scores (particularly verbal and analytical writing), study or work experience in the region, strong letters of recommendation from faculty members in the Russian, East European, and Eurasian Studies field (one letter may be from a language instructor), and a persuasive statement of purpose explaining how the program would advance the applicant's academic and career goals.

## Degree Requirements

Candidates for the M.A. degree must meet University requirements for an M.A. degree as described in the "Graduate Degrees (p. 50)" section of this bulletin.

The M.A. program in REEES can ordinarily be completed in one academic year by a well-prepared student; longer periods of study are permitted.

Requirements to complete the interdisciplinary M.A. degree are principally ones of distribution, with the exception of three required core courses and a core seminar, as described below. Each student, with the

advice of the CREEES associate director, selects courses according to the student's interests, needs, and goals.

All students in the M.A. REEES program must complete a minimum of 48 academic credit units within the following guidelines.

1. *Core Courses:* Students must complete the following 3 core courses during the 2017-18 academic year for 5 units each: REES 301B History and Politics in Russian and Eastern European Cinema during Autumn Quarter (5 units), either REES 224A The Soviet Civilization during Winter Quarter (5 units), and REES 213A Russia and the West during Spring Quarter (5 units).
2. *Core Seminar Series:* REES 200 Current Issues in Russian, East European, and Eurasian Studies is required of all students in the M.A. program in Autumn and Winter quarters (2 units total). The goal of this seminar series is to survey current methodological and substantive issues in Russian, East European and Eurasian studies, acquaint students with Stanford resources and faculty, and present professional development and career options.
3. *Interdisciplinary Course Work:* All courses (other than language courses and approved activity courses) must be taken on the graduate level (200-level or higher). Courses in Russian, East European and Eurasian studies must be completed and distributed among at least three disciplines. All course work applied to the 48-unit minimum must deal primarily with Russian, Eurasian, or East European studies.
4. *Language Study:* Students in the program are encouraged to study Russian, an East European or Central Asian language, or a language from the Caucasus. Credit towards the 48-unit minimum (maximum 4 units per quarter, 12 units total) is allowed for advanced language work.
5. Course work qualifying for the 48-unit minimum must have a letter grade of 'B' or higher. ('B-' does not count for degree credit, nor does 'CR'). Students may apply a maximum of three units of course work with a final grade of 'S' to the 48-unit minimum. 'S' units counting towards the 48-unit minimum must be approved by the CREEES associate director.
6. All courses counting towards the 48-unit minimum must be approved by the CREEES associate director, who ensures that planned course work satisfies requirements towards the degree. The CREEES director and steering committee determine the requirements. The list of pre-approved courses for the current academic year appears below. Students can petition to have courses that do not appear on this list counted towards the degree.
7. *Capstone Requirement:* Students must complete a capstone project (research paper and/or research presentation) in consultation with a faculty advisor, the CREEES director and associate director. Students will enroll in REES 300 MA Capstone Seminar for 1 unit in Spring Quarter.

### Pre-approved courses for 2017-18

The following courses are those that have been pre-approved to satisfy the M.A. interdisciplinary course work requirement for 2017-18. Students may choose from:

		Units
HISTORY 302G	Peoples, Armies and Governments of the Second World War	5
HISTORY 322A	Crime and Punishment in Early Modern Europe and Russia	4-5
HISTORY 324C	Genocide and Humanitarian Intervention	3
HISTORY 326E	Famine in the Modern World	3
HISTORY 329A	Nationhood and Belonging: Poles and Jews	3
IPS 210	The Politics of International Humanitarian Action	3-5
IPS 213	International Mediation and Civil Wars	3-5
IPS 241	International Security in a Changing World	5

IPS 280	Transitional Justice, Human Rights, and International Criminal Tribunals	3-5
MS&E 293	Technology and National Security	3
POLISCI 314D	Democracy, Development, and the Rule of Law	5
REES 200	Current Issues in Russian, East European, and Eurasian Studies	1-2
REES 213A	Russia and the West	5
REES 224A	The Soviet Civilization	4-5
REES 227	All Quiet on the Eastern Front? East Europe and Russia in the First World War	3-5
REES 300	MA Capstone Seminar	1-3
REES 301B	History and Politics in Russian and Eastern European Cinema	5
REES 310	Identity, Memory and Cultural Politics in Post-Soviet Societies	3-5
REES 326	The Russian Revolution: Politics, Society, Culture	3-5
SLAVIC 220	Hacking Russia: Technological Dreams and Nightmares of Russian Culture	3-5
SLAVIC 226	Bakhtin and his Legacy	3-5
SLAVIC 230	18th Century Russian Literature	2-4
SLAVIC 231	Tarkovsky	3-5
SLAVIC 261	Reading Leo Tolstoy in the Digital Age	3-5
SLAVIC 300B	Research Tools and Professionalization Workshop	1
SLAVIC 325	Readings in Russian Realism	3-4
SLAVIC 329	Russian Versification: History and Theory	3-4
SLAVIC 340	Russia's Castaway Classic: Andrei Platonov	3-5
SLAVIC 345	Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 346	The Great Russian Novel: Tolstoy and Dostoevsky	2-5
SLAVIC 348	Slavic Literature and Culture since the Death of Stalin	1-5
SLAVIC 356	Vladimir Nabokov: Displacement and the Liberated Eye	1-5
SLAVIC 361	Reading Leo Tolstoy in the Digital Age	3-5
SLAVIC 370	Pushkin	2
SLAVIC 388	20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky	1-5
SLAVIC 395	Russian and East European Theater	1-5

This list of courses may be updated as relevant courses are offered. Courses not appearing on this list may be counted towards the M.A. through a petition process in consultation with the CREEES associate director.

A description of the M.A. program is also available on the web at the CREEES (<https://creees.stanford.edu/content/ma-program>) web site and by request from the Center for Russian, East European and Eurasian Studies.

## Coterminal Master's Program in Russian, East European, and Eurasian Studies

To qualify for a coterminal M.A. degree in Russian, East European, and Eurasian Studies, besides completing University requirements for the B.A. degree, a student must:

1. Submit the Coterminal Online Application (<https://applyweb.com/stanterm>) for admission to the program by the CREEES M.A. admission deadline.
2. Include in the application a proposal which outlines, by quarter, the schedule of courses the student plans to complete toward the M.A.

degree. The student should seek the advice of the CREEES associate director in drafting this schedule. The application also should include:

- a. a current Stanford transcript
  - b. a one-page statement of purpose
  - c. three letters of recommendation from Stanford faculty (one may be from a language instructor)
  - d. a writing sample of 20 pages or less in English on an academic topic in Russian, East European, or Eurasian Studies
3. Applicants must have a grade point average (GPA) of at least 3.0 (B). Coterminal applicants must take the general test of the Graduate Record Examination and have the results sent to Graduate Admissions, Office of the University Registrar.
  4. Complete 15 full-time quarters or the equivalent, or three quarters in full-time residence after completing 180 units; and complete, in addition to the 180 units required for the bachelor's degree, a minimum of 48 units for the master's degree.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Joint Degree Program in Russian, East European, and Eurasian Studies

The joint degree program in Russian, East European, and Eurasian Studies and Law allows students to pursue the M.A. degree in REES concurrently with the Doctor of Jurisprudence (J.D.) degree, with a significant number of courses that may apply to both degrees. It is designed to train students interested in a career in teaching, research, or the practice of law related to REES legal affairs. Students must apply separately to the REES M.A. program and to the Stanford School of Law and be accepted by both. Completing this combined course of study requires approximately four academic years, depending on the student's background and level of language training. For more information, see the Joint Degree Programs (p. 54) section of this bulletin and the Stanford Law School (<http://www.law.stanford.edu>)'s website. Students who have been accepted by both programs should consult with the departments to determine which courses can be double-counted.

*Director of the Center:* Pavle Levi

### Affiliated Faculty and Staff:

*Anthropology:* Ewa Domanska (visiting)

*Art and Art History:* Srđan Keca, Pavle Levi, Karla Oeler, Bissera Pentcheva

*Biology:* Dmitri Petrov

*Comparative Literature:* Burcu Karahan

*Economics:* Geoffrey Rothwell

*Education, School of:* Martin Carnoy

*Engineering, School of:* Margaret Brandeau, Siegfried Hecker, William Perry (emeritus)

*English:* Nancy Ruttenburg

*Freeman Spogli Institute for International Studies:* Coit Blacker, Christophe Crombez, Gail Lapidus (emerita), Kathryn Stoner

*Graduate School of Business:* Ilya Strebulaev

*History:* Robert Crews, Terence Emmons (emeritus), David Holloway, Katherine Jolluck, Nancy Kollmann, Norman Naimark, Aron Rodrigue, Edith Sheffer, Amir Weiner, Ali Yaycioglu, Steven Zipperstein

*Hoover Institute:* Elena Danielson (emerita), John Dunlop (emeritus), Timothy Garton Ash, Paul Gregory, Bertrand Patenaude, Anatol Shmelev, Maciej Siekierski

*International Policy Studies:* Eric Morris

*International Relations:* Jasmina Bojic, Robert Rakove

*Language Center:* Jara Dusatko, Shahla Fahimi, Rima Greenhill, Lessia Jarboe, Leelo Kask, Eugenia Khassina, Alma Kunanbaeva, Suzan Negijp Schatt, Bisera Rakicevic, Eva Soos Szoke, Gerardina Malgorzata Szudelski

*Law, School of:* Allen Weiner

*Linguistics:* Vera Gribanova, Asya Pereltsvaig

*Medicine, School of:* Jayanta Bhattacharya, Grant Miller, Douglas Owens

*Political Science:* Anna Grzymala-Busse, David Holloway, David Laitin, Michael McFaul

*Psychology:* Lera Boroditsky

*Slavic Languages and Literatures:* Lazar Fleishman, Gregory Freidin (emeritus), Monika Greenleaf, Yuliya Ilchuk, Gabriella Safran, Richard Schupbach (emeritus), Nariman Skakov

*Sociology:* Nancy Tuma (emerita), Patricia Young

*Stanford Humanities Center:* TBD

*Stanford Libraries:* Zachary Baker, Liisi Esse, John Eilts, Margarita Nafpaktitis, Karen Rondestvedt (emeritus), Wojciech Zalewski (emeritus)

*Theater and Performance Studies:* Branislav Jakovljevic

# SCIENCE, TECHNOLOGY, AND SOCIETY

Courses offered by the Program in Science, Technology, and Society are listed under the subject code STS on the (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-STS=on&filter-term-Summer=on&page=0&q=STS&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on&academicYear=20142015>) ExploreCourses web site (<https://explorecourses.stanford.edu/search?filter-term-Autumn=on&filter-catalognumber-STS=on&filter-term-Summer=on&page=0&q=STS&filter-coursestatus-Active=on&view=catalog&filter-term-Spring=on&collapse=&filter-term-Winter=on&academicYear=20142015>).

## Mission of the Undergraduate Program in Science, Technology, and Society

The Program in Science, Technology, and Society (STS) aims to provide students with an interdisciplinary framework through which to understand the complex interactions of science, technology and the social world. To major in STS, students work through a common core of courses drawn from the social sciences, the humanities, the natural and physical sciences and engineering. Students pursue coursework in one of five specialized areas:

- Communication and Media
- Innovation and Organization
- Nature and Environment
- Life Sciences and Health
- Politics and Policy

Students may also undertake research in affiliated laboratories and through the honors program for course units. All students complete a capstone project, either by taking one of the senior capstone courses (STS 200) or by applying for and completing an STS honors thesis. Students are encouraged to pursue mastery in at least one field from within the humanities or social sciences and at least one field from within the sciences or engineering. Majors may declare either a B.A. or a B.S. degree (see the specific requirements for each degree).

The Program's affiliated faculty represent over a dozen departments, including Anthropology, Communication, Computer Science, Education, Electrical Engineering, History, Law, Management Science and Engineering, Political Science and Sociology. By learning to bring such a rich collection of disciplinary approaches to bear on questions of science and technology, students graduate uniquely equipped to succeed in professions that demand fluency with both technical and social frameworks. Recent graduates of STS have entered top-ranked Ph.D. and MBA programs and forged successful careers in a variety of fields, including business, engineering, law, public service, medicine and academia.

## Learning Outcomes (Undergraduate)

The Program expects undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in Science, Technology, and Society. Students are expected to demonstrate:

1. A knowledge of core theories and methods in the interdisciplinary field of STS.

2. An ability to deploy these theories and methods to analyze interactions between science, technology and society in particular historical and cultural contexts.
3. An ability to critically evaluate empirical evidence and theoretical claims in STS-related debates.
4. An ability to communicate clearly and persuasively about STS issues to a general audience in multiple media including oral presentation and writing.

## Advising and Course Selection

The Program in Science, Technology, and Society offers an advising process that includes faculty, staff and peer advisers. Prospective majors must first meet with a peer adviser and then with the Program's Student Services Officer to determine which degree they will pursue (the B.A. or B.S.) and how they will fulfill the Program's basic requirements. When they are ready to declare, they meet with the Program's Student Services Officer to submit their degree plan and then the Associate Director reviews the coursework for intellectual coherence. Majors are then assigned to a faculty adviser who serves as an intellectual mentor and helps them identify the core questions driving their interest in the field. The Program also sponsors a wide variety of events designed to help students meet their colleagues and Program alumni, discover research and internship opportunities, and make their way toward the career of their choice.

## STS Core

The program offers a Bachelor of Arts and Bachelor of Science in Science, Technology, and Society. Both degree programs require that the student complete the STS Core.

### Units

With a grade of 'C' or higher in each course, complete 8 courses satisfying the following requirements:

#### A. Gateway Requirement

STS 1	The Public Life of Science and Technology	4
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#### B. Disciplinary Requirement: six courses, one of these courses must be a STS WIM course and at least one of these courses must be a STS Global course.

1. Social Sciences and Humanities Courses (complete 4 courses)<sup>Note 1 & 2</sup>  
3 & 4 13-20

ANTHRO 41	Genes and Identity	
ANTHRO 82	Medical Anthropology	
ANTHRO 90C	Theory of Ecological and Environmental Anthropology	
ANTHRO 93B	Prefield Research Seminar: Non-Majors	
ANTHRO 126	Urban Culture in Global Perspective	
ANTHRO 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise	
ANTHRO 167A	A Wilderness Empire: The Political Ecology of California	
ANTHRO 179	Cultures of Disease: Cancer and HIV/AIDS	
ANTHRO 186	Culture and Madness: Anthropological and Psychiatric Approaches to Mental Illness	
CLASSICS 151	Ten Things: An Archaeology of Design	
COMM 120W	Digital Media in Society	
COMM 142W	Media Economics	
ECON 106	World Food Economy	
EDUC 120	Sociology of Science	
HISTORY 104D	International Security in a Changing World	
HISTORY 140	World History of Science	
HISTORY 140A	The Scientific Revolution	
PHIL 60	Introduction to Philosophy of Science	

PHIL 167A	Philosophy of Biology	
POLISCI 233F	Science, technology and society and the humanities in the face of the looming disaster	
RELIGST 31	The Religious Life of Things	
SOC 114	Economic Sociology	
STS 151	The Future of Information	
STS 166	Knowledge and Information Infrastructures	
STS 181	Techno-metabolism: technology and society in the Anthropocene	
2. Engineering and Science Courses (complete 2 courses)		6-10
BIOE 131	Ethics in Bioengineering	
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions	
CS 181W	Computers, Ethics, and Public Policy	
EARTHSYS 112	Human Society and Environmental Change	
ENGR 60	Engineering Economics and Sustainability	
ENGR 131	Ethical Issues in Engineering	
HUMBIO 173	Science, Innovation and the Law	
MS&E 193	Technology and National Security	
<b>C. Senior Requirement</b>		4-10
STS 200A	Food and Society: Politics, Culture and Technology	
or STS 200D	Predictive Technologies of Text	
or STS 200H	Ethics, Science, & Technology	
or STS 200J		
or STS 200K	Sciences of Learning	
STS 299	Advanced Individual Work	
Total Units		27-44

<sup>1</sup>WIM courses: ANTHRO 90C, COMM 120W, CS 181W, HISTORY 140A, HISTORY 232F, MS&E 193 or MS&E 197

<sup>2</sup>Global courses: ANTHRO 41, ANTHRO 126, ANTHRO 138, ANTHRO 186, ECON 106, HISTORY 131, HISTORY 140, HISTORY 44Q, HISTORY 144, HISTORY 203J, HISTORY 208A, CEE 64, POLISCI 233F

<sup>3</sup>May only take HISTORY 140A or HISTORY 232F

<sup>4</sup>May only take HISTORY 144 or HISTORY 44Q

## Concentration Area

In addition to the Core requirements common to all STS students, a minimum of 50 units, at least twelve courses, are required from among those designated on the appropriate Concentration Area course list (available in the Related Courses tab and on the STS website). All courses must be taken for a letter grade if offered and may not be double-counted with core coursework. Students may count no more than two course petitions outside the list of approved Concentration Area courses toward their STS degree plan. Thematic concentrations are organized around an STS-related area or topic:

1. Communication and Media
2. Innovation and Organization
3. Nature and Environment
4. Life Sciences and Health
5. Politics and Policy
6. Self-Designed Concentration

A student pursuing a Bachelor of Arts degree must take at least 8 classes from the Socio-Cultural Course menus, including at least 3 designated as Foundational, and at least 4 classes from the Technical Course menus.

A student pursuing a Bachelor of Science degree must take at least 8 classes from the Technical Course menu, and at least 4 classes from the Socio-Cultural Course menus, including at least 3 designated as Foundational.

Students in both degree programs are encouraged to pursue sequences of courses that build on one another to increase the coherence of their program and give depth to their skill set and knowledge related to STS.

Alternatively, subject to program approval, a student may choose to design a self-designed concentration. Students interested in designing their own concentration must work with the associate director and have their proposal approved at least 2 quarters prior to your graduating quarter. A proposal (5 to 10 pages) should (a) describe your intellectual objectives in detail, (b) explain why a self-designed concentration is the optimal way to pursue these objectives (as opposed to the five STS concentrations or other majors at Stanford), and (c) list at least 12 courses and 50 units that comprise the plan of study. Students with a self-designed concentration must fulfill the same core requirements as other STS students. More information can be found on the STS website (<https://sts.stanford.edu/major-sts/thematic-concentrations>).

Each student's Concentration Area, certified or self-designed, requires the approval of the STS Associate Director.

## Interdisciplinary Honors in Science, Technology, and Society

The Program in Science, Technology, and Society (STS) offers an opportunity for undergraduates to graduate with Interdisciplinary Honors in STS. The STS honors program is open to STS majors as well as students from other majors.

Students accepted into the program carry out an original honors project, working with a faculty adviser. For STS majors, this project also fulfills the requirements for a capstone course and a sociocultural concentration course. An STS honors thesis tackles a significant problem or question related to the intersection of science, technology, and society. Students draw research methods from one or more of the disciplines that shape STS, such as history, sociology, communication, anthropology, environmental science, computer programming/modeling, engineering, economics, political science, and art history, while also capitalizing on unique analytical perspectives of STS as an intellectual field. STS interdisciplinary honors signals expertise in a given area, organizational skills, and intellectual rigor, and students have used it as a springboard for graduate studies and for careers in fields such as information technology, entrepreneurship, finance, public policy, media, education, law, medicine, and the nonprofit sector. Past honors projects are on file in the STS office library, as well as the digital repository.

### Admission

Students are encouraged to apply to the STS honors program during the Spring Quarter of their junior year. Late application is considered up to the add/drop deadline of the Autumn Quarter of their senior year.

### For Majors in Science, Technology, and Society

In preparation for applying to the honors program in STS, students should:

1. Select an area of research interest in STS, prepare related research questions, and identify potential faculty advisers for an honors thesis based on those questions.
2. Attend one or more of the quarterly STS workshops offered for prospective honors students, and/or take STS 191 Introduction to

Research in STS (offered Winter Quarter) or an alternative course on research methods approved by the STS honors program director, and/or speak with the STS honors program director.

3. Submit a research statement and an honors program application, following the parameters set out at STS Honors Program (<https://sts.stanford.edu/major-sts/honors-program>) web site.

### For Majors in Other Departments and Programs

In addition to the requirements for STS majors, applicants from other departments should:

1. Meet with the honors program director as early as possible to ensure that they have sufficient background in relevant analytical and methodological approaches.
2. Satisfy one of the following:
  - Complete STS 1 The Public Life of Science and Technology, and either two courses approved as sociocultural foundational courses in STS, or two alternative courses approved by the STS honors program director as relevant to the proposed honors research in STS; or
  - Complete three courses approved by the STS honors program director as relevant to the proposed honors research in STS.

### Interdisciplinary Honors Requirements

To graduate with Interdisciplinary Honors in STS, seniors in the honors program need to meet the following criteria:

1. Enroll in STS 299 with an honors faculty adviser to oversee the thesis for a minimum of 10 units total, with up to 5 units per quarter, over Autumn, Winter and Spring quarters. Students who choose to obtain Permit for Services Only (PSO) status during their final quarter may do so with the consent of the STS honors program director but they must still have enrolled in a minimum of 10 units of STS 299 during previous quarters.
2. Attend required monthly workshops for current STS honors students.
3. Complete a thesis judged worthy of an honors program by the faculty adviser and STS adviser.
4. Have an overall Stanford GPA of 3.4 at the end of Winter Quarter, senior year, or demonstrated academic competence.

### Minor in Science, Technology, and Society

The program no longer offers a minor. Students currently enrolled in the minor should consult the Stanford Bulletin 2011-12 (<http://www.stanford.edu/dept/registrar/bulletin1112/6074.htm>) for degree requirements.

### STS Affiliated Faculty

*Director and Professor of Education:* John Willinsky

*Associate Director:* Kyoko Sato

William J. Perry Fellow in International Security: Paul N. Edwards

*Executive Board:* Paula Findlen (History), Duana Fullwiley (Anthropology), Mark Granovetter (Sociology), Hank Greely (Law), Sarah Lochlann Jain (Anthropology), Robert McGinn (Management Science and Engineering), Brad Osgood (Electrical Engineering), Eric Roberts (Computer Science), Scott Sagan (Political Science), Fred Turner (Communication), John Willinsky (Education)

*Affiliated Faculty and Staff:* Jeremy Bailenson (Communication), Adam Banks (Graduate School of Education), Thomas Byers (Management Science and Engineering), Angèle Christin (Communication), Jean-Pierre Dupuy (French), Paula Findlen (History), Duana Fullwiley (Anthropology), Mark Granovetter (Sociology), Hank Greely (Law), Ann Grimes (Communication), James T. Hamilton (Communication), Pamela

Hinds (Management Science and Engineering), Hector Hoyos (Iberian and Latin American Cultures), Miyako Inoue (Anthropology), Sarah Lochlann Jain (Anthropology), Robert Laughlin (Physics), Pamela Lee (Art and Art History), Sandra Soo-Jin Lee (Biomedical Ethics), Helen Longino (Philosophy), Henry Lowood (Stanford University Libraries), Robert McGinn (Management Science and Engineering), Thomas Mullaney (History), Brad Osgood (Electrical Engineering), Walter Powell (Education), Robert Proctor (History), Jessica Riskin (History), Scott Sagan (Political Science), Kyoko Sato (STS), Londa Schiebinger (History), Michael Shanks (Classics, Anthropology), Mitchell Stevens (Education), Elaine Treharne (English), Fred Turner (Communication), John Willinsky (Education)

*Emeriti:* James Adams (Management Science and Engineering, Mechanical Engineering), Barton Bernstein (History), Martin Hellman (Electrical Engineering), Eric Roberts (Computer Science), Walter Vincenti (Aeronautics and Astronautics), Gavin Wright (American Economic History)

## Thematic Concentrations Course Lists

### Communication and Media

Thematic concentration in Communication and Media:

Units

#### Socio-Cultural Courses

AMSTUD 133	Technology and American Visual Culture	
AMSTUD 143X	Starstuff: Space and the American Imagination	
ARTHIST 164A	Technology and the Visual Imagination	
ARTHIST 245	Art, Business & the Law	
ARTSTUDI 173f	Cell Phone Photography	
ARTSTUDI 174E	Creativity in the Age of Facebook: Making Art for and from Networks	
ARTSTUDI 236	Future Media, Media Archaeologies	
COMM 106	Communication Research Methods	
COMM 108	Media Processes and Effects	
COMM 120W	Digital Media in Society	
COMM 131	Media Ethics and Responsibility	
COMM 137W	The Dialogue of Democracy	
COMM 142W	Media Economics	
COMM 154	The Politics of Algorithms	
COMM 166	Virtual People	
COMM 172	Media Psychology	
CS 181	Computers, Ethics, and Public Policy	
EDUC 120	Sociology of Science	
EDUC 226	Curating Experience: Representation in and beyond Museums	
ENGR 131	Ethical Issues in Engineering	
ENGR 145	Technology Entrepreneurship	
FILMSTUD 6	Introduction to Media	
HISTORY 204D	Advanced Topics in Agnotology	
IPS 221	Politics of Data: Algorithmic Culture, Big Data, and Information Waste	
MS&E 180	Organizations: Theory and Management	
OSPFLOR 28	Between Art and Science: the Evolution of Techniques from Antiquity to Leonardo da Vinci	
OSPFLOR 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition	
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	
OSPFLOR 67	The Celluloid Gaze: Gender, Identity and Sexuality in Cinema	
OSPMADR 45	Women in Art: Case Study in the Madrid Museums	



OSPOXFRD 57	The Rise of the Woman Writer 1660-1860
OSPPARIS 30	The Avant Garde in France through Literature, Art, and Theater
PSYCH 30	Introduction to Perception
PSYCH 75	Introduction to Cultural Psychology
RELIGST 31	The Religious Life of Things
SOC 180A	Foundations of Social Research
STS 123	Making of a Nuclear World: History, Politics, and Culture
STS 151	The Future of Information
STS 166	Knowledge and Information Infrastructures
STS 181	Techno-metabolism: technology and society in the Anthropocene
STS 191	Introduction to Research in STS
SYMSYS 1	Minds and Machines
SYMSYS 245	Cognition in Interaction Design
TAPS 253T	Virtual Realities: Art, Technology, Performance

**Technical Courses**

ARTSTUDI 130	Interactive Art: Making it with Arduino
ARTSTUDI 160	Intro to Digital / Physical Design
ARTSTUDI 168	Data as Material
ARTSTUDI 176	Time Shifts
ARTSTUDI 177	Video Art I
ARTSTUDI 179	Digital Art I
ARTSTUDI 275	PHOTOGRAPHY II: Digital
CEE 112A	Industry Applications of Virtual Design & Construction
CME 108	Introduction to Scientific Computing
COMM 176	Advanced Digital Media Production
CS 102	Big Data: Tools and Techniques, Discoveries and Pitfalls
CS 103	Mathematical Foundations of Computing
CS 105	Introduction to Computers
CS 106A	Programming Methodology
CS 106B	Programming Abstractions
CS 106X	Programming Abstractions (Accelerated)
CS 107	Computer Organization and Systems
CS 108	Object-Oriented Systems Design
CS 109	Introduction to Probability for Computer Scientists
CS 110	Principles of Computer Systems
CS 124	From Languages to Information
CS 144	Introduction to Computer Networking
CS 145	Introduction to Databases
CS 147	Introduction to Human-Computer Interaction Design
CS 148	Introduction to Computer Graphics and Imaging
CS 154	Introduction to Automata and Complexity Theory
CS 161	Design and Analysis of Algorithms
CS 194H	User Interface Design Project
CS 221	Artificial Intelligence: Principles and Techniques
CS 224W	Analysis of Networks
CS 247	Human-Computer Interaction Design Studio
CS 248	Interactive Computer Graphics
CS 255	Introduction to Cryptography
CS 376	Human-Computer Interaction Research
EE 101A	Circuits I
EE 101B	Circuits II
EE 102A	Signal Processing and Linear Systems I

EE 102B	Signal Processing and Linear Systems II
EE 108	Digital System Design
EE 168	Introduction to Digital Image Processing
EE 169	Introduction to Bioimaging
EE 180	Digital Systems Architecture
HUMBIO 145L	The Biology and Evolution of Language
ME 125	Visual Frontiers
MS&E 111	Introduction to Optimization
MS&E 120	Probabilistic Analysis
MS&E 130	Information Networks and Services
MS&E 135	Networks
MUSIC 220A	Fundamentals of Computer-Generated Sound
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music
MUSIC 254	Music Query, Analysis, and Style Simulation
MUSIC 257	Neuroplasticity and Musical Gaming
OSPCTWN 67	ICT4D: An Introduction to the Use of ICTs for Development
SOC 180B	Introduction to Data Analysis
STATS 60	Introduction to Statistical Methods: Precalculus
STATS 167	Probability: Ten Great Ideas About Chance

**Innovation and Organization**

Thematic concentration in Innovation and Organization:

Units

**Socio-Cultural Courses**

AMSTUD 133	Technology and American Visual Culture
ANTHRO 41	Genes and Identity
ANTHRO 136	The Anthropology of Global Supply Chains
ANTHRO 154	Anthropology of Drugs: Experience, Capitalism, Modernity
ARTHIST 147	Modernism and Modernity
ARTSTUDI 174B	Creativity in the Age of Facebook: Making Art for and from Networks
ARTSTUDI 236	Future Media, Media Archaeologies
BIO 182	Modeling Cultural Evolution
CEE 32B	Design Theory
CLASSICS 151	Ten Things: An Archaeology of Design
CLASSICS 156	Design of Cities
COMM 154	The Politics of Algorithms
CS 181	Computers, Ethics, and Public Policy
ECON 118	Development Economics
ECON 145	Labor Economics
EDUC 120	Sociology of Science
ENGR 145	Technology Entrepreneurship
HISTORY 1C	Global History: Empires, Technology, and Modernity
HISTORY 140	World History of Science
HISTORY 140A	The Scientific Revolution
HISTORY 203C	History of Ignorance
HISTORY 241D	Einstein and the Structure of Reality
HUMBIO 173	Science, Innovation and the Law
IPS 221	Politics of Data: Algorithmic Culture, Big Data, and Information Waste
ME 120	History and Philosophy of Design
ME 177	Global Engineers' Education

ME 297	Forecasting for Innovators: Technology, Tools & Social Change	ARTSTUDI 160	Intro to Digital / Physical Design
MS&E 175	Innovation, Creativity, and Change	ARTSTUDI 168	Data as Material
MS&E 177	Creativity Rules	CS 102	Big Data: Tools and Techniques, Discoveries and Pitfalls
MS&E 180	Organizations: Theory and Management	CS 105	Introduction to Computers
MS&E 185	Global Work	CS 106A	Programming Methodology
OSPBER 115X	The German Economy: Past and Present	CS 106B	Programming Abstractions
OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	CS 106X	Programming Abstractions (Accelerated)
OSPBER 161X	The German Economy in the Age of Globalization	CS 107	Computer Organization and Systems
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	CS 108	Object-Oriented Systems Design
OSPFLO 28	Between Art and Science: the Evolution of Techniques from Antiquity to Leonardo da Vinci	CS 109	Introduction to Probability for Computer Scientists
OSPFLO 41	The Florentine Sketchbook: A Visual Arts Practicum	CS 110	Principles of Computer Systems
OSPFLO 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition	CS 124	From Languages to Information
OSPFLO 58	Space as History: Social Vision and Urban Change	CS 147	Introduction to Human-Computer Interaction Design
OSPFLO 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	CS 194H	User Interface Design Project
OSPMADR 45	Women in Art: Case Study in the Madrid Museums	CS 221	Artificial Intelligence: Principles and Techniques
OSPOXFRD 45	British Economic Policy since World War II	CS 223A	Introduction to Robotics
OSPPARIS 30	The Avant Garde in France through Literature, Art, and Theater	CS 225A	Experimental Robotics
OSPPARIS 44	EAP: Analytical Drawing and Graphic Art	CS 247	Human-Computer Interaction Design Studio
OSPPARIS 72	The Ceilings of Paris	CS 376	Human-Computer Interaction Research
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	CS 402	Beyond Bits and Atoms: Designing Technological Tools
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	CS 402L	Beyond Bits and Atoms - Lab
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	EE 101A	Circuits I
OSPSANTG 115	The Chilean Economy: History, International Relations, and Development Strategies	EE 101B	Circuits II
PUBLPOL 134	Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals	EE 102A	Signal Processing and Linear Systems I
PUBLPOL 353A	Science and Technology Policy	EE 102B	Signal Processing and Linear Systems II
RELIGST 31	The Religious Life of Things	EE 108	Digital System Design
SOC 114	Economic Sociology	EE 169	Introduction to Bioimaging
SOC 115	Topics in Economic Sociology	EE 180	Digital Systems Architecture
SOC 160	Formal Organizations	ENGR 14	Intro to Solid Mechanics
SOC 162	The Social Regulation of Markets	ENGR 40M	An Intro to Making: What is EE
SOC 168	Global Organizations: The Matrix of Change	ENGR 60	Engineering Economics and Sustainability
SOC 180A	Foundations of Social Research	ENGR 110	Perspectives in Assistive Technology (ENGR 110)
STS 123	Making of a Nuclear World: History, Politics, and Culture	ME 80	Mechanics of Materials
STS 151	The Future of Information	ME 101	Visual Thinking
STS 166	Knowledge and Information Infrastructures	ME 115A	Introduction to Human Values in Design
STS 181	Techno-metabolism: technology and society in the Anthropocene	ME 115B	Product Design Methods
STS 190	Issues in Technology and the Environment	ME 203	Design and Manufacturing
STS 191	Introduction to Research in STS	ME 216A	Advanced Product Design: Needfinding
SYMSYS 1	Minds and Machines	MS&E 52	Introduction to Decision Making
SYMSYS 245	Cognition in Interaction Design	MS&E 111	Introduction to Optimization
TAPS 253T	Virtual Realities: Art, Technology, Performance	MS&E 120	Probabilistic Analysis
<b>Technical Courses</b>		MS&E 121	Introduction to Stochastic Modeling
ARTSTUDI 130	Interactive Art: Making it with Arduino	MS&E 130	Information Networks and Services
		MS&E 135	Networks
		MS&E 152	Introduction to Decision Analysis
		MS&E 184	Future of Work: Issues in Organizational Learning and Design
		MUSIC 220A	Fundamentals of Computer-Generated Sound
		MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music
		MUSIC 257	Neuroplasticity and Musical Gaming
		OSPCPTWN 67	ICT4D: An Introduction to the Use of ICTs for Development
		SOC 180B	Introduction to Data Analysis
		STATS 60	Introduction to Statistical Methods: Precalculus

STATS 110	Statistical Methods in Engineering and the Physical Sciences
STATS 116	Theory of Probability
STATS 167	Probability: Ten Great Ideas About Chance

## Nature and Environment

Thematic concentration in Nature and Environment:

### Socio-Cultural Courses

AMSTUD 143X	Starstuff: Space and the American Imagination
ANTHRO 90C	Theory of Ecological and Environmental Anthropology
ANTHRO 125	Language and the Environment
ANTHRO 126	Urban Culture in Global Perspective
ANTHRO 160	Social and Environmental Sustainability: The Costa Rican Case
ANTHRO 162	Indigenous Peoples and Environmental Problems
ANTHRO 166	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness
CEE 175A	California Coast: Science, Policy, and Law
CLASSICS 156	Design of Cities
EARTHSYS 61Q	Food and security
EARTHSYS 105	Food and Community: Food Security, Resilience and Equity
EARTHSYS 112	Human Society and Environmental Change
EARTHSYS 121	Building a Sustainable Society: New Approaches for Integrating Human and Environmental Priorities
EARTHSYS 185	Feeding Nine Billion
ECON 106	World Food Economy
ECON 155	Environmental Economics and Policy
EDUC 120	Sociology of Science
ESS 112	Human Society and Environmental Change
HISTORY 1C	Global History: Empires, Technology, and Modernity
HISTORY 140	World History of Science
HISTORY 140A	The Scientific Revolution
HISTORY 203C	History of Ignorance
HUMBIO 2B	Culture, Evolution, and Society
HUMBIO 4B	Environmental and Health Policy Analysis
ME 297	Forecasting for Innovators: Technology, Tools & Social Change
MS&E 92Q	International Environmental Policy
OSPBER 115X	The German Economy: Past and Present
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers
OSPFLOR 28	Between Art and Science: the Evolution of Techniques from Antiquity to Leonardo da Vinci
OSPKYOTO 45	Japan's Energy-Environment Conundrum
OSPOXFRD 19	Constructing Natures: Science and Technology in the British Landscape
OSPPARIS 91	Globalization and Its Effect on France and the European Union
OSPPARIS 97	Le Grand Paris: Paris of the 21st Century
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment

### Units

PHIL 60	Introduction to Philosophy of Science
PHIL 167A	Philosophy of Biology
POLISCI 110G	Governing the Global Economy
POLISCI 114S	International Security in a Changing World
POLISCI 233F	Science, technology and society and the humanities in the face of the looming disaster
SOC 180A	Foundations of Social Research
STS 123	Making of a Nuclear World: History, Politics, and Culture
STS 166	Knowledge and Information Infrastructures
STS 181	Techno-metabolism: technology and society in the Anthropocene
STS 190	Issues in Technology and the Environment
STS 191	Introduction to Research in STS
URBANST 164	Sustainable Cities
<b>Technical Courses</b>	
BIO 138	Ecosystem Services: Frontiers in the Science of Valuing Nature
BIO 144	Conservation Biology: A Latin American Perspective
BIOHOPK 172H	Marine Ecology: From Organisms to Ecosystems
BIOHOPK 187H	Sensory Ecology
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions
CEE 70	Environmental Science and Technology
CEE 73	Water: An Introduction
CEE 100	Managing Sustainable Building Projects
CEE 107A	Understanding Energy
CEE 120A	Building Information Modeling Workshop
CEE 124	Sustainable Development Studio
CEE 171	Environmental Planning Methods
CEE 176A	Energy Efficient Buildings
CEE 176B	Electric Power: Renewables and Efficiency
CEE 272R	Modern Power Systems Engineering
CHEMENG 60Q	Environmental Regulation and Policy
CS 102	Big Data: Tools and Techniques, Discoveries and Pitfalls
EARTHSYS 101	Energy and the Environment
EARTHSYS 102	Fundamentals of Renewable Power
EARTHSYS 104	The Water Course
EARTHSYS 142	Remote Sensing of Land
EARTHSYS 155	Science of Soils
EARTHSYS 180	Principles and Practices of Sustainable Agriculture
ENERGY 104	Sustainable Energy for 9 Billion
ENERGY 120	Fundamentals of Petroleum Engineering
ENERGY 160	Modeling Uncertainty in the Earth Sciences
ENGR 25E	Energy: Chemical Transformations for Production, Storage, and Use
ENGR 60	Engineering Economics and Sustainability
MATSCI 156	Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution
OSPAUSTL 10	Coral Reef Ecosystems
OSPAUSTL 25	Freshwater Systems
OSPAUSTL 30	Coastal Forest Ecosystems
OSPMADRD 27	Canarian Night Skies
PHYSICS 240	Introduction to the Physics of Energy
PHYSICS 241	Introduction to Nuclear Energy
SOC 180B	Introduction to Data Analysis

STATS 60	Introduction to Statistical Methods: Precalculus
STATS 167	Probability: Ten Great Ideas About Chance

## Life Sciences and Health

Thematic concentration in Life Sciences and Health:

### Social-Cultural Courses

AMSTUD 156H	Women and Medicine in US History: Women as Patients, Healers and Doctors
ANTHRO 41	Genes and Identity
ANTHRO 82	Medical Anthropology
ANTHRO 128A	The Boundaries of Humanity: Humans, Animals and Machines in the Age of Biotechnology
ANTHRO 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise
ANTHRO 154	Anthropology of Drugs: Experience, Capitalism, Modernity
ANTHRO 186	Culture and Madness: Anthropological and Psychiatric Approaches to Mental Illness
ARTSTUDI 284	Art and Biology
BIOE 131	Ethics in Bioengineering
EARTHSYS 112	Human Society and Environmental Change
EDUC 120	Sociology of Science
EDUC 340	Psychology and American Indian Mental Health
FRENCH 219	The Renaissance Body in French Literature and Medicine
GENE 104Q	Law and the Biosciences
HISTORY 140	World History of Science
HISTORY 203C	History of Ignorance
HISTORY 243G	Tobacco and Health in World History
HUMBIO 2B	Culture, Evolution, and Society
HUMBIO 3B	Behavior, Health, and Development
HUMBIO 4B	Environmental and Health Policy Analysis
HUMBIO 122S	Social Class, Race, Ethnicity, and Health
HUMBIO 174	Foundations of Bioethics
HUMBIO 175L	Literature and Global Health
MED 157	Foundations for Community Health Engagement
OSPFLO 85	Bioethics: the Biotechnological Revolution, Human Rights and Politics in the Global Era
OSPMADR 57	Health Care: A Contrastive Analysis between Spain and the U.S.
OSPMADR 72	Issues in Bioethics Across Cultures
OSPOFRD 58	Ethical, Legal, and Policy Issues in the Biosciences: Comparative Perspectives
OSPPARIS 98	Global Health Systems: the Future
PHIL 60	Introduction to Philosophy of Science
PHIL 167A	Philosophy of Biology
PSYCH 30	Introduction to Perception
PSYCH 75	Introduction to Cultural Psychology
PUBLPOL 122	Biosecurity and Bioterrorism Response
SOC 152	The Social Determinants of Health
SOC 180A	Foundations of Social Research
STS 123	Making of a Nuclear World: History, Politics, and Culture
STS 181	Techno-metabolism: technology and society in the Anthropocene
STS 190	Issues in Technology and the Environment
STS 191	Introduction to Research in STS

### Units

### Technical Courses

ANTHRO 113	Culture and Epigenetics: Towards A Non-Darwinian Synthesis
BIO 45	Introduction to Laboratory Research in Cell and Molecular Biology
BIO 46	Introduction to Research in Ecology and Evolutionary Biology
BIO 47	Introduction to Research in Ecology and Evolutionary Biology
BIO 109A	The Human Genome and Disease
BIO 109B	The Human Genome and Disease: Genetic Diversity and Personalized Medicine
BIO 144	Conservation Biology: A Latin American Perspective
BIO 150	Human Behavioral Biology
BIOE 44	Fundamentals for Engineering Biology Lab
BIOE 80	Introduction to Bioengineering (Engineering Living Matter)
BIOE 101	Systems Biology
BIOE 103	Systems Physiology and Design
BIOE 115	Computational Modeling of Microbial Communities
CHEM 31A	Chemical Principles I
CHEM 31B	Chemical Principles II
CHEM 31X	Chemical Principles Accelerated
CHEM 33	Structure and Reactivity of Organic Molecules
CHEM 35	Organic Chemistry of Bioactive Molecules
CHEM 130	Organic Chemistry Laboratory
CHEM 131	Organic Polyfunctional Compounds
CHEM 171	Physical Chemistry I
COMP MED 87Q	Laboratory Mouse in Biomedical Research
CS 102	Big Data: Tools and Techniques, Discoveries and Pitfalls
EE 102A	Signal Processing and Linear Systems I
EE 102B	Signal Processing and Linear Systems II
EE 169	Introduction to Bioimaging
HUMBIO 2A	Genetics, Evolution, and Ecology
HUMBIO 3A	Cell and Developmental Biology
HUMBIO 4A	The Human Organism
HUMBIO 145L	The Biology and Evolution of Language
HUMBIO 167	The Art of Vision
OSPAUSTL 10	Coral Reef Ecosystems
OSPAUSTL 25	Freshwater Systems
OSPAUSTL 30	Coastal Forest Ecosystems
SOC 180B	Introduction to Data Analysis
STATS 60	Introduction to Statistical Methods: Precalculus
STATS 141	Biostatistics
STATS 167	Probability: Ten Great Ideas About Chance

## Politics and Policy

Thematic concentration in Politics and Policy:

### Units

### Socio-Cultural Courses

AMSTUD 133	Technology and American Visual Culture
AMSTUD 143X	Starstuff: Space and the American Imagination
ANTHRO 138	Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise

ANTHRO 166	Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness	POLISCI 150A	Data Science for Politics
COMM 133	Need to Know: The Tension between a Free Press and National Security Decision Making	POLISCI 214R	Challenges and Dilemmas in American Foreign Policy
COMM 154	The Politics of Algorithms	POLISCI 233F	Science, technology and society and the humanities in the face of the looming disaster
CS 181	Computers, Ethics, and Public Policy	PUBLPOL 122	Biosecurity and Bioterrorism Response
EARTHSYS 61Q	Food and security	PUBLPOL 353A	Science and Technology Policy
ECON 106	World Food Economy	SOC 180A	Foundations of Social Research
EDUC 120	Sociology of Science	STS 123	Making of a Nuclear World: History, Politics, and Culture
ESS 112	Human Society and Environmental Change	STS 151	The Future of Information
GERMAN 132	History and Politics of the Future in Germany, 1900-Present	STS 166	Knowledge and Information Infrastructures
HISTORY 1C	Global History: Empires, Technology, and Modernity	STS 181	Techno-metabolism: technology and society in the Anthropocene
HISTORY 102	History of the International System	STS 190	Issues in Technology and the Environment
HISTORY 103F	The Changing Face of War: Introduction to Military History	STS 191	Introduction to Research in STS
HISTORY 104D	International Security in a Changing World	<b>Technical Courses</b>	
HISTORY 140	World History of Science	CEE 171	Environmental Planning Methods
HISTORY 203C	History of Ignorance	CHEM 31A	Chemical Principles I
HISTORY 204D	Advanced Topics in Agnotology	CHEM 31B	Chemical Principles II
HISTORY 241D	Einstein and the Structure of Reality	CHEM 31X	Chemical Principles Accelerated
HISTORY 261G	Presidents and Foreign Policy in Modern History	CHEM 33	Structure and Reactivity of Organic Molecules
HUMBIO 173	Science, Innovation and the Law	CHEM 35	Organic Chemistry of Bioactive Molecules
INTNLREL 140/	International Law and International Relations	CS 102	Big Data: Tools and Techniques, Discoveries and Pitfalls
INTNLREL 140C	The U.S., U.N. Peacekeeping, and Humanitarian War	CS 105	Introduction to Computers
INTNLREL 180/	Transitional Justice, Human Rights, and International Criminal Tribunals	CS 106A	Programming Methodology
IPS 219	Intelligence and National Security	CS 106B	Programming Abstractions
IPS 221	Politics of Data: Algorithmic Culture, Big Data, and Information Waste	CS 106X	Programming Abstractions (Accelerated)
MS&E 193	Technology and National Security	CS 107	Computer Organization and Systems
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	CS 108	Object-Oriented Systems Design
OSPFLOR 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	CS 109	Introduction to Probability for Computer Scientists
OSPKYOTO 45	Japan's Energy-Environment Conundrum	CS 110	Principles of Computer Systems
OSPMADR 57	Health Care: A Contrastive Analysis between Spain and the U.S.	CS 255	Introduction to Cryptography
OSPOXFRD 58	Ethical, Legal, and Policy Issues in the Biosciences: Comparative Perspectives	MS&E 93Q	Nuclear Weapons, Energy, Proliferation, and Terrorism
OSPPARIS 91	Globalization and Its Effect on France and the European Union	PHYSICS 41	Mechanics
OSPPARIS 97	Le Grand Paris: Paris of the 21st Century	PHYSICS 43	Electricity and Magnetism
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	PHYSICS 240	Introduction to the Physics of Energy
OSPSANTG 115	The Chilean Economy: History, International Relations, and Development Strategies	PHYSICS 241	Introduction to Nuclear Energy
POLISCI 102	Politics and Public Policy	POLISCI 150A	Data Science for Politics
POLISCI 110G	Governing the Global Economy	POLISCI 150B	Machine Learning for Social Scientists
POLISCI 110Y	War and Peace in American Foreign Policy	POLISCI 150C	Causal Inference for Social Science
POLISCI 114D	Democracy, Development, and the Rule of Law	SOC 180B	Introduction to Data Analysis
POLISCI 114S	International Security in a Changing World	STATS 60	Introduction to Statistical Methods: Precalculus
POLISCI 116	The International History of Nuclear Weapons	STATS 167	Probability: Ten Great Ideas About Chance
POLISCI 122	Introduction to American Law	<b>Overseas Studies Courses in Science, Technology, and Society</b>	
POLISCI 124L	The Psychology of Communication About Politics in America	The Bing Overseas Studies Program ( <a href="http://bossp.stanford.edu">http://bossp.stanford.edu</a> ) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.	

## Overseas Studies Courses in Science, Technology, and Society

The Bing Overseas Studies Program (<http://bossp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

OSPSANTG 119X The Chilean Economy: History, International Relations, and Development Strategies 5

		<b>Units</b>
OSPAUSTL 10	Coral Reef Ecosystems	3
OSPAUSTL 25	Freshwater Systems	3
OSPAUSTL 30	Coastal Forest Ecosystems	3
OSPBER 115X	The German Economy: Past and Present	4-5
OSPBER 126X	A People's Union? Money, Markets, and Identity in the EU	4-5
OSPBER 161X	The German Economy in the Age of Globalization	4-5
OSPCPTWN 36	The Archaeology of Southern African Hunter Gatherers	4
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	3
OSPCPTWN 67	ICT4D: An Introduction to the Use of ICTs for Development	3
OSPFLO 28	Between Art and Science: the Evolution of Techniques from Antiquity to Leonardo da Vinci	4
OSPFLO 41	The Florentine Sketchbook: A Visual Arts Practicum	4
OSPFLO 48	Sharing Beauty in Florence: Collectors, Collections and the Shaping of the Western Museum Tradition	4
OSPFLO 49	On-Screen Battles: Filmic Portrayals of Fascism and World War II	5
OSPFLO 58	Space as History: Social Vision and Urban Change	4
OSPFLO 67	The Celluloid Gaze: Gender, Identity and Sexuality in Cinema	4
OSPFLO 85	Bioethics: the Biotechnological Revolution, Human Rights and Politics in the Global Era	4
OSPFLO 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4
OSPKYOTO 45	Japan's Energy-Environment Conundrum	4
OSPMADRD 27	Canarian Night Skies	4
OSPMADRD 45	Women in Art: Case Study in the Madrid Museums	4
OSPMADRD 57	Health Care: A Contrastive Analysis between Spain and the U.S.	4
OSPMADRD 72	Issues in Bioethics Across Cultures	4
OSPOXFRD 19	Constructing Natures: Science and Technology in the British Landscape	5
OSPOXFRD 45	British Economic Policy since World War II	5
OSPOXFRD 57	The Rise of the Woman Writer 1660-1860	5
OSPOXFRD 58	Ethical, Legal, and Policy Issues in the Biosciences: Comparative Perspectives	3
OSPPARIS 30	The Avant Garde in France through Literature, Art, and Theater	4
OSPPARIS 44	EAP: Analytical Drawing and Graphic Art	2
OSPPARIS 72	The Ceilings of Paris	4
OSPPARIS 91	Globalization and Its Effect on France and the European Union	5
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4
OSPPARIS 97	Le Grand Paris: Paris of the 21st Century	4
OSPPARIS 98	Global Health Systems: the Future	5
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	4-5
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5

# SLAVIC LANGUAGES AND LITERATURES

Courses offered by the Department of Slavic Languages and Literatures are listed on the Stanford Bulletin's ExploreCourses web site (<http://bulletin.stanford.edu>) under the subject codes SLAVIC (Slavic Studies) (<https://explorecourses.stanford.edu/search?q=SLAVIC&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-SLAVIC=on>), and SLAVLANG (Slavic Language).

The department supports coordinated study of Russian language, literature, literary and cultural history, theory, and criticism. The department's programs may also be combined with the programs in Russian, East European and Eurasian Studies, Jewish Studies, Film Studies, Drama, International Relations, Stanford's Overseas Studies, and the Special Languages Program. The department is a part of the Division of Literatures, Cultures, and Languages (p. 482).

A full undergraduate program provides a choice of several tracks leading to a B.A. (with a major or a minor) or to a B.A. with Honors. The department offers a full graduate program leading to an M.A. in Russian and a Ph.D. in Slavic Languages and Literatures. Stanford undergraduates are eligible to apply to the department for a coterminal B.A./M.A. degree. Students in the department's Ph.D. program are required to choose among minor programs in other national literatures, linguistics, Russian, East European, and Eurasian Studies, Jewish Studies, art and music history, theater, or film studies; or they may design their own minor or choose the related field option.

The department runs a colloquium series, which brings distinguished speakers to Stanford; organizes international conferences and symposia; and since 1987 maintains a continuing publication series, Stanford Slavic Studies. Along with the Center for Russian, East European and Eurasian Studies, the department offers qualified undergraduates summer grants (on a competitive basis) for intensive Russian language instruction in accredited programs in Russia and the U.S.

Improving cultural understanding is a critical part of the department's mission, and the department offers a full range of courses at all levels devoted to Russian literature, music and visual arts that do not require specialized knowledge, as well as advanced research seminars for graduate students. The Slavic theme house, Slavianskii Dom, serves as an undergraduate residence for many students in the program and hosts program-related activities. The undergraduate program has attracted students seeking careers in journalism, business, international relations, law, medicine, and human rights, as well as academia. Russian is still the lingua franca over the vast territory of the former Soviet Union, and a good command of this language offers a gateway to Eurasia's diverse cultures, ethnicities, economies, and religions.

Stanford students of Russian, East European and Eurasian Studies benefit from unmatched faculty resources. Green Library and the Hoover Institution libraries and archives hold world-renowned Russian and East European collections, which undergraduates and graduate students use in their research. Department students master a difficult language and a rich and challenging literature, and are rewarded by gaining entry into a unique, powerful, and diverse civilization that defined major trends in the past century and plays an increasingly significant role in the world today.

## Mission of the Undergraduate Program in Slavic Languages and Literatures

The mission of the undergraduate program in Slavic Language and Literatures is to expose students to a variety of perspectives on Russian

language, history, culture, literature, and philosophical thought. The program offers three tracks. Courses in the Russian Language and Literature track focus on the linguistic and philological study of literature, as well as the history of Russian literature. The Russian Language, Culture, and History track guides students through a comprehensive interdisciplinary study of Russian literature and culture in historic context. The Russian and Philosophy track provides students with a background in the Russian language and literary tradition with emphasis on philosophical thought.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

- oral proficiency in Russian or another Slavic language beyond the interpersonal level with presentational language abilities.
- writing proficiency in Russian or another Slavic language beyond the interpersonal level with presentational language abilities.
- close reading skills of authentic texts in Russian or another Slavic language.
- the ability to develop effective and nuanced lines of interpretation.

## Slavic Theme House

Slavianskii Dom, at 650 Mayfield Avenue, is an undergraduate residence that offers opportunities for students to expand their knowledge, understanding, and appreciation of Russia, Eastern Europe, and Eurasia. Assignment is made through the regular undergraduate housing draw.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Slavic Languages and Literatures and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Slavic Languages and Literatures. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Slavic Languages and Literatures and to interpret and present the results of their research.

## Bachelor of Arts in Slavic Languages and Literatures

The major tracks in Russian Language and Literature and Russian Studies are declared on Axess and appear on the transcript but not on the diploma. The degree option in Russian and Philosophy is not declared on Axess and does not appear on the transcript or the diploma.

## Writing in the Major

Undergraduates are required by the University to pass at least one writing-intensive course in their field of concentration in order to graduate. Majors in any Slavic track may satisfy the writing requirement in 2017-18 by taking and passing SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky for 3 units or more.

## Russian Language and Literature

The Russian Language and Literature field of study is designed for those students who wish to gain command of the Russian language and to study the nation's literary tradition. Emphasis is placed on the linguistic and philological study of literature, as well as the history of Russian

literature and related media in the broader context of Russian culture. This major also welcomes students with an interest in Russian and Slavic linguistics.

Majors who concentrate in Russian Language and Literature must earn a grade point average (GPA) of 2.0 (C) or better in order to receive credit toward the major.

## Prerequisites

Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

## Degree Requirements

Candidates for the B.A. degree with a Russian Language and Literature field of study must complete an additional 56 units according to the following distribution:

### Russian Language

A minimum of 12 units from:

		Units
SLAVLANG 111	Third-Year Russian, First Quarter	4
SLAVLANG 112	Third-Year Russian, Second Quarter	4
SLAVLANG 113	Third-Year Russian, Third Quarter	4
SLAVLANG 177	Fourth-Year Russian, First Quarter	3
SLAVLANG 178	Fourth-Year Russian, Second Quarter	3
SLAVLANG 179	Fourth-Year Russian, Third Quarter	3
SLAVLANG 181	Fifth-Year Russian, First Quarter	3
SLAVLANG 182	Fifth-Year Russian, Second Quarter	3
SLAVLANG 183	Fifth-Year Russian, Third Quarter	3

### Russian Literature

12 units from the Russian Literature major core classes, defined as follows:

		Units
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky Must be taken for 3 or more units to count towards the WIM	1-5

Take one of the following courses:

SLAVIC 145	Survey of Russian Literature: The Age of Experiment	1-5
SLAVIC 187		2-4

And take one of the following courses:

		Units
SLAVIC 147		2-5
SLAVIC 148	Slavic Literature and Culture since the Death of Stalin	1-5
SLAVIC 188	20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky	1-5

### Electives

Students must take 32 units of electives. These courses are chosen in consultation with the department's chair of undergraduate studies. With department consent, work in related academic fields may be applied toward the degree requirements. Students who have completed a Thinking Matters or PWR course instructed by Slavic faculty, with a grade of 'B' or better may count up to 5 units towards elective courses required

for the major, and students who have completed the SLE sequence may count up to 10 units..

## Capstone

Students must designate a 300-level course taken in their junior or senior year as a capstone course or complete a substantial (20-30 page) independent writing project, advised by a Slavic Faculty member. Before graduation, skills in writing, textual analysis, and discussion is evaluated by the Chair of Undergraduate Studies based on work submitted for the capstone course.

## Language Assessment

All Slavic Languages and Literature majors must complete an oral and written language assessment two quarters prior to their graduation. This is coordinated with the Chair of Undergraduate Studies and the Undergraduate Student Affairs Officer.

## Russian Studies

The Russian Studies major is for students who want to obtain command of the Russian language and to pursue a broad, interdisciplinary study of Russian literature and culture in historical context. Emphasis is on the relation of the Russian literary tradition to other arts, including film, as well as the disciplines that have enriched the historical understanding of Russian literature: history, anthropology, art history, political science, and sociology. Majors in the Russian Studies must earn a GPA of 2.0 (C) or better in order to receive credit toward the major.

## Prerequisites

Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

## Degree Requirements

Candidates for the B.A. degree in Russian Studies must complete an additional 56 units according to the following distribution.

### Russian Language

A minimum of 12 units from:

		Units
SLAVLANG 111	Third-Year Russian, First Quarter	4
SLAVLANG 112	Third-Year Russian, Second Quarter	4
SLAVLANG 113	Third-Year Russian, Third Quarter	4
SLAVLANG 177	Fourth-Year Russian, First Quarter	3
SLAVLANG 178	Fourth-Year Russian, Second Quarter	3
SLAVLANG 179	Fourth-Year Russian, Third Quarter	3
SLAVLANG 181	Fifth-Year Russian, First Quarter	3
SLAVLANG 182	Fifth-Year Russian, Second Quarter	3
SLAVLANG 183	Fifth-Year Russian, Third Quarter	3

## 19th-Century Russian Literature and History

A minimum of 8 units chosen from the following or the equivalent; students must choose one course from Slavic and one course from History. To fulfill the WIM take SLAVIC 146 for 3 or more units and a letter grade :

		Units
One of the following:		
SLAVIC 145	Survey of Russian Literature: The Age of Experiment <sup>1</sup>	1-5
or SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	
	A pre-revolutionary Russian history course.	1-5



<sup>1</sup> SLAVIC 146 Must take for 3 or more units to count as WIM.

## 20th-Century Russian Literature and History

A minimum of 8 units chosen from the following or the equivalent; students must choose from Slavic 147 or Slavic 148 and one course from History.

SLAVIC 147		
SLAVIC 148	Slavic Literature and Culture since the Death of Stalin	1-5

## Electives

Students must take 32 additional units of course work in Russian language, literature, history, or other fields, chosen in consultation with the Chair of Undergraduate Studies. Students who have completed Thinking Matters or PWR courses instructed by Slavic faculty, with a grade of 'B' or better may count these 5 units towards elective courses required for the major, and students who have completed the SLE sequence may count up to ten units.

## Capstone

Students must designate a 300-level course taken in their junior or senior year as a capstone course or complete a substantial (20-30 page) independent writing. Before graduation, skills in writing, textual analysis, and discussion are evaluated by the Chair of Undergraduate Studies based on work submitted for the capstone course.

## Language Assessment

All Slavic Languages and Literature majors must complete an oral and written language assessment two quarters prior to their graduation. This is coordinated with the Chair of Undergraduate Studies and the undergraduate student services officer.

## Russian and Philosophy

The Russian and Philosophy option offers students the opportunity to gain a command of the Russian language and literary tradition, while gaining a background in philosophical thought, broadly construed. They take courses alongside students in other departments participating in the program in Philosophical and Literary Thought, administered through the DLCL. This option is not declared on Axess, thus it does not appear on the transcript or diploma. Majors who concentrate in Russian and Philosophy must earn a grade point average (GPA) of 2.0 (C) or better in order to receive credit toward the major.

## Prerequisites

Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

## Degree Requirements

Candidates for the B.A. degree with a concentration in Russian and Philosophy must complete an additional 67 units according to the following distribution:

## Russian Language

A minimum of 12 units from:

SLAVLANG 111	Third-Year Russian, First Quarter	4
SLAVLANG 112	Third-Year Russian, Second Quarter	4
SLAVLANG 113	Third-Year Russian, Third Quarter	4
SLAVLANG 177	Fourth-Year Russian, First Quarter	3
SLAVLANG 178	Fourth-Year Russian, Second Quarter	3

SLAVLANG 179	Fourth-Year Russian, Third Quarter	3
SLAVLANG 181	Fifth-Year Russian, First Quarter	3
SLAVLANG 182	Fifth-Year Russian, Second Quarter	3
SLAVLANG 183	Fifth-Year Russian, Third Quarter	3

## Russian Literature

A minimum of 16 units of Russian literature, including the following. To fulfill the WIM take SLAVIC 146 for 5 units and a letter grade :

SLAVIC 145	Survey of Russian Literature: The Age of Experiment	1-5	Units
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	1-5	
SLAVIC 147		2-5	
SLAVIC 148	Slavic Literature and Culture since the Death of Stalin	1-5	

## Electives

At least 12 units of electives in Russian language and literature, chosen in consultation with the Chair of Undergraduate Studies.

## Philosophy and Literature Gateway Course

SLAVIC 181	Philosophy and Literature	5	Units
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## Philosophy Writing in the Major

PHIL 80	Mind, Matter, and Meaning (prerequisite: introductory philosophy course)	5	Units
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## Philosophy Core

12 units of the following:

A course in the PHIL 170 series (value theory)	4
A course in the PHIL 180 series (theories of the mind, language, action)	4
A course in PHIL 100-139 series (history of philosophy)	4

## Related Course

An upper-division course of special relevance to philosophy and literature. Major may choose from:

ITALIAN 236E	Dante's "Purgatorio" and "Paradiso"	4-5
COMPLIT 223	Literature and Human Experimentation	3-5
PHIL 194W	Capstone Seminar: Literature and the Moral Imagination	4

## Language Assessment

All Slavic Languages and Literature majors must complete an oral and written language assessment two quarters prior to their graduation. This is coordinated with the Chair of Undergraduate Studies and the Undergraduate Student Affairs Officer.

## Capstone Seminar

One capstone seminar must be taken in the student's senior year. This year's capstone seminar is:

COMPLIT 199	Senior Seminar	5	Units
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## Honors Program

Slavic Languages and Literature majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) website.

Enrollment: A minimum of 10 units total, described below, and a completed thesis is required. Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

1. Spring Quarter of the junior year (optional) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Drafting or revision of the thesis proposal. The proposal is reviewed by the Chair of Undergraduate Studies and the director of the department and is either approved or returned for submission.
2. Autumn Quarter of the senior year (required) DLCL 189A Honors Thesis Seminar (4 units S/NC) taught by a DLCL appointed faculty member. Course focuses on researching and writing the honors thesis.
3. Winter Quarter of the senior year (required) DLCL 189B Honors Thesis Seminar (2-4 units letter grade) under the primary thesis adviser. Focus is on writing under guidance of primary adviser. The letter grade determines if honors is granted or not.
4. Spring Quarter of the senior year (option; mandatory if not taken during junior year) DLCL 189C Honors Thesis Seminar (2-4 units S/NC) under the primary thesis adviser. Honors essays are due to the thesis adviser and student services officer no later than 5:00 p.m. on May 15 of the terminal year.
5. Spring Quarter of the senior year (required) DLCL 199 Honors Thesis Oral Presentation (1 unit S/NC). Enroll with primary thesis adviser.

## Joint Major Program in Slavic Languages and Literatures and Computer Science

The joint major program (JMP), authorized by the Academic Senate for a pilot period of six years beginning in 2014-15, permits students to major in both Computer Science and one of ten Humanities majors. See the "Joint Major Program (p. 31)" section of this bulletin for a description

of University requirements for the JMP. See also the Undergraduate Advising and Research JMP web site and its associated FAQs.

Students completing the JMP receive a B.A.S. (Bachelor of Arts and Science).

Because the JMP is new and experimental, changes to procedures may occur; students are advised to check the relevant section of the bulletin periodically.

## Slavic Languages and Literatures Major Requirements in the Joint Major Program

The major tracks in Russian Language and Literature and Russian Language, Culture, and History are declared on Axxess and appear on the transcript but not on the diploma.

1. Senior year, the student enrolls in a 2 unit independent study SLAVIC 199 Individual Work for Undergraduates with a DLCL faculty member. The faculty member advising this project must sign off on this description. In order to have it approved as their capstone Slavic Languages and Literatures and Computer Science project, the student must submit a description of their project to the Chair of Undergraduate Studies in Slavic Languages and Literatures.
2. Students must take the Oral Proficiency Interview (OPI) two quarters prior to degree conferral. Students should contact the undergraduate student affairs officer for the major to begin the process.
3. The remaining units needed to reach 46 units could be completed through elective courses taken in Slavic, or in other departments, as approved by the Chair of Undergraduate Studies.
4. Structured Liberal Education courses.
5. Thinking Matters courses approved by the Chair of Undergraduate Studies may also be counted toward the electives.
6. Subject to approval by the Chair of Undergraduate Studies, courses from other fields may count if they contribute to the student's language skills, the ability to interpret literature and other cultural material, or the capacity to analyze societies.

## Writing in the Major

Undergraduates are required by the University to pass at least one writing intensive course in their field of concentration in order to graduate. Majors in any Slavic track may satisfy the writing requirement in 2017-18 by passing SLAVIC 146 The Great Russian Novel: Tolstoy and Dostoevsky.

## Russian Language and Literature

The Russian Language and Literature field of study is designed for those students who wish to gain command of the Russian language and to study the nation's literary tradition. Emphasis is placed on the linguistic and philological study of literature, as well as the history of Russian literature and related media in the broader context of Russian culture. This major also welcomes students with an interest in Russian and Slavic linguistics.

Majors who concentrate in Russian Language and Literature must earn a grade point average (GPA) of 2.0 (C) or better in order to receive credit toward the major.

## Prerequisites

Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

## Degree Requirements

Candidates for the B.A.S. degree with a Russian Language and Literature field of study must complete an additional 46 units according to the following distribution:

### Russian Language

A minimum of 12 units from:

		Units
SLAVLANG 111	Third-Year Russian, First Quarter	4
SLAVLANG 112	Third-Year Russian, Second Quarter	4
SLAVLANG 113	Third-Year Russian, Third Quarter	4
SLAVLANG 177	Fourth-Year Russian, First Quarter	3
SLAVLANG 178	Fourth-Year Russian, Second Quarter	3
SLAVLANG 179	Fourth-Year Russian, Third Quarter	3
SLAVLANG 181	Fifth-Year Russian, First Quarter	3
SLAVLANG 182	Fifth-Year Russian, Second Quarter	3
SLAVLANG 183	Fifth-Year Russian, Third Quarter	3

### Russian Literature

12 units from the Russian Literature major core classes, defined as follows:

		Units
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky (must be taken for 3 or more units to count towards the WIM)	1-5

Take one of the following courses:

		Units
SLAVIC 145	Survey of Russian Literature: The Age of Experiment	1-5
SLAVIC 187		2-4

And take one of the following courses:

		Units
SLAVIC 147		2-5
SLAVIC 148	Slavic Literature and Culture since the Death of Stalin	1-5
SLAVIC 188	20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky	1-5

## Electives

Students must take 22 units of electives. These courses are chosen in consultation with the department's chair of undergraduate studies. With department consent, work in related academic fields may be applied toward the degree requirements. Students who have completed a Thinking Matters or PWR course instructed by Slavic Languages and Literatures faculty, with a grade of 'B' or better may count up to 5 units towards elective courses required for the major, and students who have completed the SLE sequence may count up to 10 units.

## Capstone

Students must designate a 300-level course taken in their junior or senior year as a capstone course or complete a substantial (20-30 page) independent writing project, advised by a Slavic Languages and Literatures faculty member. Before graduation, skills in writing, textual analysis, and discussion are evaluated by the Chair of Undergraduate Studies based on work submitted for the capstone course.

## Language Assessment

All Slavic Languages and Literature majors must complete an oral and written language assessment two quarters prior to their graduation. This is coordinated with the Chair of Undergraduate Studies and the undergraduate student services officer.

## Russian Studies

The Russian Studies major is for students who want to obtain command of the Russian language and to pursue a broad, interdisciplinary study of Russian literature and culture in historical context. Emphasis is on the relation of the Russian literary tradition to other arts, including film, as well as the disciplines that have enriched the historical understanding of Russian literature: history, anthropology, art history, political science, and sociology. Majors in the Russian Studies must earn a GPA of 2.0 (C) or better in order to receive credit toward the major.

## Prerequisites

Completion of first year Russian, or the equivalent, as determined by the Language Center placement examination.

## Degree Requirements

Candidates for the B.A.S. degree with a Russian Language, Culture, and History field of study must complete an additional 46 units according to the following distribution.

### Russian Language

A minimum of 12 units from:

		Units
SLAVLANG 111	Third-Year Russian, First Quarter	4
SLAVLANG 112	Third-Year Russian, Second Quarter	4
SLAVLANG 113	Third-Year Russian, Third Quarter	4
SLAVLANG 177	Fourth-Year Russian, First Quarter	3
SLAVLANG 178	Fourth-Year Russian, Second Quarter	3
SLAVLANG 179	Fourth-Year Russian, Third Quarter	3
SLAVLANG 181	Fifth-Year Russian, First Quarter	3
SLAVLANG 182	Fifth-Year Russian, Second Quarter	3
SLAVLANG 183	Fifth-Year Russian, Third Quarter	3

### 19th-Century Russian Literature and History

A minimum of 8 units chosen from the following or the equivalent; students must choose one course from Slavic and one course from History.

		Units
SLAVIC 145	Survey of Russian Literature: The Age of Experiment	5
or SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	
	A pre-revolutionary Russian history course.	5

### 20th-Century Russian Literature and History

A minimum of 10 units chosen from the following or the equivalent; students must choose one course from Slavic and one course from History.

		Units
SLAVIC 147		2-5
SLAVIC 148	Slavic Literature and Culture since the Death of Stalin	1-5

## Electives

Students must take 22 additional units of course work in Russian language, literature, history, or other fields, chosen in consultation with the Chair of Undergraduate Studies. Students who have completed Thinking Matters or PWR courses instructed by Slavic faculty, with a grade of 'B' or better may count these 5 units towards elective courses required for the major, and students who have completed the SLE sequence may count up to ten units.

## Capstone

Students must designate a 300-level course taken in their junior or senior year as a capstone course or complete a substantial (20-30 page) independent writing. Before graduation, skills in writing, textual analysis, and discussion are evaluated by the Chair of Undergraduate Studies based on work submitted for the capstone course.

## Language Assessment

All Slavic Languages and Literature majors must complete an oral and written language assessment two quarters prior to their graduation. This is coordinated with the Chair of Undergraduate Studies and the undergraduate student affairs officer.

## Honors Program

Students have the option to complete the honors program for Computer Science and Slavic, by completing an honors thesis that is partially or fully integrated with Computer Science; such a thesis would fulfill both the capstone and honors requirements for this degree. Students also have the option to complete the honors program for Slavic only; such a thesis would not fulfill the capstone requirement for this degree.

Slavic Languages and Literature majors with an overall grade point average (GPA) of 3.3 or above, and who maintain a 3.5 (GPA) in major courses, are eligible to participate in the DLCL's honors program. Prospective honors students must choose a senior thesis adviser from among their home department's regular faculty, in their junior year, preferably by March 1, but no later than May 1. During Spring Quarter of the junior year, a student interested in the honors program should consult with the Chair of Undergraduate Studies of their home department to submit a thesis proposal (2-5 pages), DLCL Honors application and an outline of planned course work for their senior year.

Honors papers vary considerably in length as a function of their topic, historical scope, and methodology. They may make use of previous work developed in seminars and courses, but display an enhanced comparative or theoretical scope. Quality rather than quantity is the key criterion. Honors theses range from 40-90 pages not including bibliography and notes. Please consult the DLCL Honors Handbook for more details on declaring and completing the honors thesis.

Honors students are encouraged to participate in the honors college hosted by Bing Honors College ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) and coordinated by the Division of Literatures, Cultures, and Languages. The honors college is offered at the end of the summer, during the weeks directly preceding the start of the academic year, and is designed to help students develop their honors thesis projects. Applications must be submitted through the Bing program. For more information, view the Bing Honors ([http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/OO\\_honors\\_BingHonors.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/OO_honors_BingHonors.html)) website.

Honors essays are due to the thesis adviser no later than 5:00 p.m. on May 15th of the terminal year. If an essay is found deserving of a grade of 'A-' or better by the thesis adviser, honors are granted at the time of graduation.

## Declaring a Joint Major Program

To declare the joint major, students must first declare each major through Axess, and then submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) The Major-Minor and Multiple Major Course Approval Form (<https://stanford.box.com/MajMin-MultMaj>) is required for graduation for students with a joint major.

## Dropping a Joint Major Program

To drop the joint major, students must submit the Declaration or Change of Undergraduate Major, Minor, Honors, or Degree Program. (<https://stanford.box.com/change-UG-program>) . Students may also consult the Student Services Center (<http://studentservicescenter.stanford.edu>) with questions concerning dropping the joint major.

## Transcript and Diploma

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

## Minors in Slavic Languages and Literatures

The Department of Slavic Languages and Literatures offers three undergraduate minor options.

The minor is designed for students who, while pursuing a major in another program, seek a comprehensive introduction to Russian culture through Russian language courses, a combination of minimal proficiency in Russian and courses in the history of Russian culture, or a multidisciplinary introduction to Russian, East European, and Eurasian studies. Students who have chosen one of the minor programs in Russian may use 5 units from a Thinking Matters course taught by a Slavic faculty member towards their electives with permission from their adviser. Up to 5 units may count from SLE towards all Slavic Languages and Literatures minors.

## Minor in Russian Language

### Prerequisites

The minor option in Russian Language requires completion of second year Russian, or the equivalent, as determined by the results of the Language Center placement examination.

### Requirements

Candidates for the B.A. degree with a minor option in Russian Language must complete 24 units of Russian language and literature courses according to the following distribution:

12 to 15 units of Russian language:

		Units
SLAVLANG 111	Third-Year Russian, First Quarter	4
SLAVLANG 112	Third-Year Russian, Second Quarter	4
SLAVLANG 113	Third-Year Russian, Third Quarter	4
SLAVLANG 177	Fourth-Year Russian, First Quarter	3
SLAVLANG 179	Fourth-Year Russian, Third Quarter	3
SLAVLANG 178	Fourth-Year Russian, Second Quarter	3
SLAVLANG 181	Fifth-Year Russian, First Quarter	3
SLAVLANG 182	Fifth-Year Russian, Second Quarter	3
SLAVLANG 183	Fifth-Year Russian, Third Quarter	3

The remaining 9-12 units should be chosen from:

		Units
SLAVIC 145	Survey of Russian Literature: The Age of Experiment	1-5
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	1-5
Other courses offered within the Slavic Languages and Literatures department.		
SLAVIC 147		2-5
SLAVIC 148	Slavic Literature and Culture since the Death of Stalin	1-5
SLAVIC 187		
SLAVIC 188	20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky	1-5

**Or, with the approval of the department's Chair of Undergraduate Studies, courses in history, politics, linguistics, or other relevant programs.**

## Minor in Russian Language, Literature, and Culture

### Prerequisites

The minor option in Russian Language, Literature, and Culture requires completion of first year Russian, or the equivalent, as determined by the results of the Language Center placement examination.

### Requirements

Candidates for the B.A. degree with the minor option in Russian Language, Literature, and Culture must complete 28 units according to the following distribution:

A minimum of 12 units of courses on literature and culture including:

#### Option 1:

Two courses from the following:

SLAVIC 145	Survey of Russian Literature: The Age of Experiment	3-5
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	1-5
SLAVIC 147		2-5
SLAVIC 148	Slavic Literature and Culture since the Death of Stalin	1-5

#### Option 2:

One course from the following:

SLAVIC 145	Survey of Russian Literature: The Age of Experiment	1-5
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	1-5
SLAVIC 147		2-5
SLAVIC 148	Slavic Literature and Culture since the Death of Stalin	1-5

and one course from the following:

SLAVIC 187		
SLAVIC 188	20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky	1-5

## Minor in Russian, East European, and Eurasian Studies

The minor in Russian, East European and Eurasian Studies offers students the opportunity to choose courses offered by the Center for Russian, East European and Eurasian Studies (subject code REES) in various departments for their minor.

### Requirements

Candidates for the B.A. degree with the minor option in Russian, East European, and Eurasian Studies must complete 28 units according to the following distribution:

1. Two core courses: one on Russia and one on Eastern Europe or Eurasia, to be chosen by the student from an annual list of qualifying courses issued by CREEES for their M.A. students.
2. At least four additional REES courses, totaling at least 20 units.
3. The student's core and additional courses must include 9 units of course work in the Slavic Department, either literature courses or Russian language in the third year or above. Courses must be distributed among at least three disciplines, such as Slavic, History, Political Science, Anthropology, Art and Art History, Economics, Religious Studies, and Sociology. The Slavic Chair of Undergraduate Studies determines which courses qualify for the minor.
4. A capstone experience in CREEES, including, but not limited to, one of the following:
  - a. a departmental seminar course for advanced undergraduates.
  - b. directed reading and research with a Stanford faculty member or a CREEES-approved resident or visiting scholar.
  - c. participation in the Stanford Overseas Studies Program in Berlin.

### Foreign Language

The Slavic/REES minor has no language requirement, but students are strongly encouraged to attain working competence in Russian or another relevant language. Courses at the third-year level or above in Russian or another language of Central Asia, the Caucasus, or Eastern Europe may be counted towards the Slavic/REES minor, up to a maximum of 3 units per academic quarter, 9 units total.

### Additional Information

Courses taken at Stanford overseas campuses may count towards the REES minor, with the approval of the Slavic Chair of Undergraduate Studies; at least three courses for the minor must be taken in residence at Stanford.

Students interested in pursuing the Slavic/REES minor should consult the Slavic Chair of Undergraduate Studies.

## Minor in Modern Languages

The Division of Literatures, Cultures, and Languages offers a minor in Modern Languages. This minor draws on literature and language courses offered in this and other literature departments. See the "Literatures, Cultures, and Languages (<http://www.stanford.edu/dept/registrar/bulletin/6009.htm>)" section of this bulletin for further details about this minor and its requirements.

## Coterminal Master's Program in Slavic Languages and Literatures

The department allows a limited number of undergraduates to work for the coterminal M.A. degree in Slavic Languages and Literatures with a concentration in Russian. In addition to University requirements for the B.A. degree, the student must:

1. Submit an application for admission by January 31 of the senior year. Applicants must meet the same general standards as those seeking admission to an M.A. program. Applicants must submit: an application for admission; a written statement of purpose; a transcript; and three letters of recommendation, at least two of which should be from members of the Department of Slavic Languages and Literatures faculty.
2. Meet all requirements for both the B.A. and M.A. degrees. Applicants must complete 15 full-time quarters (or the equivalent), or three full-time quarters after completing 180 units, for a total of 225 units. During the senior year they may, with the consent of the instructors, register for as many as two graduate courses. In the final year of study, they must complete at least three graduate-level courses.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken during or after the first quarter of the sophomore year are eligible for consideration for transfer to the graduate career; the timing of the first graduate quarter is not a factor. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Arts in Slavic Languages and Literatures

The Department of Slavic Languages and Literatures offers a Master of Arts degree only to students concurrently enrolled in other Stanford degree programs.

University requirements for the M.A. degree are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

### Admission

The requirements for admission to the master's degree program in Russian are:

1. A B.A. (or its equivalent) from an accredited college or university.
2. A command of the Russian language sufficient to permit the student to do satisfactory graduate work.
3. A familiarity with Russian literature sufficient to permit the student to perform adequately in courses at the graduate level.

The applicant's previous academic training in Russian language and literature normally serves as an indication of competence. Accordingly, the department does not ordinarily consider applications from students who have not had at least three years of college Russian and some undergraduate training in Russian literature of the 19th and 20th

centuries. Before registering for the first quarter's work in the department, entering graduate students are required to take placement examinations in Russian. Students who fail to perform satisfactorily on such examinations must register for remedial courses in the areas in which they are deficient. Course work in third-year Russian and below carries no credit toward the M.A. degree.

### Course Requirements

Candidates for the M.A. should plan course work that ensures adequate preparation for the M.A. final examination at the end of the third quarter of work. Course work should be planned in consultation with the graduate adviser, whose approval of the overall course load is required.

Candidates for the M.A. must complete a program of 45 units, of which 36 units must be selected from courses given by the department.

### The Qualifying Paper

The Qualifying paper represents a complete article-length research paper (6,000-9,000 words) that, in both form and substance, qualifies for submission to English-language professional publications in the Slavic field. The Qualifying paper must be submitted to the thesis adviser no later than the eighth week of the final quarter of registration.

### Final Examination

A final examination may substitute for the Qualifying paper requirement. The final examination requires a student to demonstrate in a written examination:

1. command of the phonology, morphology, syntax, and lexicology of contemporary standard Russian sufficient to teach beginning and intermediate courses at the college level
2. an ability to read contemporary Standard Russian sufficiently to assist students studying contemporary Russian poetry or literary prose
3. sufficient familiarity with Russian literature of either the 19th or 20th century to successfully handle survey courses dealing with the chosen period of specialization.

The examination should be taken at the end of the final quarter of required course work.

## Doctor of Philosophy in Slavic Languages and Literatures

University requirements for the Ph.D. are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

Students enrolled in the Ph.D. program in Slavic Languages and Literatures are expected to fulfill the following requirements while meeting the program's deadlines in the course of their progress toward the degree:

### 1. Course Work, Breadth Requirements, and Overall Scheduling

In consultation with the Chair of Graduate Studies, students are expected to take 10 units of credit each quarter of their first year, 10 units each funded summer, and 10 units each quarter thereafter. They are expected to reach 135 units and attain TGR status in the Spring of their fourth year. All courses counted towards the 135-unit requirement for the Ph.D. must be at the graduate level. Excess course work can be taken at the undergraduate level, but not used towards the Ph.D. requirements. Students should take all courses for letter grades, when the option is available. Entering graduate students must enroll in DLCL 369 Introduction to the Profession of Literary Studies. For the Ph.D. degree, students are free to select course work to suit their individual program of study. However,

candidates must do so in consultation with their adviser (Chair of Graduate Studies or principal dissertation adviser) and are held responsible for all of the areas covered by the general examinations regardless of whether they have registered for the department's offerings in a given field. For this reason, it is strongly recommended that before taking Ph.D. examinations, students complete seminar-level work directly related to the following broad areas:

- a. Russian poetry
- b. the Russian novel
- c. 20th-century Russian literature
- d. 19th-century Russian literature (the Age of Pushkin and after)
- e. 18th-century Russian literature (the early 1700's to the Age of Pushkin)
- f. medieval Russian literature
- g. a monograph course on a major Russian author
- h. theory of literature relevant to the major field

The candidate must have demonstrated commitment to graduate studies by completing a minimum of 21 content courses (not counting Summer Quarter) with a grade point average (GPA) of 3.3 or better in order to complete the requirements of the degree program. These must include 14 seminars in the Slavic Languages and Literatures Department. Unless they have taken such courses elsewhere, students are expected to take the departmental course on medieval literature, 18th-century literature, and Old Church Slavonic. They must also enroll in the 1 unit SLAVIC 300B, a professionalization workshop, during their first quarter of enrollment.

### 1. Minor or Related Fields

During the course of study, students must develop substantial expertise in a field contiguous to the area of specialization. A candidate may elect to present a full minor or, in consultation with the graduate adviser, develop a special program in a related field, preferably no later than the second quarter of enrollment.

- a. *Related Field*—A student is required to complete a sequence of basic courses in a chosen discipline outside the department of Slavic Languages and Literatures. The choice of patterns is one of the following:
  - i a sequence of three courses in another literature, selected in consultation with the adviser, or
  - ii three basic courses in comparative literature chosen in consultation with the Chair of Graduate Studies (CGS), or
  - iii a sequence of three courses in another department selected in consultation with the CGS.
- b. *Minor*—Students electing a minor fulfill the Ph.D. minor requirements established by that department. Students considering minors should consult with their adviser, the CGS, the Chair of Slavic Languages and Literatures, and the Chair of the minor department.

### 2. Admission to Candidacy

Admission to candidacy is an important decision grounded in an overall assessment of a student's ability to successfully complete the Ph.D. program. Per University policy, students are expected to complete department qualifying procedures and apply for candidacy by the end of the second year in residence. In reviewing a student for admission to candidacy, the faculty considers a student's academic progress including but not limited to: advanced language proficiency, course work, performance on the Qualifying paper, and successful completion of teaching and research assistantships. Additionally, a student must have completed at least one class with each of four Slavic Languages and Literatures department faculty members prior to consideration for candidacy. In addition to successful completion of department prerequisites, a student is only admitted to candidacy if the faculty makes the judgment that the student has the potential to successfully complete the requirements of the degree program. Candidacy is determined by faculty vote. Failure

to advance to candidacy results in dismissal of the student from the doctoral program. Candidacy is valid for five years and students are required to maintain active candidacy through conferral of the doctoral degree. All requirements for the degree must be completed before candidacy expires. The Department of Slavic Languages and Literatures conducts regular reviews of each student's academic performance, both prior to and following successful admission to candidacy. Failure to make satisfactory progress to degree may result in dismissal from the doctoral program. Additional information about University candidacy policy is available in the Bulletin (p. 52) and GAP (<http://gap.stanford.edu/4-6.html>).

### 3. Qualifying Paper

The candidate must submit a complete draft of a qualifying paper approved by the thesis adviser. The qualifying paper represents a complete article-length research paper (6,000-9,000 words) that qualifies in both form and substance for submission to an English language professional publication in the Slavic field. The deadline for the qualifying paper approval is the eighth week of the sixth quarter of registration. Failure to meet these requirements results in termination of enrollment from the Ph.D. program. Following such termination, the student who has fulfilled all of the M.A. requirements may be given the opportunity to take the M.A. written examination in the history of Russian literature. If successful, the student is then awarded the terminal M.A. degree. In exceptional cases, the written examination requirement may be waived at the discretion of the Chair of Graduate Studies and the Chair of the department.

### 4. Proficiency Test

Administered to all entering graduate students, this test determines whether the student's knowledge of Russian language and literature falls below the department's standard (Advanced Low on the OPI test). Students who fail are required to complete appropriate courses in the first year of graduate study. Courses required to meet the language proficiency are not counted towards the Course Work requirement of the Ph.D. degree.

### 5. Foreign Languages

A candidate must demonstrate reading knowledge of French or German, plus another language useful for the student's area of concentration, by passing written examinations, or receiving a grade of 'A-' or better in a qualifying class with consent of the CGS. The reading examination in German or French must be passed by the end of the first year of study. The reading examination in the second language of choice must be passed by the end of the second year of study.

### 6. Examinations

A candidate must pass the departmental general qualifying examinations. The comprehensive exam covers the history of Russian literature from the medieval period through the twenty-first century and is divided into six chronological sections. Two of these are taken early in the fourth quarter of enrollment and the remainder are taken in the seventh quarter of enrollment (preferably a day or two before the beginning of academic instruction). One section of the comprehensive exam is taken orally in Russian. The departmental oral qualifying examination follows no later than two weeks after completion of the comprehensive exams. The oral examination committee consists of four faculty members and may include one member representing the student's minor or related field; the rest must be drawn from among the Slavic Languages and Literatures faculty. The student makes a 20-minute presentation, following an academic conference format, and based possibly on the student's qualifying paper. Each examiner questions the student on the presentation and related topics in the history of Russian literature and the minor related field. Following the departmental examinations, a candidate must pass a University oral examination, consisting of a defense of a doctoral dissertation prospectus and covering content relevant to the area of study, rationale for the proposed

investigation, and strategy to be employed in the dissertation research. The prospectus defense is expected to be scheduled no later than the beginning of the tenth quarter of registration. Note: Ph.D. examinations are scheduled by the graduate student in consultation with the CGS.

## 7. Teaching

Students are required to complete five quarters of teaching within the funding period, including three quarters of first-year Russian and at least one quarter as a teaching assistant of literature for a faculty member, usually in the survey courses in translation:

SLAVIC 145	Survey of Russian Literature: The Age of Experiment	1-5
SLAVIC 146	The Great Russian Novel: Tolstoy and Dostoevsky	1-5
SLAVIC 147		1-5
SLAVIC 148	Slavic Literature and Culture since the Death of Stalin	1-5

b. Students are required to take in preparation for teaching: DLCL 301: The Learning and Teaching of Second Languages.

## 8. Yearly Review

The faculty must provide students with timely and constructive feedback on their progress toward the Ph.D. In order to evaluate students' progress and to identify potential problem areas, the department's faculty reviews the academic progress of each student at the end of the academic year. The yearly reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if more serious concerns warrant, a student may be placed on probation with specific guidelines for addressing the problems detected. Possible outcomes of the yearly review include:

- a. continuation of the student in good standing
- b. placing the student on probation, with specific guidelines for the period on probation and the steps to be taken in order to be returned to good standing.
  - i. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include:
    1. restoration to good standing
    2. continued probation, again with guidelines for necessary remedial steps
    3. termination from the program. Students leaving the program at the end of the first or second year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residency or financial support.

## 9. Continuation

Continuation in the Ph.D. program is contingent on fulfilling the following criteria: for first-year students, a high quality of performance in course work (decided by department evaluation); for second-year students, satisfactory academic progress and approval of the Qualifying paper as described above. The principal conditions for continued registration of a graduate student are the timely and satisfactory completion of the University, department, and program requirements for the degree, and fulfillment of minimum progress requirements. Failure to meet these requirements results in corrective measures, which may include a written warning, academic probation, and/or release from the program.

## Ph.D. Minor in Slavic Languages and Literatures

The department offers a Ph.D. Minor in Slavic Languages and Literatures. The requirement for the Ph.D. minor is completion of 25 units of graduate course work in Slavic Literature and Culture classes. Interested students should consult the Chair of Graduate Studies.

## Faculty in Slavic Languages and Literatures

*Emeriti:* Gregory Freidin, Richard D. Schupbach

*Director:* Gabriella Safran

*Chair of Graduate Studies:* Lazar Fleishman

*Chair of Undergraduate Studies:* Nariman Skakov

*Professors:* Lazar Fleishman, Gabriella Safran

*Associate Professor:* Monika Greenleaf

*Assistant Professor:* Nariman Skakov, Yuliya Ilchuk

*Courtesy Professor:* Nancy Ruttenburg

## Overseas Studies Courses in Slavic Languages and Literatures

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).



# SOCIOLOGY

Courses offered by the Department of Sociology are listed under the subject code SOC on the Stanford Bulletin's ExploreCourses web site.

Sociology seeks to understand all aspects of human social behavior, including the behavior of individuals as well as the social dynamics of small groups, large organizations, communities, institutions, and entire societies. Sociologists are typically motivated both by the desire to better understand the principles of social life and by the conviction that understanding these principles may aid in the formulation of enlightened and effective social policy. Sociology provides an intellectual background for students considering careers in the professions or business. Students may pursue degrees in sociology at the bachelor's, master's, or doctoral levels. The department organizes its courses by areas of study to assist students in tailoring their education and research to their academic interests and career goals.

## Mission of the Undergraduate Program in Sociology

The mission of the undergraduate program in Sociology is to provide students with the skills necessary to understand and address social problems and inequalities in global, institutional, and interpersonal social relations. At its core, the curriculum in the major is rooted in social theory and the scientific method. Sociology majors are given opportunities to develop a broad understanding of core sociological theories and the methodological skills used to evaluate human behavior and social organizations. Sociology provides an intellectual background for students considering careers in business, social services, public policy, government service, international nongovernmental organizations, foundations, or academia.

The Sociology major consists of a core curriculum plus elective courses intended to provide breadth of exposure to the variety of areas encompassed by sociology.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the department's undergraduate program. Students are expected to demonstrate:

1. an understanding of core knowledge within the discipline of sociology.
2. the ability to communicate ideas clearly and persuasively in writing.
3. the ability to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. the ability to evaluate theory and critique research within the discipline of sociology.

## Graduate Programs in Sociology

The Department of Sociology offers three types of advanced degrees:

- the Doctor of Philosophy
- the coterminal Master of Arts in Sociology which is restricted to currently enrolled Stanford undergraduates
- the Master of Arts in Sociology which is available to Stanford students who are currently enrolled in other advanced degree programs.

The department does not have a terminal M.A. program for external applicants.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Sociology and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Sociology. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge of Sociology and to interpret and present the results of such research.

## Areas of Study

The Department of Sociology specializes in four general areas of study, allowing students to tailor their education and research to their academic interests and career goals. The five areas of study supported by the department are:

### Organizations, Business, and the Economy

Focus is on the arrangements which societies construct for the provision of material goods or services. A formal organization which provides goods or services for profit and sells them through a market is called a business, and the economic system is capitalism. Social needs are also met through government and not-for-profit organizations, such as garden clubs, hospitals, prisons, and the Red Cross; some private and social needs are met outside of organizations, such as health care provided by family members and exchange of favors among friends. Courses stress the factors that determine whether needs that people define are met through markets or non-market allocation, through organizations, or by other means. They also investigate the environmental and technical factors that shape organization structure, the determinants of how efficiently organizations operate, and the interpersonal processes that shape individual behavior within organizations. Careers related to this field include management and administration in business or public settings, management consulting and analysis, and legal studies related to corporations, organizations, and business.

### Social Movements, Comparative Politics, and Social Change

Focus is on the emergence, reproduction, and change of political systems and institutions, especially on why and how different political systems and social movements appear in different times and places, and how differences in political regimes and economic systems influence attempts to change these systems. The origins and significance of national and transnational social movements, transition to democracy, including revolution, nationalism, and other forms of collective action, in creating and sustaining these changes analyzed across countries and over time. Careers that are relevant to this field include law, public policy, government service, nonprofit and international nongovernmental organizations, business organizations (especially those with international interests), consulting, and managerial jobs.

### Social Psychology and Interpersonal Processes

Focus is on the social organization of individual identity, beliefs, and behavior, and upon social structures and processes which emerge in and define interpersonal interactions. Processes studied include social acceptance and competition for prestige and status, the generation of power differences, the development of intimacy bonds, the formation of expectation states which govern performance in task oriented groups, and social pressures to constrain deviance. Foundation courses emphasize the effect of social processes on individual behavior and the analysis of group processes. This field provides training for careers with a significant interpersonal component, including advertising and marketing, business, education, law, management, medicine and health, or social work.

## Social Inequality

Focus is on forms of social inequality, including fields such as: the shape and nature of social inequalities; competition for power; allocation of privilege; production and reproduction of social cleavages; and consequences of class, race, and gender for outcomes such as attitudes, political behavior, and life styles. Many courses emphasize changes in the structure of social inequalities over time, and the processes which produce similarities or differences in stratification across nations. Topics include educational inequality, employment history, gender differences, income distributions, poverty, race, and ethnic relations, social mobility, and status attainment. Careers related to this field include administration, advertising, education, foreign service, journalism, industrial relations, law, management consulting, market research, public policy, and social service.

## Race, Gender, Immigration, Identity and Policy

Focus is on population diversity, primarily in the United States, and on how identity is formed and maintained. Classes in this subject area address segregation, integration, and assimilation. What does it mean to cross from one group to another? How has the law treated racial minorities, sexual minorities, and immigrants differently over time? Careers related to this field include social work, teaching, research, law, management, and population studies which can be applied to any industry.

## Joint Programs in Sociology with the School of Law

The School of Law and Department of Sociology conduct joint programs leading to either a combined J.D. degree with an M.A. degree in Sociology or to a combined J.D. degree with a Ph.D. in Sociology.

Law students interested in pursuing an M.A. in Sociology apply for admission to the Department of Sociology during the first year of Law school. Once admitted to the Department of Sociology, the student must complete standard departmental master's degree requirements as specified in this bulletin. Applications for the joint J.D./M.A. degree program must be approved by both the department and the Law school. Faculty advisers from each program participate in the planning and supervising of the student's academic program.

The J.D./Ph.D. degree program is designed for students who wish to prepare themselves for research or teaching careers in areas relating to both legal and sociological concerns. Students interested in the joint degree program must be admitted to both the School of Law and the Department of Sociology. Interest in the joint degree program must be noted on each of the student's applications. Alternatively, an enrolled student in either the Law School or the Sociology department may apply to the other program, preferably during their first year of study. Students participating in the joint degree program are not eligible to transfer and receive credit for a masters, or other degree, towards the Sociology Ph.D..

Upon admission, students are assigned a joint program faculty adviser who assists the student in planning an appropriate program and ensuring that all requirements for both degrees are satisfied. The faculty adviser serves in this capacity during the student's course of study regardless of whether the student is enrolled in the School of Law or the Sociology department.

J.D./Ph.D. students may elect to begin their course of study in either the School of Law or the Department of Sociology. Students must be enrolled full-time in the Law school for the first year of Law school, and must enroll full time in the graduate school for the first year of the Sociology program. After that time, enrollment may be in the graduate school or the Law school, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the Ph.D. degrees. Up to 54 quarter units of approved course work may be counted towards both degrees, but no more than

31 quarter units of courses that originate outside the Law school may count towards the Law degree. The Law degree may be conferred upon completion of applicable Law school requirements; it is not necessary to have both degrees conferred simultaneously. Students participating in the joint degree program are not eligible to transfer and receive credit for a master's or other degree towards the Ph.D. Students must complete the equivalent of 183 quarter units to complete both degrees. Tuition and financial aid arrangements normally are through the school in which the student is currently enrolled.

The Law degree may be conferred upon completion of applicable Law school requirements; it is not necessary to have both degrees conferred simultaneously.

For more information, see the Sociology (<https://sociology.stanford.edu/academics/phd-programs/jdphd>) web site, and the Law School web site on the J.D./Ph.D. (<https://www.law.stanford.edu/degrees/joint-degrees/law-and-sociology>)

## Bachelor of Arts in Sociology

There are two pathways to a Sociology B.A. degree:

- the Sociology Bachelor's degree, or
- the Sociology Bachelor's degree with the Data Science, Markets, and Management subplan.

The following requirements are for the Sociology bachelor's degree. Students interested in the Sociology Bachelor's degree with the Data Science, Markets, and Management subplan should see that tab (p. 746).

## Declaring the Major in Sociology

To declare a major in Sociology, students should declare the B.A. in Axxess, then download the major declaration form from the department web site. Complete the top portion of the form, sign, and email the Director of the Undergraduate Program in Sociology to set up an entrance advising meeting.

## Major Requirements

A 3.0 GPA is required to enter the Sociology major. The B.A. in Sociology requires 60 units of course work. Units applied to the major must be taken for a letter grade (except for independent study or directed reading), and all earned grades must be 'C' or better (except where permission has been granted by the Sociology Director of Undergraduate Studies.)

Unit values for courses can vary from year to year. If you have any questions, contact the undergraduate student services specialist in Sociology.

Students are encouraged to complete some course work at the 200-level. Sociology majors are encouraged to participate in directed research or undertake independent research with Sociology faculty. See the department web site for additional information.

## Requirements

Units required for the Sociology B.A. are:

	Units
Sociology Core Courses (4 courses)	16
Sociology Foundation Courses (3 courses)	12
Social Science Electives (Units sufficient to bring the total # of units to 60—usually 4-6 courses)	27
Methodology, Quantitative or Qualitative (1 course)	5
<b>Total Units</b>	<b>60</b>

## Core Courses Required for the Major

The following core courses are required of all Sociology majors.

SOC 1	Introduction to Sociology at Stanford	
or SOC 170	Classics of Modern Social Theory	
SOC 180A	Foundations of Social Research	4
SOC 180B	Introduction to Data Analysis	4
SOC 200	Junior/Senior Seminar for Majors	4-5
or SOC 202	Junior Seminar: Preparation for Research	
or SOC 204	Junior/Senior Seminar for Majors	
Total Units		17-18

- Students considering honors are encouraged to enroll in SOC 202 Junior Seminar: Preparation for Research in their junior year, in order to have a research plan in place in the Summer before senior year.

## Foundation Courses Required for the Major

Sociology majors must complete 3 foundation courses; one course in three different areas for a total of three courses. For further information about Sociology areas of study, see the department web site.

Foundation courses, classified by area of study, are as follows:

### Organizations, Business, and the Economy

SOC 114	Economic Sociology	4
SOC 160	Formal Organizations	4
SOC 162	The Social Regulation of Markets	4

### Social Movements, Comparative Politics, and Social Change

SOC 118	Social Movements and Collective Action	4
SOC 119	Understanding Large-Scale Societal Change: The Case of the 1960s	5
SOC 130	Education and Society	4-5

### Social Psychology and Interpersonal Processes

SOC 2	Self and Society: Introduction to Social Psychology	4
SOC 120	Interpersonal Relations	4
SOC 121	The Individual in Social Structure: Foundations in Sociological Social Psychology	5
SOC 127	Bargaining, Power, and Influence in Social Interaction	5

### Social Inequality

SOC 135	Poverty, Inequality, and Social Policy in the United States	3
SOC 140	Introduction to Social Stratification	3
SOC 141	Controversies about Inequality	5
SOC 144	Inequality and the Workplace	5
SOC 149	The Urban Underclass	4

### Race, Gender, Immigration, Identity, and Policy

SOC 142	Sociology of Gender	3
SOC 145	Race and Ethnic Relations in the USA	4
SOC 150	Race and Political Sociology	3

SOC 155	The Changing American Family	4
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## Social Science Elective Courses

**Units** Social Science electives are required for the major, sufficient to bring the total number of units in the Sociology major to 60. You may take all elective courses in Sociology if you wish. Students may choose their elective courses according to personal interest. Non-Sociology courses must be approved by the Director of Undergraduate Studies. A maximum of 10 units taken in other Social Science departments (Anthropology, Communication, Economics, Political Science, Psychology) may be counted towards the 60 units required for the Sociology B.A.

## Methods Requirement

Sociology majors are required to take at least one methodology course, either quantitative or qualitative, to supplement the core and foundation courses within Sociology. Quantitative classes in data analysis, programming, computer science, statistics, mathematics, are all suitable for this requirement, as are qualitative methods classes such as field research methods.

## Bachelor of Arts in Sociology with Data Science, Markets, and Management Subplan

There are two pathways to a Sociology B.A. degree:

- the Sociology Bachelor's degree, or
- the Sociology Bachelor's degree with the Data Science, Markets, and Management subplan.

The following requirements are for the Sociology bachelor's degree with the Data Science, Markets, and Management subplan. Students interested in the Sociology Bachelor's degree should see that tab (p. 745).

## Declaring the Major in Sociology with Data Science, Markets, and Management Subplan

To declare a major in Sociology, students should declare the B.A. in Axess, then download the major declaration form from the department web site. Complete the top portion of the form, sign, and email the Director of the Undergraduate Program in Sociology to set up an entrance advising meeting. Then, students declare the Data Science, Markets, and Management subplan in Axess.

The subplan prints on the diploma and transcript.

## Major Requirements

A 3.0 GPA is required to enter the Sociology major. The B.A. in Sociology requires 60 units of course work. Units applied to the major must be taken for a letter grade (except for independent study or directed reading), and all earned grades must be 'C' or better.

Unit values for courses can vary from year to year. If you have any questions, contact the undergraduate student services specialist in Sociology.

Students are encouraged to complete some course work at the 200-level. Sociology majors are encouraged to participate in directed research or undertake independent research with Sociology faculty. See the department website for additional information.

## Requirements

Students in the Data Science, Markets, and Management subplan must take the following courses; substitutions may be made only with consent of the Director of Undergraduate Studies.

## Core Requirements

The core requirements include one class in each of: experimental methods, computer programming, analysis of big data, data analysis and regression, network analysis, and Writing in the Major class, as follows:

		Units
SOC 2	Self and Society: Introduction to Social Psychology	4
or SOC 120	Interpersonal Relations	
CS 105	Introduction to Computers (all CS requirements can be substituted for by higher level CS or programming classes)	3-5
or CS 106A	Programming Methodology	
or CS 106B	Programming Abstractions	
or CS 106X	Programming Abstractions (Accelerated)	
MS&E 231	Introduction to Computational Social Science	3
or SOC 278	Introduction to Computational Social Science	
SOC 180B	Introduction to Data Analysis	4
SOC 126	Introduction to Social Networks	2-5
or SOC 224B	Relational Sociology	
or CS 224W	Analysis of Networks	
or ECON 291	Social and Economic Networks	
or MS&E 135	Networks	
SOC 204	Junior/Senior Seminar for Majors	4-5
or SOC 200	Junior/Senior Seminar for Majors	
or SOC 202	Junior Seminar: Preparation for Research	

## Foundation Sociology Courses on Economics, Organizations, Business, Labor Markets, and the Economy.

Choose any two of the following courses:

		Units
SOC 114	Economic Sociology	4
SOC 130	Education and Society	4-5
SOC 160	Formal Organizations	4
SOC 162	The Social Regulation of Markets	3
SOC 271	Organizational Analysis	4
THINK 46	Why So Few? Gender Diversity and Leadership	4

## Electives

In addition to the Core classes and the Foundation classes, the Data Science, Markets and Management subplan requires 7 additional courses, as follows:

	Units
Four additional Sociology (SOC) courses	16
Two additional Computer Science, Math, Statistics, or Quantitative Social Science Courses	8
One additional Sociology or Social Science elective	4

## Honors Program

Sociology majors who wish to complete an independent scholarly project under the direction of a faculty member are encouraged to apply for admission to the department's honors program. Admission to the program requires a grade point average (GPA) of 3.5 or higher in courses taken within the major, and an overall GPA of 3.3 (B+) or higher in all undergraduate course work. Applicants are required to identify a Sociology faculty member to advise on the research and writing of the essay. With the approval of the Director of Undergraduate Studies, students may work with faculty advisers in other departments.

Students are encouraged to begin planning their honors thesis in their junior year; at this time they should enroll in SOC 202 Junior Seminar: Preparation for Research, SOC 200 Junior/Senior Seminar for Majors or SOC 204 Junior/Senior Seminar for Majors. Students begin designing their honors project in connection with this seminar and in consultation with the seminar leader. To apply for the honors program, students should complete the honors application, obtain an adviser's approval and signature, and submit the application with a brief description of the proposed project, and a copy of the student's unofficial undergraduate transcript, to the Director of Undergraduate Studies. Prospective candidates are asked to submit an honors application as soon as possible in their junior or senior year, ideally no later than the end of the fourth quarter prior to graduation (typically Spring Quarter of the junior year). Honors students may earn up to 12 independent study units for work leading to completion of the required honors thesis, excluding units associated with the Junior/Senior Seminar.

If the student is admitted to the program, students will be directed to declare the B.A.H. in Axxess and drop the general B.A. Completion of honors in Sociology requires:

1. Application and acceptance into the Sociology honors program
2. Completion of all requirements of the Sociology major or Sociology major with subplan
3. Completion of an honors thesis with a grade of A- or higher
4. Participation in the Sociology Honors Colloquium in the Spring Quarter prior to graduation.

If honors program requirements are not met, students must drop the B.A.H. degree program in Axxess and declare the B.A. before applying to graduate.

## Minor in Sociology

Students must complete a minimum of 35 units in Sociology for the minor. Courses must be taken for a letter grade, and a minimum grade point average (GPA) of 2.0 (C) must be achieved. Students who wish to declare a minor in Sociology must do so no later than the deadline for their application to graduate. Related course work from other departments may fulfill a minor requirement. All course substitutions must be pre-approved by the Sociology student services office and the Undergraduate Program Director; a student may not exceed 5 substitution units for the minor.

Course requirements for a minor in Sociology are as follows:

	Units	
SOC 1	Introduction to Sociology at Stanford	5
or SOC 170	Classics of Modern Social Theory	
SOC 2	Self and Society: Introduction to Social Psychology	4
or SOC 180A	Foundations of Social Research	
or SOC 180B	Introduction to Data Analysis	
Two foundation courses: see foundation courses required for the major above		10
Additional course work in the department (100- or 200-level courses)		17
Total Units		36

## Coterminal Master of Arts in Sociology

Stanford undergraduates, regardless of undergraduate major, who wish to pursue an M.A. in Sociology may apply for the coterminal master's program. The coterminal M.A. in Sociology is a flexible, self-designed program. Most students complete a Sociology M.A. during their fifth year at Stanford; occasionally students are able to complete their B.A. and coterminal M.A. in the fourth year.

## Application and admission

Undergraduates must be admitted to the program and enrolled as a graduate student for at least one quarter prior to their B.A. conferral. A cumulative GPA of at least 3.5 in previous undergraduate work is required for admission; GRE test scores are required. It is highly recommended that applicants have completed at least one Sociology course at the 100 level with a grade of 'B' or better.

The department accepts applications once a year; the application deadline is February 2, 2018 for Spring Quarter enrollment. There are no exceptions to this deadline.

All application materials are submitted online. The department does not fund coterminal M.A. students.

To apply for admission to the Sociology coterminal M.A. program, students must submit the following:

1. The Application for Admission to Coterminal Master's Program (<https://applyweb.com/stanterm>) available online in mid-September;
2. Statement of purpose: should be 2-5 pages double-spaced. Applicants should outline reasons for pursuing the M.A. in Sociology, including career aspirations and/or future plans for additional advanced degrees;
3. Preliminary program proposal: this is a form in the application packet. At least 45 units of course work relevant to the degree program must be specified;
4. Undergraduate Coterm Application Approval form (<https://stanford.app.box.com/v/ug-coterm-application-approval>): downloaded from the Registrar's Office web site and uploaded to the online application;
5. Current unofficial undergraduate transcript;
6. Two letters of recommendation from Stanford faculty familiar with the student's academic work; additional letters from teaching assistants, employers, or other individuals are accepted as supplemental materials but are not required;
7. GRE scores.

## University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Program requirements

Coterminal M.A. students are required to take 45 units of course work during their graduate career. All units for the coterminal M.A. must be taken at or above the 100 level; advanced-level course work is encouraged and a minimum of 20 units must be taken at the 200 level. Students who wish to take courses outside the department must seek approval in advance from the Sociology student services office; coterminal master's students are limited to 5 units from outside of the department and outside courses must be taken in other Social Science departments.

Students may transfer a maximum of 10 units from their undergraduate career; to be eligible for transfer, courses must have been taken in the three quarters preceding the student's first graduate quarter. Courses cannot be transferred after a student's bachelor's degree has been conferred. See the Registrar's Office (<https://registrar.stanford.edu/students/coterminal-degree-programs/coterm-course-transfer>) for additional information on course transfer policies.

All units applied to the coterminal master's degree must be taken for a letter grade, and an overall grade point average (GPA) of 3.0 (B) or better is required for the degree.

Coterminal students are strongly encouraged to take SOC 180A Foundations of Social Research, and SOC 180B Introduction to Data Analysis, in sequence when possible. These methods courses provide skills for research opportunities within the department and in academic or professional careers. They are also an important component of graduate training in the social sciences. Coterminal M.A. students should meet with their assigned faculty adviser upon acceptance to the program to discuss their program proposal. Program proposals, which outline the courses to be completed for the master's degree, must be submitted before the end of the student's first graduate quarter.

Students are responsible for knowing and adhering to University and Departmental policies, standards, and requirements for coterminal students. For University coterminal degree program rules and University application forms, see the Coterminal Degrees (p. 46) section of this bulletin. For additional information regarding the Sociology coterminal M.A. and how to apply, see the Department of Sociology (<http://www.stanford.edu/dept/soc/coterminal>) web site.

## Master of Arts in Sociology for Current Stanford Graduate Students

The M.A. degree in Sociology is available to current Ph.D. candidates in Sociology and to students in advanced degree programs (Ph.D., J.D., M.D.) from other Stanford departments and schools.

For the M.A. degree, students must complete a minimum of 45 units of Sociology course work with a grade point average (GPA) of 3.0 (B) or better. Of these units, 30 units must be taken in courses taught by faculty appointed in the Sociology department. Students may petition to use the remaining 15 units as flex units for courses not offered by faculty appointed in Sociology, but that are highly relevant to the discipline. 5 of these flex units can be taken as an independent study or directed reading with a member of the faculty appointed in Sociology. All flex units applied to courses not taught by faculty appointed in Sociology must be approved by the Director of Graduate Studies. All courses must be taken for a letter grade if possible. Workshops and colloquia do not count towards the M.A.

University regulations pertaining to the M.A. are listed in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

Students who wish to engage in more in-depth study in a specific area may do so by focusing on course work within an area of study.

No thesis is required.

While formal application to the M.A. program is not required, applicants from outside of the Sociology department must submit:

1. Graduate Authorization Petition form, available electronically through ACESS (<https://access.stanford.edu>);
2. Program Proposal for an M.A. form available for download from the registrar's office website, submitted to Sociology graduate student services manager;
3. Short statement of purpose; 1 page double-spaced, submitted to Sociology graduate student services manager.

Sociology Ph.D.s may receive their M.A. in their second or third year of graduate study. Interested students from other degree programs should visit the department's (<https://sociology.stanford.edu/academics/coterminal-masters-program/master-arts-sociology-current-stanford-graduate-students>) web site.

## Doctor of Philosophy in Sociology

The Ph.D. curriculum and degree requirements are designed to provide students with the knowledge and skills to become proficient scholars and teachers. Doctoral students in the department taking a substantive sociology course are expected to take "letter grade" whenever possible and are expected to earn a grade of 'B+' or better in each course. Any grade of 'B' or below is considered to be less than satisfactory. Grades of 'B' or below are reviewed by faculty and the following actions may take place: the grade stands and the student's academic performance is monitored to ensure that satisfactory progress is being made; the grade stands and the student is required to revise and resubmit the work associated with that course; or the student may be required to retake the course.

The following program requirements apply to students who entered the Ph.D program in 2010-11 or later; students admitted prior to 2010 should consult the department or the Bulletin from their year of admission ([http://www.stanford.edu/dept/registrar/bulletin\\_past](http://www.stanford.edu/dept/registrar/bulletin_past)) for requirements specific to their cohort.

Students must complete the following department requirements for the Ph.D. degree in Sociology:

1. Students must enroll in SOC 305 Graduate Proseminar in Autumn Quarter of the first year. The course provides an introduction and orientation to the field of sociology, and to the department and faculty. One unit of credit is given for this course; grading is on a satisfactory/no credit basis.
2. Students must enroll in SOC 396 Sociology Colloquium in Autumn, Winter and Spring quarters of their first and second years. The Sociology Colloquium is a semimonthly seminar held throughout the academic year, in which distinguished scholars lecture about their cutting-edge research findings. Students must enroll for credit and it is required for all first and second year Sociology students.
3. Students are required to complete 45 units of course work in Sociology in the first academic year, then 15 units of Sociology course work in the second academic year. Course work excludes workshop, independent study, and directed reading units.
4. *Theory*: Students are required to take at least two courses in sociological theory. One course should be in either macro-sociological theory (SOC 370A Sociological Theory: Social Structure, Inequality, and Conflict), or micro-sociological theory (SOC 370B Social Interaction and Group Process), in the first year of the program. A second course, in research design, should be taken during the first year in the program SOC 372 Theoretical Analysis and Research Design).
5. *Methodology*: Students are required to complete a series of courses in methodology as well as one methods elective. Students with little

background in statistics are encouraged to take an undergraduate statistics course in their first quarter of the program. The required methods sequence, to be taken in order, is listed below.

6. *Survey Courses*: Students must complete four broad survey courses to demonstrate command of a range of sociological literature. Each year the department specifies which courses meet this requirement. A list of courses that generally fulfill this requirement is listed below. Students should consult with their adviser to ensure that the combination of courses selected to meet this requirement exhibits sufficient breadth. This requirement is normally completed by the end of the second year of residency and must be met by the end of the third year of residency. The most current list of approved survey courses is available on the department website.
7. *Workshops*: Beginning in year two, doctoral students are required to enroll in at least one workshop each quarter. First year students may attend workshops but are not required to enroll. Sociology workshops are offered for 1-2 units on a credit/non-credit basis only and attendance is required to receive course credit. The Director of Graduate Studies may approve a student's petition to attend a workshop when enrollment is prohibited by unit constraints; such attendance is not noted on the transcript. A list of approved workshops that fulfill this requirement is listed in the requirements section below and also on the department website.
8. *Qualifying Exam #1*: The first comprehensive examination is designed to ensure that students enter their second year with a firm reading knowledge of two substantive subfields. Students write two essays in response to questions provided by the examining committee. The questions are due exactly one week later. Students choose one of two questions to write on for each subfield. Examinations are offered in the subject areas below, based on comprehensive readings lists that are available at the beginning of each academic year. Each subject area has one faculty point person or group leader. Group leaders are responsible for assembling essay questions and agree to meet with students as requested.

Exam subject areas for 2017 -18 are:

- Economic Sociology
- Gender
- Historical and Comparative Sociology
- Organizations
- Political Sociology
- Population, Family, Demography, and Marriage
- Race, Ethnicity, and Immigration
- Social Inequality
- Social Movements
- Social Psychology

Students may work together to read and discuss the materials on the comprehensive reading lists (and in fact they are encouraged to do so). They may consult with faculty members as they study for the exams. However, once the examination questions are released, all such collaboration and consultation should stop, and students should work independently on their essays.

9. *Qualifying Exam #2*: The second qualifying examination provides students with a more focused engagement in a specialized subfield or research area, and tests the student's ability to work and think independently. Exam #2 is due by June 1 of the second year in residence. A two-person committee that includes the primary adviser evaluates the paper. Although the committee is usually comprised of two regular faculty members in the department, emeritus and other faculty outside the department may serve as a committee member with prior approval. Committees and a brief proposal are recorded on the second year qualifying paper form, which the student should complete and submit to the graduate student services manager by December 1 of the second year. Second year students are required to enroll in SOC 385A Research Practicum I and SOC 385B Research Practicum II (both workshops assist in developing the front end of

the research paper). Exams are read and graded by both committee members. The grades are an important component of the decision to advance a student to candidacy. Students must submit a one-page proposal to the reading committee and receive its approval by December 1 of the second year. The proposal includes a brief statement of the problem; a preliminary research design; a data source and proof of reasonable access to it; and a short reading list. Students submit the proposal along with second year qualifying paper form to the graduate student services manager. Students should produce a paper that makes an original contribution to sociological knowledge and that is ultimately publishable. That generally means writing a paper that includes data analysis; a full and focused analytic discussion of relevant theory and research; and frame the findings as a contribution to the literature. Students may also produce a paper with a primarily theoretical contribution so long as the prospects for eventual publication are clear to the committee. The paper should contain no more than 8,000 words of text. This paper may not also be employed to meet the Third Year Paper requirement, even in revised form.

10. *Third Year Paper:* In preparation for a career of writing scholarly papers, each student must complete a research paper in the third year of residency. This third-year paper may be on any sociological topic, and may address theoretical, empirical, or methodological issues. The paper is expected to reflect original work and be of publishable quality. Students select a committee of at least two Sociology faculty members to serve as third year paper readers. To ensure that students are making adequate progress on their paper, students are required to provide a first draft of the paper to readers by April 1. The final deadline for paper submission is June 1. The committee provides a review that speaks to (1) whether the paper is publishable and whether the student should therefore invest in attempting to publish it, and (2) what types of revisions, insofar as the paper is publishable, that the student should be pursuing to ready the paper for publication. These comments are shared with the Director of Graduate Studies, and copies of the paper and faculty comments will go in the student file.
11. *TA requirement:* Students must complete three quarters of teaching apprenticeship in departmental courses, or in other courses by approval. Students working as either a teaching assistant (TA) under the supervision of a faculty member or as a teaching fellow (TF) fulfills this requirement. Students are required to take SOC 300, Workshop: Teaching Development, in Spring Quarter of the first year. In addition, students are encouraged to take advantage of department and University teacher training programs. Students for whom English is a second language are expected to acquire sufficient facility in English to be an effective teacher. It is recommended that students complete their research requirements early in their graduate program; the requirement must be completed by the end of the fourth year of residency.
12. *RA requirement:* As partial preparation for becoming an accomplished researcher, each student must complete three quarters of research experience, working under the supervision of one or more faculty members, including regular, emeritus, and affiliated faculty. The experience may involve paid (or unpaid) work as a Research Assistant (RA). With the approval of the Director of Graduate Studies, research experience may be acquired by involvement in research projects outside the department. It is recommended that students complete their research requirements early in their graduate program; the requirement must be completed by the end of the fourth year of residency.
13. Students are required to present at least two papers at a major professional meeting (e.g., ASA) in their first five years of graduate study
14. *Dissertation Prospectus and Prospectus Defense:* In order to demonstrate the ability to conduct independent scholarly work, each student must prepare and defend dissertation prospectus by the end

of May during the fourth year in residence. Students should have their dissertation committee selected by the end of their third year in the program.

15. *Doctoral Dissertation and Defense:* Each student must complete and defend a doctoral dissertation. At the choice of the student (and in consultation with his/her adviser), the dissertation requirement may be met either by (1) submitting a book-length document, or (2) submitting three independent papers. The papers may address the same topic, but should be written as stand-alone, single-authored papers in standard journal format (i.e., AJS or ASR). None of these papers may overlap substantially with one another, and none of them may be co-authored. (The main criterion in judging substantial overlap is whether any standard journal, such as AJS, would regard the papers as too similar to publish both.) The dissertation must be submitted to all committee members at least 30 days in advance of the defense date. The dissertation defense serves as the Oral Examination required by the University. Assessment of satisfactory completion is determined by the student's doctoral committee members. All students are invited to present their dissertation findings at an informal department colloquium.

The faculty are responsible for providing students with timely and constructive feedback on their progress towards the Ph.D. In order to evaluate student progress and to identify potential problem areas, the department's faculty reviews the academic progress of each first-year student at the beginning of Winter and Spring quarters and again at the end of the academic year. The first two reviews are primarily intended to identify developing problems that could impede progress. In most cases, students are simply given constructive feedback, but if there are more serious concerns, a student may be placed on probation with specific guidelines for addressing the problems detected. The review at the end of the academic year is more thorough; each student's performance during the first year is reviewed and discussed. Possible outcomes of the spring review include: (1) continuation of the student in good standing, or (2) placing the student on probation, with specific guidelines for the period of probation and the steps to be taken in order to be returned to good standing. For students on probation at this point (or at any other subsequent points), possible outcomes of a review include: (1) restoration to good standing; (2) continued probation, again with guidelines for necessary remedial steps; or (3) termination from the program. Students leaving the program at the end of the first year are usually allowed to complete the requirements to receive an M.A. degree, if this does not involve additional residence or financial support. All students are given feedback from their advisers at the end of their first year of graduate work, helping them to identify areas of strengths and potential weakness.

At the end of the second year of residency, students who are performing well are advanced to candidacy. This step implies that the student has demonstrated the relevant qualities required for successful completion of the Ph.D. Future evaluations are based on the satisfactory completion of specific remaining department and University requirements. Students who are not advanced to candidacy will normally be terminated from the program and awarded an M.A. degree. In some cases, the department may require that a student complete outstanding work or complete unmet requirements before admission to candidacy. The University requires that all students must be admitted to candidacy by the beginning of the third year in residence in order to continue in the Ph.D. program. Therefore all requirements stipulated by the department must be met before registration for the fall quarter of the student's third year.

At any point during the degree program, evidence that a student is performing at a less than satisfactory level may be cause for a formal academic review of that student.

## Degree Requirements

### Survey Courses

Students must complete four courses from an approved list. This list is updated and circulated to students at the start of each academic year. *Note:* class offerings rotate; not all approved survey courses are offered every year. The following courses typically fulfill the survey course requirement:

		Units
SOC 308	Social Demography	4-5
SOC 310	Political Sociology	4-5
SOC 314	Economic Sociology	4-5
SOC 316	Historical and Comparative Sociology	4-5
SOC 318	Social Movements and Collective Action	4-5
SOC 320	Foundations of Social Psychology	4-5
SOC 323	Sociology of the Family	4-5
SOC 339	Gender Meanings and Processes	5
SOC 340	Social Stratification	4-5
SOC 342B	Gender and Social Structure	5
SOC 350	Sociology of Race	4-5
SOC 357	Immigration and Assimilation	3-5
SOC 358	Sociology of Immigration	1-5
SOC 362	Organization and Environment	3
SOC 363A	Seminar on Organizational Theory	5
SOC 366A	Organizational Ecology	3
SOC 376	Perspectives on Organization and Environment: Social Movement Organizations and Environments	3

### Research Methods

Required methodology courses are listed below.

		Units
SOC 381	Sociological Methodology I: Introduction	5
SOC 382	Sociological Methodology II: Principles of Regression Analysis	4-5
SOC 383	Sociological Methodology III: Models for Discrete Outcomes	5

### Theory

SOC 370A	Sociological Theory: Social Structure, Inequality, and Conflict	5
or SOC 370B	Social Interaction and Group Process	
SOC 372	Theoretical Analysis and Research Design	3-5

### Workshops

SOC 311A	Workshop: Comparative Studies of Educational and Political Systems	1-5
SOC 315W	Workshop: Economic Sociology and Organizations	1-2
SOC 317W	Workshop: Networks, Histories, and Theories of Action	1-2
SOC 321W	Workshop: Social Psychology and Gender	1-2
SOC 325W	Workshop: Graduate Family	1-2
SOC 338W	Workshop: Sociology of Law	1-5
SOC 341W	Workshop: Inequality	1-2
SOC 350W	Workshop: Migration, Ethnicity, Race and Nation	1-3
SOC 368W	Workshop: China Social Science	1

SOC 375W	Workshop: Morality and Hierarchy	1-2
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## Ph.D. Minor in Sociology

Sociology offers a minor for currently enrolled doctoral students in other Stanford departments and schools. Students must complete a minimum of 30 graduate-level units with a grade point average (GPA) of 3.0 (B) or better. All 30 units for the minor must be in courses taught by faculty appointed in the Sociology department. Students must enroll in the SOC course offerings (not cross-listed sections). There are two exceptions: five (5) of these units may be taken as an independent study or directed reading with a member of the sociology faculty; another five (5) units may be taken in a statistics or methods course taught in another department. All units must be taken for a letter grade. Workshops and colloquium do not count towards the Ph.D. minor. The program must be approved by a Sociology adviser and filed with the Sociology student services office. While there is not a formal application process, candidates must submit a short statement of purpose (2 pages), and a completed Application for Ph.D. Minor form ([http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app\\_phd\\_minor.pdf](http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app_phd_minor.pdf)) to the Sociology student services office. The Application for Ph.D. Minor form must have all Sociology or other courses to be applied to the minor listed, including course number, units, and final grades.

*Emeriti: (Professors)* Joseph Berger, Michael T. Hannan, , James G. March, John W. Meyer, Susan Olzak, Richard Scott, Nancy B. Tuma, Morris Zelditch Jr.

*Chair:* Xueguang Zhou

*Professors:* Karen Cook, Shelley Correll, Jeremy Freese, Mark Granovetter, David Grusky, Douglas McAdam, Cecilia Ridgeway, Michael Rosenfeld, Gi-Wook Shin, C. Matthew Snipp, Florencia Torche, Andrew Walder, Robb Willer, Xueguang Zhou

*Associate Professors:* Tomás Jiménez, Aliya Saperstein

*Units Assistant Professors:* Jackelyn Hwang, Michelle Jackson, David Pedulla, Cristobal Young

*Adjunct Professors:* Glenn Carroll, Raj Chetty, Michele Landis Dauber, Larry Diamond, Daniel McFarland, Walter Powell, Francisco Ramirez, Hayagreeva Rao, Sean Reardon, Jesper Sorensen, Sarah Soule

*Adjunct Associate Professors:* Amir Goldberg, Mitchell Stevens, Christine Min Wotipka

*Units Adjunct Assistant Professors:* Patricia Bromley, Angèle Christin, Sharad Goel, Jennifer Pan

*Lecturers:* Patricia Young

*Adjunct Associate Professor:* Ruth Cronkite

## Overseas Studies Courses in Sociology

*Units* The Bing Overseas Studies Program (<http://bossp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bossp.stanford.edu>).



		<b>Units</b>
OSPBER 66	Theory from the Bleachers: Reading German Sports and Culture	3
OSPFLOR 23	Italian Emigration, Immigration, and the Making of Nation	3
OSPFLOR 46	Images of Evil in Criminal Justice	5
OSPMADRD 61	Society and Cultural Change: The Case of Spain	4
OSPOXFRD 117W	Gender and Social Change in Modern Britain	4-5

# STATISTICS

Courses offered by the Department of Statistics are listed under the subject code STATS on the Stanford Bulletin's ExploreCourses web site.

The department's goals are to acquaint students with the role played in science and technology by probabilistic and statistical ideas and methods, to provide instruction in the theory and application of techniques that have been found to be commonly useful, and to train research workers in probability and statistics. There are courses for general students as well as those who plan careers in statistics in business, government, industry, and teaching.

The department has long recognized the relation of statistical theory to applications. It has fostered this by encouraging a liaison with other departments in the form of joint and courtesy faculty appointments, as well as membership in various interdisciplinary programs: Biomedical Data Science, Bio-X, Center for Computational, Evolutionary and Human Genomics, Computer Science, Economics, Education, Electrical Engineering, Environmental Earth System Science, Genetics, Mathematics, Mathematical and Computational Finance, and Medicine. The research activities of the department reflect an interest in applied and theoretical statistics and probability. There are workshops in biology/medicine and in environmental factors in health.

In addition to courses for Statistics students, the department offers a number of service courses designed for students in other departments. These tend to emphasize the application of statistical techniques rather than their theoretical development.

The department has always drawn visitors from other countries and universities, and as a result there are a wide range of seminars offered by both the visitors and the department's own faculty.

## Undergraduate Programs in Statistics

The department offers a minor in Statistics and in Data Science (<https://statistics.stanford.edu/academics/undergraduate-programs>). Program details can be found under the Minor section.

### Undergraduates Interested in Statistics

Students wishing to build a concentration in probability and statistics are encouraged to consider declaring a major in Mathematical and Computational Science (<https://mcs.stanford.edu>). This interdisciplinary program is administered in the Department of Statistics and provides core training in computing, mathematics, operations research, and statistics, with opportunities for further elective work and specialization. See the "Mathematical and Computational Science" section of this bulletin.

## Graduate Programs in Statistics

University requirements for the M.S. and Ph.D. degrees are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

### Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Statistics and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses, in the primary field as well as related areas, and experience with independent work and specialization.

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Statistics. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students

to make original contributions to the knowledge of Statistics and to interpret and present the results of such research.

The Department of Statistics offers two minor programs for undergraduates, a minor in Data Science and a minor in Statistics.

## Minor in Data Science

The undergraduate Data Science minor has been designed for majors in the humanities and social sciences who want to gain practical knowledge of statistical data analytic methods as it relates to their field of interest. The minor:

- provides students with the knowledge of exploratory and confirmatory data analyses of diverse data types such as text, numbers, images, graphs, trees, and binary input)
- strengthens social research by teaching students how to correctly apply data analysis tools and the techniques of data visualization to convey their conclusions.

No previous programming or statistical background is assumed.

### Learning Outcomes

Students are expected to:

1. be able to connect data to underlying phenomena and to think critically about conclusions drawn from data analysis.
2. be knowledgeable about programming abstractions so that they can later design their own computational inferential procedures

All courses for the minor must be taken for a letter grade, with the exception of the Data Mining requirement.

Seven courses are required, 22 units minimum. An overall 2.75 grade point average (GPA) is required for courses fulfilling the minor.

### Requirements

#### Linear Algebra

		Units
<b>One of the following:</b>		
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
CME 100	Vector Calculus for Engineers	5

#### Programming

		Units
CS 106A	Programming Methodology	3-5

#### Programming in R

		Units
<b>One of the following:</b>		
STATS 32	Introduction to R for Undergraduates	1
STATS 48N	Riding the Data Wave	3
THINK 3	Breaking Codes, Finding Patterns	4

Or other course that teaches proficiency in R programming.

#### Data Science

		Units
STATS 101	Data Science 101	5

#### Statistics

		Units
<b>One of the following:</b>		
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5

PHIL 166	Probability: Ten Great Ideas About Chance	4
STATS 141	Biostatistics	3-5
STATS 191	Introduction to Applied Statistics	3-4
STATS 211	Meta-research: Appraising Research Findings, Bias, and Meta-analysis	3
STATS 216	Introduction to Statistical Learning	3

### Data Mining and Analysis

STATS 202	Data Mining and Analysis (may be taken CR/NC)	3
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### Elective Course

**One course fulfilling Data Science methodology from cognate field of interest. Suggested courses:**

CS 224W	Analysis of Networks	3-4
ECON 291	Social and Economic Networks	2-5
ENGLISH 184E	Literary Text Mining	5
LINGUIST 275	Probability and Statistics for linguists	2-4
MS&E 135	Networks	3
PHIL 50S	Truth, Proof and Probability: An Introduction To Philosophical and Logical Reasoning	3
PHIL 166	Probability: Ten Great Ideas About Chance	4
POLISCI 150B	Machine Learning for Social Scientists	5
POLISCI 155	Political Data Science	5
POLISCI 450A	Political Methodology I: Regression	5
PSYCH 109		4
PSYCH 196A		3
PUBLPOL 105	Empirical Methods in Public Policy	4-5
SOC 126	Introduction to Social Networks	4
SOC 180A	Foundations of Social Research	4
or SOC 180B	Introduction to Data Analysis	

## Minor in Statistics

The undergraduate minor in Statistics is designed to complement major degree programs primarily in the social and natural sciences. Students with an undergraduate Statistics minor should find broadened possibilities for employment. The Statistics minor provides valuable preparation for professional degree studies in postgraduate academic programs.

The minor consists of a minimum of six courses with a total of at least 20 units. There are two required courses (8 units) and four qualifying or elective courses (12 or more units). All courses for the minor must be taken for a letter grade. An overall 2.75 grade point average (GPA) is required for courses fulfilling the minor.

### Required Courses

#### Both:

STATS 116	Theory of Probability	3-5
STATS 200	Introduction to Statistical Inference	3

### Qualifying Courses

At most, one of these two courses may be counted toward the six course requirement for the minor:

#### Choose one from the following:

MATH 52	Integral Calculus of Several Variables	5
STATS 191	Introduction to Applied Statistics	3-4

### Elective Courses

At least one of the elective courses should be a STATS 200-level course. The remaining two elective courses may also be 200-level courses. Alternatively, one or two elective courses may be approved courses in other departments. Special topics courses and seminars for undergraduates are offered from time to time by the department, and these may be counted toward the course requirement. Students may not count any Statistics courses below the 100 level toward the minor.

### Examples of elective course sequences are:

		Units
<b>Data Analysis and Applied Statistics</b>		
STATS 202	Data Mining and Analysis	3
STATS 203	Introduction to Regression Models and Analysis of Variance	3
<b>Statistical Methodology</b>		
STATS 205	Introduction to Nonparametric Statistics	3
STATS 206	Applied Multivariate Analysis	3
STATS 207	Introduction to Time Series Analysis	3
<b>Economic Optimization</b>		
STATS 206	Applied Multivariate Analysis	3
ECON 160	Game Theory and Economic Applications	5
<b>Psychology Modeling and Experiments</b>		
STATS 206	Applied Multivariate Analysis	3
<b>Signal Processing</b>		
STATS 207	Introduction to Time Series Analysis	3
EE 264	Digital Signal Processing	3
EE 279	Introduction to Digital Communication	3
<b>Genetic and Ecologic Modeling</b>		
STATS 217	Introduction to Stochastic Processes I	3
BIO 283	Theoretical Population Genetics	3
<b>Probability and Applications</b>		
STATS 217	Introduction to Stochastic Processes I	3
STATS 218	Introduction to Stochastic Processes II	3
<b>Mathematical Finances</b>		
STATS 240	Statistical Methods in Finance	3-4
STATS 243	Risk Analytics and Management in Finance and Insurance	3
STATS 250	Mathematical Finance	3

## Master of Science in Statistics

The University's basic requirements for the M.S. degree are discussed in the "Graduate Degrees" (p. 50) section of this bulletin. The following are specific departmental requirements.

The M.S. in Statistics and the M.S. in Statistics, Data Science track, are intended as terminal degree programs and do not lead to the Ph.D. program in Statistics. Students interested in pursuing doctoral study in Statistics should apply directly to the Ph.D. program.

### Admission

Prospective applicants should consult the Graduate Admissions (<https://gradadmissions.stanford.edu>) and the Statistics Department admissions web pages (<https://statistics.stanford.edu/academics/admissions>) for complete information on admission requirements and deadlines.

Recommended preparatory courses include advanced undergraduate level courses in linear algebra, statistics/probability and proficiency in programming.

## Coterminal Master's Program

Stanford undergraduates who want to apply for the coterminal master's degree must submit a complete application to the department by the deadline published on Statistics Department admissions web page. (<https://statistics.stanford.edu/academics/ms-coterm-apply>)

Applications are accepted twice a year in autumn and winter quarter for the internal/coterminal master's degree program in Statistics.

The department does not accept coterminal or internal applications for the Data Science track.

Students pursuing the Statistics coterminal master's degree must follow the same curriculum requirements stated in the Requirements for the Master of Science in Statistics section.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Science in Statistics

### Curriculum and Degree Requirements

The department requires that a master's student take 45 units of work from offerings in the Department of Statistics (<http://explorecourses.stanford.edu/search?view=catalog&filter-coursestatus-Active=on&page=0&catalog=&academicYear=&q=STATS&collapse=>) or from authorized courses in other departments. With the advice of the master's program advisers, each student selects his or her own set of electives.

All requirements for the Statistics master's degree, including the coterminal master's degree, must be completed within three years of the first quarter of graduate standing. Ordinarily, four or five quarters are needed to complete all requirements. Honors Cooperative students must finish within five years.

Units for a given course may not be counted to meet the requirements of more than one degree, with the exception that up to 45 units of a Stanford M.A. or M.S. degree may be applied to the residency requirement for the Ph.D., D.M.A. or Engineer degrees. See the "Residency Policy for Graduate Students (p. 57)" section of this Bulletin for University rules.

As defined in the general graduate student requirements, students must maintain a grade point average (GPA) of 3.0 or better and classes must be taken at the 200 level or higher. No thesis is required.

For further information about the Statistics master's degree program requirements, see the department web site (<https://statistics.stanford.edu/academics/ms-statistics>). (<https://statistics.stanford.edu/masters-program-proposal-form>)

### 1. Statistics Core Courses (must complete all four courses):

		Units
<b>Probability</b>		
STATS 116	Theory of Probability	3-5
<b>Applied Statistics</b>		
STATS 191	Introduction to Applied Statistics	3-4
<b>Theoretical Statistics</b>		
STATS 200	Introduction to Statistical Inference	3
<b>Stochastic Processes</b>		
STATS 217	Introduction to Stochastic Processes I	2-3

Students with prior background may replace each course with a more advanced course from the same area. Courses previously taken may be waived by the adviser, in which case they must be replaced by other graduate courses offered by the department. All must be taken for a letter grade.

### 2. Additional Statistics courses:

At least four additional Statistics courses must be taken from graduate offerings in the department (STATS 202 through 390). All must be taken for a letter grade, with the exception of courses offered satisfactory/no credit only.

		Units
Students cannot count more than a total 6 units of the following toward the master's degree requirements:		
STATS 260A	Workshop in Biostatistics	1-2
STATS 260B	Workshop in Biostatistics	1-2
STATS 260C	Workshop in Biostatistics	1-2
STATS 298	Industrial Research for Statisticians	1
STATS 299	Independent Study	1-10
STATS 390	Consulting Workshop	1-3

### 3. Linear Algebra Mathematics Requirement:

		Units
Select one of the following:		
MATH 104	Applied Matrix Theory	3
MATH 113	Linear Algebra and Matrix Theory	3
MATH 115	Functions of a Real Variable	3
MATH 171	Fundamental Concepts of Analysis	3

Substitution of other courses in Mathematics may be made with consent of the adviser. All must be taken for a letter grade, with the exception of courses offered satisfactory/no credit only.

### 4. Programming Requirement:

		Units
Select one of the following:		
CS 106A	Programming Methodology	3
CS 106B	Programming Abstractions	3
CS 106X	Programming Abstractions (Accelerated)	3
CS 107	Computer Organization and Systems	3-5
CME 108	Introduction to Scientific Computing	3

Substitution of other courses in Computer Science may be made with consent of the adviser. All must be taken for a letter grade, with the exception of courses offered satisfactory/no credit only.

### 5. Elective Courses:

Additional elective units to complete the requirements may be chosen from the list available from the department web site (<https://statistics.stanford.edu/academics/ms-statistics-elective-courses>). Other graduate courses (200 or above) may be authorized by the adviser if they provide skills relevant to degree requirements or deal primarily with an application of statistics or probability and do not overlap courses in the student's program.

There is sufficient flexibility to accommodate students with interests in applications to business, computing, economics, engineering, health, operations research, and biological and social sciences.

#### Courses below 200 level are not acceptable, with the following exceptions:

STATS 116	Theory of Probability	3-5
STATS 191	Introduction to Applied Statistics	3-4
MATH 104	Applied Matrix Theory	3
MATH 113	Linear Algebra and Matrix Theory	3
MATH 115	Functions of a Real Variable	3
MATH 171	Fundamental Concepts of Analysis	3
CS 106A	Programming Methodology	3-5
CS 106B	Programming Abstractions	3-5
CS 106X	Programming Abstractions (Accelerated)	3-5
CS 140	Operating Systems and Systems Programming	3-4
CS 142	Web Applications	3
CS 143	Compilers	3-4
CS 144	Introduction to Computer Networking	3-4
CS 145	Introduction to Databases	3-4
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 149	Parallel Computing	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 155	Computer and Network Security	3
CS 157	Logic and Automated Reasoning	3
CS 161	Design and Analysis of Algorithms	3-5
CS 170	Stanford Laptop Orchestra: Composition, Coding, and Performance	1-5
CS 181	Computers, Ethics, and Public Policy	4

At most, one of these courses may be counted:

MATH 104	Applied Matrix Theory	3
MATH 113	Linear Algebra and Matrix Theory	3
STATS 116	Theory of Probability	3-5
MATH 151	Introduction to Probability Theory	3

### Master's Degree Program Proposal

The Statistics Master's Degree Program Proposal form (<https://statistics.stanford.edu/masters-program-proposal-form>), signed and approved by the student's program adviser, must be submitted by the student to the department's student services administrator prior to the end of the first quarter of enrollment in the program. A revised program proposal must be submitted if degree plans change.

There is no thesis requirement.

Students with a strong mathematical background who are interested in pursuing a Ph.D. in Statistics should consider applying to the Ph.D. program.

## Master of Science in Statistics, Data Science Track

The Data Science track develops strong mathematical, statistical, and computational and programming skills through the general master's core and programming requirements. In addition, it provides a fundamental data science education through general and focused electives requirement from courses in data sciences and related areas. Course choices are limited to predefined courses from the data sciences and related courses group. Programming requirement (requirement 4) is extended to 6 units and includes course work in advanced scientific programming and high performance computing. The final requirement is a practical component (requirement 5) for 6 units to be completed through capstone project, data science clinic, or other courses that have strong hands-on or practical component, such as statistical consulting.

Units

### Admission

Prospective applicants should consult the Graduate Admissions (<https://studentaffairs.stanford.edu/gradadmissions>) and the Statistics Department admissions webpages (<https://statistics.stanford.edu/academics/admissions>) for complete information on admission requirements and deadlines.

Applicants apply to the Master of Science degree in Statistics and declare preference for the Data Science subplan (track) within the application ("Department Specialization" option).

### Prerequisites

Fundamental courses in mathematics and computing may be needed as prerequisites for other courses in the program. Check the prerequisites of each required course. Recommended preparatory courses include advanced undergraduate level courses in linear algebra, probability, and introductory courses in PDEs, stochastics, numerical methods and proficiency in programming.

### Curriculum and Degree Requirements

As defined in the general graduate student requirements, students must maintain a grade point average (GPA) of 3.0 or better and classes must be taken at the 200 level or higher. Students must complete 45 units of required coursework in Data Science.

A Master's Degree Program Proposal (<https://statistics.stanford.edu/academics/ms-statistics-data-science>), signed and approved by the student's program adviser, is to be submitted by the student to the department's student services administrator prior to the end of the first quarter of enrollment in the program. A revised program proposal must be submitted if degree plans change.

No thesis is required.

The Data Science subplan (track) is printed on the transcript and diploma.

### Requirement 1: Foundational (12 units)

Students must demonstrate foundational knowledge in the field by completing the following core courses. Courses in this area must be taken for letter grades.

		Units
CME 302	Numerical Linear Algebra	3
CME 305	Discrete Mathematics and Algorithms	3
CME 307	Optimization	3
CME 308	Stochastic Methods in Engineering	3

or

CME 309	Randomized Algorithms and Probabilistic Analysis
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**Requirement 2: Programming (6 units)**

To ensure that students have a strong foundation in programming, 3 units of advanced scientific programming for letter grade at the level of CME 212 and three units of parallel computing. Courses in this area must be taken for letter grades.

Programming proficiency at the level of CME 211 is a hard prerequisite for CME 212 (students may only place out of 211 with prior written approval). CME 211 can be applied towards elective requirement.

**Advanced Scientific Programming: (3 units)**

CME 212	Advanced Software Development for Scientists and Engineers	3
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**Parallel Computing/HCP courses: (3 units)**

CME 213	Introduction to parallel computing using MPI, openMP, and CUDA	3
CME 323	Distributed Algorithms and Optimization	3
CME 342	Parallel Methods in Numerical Analysis	3
CS 149	Parallel Computing	3-4
CS 315A	Parallel Computer Architecture and Programming	3
CS 316	Advanced Multi-Core Systems	3

Units

**Requirement 3: Data Science Electives (12 units)**

Data Science electives should demonstrate breadth of knowledge in the technical area. The elective course list is defined. Courses outside this list are subject to approval. Courses in this area must be taken for letter grades.

STATS 200	Introduction to Statistical Inference	3
STATS 203	Introduction to Regression Models and Analysis of Variance	3
or STATS 305A	Introduction to Statistical Modeling	
STATS 315A	Modern Applied Statistics: Learning	2-3
STATS 315B	Modern Applied Statistics: Data Mining	2-3

Units

or equivalent courses as approved by the adviser.

**Requirement 4: Specialized Electives (9 units)**

Choose three courses in specialized areas from the following list. Courses outside this list are subject to approval.

BIOE 214	Representations and Algorithms for Computational Molecular Biology	3-4
BIOMEDIN 215	Data Driven Medicine	3
BIOS 221/ STATS 366	Modern Statistics for Modern Biology	3
CS 224W	Analysis of Networks	3-4
CS 229	Machine Learning	3-4
CS 231N	Convolutional Neural Networks for Visual Recognition	3
CS 246	Mining Massive Data Sets	3-4
CS 448	Topics in Computer Graphics	3-4
ENERGY 240	Data science for geoscience	3
OIT 367	Business Intelligence from Big Data	3
PSYCH 204A	Human Neuroimaging Methods	3
STATS 290	Computing for Data Science	3

Units

**Requirement 5: Practical Component (6 units)**

Students are required to take 6 units of practical component that may include any combination of:

- Master’s research: STATS 299 Independent Study. A capstone project, supervised by a faculty member and approved by the student’s adviser. The capstone project should be computational in nature. Students should submit a one-page proposal, supported by the faculty member and sent to the student’s Data Science adviser for approval (at least one quarter prior to start of project). Should be taken for a letter grade.
- Project labs offered by Stanford Data Lab: ENGR 250 Data Challenge Lab , and ENGR 350 Data Impact Lab . (Limited enrollment; application required.)
- Other courses that have a strong hands-on and practical component, such as STATS 390 Consulting Workshop .

**Doctor of Philosophy in Statistics**

The department looks for students who wish to prepare for research careers in statistics or probability, either applied or theoretical. Advanced undergraduate or master’s level work in mathematics and statistics provides a good background for the doctoral program. Quantitatively oriented students with degrees in other scientific fields are also encouraged to apply for admission. The program normally takes five years to complete.

**Program Summary**

**First-year core program**

		Units
STATS 300	Advanced Topics in Statistics (offered Summer Quarter)	2-3
STATS 300A	Theory of Statistics I	2-3
STATS 300B	Theory of Statistics II	2-4
STATS 300C	Theory of Statistics III	2-4
STATS 305A	Introduction to Statistical Modeling	3
STATS 305B	Methods for Applied Statistics I: Exponential Families in Theory and Practice	3
STATS 305C	Methods for Applied Statistics II: Applied Multivariate Statistics	2-3
STATS 310A	Theory of Probability I	2-4
STATS 310B	Theory of Probability II	2-3
STATS 310C	Theory of Probability III	2-4

- Pass two of three parts of the qualifying examinations (end of first year); breadth requirement (second, third and fourth year); successfully complete the dissertation proposal meeting (before end of third year); pass the University oral examination (fourth or fifth year); dissertation (fifth year).
- In addition, students are required to take nine units of advanced topics courses offered by the department. Recommended courses include the following:

		Units
STATS 314A	Advanced Statistical Theory	3
STATS 315A	Modern Applied Statistics: Learning	2-3
STATS 315B	Modern Applied Statistics: Data Mining	2-3
STATS 317	Stochastic Processes	3
STATS 318	Modern Markov Chains	3
STATS 330	An Introduction to Compressed Sensing	3
STATS 370	A Course in Bayesian Statistics	3
STATS 376A	Information Theory	3

STATS 376B	Network Information Theory	3
EE 364A	Convex Optimization I	3

- Complete a minimum of three units of STATS 390 Consulting Workshop, taking it at least twice.
- Take STATS 319 Literature of Statistics once per year after passing the Qualifying Exam until the year after passing the dissertation proposal meeting.

## First-Year Core Courses

- STATS 300A Theory of Statistics I, STATS 300B Theory of Statistics II and STATS 300C Theory of Statistics III systematically survey the ideas of estimation and of hypothesis testing for parametric and nonparametric models involving small and large samples.
- STATS 305A Introduction to Statistical Modeling is concerned with linear regression and the analysis of variance.
- STATS 305B Methods for Applied Statistics I: Exponential Families in Theory and Practice and STATS 305C Methods for Applied Statistics II: Applied Multivariate Statistics survey a large number of modeling techniques, related to but going beyond the linear models of STATS 305A Introduction to Statistical Modeling.
- STATS 310A Theory of Probability I, STATS 310B Theory of Probability II, and STATS 310C Theory of Probability III are measure-theoretic courses in probability theory, beginning with basic concepts of the law of large numbers and martingale theory.

Students who do not have enough mathematics background can take STATS 310A,B,C after their first year but need to have their first-year program approved by the Director of Graduate Studies.

## Qualifying Examinations

These are intended to test the student's level of knowledge when the first-year program, common to all students, has been completed. There are separate examinations in the three core subjects of statistical theory and methods, applied statistics, and probability theory, and all are typically taken during the summer between the student's first and second years. Students are expected to show acceptable performance in two examinations. Letter grades are not given. After passing the qualifying exams students file for Ph.D. candidacy, a University milestone.

## Breadth Requirement

Students are required to take 15 units of coursework outside of the department and are advised to choose an area of concentration in a specific scientific field of statistical applications approved by their Ph.D. program adviser.

Popular areas include: Computational Biology and Statistical Genomics, Machine Learning, Applied Probability, Earth Science Statistics, and Social and Behavioral Sciences.

## Dissertation Reading Committee, Dissertation Proposal Meeting and University Oral Examinations

The dissertation reading committee consists of the student's adviser plus two faculty readers, all of whom are responsible for reading and approving the full dissertation.

The dissertation proposal meeting is intended to demonstrate students' depth in some areas of statistics, and to examine the general plan for their research. It also confirms that students have chosen a Ph.D. faculty adviser and have started to work with that adviser on a research topic. In the meeting, the student will give a 50-minute presentation and discuss their ideas for completing a Ph.D. thesis, with a committee typically consisting of the members of the dissertation reading committee. The meeting must be successfully completed before the end of the third year. "Successful completion" means that the general research plan is sound and has a reasonable chance of success. If the student does not pass,

the meeting must be repeated. Repeated failure by the end of Year 3 can lead to a loss of financial support.

The oral examination/dissertation defense is scheduled when the student has finished their dissertation and is in the process of completing their final draft. The oral exam consists of a 50-minute presentation on the dissertation topic, followed by a question and answer period attended only by members of the examining committee. The questions relate both to the student's presentation and also explore the student's familiarity with broader statistical topics related to the thesis research. The oral examination is normally completed within the last few months of the student's Ph.D. period. The examining committee usually consists of at least five members: four examiners including the three members of the Dissertation Reading Committee, plus an outside chair who serves as an impartial representative of the academic standards of the University. Four out of five passing votes are required and no grades are given. Nearly all students can expect to pass this examination, although it is common for specific recommendations to be made regarding completion of the written dissertation.

For further information on University oral examinations and committees, see the Graduate Academic Policies and Procedures (GAP) Handbook, section 4.7 (<http://gap.stanford.edu/4-7.html>) or the "University Oral Examination (p. 52)" section of this bulletin.

## Doctoral and Research Advisers

From the student's arrival until the selection of a research adviser, the student's academic progress is monitored by the department's Director of Graduate Studies. Each student should meet at least once a quarter with the Doctoral Adviser to discuss their academic plans and their progress towards choosing a dissertation adviser.

## Financial Support

Students accepted to the Ph.D. program are offered financial support. All tuition expenses are paid and there is a fixed monthly stipend determined to be sufficient to pay living expenses. Financial support can be continued for five years, department resources permitting, for students in good standing. The resources for student financial support derive from funds made available for student teaching and research assistantships. Students receive both a teaching and research assignment each quarter which, together, do not exceed 20 hours. Students are encouraged to apply for outside scholarships, fellowships, and other forms of financial support.

## Ph.D. Minor in Statistics

Students must complete 30 total units for the Ph.D. minor. 20 units must be from Statistics courses numbered 300 and above and taken for a letter grade (minimum grade of B for each course). The remaining 10 units can be from Statistics courses numbered 200 and above, and may be taken for credit. Students may not include more than three units of Stats 390, Consulting Workshop, towards the 30 units. The selection of courses must be approved by the Director of Graduate Studies. The Application for the Ph.D. Minor form must be approved by both the student's Ph.D. department and the Statistics department.

For further information about the Statistics Ph.D. degree program requirements, see the department web site (<https://statistics.stanford.edu/academics/doctoral-program>).

## Faculty

*Emeriti:* (Professors) Jerome H. Friedman, Paul Switzer

*Chair:* Emmanuel Candès

*Professors:* Emmanuel Candès, Sourav Chatterjee, Amir Dembo, Persi Diaconis, David L. Donoho, Bradley Efron, Trevor J. Hastie, Susan P. Holmes, Iain M. Johnstone, Tze L. Lai, Andrea Montanari, Art Owen,

Joseph P. Romano, Chiara Sabatti, David O. Siegmund, Jonathan Taylor,  
Robert J. Tibshirani, Guenther Walther, Wing H. Wong

*Assistant Professors:* John Duchi, Julia Palacios

*Courtesy Professors:* John Ioannidis, Hua Tang

*Courtesy Associate Professors:* David Rogosa, Lu Tian

*Courtesy Assistant Professors:* Mike Baiocchi, Percy Shuo Liang, Stefan  
Wager

*Stein Fellows:* James Johndrow, Lucy Xia, Yumeng Zhang, Xiang Zhu



# SYMBOLIC SYSTEMS

Courses offered by the Symbolic Systems Program are listed under the subject code SYMSYS on the Stanford Bulletin's ExploreCourses web site.

The observation that both human beings and computers can manipulate symbols lies at the heart of Symbolic Systems, an interdisciplinary program focusing on the relationship between natural and artificial systems that represent, process, and act on information. Computer programs, natural languages, the human mind, and the Internet embody concepts whose study forms the core of the Symbolic Systems curriculum, such as computation, representation, communication, and intelligence. A body of knowledge and theory has developed around these notions, from disciplines such as philosophy, computer science, linguistics, psychology, statistics, neurobiology, and communication. Since the invention of computers, researchers have been working across these disciplines to study questions such as: in what ways are computers and computer languages like human beings and their languages; how can the interaction between people and computers be made easier and more beneficial?

The core requirements of the Symbolic Systems Program (SSP) include courses in symbolic logic, the philosophy of mind, formal linguistics, cognitive psychology, programming, the mathematics of computation, statistical theory, artificial intelligence, and interdisciplinary approaches to cognitive science. These courses prepare students with the vocabulary, theoretical background, and technical skills needed for study and research at the advanced undergraduate and graduate levels. Most of the courses in SSP are drawn from affiliated departments. Courses designed specifically for the program are aimed at integrating and supplementing topics covered by the department-based offerings. The curriculum includes humanistic approaches to questions about language and intelligence, as well as training in science and engineering.

SSP offers B.S. and M.S. degree programs. Both programs require students to master a common core of required courses and to choose an area of specialization.

## Mission of the Undergraduate Program in Symbolic Systems

The undergraduate program in Symbolic Systems is an interdisciplinary program focusing on the relationships between natural and artificial systems that use symbols to communicate and to represent information. The mission of the program is to prepare majors with the vocabulary, theoretical background, and technical skills necessary to research questions about language, information, and intelligence, both human and machine. The curriculum offers a combination of traditional humanistic approaches to these questions as well as a training and familiarity with contemporary developments in the science and technology of computation. Students in the major take courses in cognitive science, computer programming, logic and computational theory, probability, cognitive psychology, philosophy of mind, linguistics, and artificial intelligence. The program prepares students for a variety of careers in the private and public sectors, especially those involving the human-facing sides of information systems/technology, as well as for further study and research in the cognitive and/or information sciences.

## Learning Outcomes (Undergraduate)

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Symbolic Systems Program. Students are expected to demonstrate:

1. ability to apply formal, philosophical, and/or computational analysis to experimental designs and data and vice versa.
2. ability to understand multiple formal, philosophical, and/or computational frameworks and how they are related to each other.
3. ability to map real world problems or observed phenomena onto formal, philosophical and/or computational frameworks and vice versa.

## Learning Outcomes (Graduate)

The purpose of the master's program is to further develop knowledge and skills in Symbolic Systems and to prepare students for a professional career or doctoral studies. This is achieved through completion of courses representing each of the core disciplines of Symbolic Systems as well as an individualized course program in support of the completion of a Master's thesis.

## Bachelor of Science in Symbolic Systems

The program leading to a B.S. in Symbolic Systems provides students with a core of concepts and techniques, drawing on faculty and courses from various departments. The curriculum prepares students for advanced training in the interdisciplinary study of language and information, or for postgraduate study in any of the main contributing disciplines. It is also excellent preparation for employment immediately after graduation.

Symbolic Systems majors must complete a core of required courses plus a field of study consisting of five additional courses. All major courses are to be taken for letter grades unless an approved course is offered satisfactory/no credit only. All core courses must be passed with a grade of 'C-' or better. Students who receive a grade lower than this in a core course must alert the program of this fact so that a decision can be made about whether the student should continue in the major.

### Core Requirements

In order to graduate with a B.S. in Symbolic Systems, a student must complete the following requirements. Some of these courses have other courses as prerequisites; students are responsible for completing each course's prerequisites before they take it. With the exception of the advanced small seminar requirement, courses cannot be used towards more than one area of the core requirements. For additional information, see the Symbolic Systems web site ([http://symsys.stanford.edu/undergraduate\\_programs](http://symsys.stanford.edu/undergraduate_programs)). *Note:* Students matriculating in the Class of 2018 or later must take SYMSYS 1 Minds and Machines (formerly SYMSYS 100) before their declaration of the Symbolic Systems undergraduate major can be approved.

#### 1. Introductory Core Course

Students matriculating in the Class of 2018 or later must take SYMSYS 1 Minds and Machines (formerly SYMSYS 100) before their declaration of the Symbolic Systems undergraduate major can be approved.

SYMSYS 1	Minds and Machines (formerly SYMSYS 100)	Units 4
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#### 2. Continuous Fundamentals Level 1—Single Variable Calculus

Select one of the following Series:

<b>Series A</b>		
10 units of Advanced Placement Calculus credit		10
<b>Series B</b>		
MATH 19 & MATH 20 & MATH 21	Calculus and Calculus and Calculus	10
<b>Series C</b>		

Equivalent preparation in Single Variable Calculus, as judged by student

### 3. Continuous Fundamentals Level 2—Multivariable Calculus

Select one of the following:<sup>1</sup>

CME 100	Vector Calculus for Engineers	5
CME 100A	Vector Calculus for Engineers, ACE	6
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
MATH 51A	Linear Algebra and Differential Calculus of Several Variables, ACE	6

<sup>1</sup> MATH 52 Integral Calculus of Several Variables and/or MATH 53 Ordinary Differential Equations with Linear Algebra, or CME 102 Ordinary Differential Equations for Engineers and/or CME 104 Linear Algebra and Partial Differential Equations for Engineers, are recommended and may be required for some optional higher level courses.

### 4. Continuous Fundamentals Level 3—Probability and Statistics

Select one of the following:

CS 109	Introduction to Probability for Computer Scientists	3-5
STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5
STATS 116	Theory of Probability	3-5
EE 178	Probabilistic Systems Analysis	4
MATH 151	Introduction to Probability Theory	3
MS&E 120	Probabilistic Analysis	5
CME 106/ ENGR 155C	Introduction to Probability and Statistics for Engineers	4

### 5. Discrete Fundamentals

#### a. Computing Level 1

CS 106A	Programming Methodology	3-5
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Or equivalent preparation, as judged by student

#### b. Computing Level 2

Select one of the following:		
CS 106B	Programming Abstractions	3-5
CS 106X	Programming Abstractions (Accelerated)	3-5

#### c. Logic and Computational Theory

Select one of the following:		
CS 103	Mathematical Foundations of Computing	3-5
PHIL 150	Mathematical Logic	4
PHIL 150E	Logic in Action: A New Introduction to Logic	4

### 6. Technical Depth

Two courses chosen from the list below (from either the same or different areas), appropriate to a student's concentration. Students concentrating in HCI, AI, or Computer Music must take CS 107 Computer Organization and Systems. Other concentrations may also restrict the particular courses that can be taken to fulfill this requirement. See concentration lists at <http://symsys.stanford.edu/viewing/htmldocument/16190>

#### Area A. Computer Programming

CS 107	Computer Organization and Systems (required for HCI, AI, or Computer Music)	3-5
CS 107E	Computer Systems from the Ground Up	3-5

#### Area B. Computational Theory<sup>1</sup>

CS 154	Introduction to Automata and Complexity Theory	3-4
CS 161	Design and Analysis of Algorithms	3-5
PHIL 151A	Recursion Theory	4

Units

#### Area C. Logic

CS 157	Logic and Automated Reasoning	3
PHIL 151	Metalogic	4
PHIL 152	Computability and Logic	4
PHIL 154	Modal Logic	4

#### Area D. Decision Theory/Game Theory

CS 238	Decision Making under Uncertainty	3-4
POLISCI 152	Introduction to Game Theoretic Methods in Political Science	3-5

ECON 160	Game Theory and Economic Applications	5
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ECON 180	Honors Game Theory	5
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MS&E 252	Decision Analysis I: Foundations of Decision Analysis	3-4
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#### Area E. Probability and Statistics

STATS 200	Introduction to Statistical Inference	3
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STATS 217	Introduction to Stochastic Processes I	2-3
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CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
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CS 246	Mining Massive Data Sets	3-4
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MS&E 221	Stochastic Modeling	3
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<sup>1</sup> CS 156 is not offered in 2016-17 but may be used to fulfill this requirement.

### 7. Philosophical Foundations Level 1

#### Introductory Philosophy

Select one of the following:

PHIL 1	Introduction to Philosophy	5
PHIL 2	Introduction to Moral Philosophy	5
PHIL 60	Introduction to Philosophy of Science	5
PHIL 102	Modern Philosophy, Descartes to Kant	4
PHIL 135	Existentialism	4
THINK 24	Evil	4
ESF 7	Education as Self-Fashioning: The Transformation of the Self	7

All 3 of the following (must complete entire sequence):

SLE 91	Structured Liberal Education
& SLE 92	and Structured Liberal Education
& SLE 93	and Structured Liberal Education

Other introductory courses taught in the Philosophy Department, if approved by the Program Director or Associate Director

### 8. Philosophical Foundations Level 2

PHIL 80	Mind, Matter, and Meaning	5
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### 9. Philosophical Foundations Level 3

Select one of the following advanced undergraduate course in metaphysics/epistemology (post-PHIL 80):

PHIL 107B	Plato's Later Metaphysics and Epistemology	4
PHIL 173B	Metaethics	4
PHIL 175	Philosophy of Law	4
PHIL 180	Metaphysics	4
PHIL 180A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 181	Philosophy of Language	4

PHIL 182	Advanced Philosophy of Language	4
PHIL 184	Epistemology	4
PHIL 186	Philosophy of Mind	4
PHIL 187	Philosophy of Action	4

Note: Symbolic Systems majors must take PHIL 182 for 3 or more units.

## 10. Cognition and Neuroscience

### Introductory Cognition and Neuroscience

PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4

### An additional undergraduate course in cognition and/or neurosciences

Select one of the following:

BIO 150	Human Behavioral Biology	5
HUMBIO 3B	Behavior, Health, and Development	5
PSYCH 30	Introduction to Perception	3
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
PSYCH 60	Introduction to Developmental Psychology	3
PSYCH 70	Self and Society: Introduction to Social Psychology	4
PSYCH 131		
PSYCH 141	Cognitive Development	3
PSYCH 154	Judgment and Decision-Making	3

## 11. Natural Language

### Language and Mind

Select one of the following:

LINGUIST 1	Introduction to Linguistics	4
LINGUIST 106	Introduction to Speech Perception	4
LINGUIST 140	Learning to Speak: An introduction to child language acquisition	4

PSYCH 131

### Linguistic Theory

Select one of the following:

LINGUIST 105	Phonetics	4
LINGUIST 110	Introduction to Phonology	4
LINGUIST 120	Introduction to Syntax	4
LINGUIST 121A	The Syntax of English	4
LINGUIST 121B	Crosslinguistic Syntax	4
LINGUIST 130A/230A	Introduction to Semantics and Pragmatics	4
LINGUIST 130B	Introduction to Lexical Semantics	3-4
LINGUIST 184	Syntactic Theory and Implementation	4
LINGUIST 281	Computational Models of Linguistic Formalism	1-4

## 12. Computation and Cognition

A course applying core technical skills to cognition

Select one of the following:

CS 131	Computer Vision: Foundations and Applications	3-4
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
APPPHYS 293	Theoretical Neuroscience	3

LINGUIST 180/CS 124	From Languages to Information	3-4
LINGUIST 182	Computational Theories of Syntax	3-4
NENS 220	Computational Neuroscience	4
PSYCH 204	Computation and cognition: the probabilistic approach	3
PSYCH 209	Neural Network Models of Cognition: Principles and Applications	4

Units

### Advanced Small Seminar Requirement

An upper-division, limited-enrollment seminar drawing on material from other courses in the core. Courses listed under Symbolic Systems Program offerings with numbers from SYMSYS 200 through SYMSYS 209 are acceptable, as are other courses as listed in the Advanced Small Seminar section of the Symbolic Systems website. Total enrollment must not exceed 20 students for a course to be approved as fulfilling the Advanced Small Seminar Requirement. A course taken to fulfill this requirement can also be counted toward another requirement, as part of either the core or a student's concentration, but not both.

### Fields of Study

In addition to the core requirements listed above, the Symbolic Systems major requires each student to complete a field of study consisting of five courses that are thematically related to each other. Students select concentrations from the list below or design others in consultation with their advisers. The field of study is declared on Axxess; it appears on the transcript but not on the diploma.

- Applied Logic
- Artificial Intelligence
- Cognitive Science
- Computer Music
- Decision Making and Rationality
- Human-Computer Interaction
- Learning
- Natural Language
- Neurosciences
- Philosophical Foundations

Note: A course may not count toward both a core and a concentration requirement, unless it is applied to the Advanced Small Seminar area within the core. A course that is applied to the Advanced Small Seminar requirement may also be counted toward a student's concentration or toward another core requirement, if appropriate, but not to both.

### Individually Designed Concentrations (IDCs)

Individually Designed Concentrations (IDCs) consist of five courses in a coherent subject area related to symbolic systems. This relationship may be established through inclusion in an IDC of two or more courses that connect the proposed concentration to the core, i.e. courses that (a) directly apply disciplines included in the core and (b) are related by topic or methodology to the other courses in the proposed concentration.

Course selection is to be made in consultation with the student's adviser and is subject to approval by the adviser, the Associate Director, and the Director. For examples of IDCs completed by past SSP students, consult the list of alumni and apply the filter "Individually Designed Concentration".

Units

Approval of an IDC must take place no less than two full quarters before a student plans to graduate, e.g. prior to the first day of Winter Quarter of the senior year if a student intends to graduate in June of that year. Failure to obtain approval by the required date will necessitate either completing the requirements for one of the suggested concentrations,

or delaying graduation to the end of the second full quarter following approval of an IDC.

To get a proposed IDC approved, send an email message to [symsys-directors@lists.stanford.edu](mailto:symsys-directors@lists.stanford.edu), cc'd to your prospective concentration adviser, stating that the adviser has approved your proposal, and giving a title, one-paragraph description, and course plan for your proposed concentration.

## Undergraduate Research

The program encourages all SSP majors to gain experience in directed research by participating in faculty research projects or by pursuing independent study. In addition to the Symbolic Systems Honors Program (see below), the following avenues are offered.

*Summer Internships:* students work on SSP-related faculty research projects. Application procedures are announced in the Winter Quarter for SSP majors.

*Research Assistantships:* other opportunities to work on faculty research projects are typically announced to SSP majors as they arise during the academic year.

*Independent Study:* under faculty supervision. For course credit, students should enroll in SYMSYS 196 Independent Study.

Contact SSP for more information on any of these possibilities, or see the Symbolic Systems (<http://symsys.stanford.edu>) web site. In addition, see the Undergraduate Advising and Research (<https://undergrad.stanford.edu/opportunities/research.html>) web site for information on UAR grants and scholarships supporting student research projects at all levels.

## Honors Program

Seniors in SSP may apply for admission to the Symbolic Systems honors program prior to the beginning of their final year of study. Students who are accepted into the honors program can graduate with honors by completing an honors thesis under the supervision of a faculty member. Course credit for the honors project may be obtained by registering for SYMSYS 190 Senior Honors Tutorial any quarter while a student is working on an honors project. SYMSYS 191 Senior Honors Seminar, is recommended for honors students during the senior year. Contact SSP or visit the program's web site for more information on the honors program, including deadlines and policies.

## Minor in Symbolic Systems

Students may minor in Symbolic Systems by completing either Option 1 or Option 2. For additional information see the Symbolic Systems minors web site (<http://symsys.stanford.edu/viewing/htmldocument/13635>).

### Option 1

One course in each of the following core areas (please note that several of these courses have prerequisites):

#### a. Cognition

Select one of the following:

SYMSYS 1	Minds and Machines (formerly SYMSYS 100)	4
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4

#### b. Logic and Computation

Select one of the following:

PHIL 150	Mathematical Logic	4
PHIL 150E	Logic in Action: A New Introduction to Logic	4
PHIL 151	Metalogic	4

CS 103	Mathematical Foundations of Computing	3-5
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#### c. Computer Programming

Select one of the following:

CS 106B	Programming Abstractions	3-5
CS 106X	Programming Abstractions (Accelerated)	3-5
CS 107	Computer Organization and Systems	3-5

#### d. Philosophical Foundations

Select one of the following:

SYMSYS 1	Minds and Machines (formerly SYMSYS 100)	4
PHIL 80	Mind, Matter, and Meaning	5

#### e. Linguistic Theory

Select one of the following:

LINGUIST 105	Phonetics	4
LINGUIST 110	Introduction to Phonology	4
LINGUIST 120	Introduction to Syntax	4
LINGUIST 121A	The Syntax of English	4
LINGUIST 121B	Crosslinguistic Syntax	4
LINGUIST 130A	Introduction to Semantics and Pragmatics	4
LINGUIST 130B	Introduction to Lexical Semantics	3-4
LINGUIST 184	Syntactic Theory and Implementation	4

#### f. Computation and Cognition

Select one of the following:

CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
LINGUIST 180	From Languages to Information	3-4
LINGUIST 182	Computational Theories of Syntax	3-4
PSYCH 204	Computation and cognition: the probabilistic approach	3
PSYCH 209	Neural Network Models of Cognition: Principles and Applications	4
PSYCH 239	Formal and Computational Approaches in Psychology and Cognitive Science	3

<sup>1</sup> SYMSYS 1 Minds and Machines (formerly SYMSYS 100) may not be counted for both areas 'a' and 'd'.

### Option 2

SYMSYS 1 Minds and Machines (formerly SYMSYS 100), plus an interdisciplinary SSP concentration listed on the SSP (<http://symsys.stanford.edu/viewing/htmldocument/16190>) web site. To qualify, the selection of courses used for the minor must be interdisciplinary; it must either include courses from at least three departments, or include more than one course from each of two departments.

## Coterminal Master's Degrees in Symbolic Systems

Many SSP majors also complete coterminal M.S. or M.A. degrees in affiliated departments. In addition to the Symbolic Systems M.S. program, the Department of Philosophy offers a Special Program in Symbolic Systems track for interdisciplinary graduate level work leading to the Master of Arts in Philosophy (<http://www.stanford.edu/dept/registrar/bulletin/6567.htm>).

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements

for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Master of Science in Symbolic Systems

The University's basic requirements for the M.S. degree are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

The M.S. degree in Symbolic Systems is designed to be completed in the equivalent of one academic year by coterminal students or returning students who already have a B.S. degree in Symbolic Systems, and in two years or less by other students depending upon level of preparation. Admission is competitive, providing a limited number of students with the opportunity to pursue course and project work in consultation with a faculty adviser who is affiliated with the Symbolic Systems Program. The faculty adviser may impose requirements beyond those described here.

Admission to the program as a coterminal student is subject to the policies and deadlines described in the "Coterminal Bachelor's and Master's Degrees (p. 46)" section of this bulletin. Applicants to the M.S. program are reviewed each Winter Quarter. Information on deadlines, procedures for applying, and degree requirements are available from the program's student services coordinator in the Linguistics Department office (460-127E) and at the Symbolic Systems (<http://symsys.stanford.edu/viewing/htmldocument/13623>) web site.

### Degree Requirements

A candidate for the M.S. degree in Symbolic Systems must complete a program of 45 units. At least 36 of these must be graded units, passed with an average grade of 3.0 (B) or better, and any course taken as part of the 45 unit program must be taken for a letter grade unless the course is offered S/NC only. None of the 45 units to be counted toward the M.S. degree may include units counted toward an undergraduate degree at Stanford or elsewhere. Course requirements are waived only if evidence is provided that similar or more advanced courses have been taken, either at Stanford or another institution. Courses that are waived rather than taken may not be counted toward the M.S. degree. For additional information, see the Symbolic Systems web site ([http://symsys.stanford.edu/graduate\\_programs](http://symsys.stanford.edu/graduate_programs)).

Each candidate for the M.S. degree must fulfill the following requirements:

1. Submission to the Symbolic Systems Program office and approval of the following pre-project research documents:
  - a. Project Area Statement, endorsed with a commitment from a student's prospective project adviser no later than May 1 of the academic year prior to the expected graduation year; and

- b. Qualifying Research Paper due no later than the end of the Summer Quarter prior to the expected graduation year.

2. Completion of a coherent plan of study, to be approved by the Graduate Studies Director in consultation with the student's adviser and designed to support a student's project. An initial plan of study should be delineated on the Program Proposal Form (<http://studentaffairs.stanford.edu/sites/default/files/registrar/files/progpropma.pdf>) prior to the end of the student's first quarter of study, as required by the University, to be modified at the time of the Project Area Statement with the approval of a student's adviser and the Graduate Studies Director. The final version of the Program Proposal, which should specify all the courses the student has taken and proposes as fulfillment of the unit requirements for the degree, is due by the end of Finals Week in the quarter prior to the student's expected graduation quarter (i.e. end of Winter Quarter for a student graduating in the Spring). The plan of study must include courses taken for 3 units or more each that are more advanced than the Symbolic Systems undergraduate core in four main skill areas: formal, empirical, computational, and philosophical; and in at least three of the following departments: Computer Science, Linguistics, Philosophy, and Psychology. More advanced courses in each of the skill areas are defined as follows:

a) formal: a course in logic and computational theory beyond the level of PHIL 151 Metalogic. The courses below have been approved. Other courses may be approved if appropriate.

- PHIL 252 Computability and Logic
- PHIL 254 Modal Logic
- PHIL 350A Model Theory
- PHIL 355
- CS 154 Introduction to Automata and Complexity Theory
- CS 157 Logic and Automated Reasoning
- CS 161 Design and Analysis of Algorithms

b) empirical: a course drawing on experimental or observational data or methods, beyond the level of PSYCH 55, LINGUIST 121A, 121B or 130A. The courses below are examples of those that have been approved. Other courses may be approved if appropriate.

- COMM 268. Experimental Research in Advanced User Interfaces (same as COMM 168, COMM 368, ME 468)
- COMM 269. Computers and Interfaces: Psychological and Social Issues (same as COMM 169)
- CS 224N Natural Language Processing with Deep Learning
- CS 376 Human-Computer Interaction Research
- LINGUIST 230B Semantics and Pragmatics I
- LINGUIST 241 Language Acquisition II
- LINGUIST 274C Linguistic Field Methods: Syntax
- NBIO 206 The Nervous System
- NBIO 258 Information and Signaling Mechanisms in Neurons and Circuits
- PSYCH 204 Computation and cognition: the probabilistic approach
- PSYCH 204A Human Neuroimaging Methods
- PSYCH 209 Neural Network and Deep Learning Models for Cognition and Cognitive Science
- PSYCH 252 Statistical Methods for Behavioral and Social Sciences
- PSYCH 254 Affective Neuroscience
- STATS 200 Introduction to Statistical Inference
- SYMSYS 245. Cognition in Interaction Design

c) computational: a course involving programming beyond the level of CS 107. The courses below have been approved. Other courses may be approved if appropriate.

- CS 108 Object-Oriented Systems Design
- CS 110 Principles of Computer Systems
- CS 124 From Languages to Information
- CS 142 Web Applications
- CS 143 Compilers
- CS 148 Introduction to Computer Graphics and Imaging
- CS 221 Artificial Intelligence: Principles and Techniques
- CS 224N Natural Language Processing with Deep Learning
- CS 224W Analysis of Networks

d) philosophical: a course in the area of Philosophy of Mind/Language/Science/Epistemology or Metaphysics at the 200 level or above, certified by the instructor as worthy of graduate credit. The courses below are examples of those that have been approved. Other courses may be approved if appropriate.

- PHIL 264 Central Topics in the Philosophy of Science: Theory and Evidence
- PHIL 267B Philosophy, Biology, and Behavior
- PHIL 281 Philosophy of Language
- PHIL 285B Philosophy of Perception
- PHIL 286 Philosophy of Mind
- PHIL 287 Philosophy of Action
- PHIL 383B What's an Inference?
- SYMSYS 206A Philosophy of Neuroscience

3. Completion of three quarters of SYMSYS 291 Master's Program Seminar.

4. Completion of a substantial project appropriate to the program plan, represented by the M.S. Thesis, the last of the the M.S research documents (<http://symsys.stanford.edu/viewing/htmldocument/13678>). The project normally takes three quarters, and work on the project may account for up to 15 units of a student's program. The thesis must be read and approved for the master's degree in Symbolic Systems by two qualified readers approved by the program, at least one of whom must be a member of the academic council. A copy of the thesis must be submitted (in both print and electronic forms) to the Associate Director of Symbolic Systems, with the print version including the signatures of each reader indicating approval of the thesis for the degree of Master of Science, no later than 12 noon on the day of the University Dissertation/Thesis Submission Deadline (<https://studentaffairs.stanford.edu/registrar/students/dissertation-thesis>) for the quarter of a student's graduation.

## Faculty

*Director:* Kenneth A. Taylor

*Director of Graduate Studies:* Kenneth A. Taylor

*Associate Director:* Todd Davies

*Program Committee:* Jeremy Bailenson, Michael Bernstein, Rachael Briggs, Todd Davies, Judith Degen, Michael C. Frank, Noah Goodman, Thomas Icard, Daniel Jurafsky, Daniel Lassiter, Krista Lawlor, Christopher Manning, James McClelland, Stanley Peters, Christopher Potts, Mehran Sahami, Kenneth A. Taylor, Johan van Benthem, Thomas A. Wasow

*Program Faculty:*

*Aeronautics and Astronautics:* Mykel Kochenderfer (Assistant Professor)

*Biology:* Deborah Gordon (Professor)

*Classics:* Reviel Netz (Professor)

*Communication:* Jeremy Bailenson (Professor), Jeff Hancock (Professor), Byron Reeves (Professor), Frederick Turner (Professor)

*Computer Science:* Maneesh Agrawala (Professor), Michael Bernstein (Assistant Professor), David Dill (Professor, emeritus), Michael Genesereth (Associate Professor), Oussama Khatib (Professor), Daphne Koller (Adjunct Professor), James Landay (Professor), Jean-Claude Latombe (Professor, emeritus), Marc Levoy (Professor, emeritus), Christopher Manning (Professor), Andrew Ng (Adjunct Professor), Nils Nilsson (Professor, emeritus), Vaughan Pratt (Professor, emeritus), Eric Roberts (Professor, emeritus), Tim Roughgarden (Associate Professor), Mehran Sahami (Professor, Teaching), Yoav Shoham (Professor, emeritus), Sebastian Thrun (Adjunct Professor), Terry Winograd (Professor, emeritus)

*Economics:* Muriel Niederle (Professor)

*Education:* Raymond P. McDermott (Professor), Roy Pea (Professor), Daniel Schwartz (Professor)

*Electrical Engineering:* Krishna Shenoy (Professor)

*French and Italian:* Jean-Pierre Dupuy (Professor)

*Genetics:* Russ B. Altman (Professor)

*Graduate School of Business:* Baba Shiv (Professor)

*History:* Jessica G. Riskin (Professor)

*Linguistics:* Arto Anttila (Associate Professor), Joan Bresnan (Professor, emerita), Eve Clark (Professor, emerita), Cleo Condoravdi (Professor Research), Judith Degen (Assistant Professor), Penelope Eckert (Professor), Daniel Jurafsky (Professor), Ronald Kaplan (Adjunct Professor), Lauri Karttunen (Adjunct Professor), Martin Kay (Professor), Daniel Lassiter (Assistant Professor), Beth Levin (Professor), Christopher Manning (Professor), Stanley Peters (Professor, emeritus), Christopher Potts (Professor), Meghan Sumner (Associate Professor), Thomas A. Wasow (Professor, emeritus), Annie Zaenen (Adjunct Professor)

*Management Science and Engineering:* Pamela Hinds (Professor)

*Mathematics:* Persi Diaconis (Professor), Solomon Feferman (Professor, emeritus)

*Mechanical Engineering:* Sean Follmer (Assistant Professor)

*Medicine:* Russ B. Altman (Professor), Mark Musen (Professor)

*Music:* Jonathan Berger (Professor), Christopher Chafe (Professor), Eleanor Selfridge-Field (Adjunct Professor), Ge Wang (Associate Professor)

*Neurobiology:* Ben Barres (Professor), William T. Newsome (Professor), Jennifer Raymond (Professor)

*Philosophy:* Michael Bratman (Professor), Rachael Briggs (Professor), Mark Crimmins (Associate Professor), John Etchemendy (Professor), Dagfinn Føllesdal (Professor, emeritus), Thomas Icard III (Assistant Professor), Krista Lawlor (Professor), Anna-Sara Malmgren (Assistant Professor), John Perry (Professor, emeritus), Brian Skyrms (Professor), Kenneth Taylor (Professor), Johan van Benthem (Professor), Thomas A. Wasow (Professor, emeritus)

*Psychiatry and Behavioral Sciences:* Vinod Menon (Professor)

*Psychology:* Herbert H. Clark (Professor, emeritus), Anne Fernald (Associate Professor), Michael C. Frank (Associate Professor), Justin Gardner (Assistant Professor), Noah Goodman (Associate Professor), Kalanit Grill-Spector (Professor), Hyowon Gweon (Assistant Professor), Brian Knutson (Professor), Ellen Markman (Professor), James McClelland

(Professor), Russell Poldrack (Professor), Barbara Tversky (Professor, emerita), Anthony Wagner (Professor), Brian Wandell (Professor), Daniel Yamins (Assistant Professor), Jamil Zaki (Assistant Professor)

*Statistics:* Persi Diaconis (Professor), Susan P. Holmes (Professor)

*Symbolic Systems:* Todd Davies (Associate Director), Damon Horowitz (Adjunct Professor), Jeff Shrager (Adjunct Professor), Paul Skokowski (Adjunct Professor)

*Other Affiliates:* David Barker-Plummer (CSLI Engineering Research Associate), Keith Devlin H-STAR Operation Senior Researcher), Daniel Flickinger (CSLI Research and Development Engineer)

## Cognate Courses for the Bachelor's Degree

The following is a list of cognate courses that may be applied to the B.S. in Symbolic Systems. Click on the course or see ExploreCourses for course descriptions and General Education Requirements (GER) information. Courses taken for a Symbolic Systems degree or Minor must be taken for 3 units (or more). See Degree Requirements for details.

### Core

		Units
APPPHYS 293	Theoretical Neuroscience	3
BIO 150	Human Behavioral Biology	5
CME 100	Vector Calculus for Engineers	5
CME 100A	Vector Calculus for Engineers, ACE	6
CME 106	Introduction to Probability and Statistics for Engineers	4
CS 103	Mathematical Foundations of Computing	3-5
CS 106A	Programming Methodology	3-5
CS 106B	Programming Abstractions	3-5
CS 106X	Programming Abstractions (Accelerated)	3-5
CS 107	Computer Organization and Systems	3-5
CS 107E	Computer Systems from the Ground Up	3-5
CS 109	Introduction to Probability for Computer Scientists	3-5
CS 124	From Languages to Information	3-4
CS 131	Computer Vision: Foundations and Applications	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
CS 161	Design and Analysis of Algorithms	3-5
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 238	Decision Making under Uncertainty	3-4
CS 246	Mining Massive Data Sets	3-4
ECON 160	Game Theory and Economic Applications	5
ECON 180	Honors Game Theory	5
EE 178	Probabilistic Systems Analysis	4
ENGR 155C	Introduction to Probability and Statistics for Engineers	4
ESF 7	Education as Self-Fashioning: The Transformation of the Self	7
ETHICSOC 20	Introduction to Moral Philosophy	5
HUMBIO 3B	Behavior, Health, and Development	5
LINGUIST 1	Introduction to Linguistics	4
LINGUIST 105	Phonetics	4
LINGUIST 106	Introduction to Speech Perception	4

LINGUIST 110	Introduction to Phonology	4
LINGUIST 120	Introduction to Syntax	4
LINGUIST 121A	The Syntax of English	4
LINGUIST 121B	Crosslinguistic Syntax	4
LINGUIST 130A	Introduction to Semantics and Pragmatics	4
LINGUIST 130B	Introduction to Lexical Semantics	3-4
LINGUIST 140	Learning to Speak: An introduction to child language acquisition	4
LINGUIST 180	From Languages to Information	3-4
LINGUIST 182	Computational Theories of Syntax	3-4
LINGUIST 230A	Introduction to Semantics and Pragmatics	4
LINGUIST 281	Computational Models of Linguistic Formalism	1-4
LINGUIST 282	Computational Theories of Syntax	3-4
MATH 19	Calculus	3
MATH 20	Calculus	3
MATH 21	Calculus	4
MATH 51	Linear Algebra and Differential Calculus of Several Variables	5
MATH 51A	Linear Algebra and Differential Calculus of Several Variables, ACE	6
MATH 151	Introduction to Probability Theory	3
MATH 162	Philosophy of Mathematics	4
MS&E 120	Probabilistic Analysis	5
MS&E 220	Probabilistic Analysis	3-4
MS&E 221	Stochastic Modeling	3
MS&E 252	Decision Analysis I: Foundations of Decision Analysis	3-4
NENS 220	Computational Neuroscience	4
PHIL 1	Introduction to Philosophy	5
PHIL 2	Introduction to Moral Philosophy	5
PHIL 60	Introduction to Philosophy of Science	5
PHIL 80	Mind, Matter, and Meaning	5
PHIL 102	Modern Philosophy, Descartes to Kant	4
PHIL 107B	Plato's Later Metaphysics and Epistemology	4
PHIL 135	Existentialism	4
PHIL 150	Mathematical Logic	4
PHIL 150E	Logic in Action: A New Introduction to Logic	4
PHIL 151	Metalogic	4
PHIL 151A	Recursion Theory	4
PHIL 152	Computability and Logic	4
PHIL 154	Modal Logic	4
PHIL 162	Philosophy of Mathematics	4
PHIL 164	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 166	Probability: Ten Great Ideas About Chance	4
PHIL 167B	Philosophy, Biology, and Behavior	4
PHIL 169	Evolution of the Social Contract	4
PHIL 173B	Metaethics	4
PHIL 175	Philosophy of Law	4
PHIL 180	Metaphysics	4
PHIL 180A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 181	Philosophy of Language	4
PHIL 182	Advanced Philosophy of Language	4
PHIL 184	Epistemology	4
PHIL 184F	Feminist Theories of Knowledge	4
PHIL 184P	Probability and Epistemology	4
PHIL 185	Theory of Understanding	4

PHIL 186	Philosophy of Mind	4
PHIL 187	Philosophy of Action	4
PHIL 188	Personal Identity	4
PHIL 189	Examples of Free Will	4
PHIL 280A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 289	Examples of Free Will	4
POLISCI 152	Introduction to Game Theoretic Methods in Political Science	3-5
PSYCH 30	Introduction to Perception	3
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
PSYCH 60	Introduction to Developmental Psychology	3
PSYCH 70	Self and Society: Introduction to Social Psychology	4
PSYCH 141	Cognitive Development	3
PSYCH 154	Judgment and Decision-Making	3
PSYCH 204	Computation and cognition: the probabilistic approach	3
PSYCH 209	Neural Network Models of Cognition: Principles and Applications	4
PSYCH 239	Formal and Computational Approaches in Psychology and Cognitive Science	3
SLE 91	Structured Liberal Education	8
SLE 92	Structured Liberal Education	8
SLE 93	Structured Liberal Education	8
STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5
STATS 116	Theory of Probability	3-5
STATS 200	Introduction to Statistical Inference	3
STATS 217	Introduction to Stochastic Processes I	2-3
SYMSYS 184	Syntactic Theory and Implementation	4
THINK 24	Evil	4
ECON 160	Game Theory and Economic Applications	5
EE 263	Introduction to Linear Dynamical Systems	3
EE 364A	Convex Optimization I	3
EE 364B	Convex Optimization II	3
EE 376A	Information Theory	3
EE 376B	Network Information Theory	3
ENGR 205	Introduction to Control Design Techniques	3
ENGR 209A	Analysis and Control of Nonlinear Systems	3
LINGUIST 180	From Languages to Information	3-4
LINGUIST 188	Natural Language Understanding	3-4
LINGUIST 280	From Languages to Information	3-4
LINGUIST 284	Natural Language Processing with Deep Learning	3-4
LINGUIST 285	Spoken Language Processing	2-4
LINGUIST 288	Natural Language Understanding	3-4
MATH 113	Linear Algebra and Matrix Theory	3
MS&E 251	Introduction to Stochastic Control with Applications	3
PHIL 152	Computability and Logic	4
PHIL 154	Modal Logic	4
STATS 315A	Modern Applied Statistics: Learning	2-3
STATS 315B	Modern Applied Statistics: Data Mining	2-3

## Applied Logic

		Units
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
LINGUIST 230A	Introduction to Semantics and Pragmatics	4
MATH 161	Set Theory	3
PHIL 152	Computability and Logic	4
PHIL 154	Modal Logic	4
PHIL 350A	Model Theory	3
PHIL 351A	Recursion Theory	3
PHIL 354	Topics in Logic	1-3
PHIL 391	Research Seminar in Logic	1-3

## Philosophical Foundations

		Units
CS 124	From Languages to Information	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 225A	Experimental Robotics	3
CS 225B	Robot Programming Laboratory	3-4
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 326A	Motion Planning	3
CS 329	Topics in Artificial Intelligence	3
LINGUIST 110	Introduction to Phonology	4
MATH 162	Philosophy of Mathematics	4
PHIL 9N	Philosophical Classics of the 20th Century	4
PHIL 14N	Belief and the Will	3
PHIL 102	Modern Philosophy, Descartes to Kant	4
PHIL 143	Quine	4
PHIL 152	Computability and Logic	4
PHIL 154	Modal Logic	4
PHIL 157	Topics in Philosophy of Logic	3
PHIL 162	Philosophy of Mathematics	4
PHIL 164	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 165	Philosophy of Physics: Philosophical Issues in Quantum Mechanics	4
PHIL 166	Probability: Ten Great Ideas About Chance	4
PHIL 167B	Philosophy, Biology, and Behavior	4
PHIL 170	Ethical Theory	4
PHIL 180	Metaphysics	4
PHIL 180A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 181	Philosophy of Language	4

Note: Symbolic Systems majors must take PHIL 182 Advanced Philosophy of Language for 3 or more units.

## Artificial Intelligence



PHIL 184	Epistemology	4
PHIL 184P	Probability and Epistemology	4
PHIL 252	Computability and Logic	4
PHIL 254	Modal Logic	4
PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 265	Philosophy of Physics: Philosophical Issues in Quantum Mechanics	4
PHIL 266	Probability: Ten Great Ideas About Chance	4
PHIL 267B	Philosophy, Biology, and Behavior	4
PHIL 280A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 350A	Model Theory	3

## Cognitive Science

		Units
BIO 150	Human Behavioral Biology	5
COMM 106	Communication Research Methods	4-5
CS 124	From Languages to Information	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 229	Machine Learning	3-4
ECON 160	Game Theory and Economic Applications	5
EE 376A	Information Theory	3
EE 376B	Network Information Theory	3
HUMBIO 160	Human Behavioral Biology	5
LINGUIST 105	Phonetics	4
LINGUIST 110	Introduction to Phonology	4
LINGUIST 140	Learning to Speak: An introduction to child language acquisition	4
LINGUIST 180	From Languages to Information	3-4
LINGUIST 205A	Phonetics	4
LINGUIST 241	Language Acquisition II	4
LINGUIST 280	From Languages to Information	3-4
LINGUIST 284	Natural Language Processing with Deep Learning	3-4
MATH 113	Linear Algebra and Matrix Theory	3
MUSIC 251	Psychophysics and Music Cognition	1-5
NBIO 206	The Nervous System	6
NBIO 218	Neural Basis of Behavior	5
PHIL 152	Computability and Logic	4
PHIL 154	Modal Logic	4
PHIL 164	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 180	Metaphysics	4
PHIL 180A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 181	Philosophy of Language	4
PHIL 184	Epistemology	4
PHIL 184P	Probability and Epistemology	4
PHIL 186	Philosophy of Mind	4
PHIL 187	Philosophy of Action	4
PHIL 188	Personal Identity	4
PHIL 189	Examples of Free Will	4
PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 280A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 289	Examples of Free Will	4
PSYCH 1	Introduction to Psychology	5

PSYCH 30	Introduction to Perception	3
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
PSYCH 70	Self and Society: Introduction to Social Psychology	4
PSYCH 75	Introduction to Cultural Psychology	5
PSYCH 141	Cognitive Development	3
PSYCH 154	Judgment and Decision-Making	3
PSYCH 202	Cognitive Neuroscience	3
PSYCH 204A	Human Neuroimaging Methods	3
PSYCH 204B	Computational Neuroimaging: Methods & Analyses	3
PSYCH 205	Foundations of Cognition	1-3
PSYCH 221	Image Systems Engineering	1-3
PSYCH 226	Models and Mechanisms of Memory	1-3
PSYCH 232	Brain and Decision Making	3
PSYCH 250	High-level Vision: From Neurons to Deep Neural Networks	3
PSYCH 252	Statistical Methods for Behavioral and Social Sciences	1-6
PSYCH 279	Topics in Cognitive Control	1-3
STATS 191	Introduction to Applied Statistics	3-4
STATS 200	Introduction to Statistical Inference	3

## Decision Making and Rationality

		Units
BIO 150	Human Behavioral Biology	5
BIOMEDIN 251	Outcomes Analysis	4
COMM 106	Communication Research Methods	4-5
COMM 172	Media Psychology	4-5
COMM 206	Communication Research Methods	4-5
COMM 272	Media Psychology	4-5
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 161	Design and Analysis of Algorithms	3-5
CS 181	Computers, Ethics, and Public Policy	4
CS 204	Legal Informatics	2-3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 261	Optimization and Algorithmic Paradigms	3
ECON 50	Economic Analysis I	5
ECON 51	Economic Analysis II	5
ECON 102B	Applied Econometrics	5
ECON 102C	Advanced Topics in Econometrics	5
ECON 135	Finance for Non-MBAs	3
ECON 136	Market Design	5
ECON 137	Decision Modeling and Information	5
ECON 141	Public Finance and Fiscal Policy	5
ECON 150	Economic Policy Analysis	4-5
ECON 155	Environmental Economics and Policy	5
ECON 160	Game Theory and Economic Applications	5
ECON 179	Experimental Economics	5
ECON 286	Game Theory and Economic Applications	2-5
ECON 288	Computational Economics	2-5
ECON 289	Advanced Topics in Game Theory and Information Economics	2-5
ECON 290	Multiperson Decision Theory	3

EDUC 247	Moral and Character Education	3
EDUC 375A	Seminar on Organizational Theory	5
ENGR 62	Introduction to Optimization	3-4
MS&E 111	Introduction to Optimization	3-4
MS&E 120	Probabilistic Analysis	5
MS&E 121	Introduction to Stochastic Modeling	4
MS&E 180	Organizations: Theory and Management	4
MS&E 201	Dynamic Systems	3-4
MS&E 250A	Engineering Risk Analysis	3
MS&E 250B	Project Course in Engineering Risk Analysis	3
MS&E 252	Decision Analysis I: Foundations of Decision Analysis	3-4
MS&E 254	The Ethical Analyst	1-3
MS&E 299	Voluntary Social Systems	1-3
MS&E 352	Decision Analysis II: Professional Decision Analysis	3-4
MS&E 355	Influence Diagrams and Probabilistics Networks	3
PHIL 154	Modal Logic	4
PHIL 164	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 166	Probability: Ten Great Ideas About Chance	4
PHIL 167B	Philosophy, Biology, and Behavior	4
PHIL 170	Ethical Theory	4
PHIL 194C	Time and Free Will	4
PHIL 194R	Epistemic Paradoxes	4
PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 266	Probability: Ten Great Ideas About Chance	4
PHIL 267B	Philosophy, Biology, and Behavior	4
PHIL 270	Ethical Theory	4
PHIL 366	Evolution and Communication	4
PHIL 387	Intention and Normative Judgment	2-4
POLISCI 152	Introduction to Game Theoretic Methods in Political Science	3-5
POLISCI 344U	Political Culture	3-5
POLISCI 351A	Foundations of Political Economy	3
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
PSYCH 70	Self and Society: Introduction to Social Psychology	4
PSYCH 75	Introduction to Cultural Psychology	5
PSYCH 80	Introduction to Personality and Affective Science	3
PSYCH 152	Mediation for Dispute Resolution	3
PSYCH 154	Judgment and Decision-Making	3
PSYCH 168	Emotion Regulation	3
PSYCH 205	Foundations of Cognition	1-3
PSYCH 212	Classic and contemporary social psychology research	1-3
PSYCH 215	Mind, Culture, and Society	3
PSYCH 223	Social Norms	3
PSYCH 232	Brain and Decision Making	3
PSYCH 252	Statistical Methods for Behavioral and Social Sciences	1-6
PSYCH 253	High-Dimensional Methods for Behavioral and Neural Data	3
PSYCH 268	Emotion Regulation	3
PSYCH 279	Topics in Cognitive Control	1-3
PUBLPOL 302B	Economic Analysis of Law	3

SOC 114	Economic Sociology	4
SOC 115	Topics in Economic Sociology	5
SOC 120	Interpersonal Relations	4
SOC 121	The Individual in Social Structure: Foundations in Sociological Social Psychology	5
SOC 126	Introduction to Social Networks	4
SOC 127	Bargaining, Power, and Influence in Social Interaction	5
SOC 160	Formal Organizations	4
SOC 214	Economic Sociology	4
SOC 220	Interpersonal Relations	4
SOC 226	Introduction to Social Networks	4
SOC 227	Bargaining, Power, and Influence in Social Interaction	5
SOC 260	Formal Organizations	4
STATS 200	Introduction to Statistical Inference	3
STATS 211	Meta-research: Appraising Research Findings, Bias, and Meta-analysis	3
STATS 217	Introduction to Stochastic Processes I	2-3
STATS 218	Introduction to Stochastic Processes II	3
STATS 310A	Theory of Probability I	2-4
STATS 310B	Theory of Probability II	2-3
STATS 310C	Theory of Probability III	2-4
SYMSYS Majors must take for 3 or more units		

## Natural Language

		Units
CS 124	From Languages to Information	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 229	Machine Learning	3-4
CS 276	Information Retrieval and Web Search	3
LINGUIST 105	Phonetics	4
LINGUIST 110	Introduction to Phonology	4
LINGUIST 116	Morphology	4
LINGUIST 124	Introduction to Lexical Function Grammar	2-4
LINGUIST 130A	Introduction to Semantics and Pragmatics	4
LINGUIST 130B	Introduction to Lexical Semantics	3-4
LINGUIST 140	Learning to Speak: An introduction to child language acquisition	4
LINGUIST 180	From Languages to Information	3-4
LINGUIST 188	Natural Language Understanding	3-4
LINGUIST 205B	Advanced Phonetics	2-4
LINGUIST 210A	Phonology	3-4
LINGUIST 210B	Advanced Phonology	2-4
LINGUIST 222A	Foundations of Syntactic Theory I	3-4
LINGUIST 224	Introduction to Lexical Function Grammar	2-4
LINGUIST 224B	Advanced Topics in Lexical Functional Grammar	1-4
LINGUIST 230A	Introduction to Semantics and Pragmatics	4
LINGUIST 230B	Semantics and Pragmatics I	2-4
LINGUIST 232A	Lexical Semantics	2-4
LINGUIST 241	Language Acquisition II	4
LINGUIST 280	From Languages to Information	3-4
LINGUIST 281	Computational Models of Linguistic Formalism	1-4
LINGUIST 285	Spoken Language Processing	2-4

LINGUIST 286	Information Retrieval and Web Search	3
LINGUIST 288	Natural Language Understanding	3-4
PHIL 154	Modal Logic	4
PHIL 181	Philosophy of Language	4

## Learning

		Units
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 224N	Natural Language Processing with Deep Learning	3-4
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
EDUC 124	Collaborative Design and Research of Technology-integrated Curriculum	3-4
EDUC 218	Topics in Cognition and Learning: Technology and Multitasking	3
EDUC 333A	Understanding Learning Environments	3
EDUC 342	Child Development and New Technologies	3
EE 376A	Information Theory	3
LINGUIST 140	Learning to Speak: An introduction to child language acquisition	4
LINGUIST 241	Language Acquisition II	4
LINGUIST 284	Natural Language Processing with Deep Learning	3-4
PSYCH 7Q	Language Understanding by Children and Adults	3
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
PSYCH 141	Cognitive Development	3
PSYCH 202	Cognitive Neuroscience	3
PSYCH 204	Computation and cognition: the probabilistic approach	3
PSYCH 239	Formal and Computational Approaches in Psychology and Cognitive Science	3
STATS 315A	Modern Applied Statistics: Learning	2-3
STATS 315B	Modern Applied Statistics: Data Mining	2-3

## Neurosciences

		Units
BIO 150	Human Behavioral Biology	5
BIO 153	Cellular Neuroscience: Cell Signaling and Behavior	4
BIO 154	Molecular and Cellular Neurobiology	4
BIO 158	Developmental Neurobiology	4
BIO 222	Exploring Neural Circuits	3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 223A	Introduction to Robotics	3
CS 229	Machine Learning	3-4
HUMBIO 163	Neural Systems and Behavior	4
MATH 113	Linear Algebra and Matrix Theory	3
NBIO 206	The Nervous System	6
NBIO 218	Neural Basis of Behavior	5
NENS 220	Computational Neuroscience	4
PHIL 186	Philosophy of Mind	4
PSYCH 30	Introduction to Perception	3
PSYCH 45	Introduction to Learning and Memory	3
PSYCH 50	Introduction to Cognitive Neuroscience	4
PSYCH 120	Cellular Neuroscience: Cell Signaling and Behavior	4
PSYCH 121	Ion Transport and Intracellular Messengers	3

PSYCH 204A	Human Neuroimaging Methods	3
PSYCH 204B	Computational Neuroimaging: Methods & Analyses	3
PSYCH 221	Image Systems Engineering	1-3
PSYCH 226	Models and Mechanisms of Memory	1-3
PSYCH 232	Brain and Decision Making	3
PSYCH 250	High-level Vision: From Neurons to Deep Neural Networks	3
PSYCH 252	Statistical Methods for Behavioral and Social Sciences	1-6
PSYCH 279	Topics in Cognitive Control	1-3
STATS 141	Biostatistics	3-5
STATS 191	Introduction to Applied Statistics	3-4
STATS 200	Introduction to Statistical Inference	3

## Cognate Courses for the Master's Degree

The following is a list of cognate courses that may be applied to the M.S. in Symbolic Systems. Click on the course or see ExploreCourses for course descriptions and General Education Requirements (GER) information. Courses taken for a Symbolic Systems degree or Minor must be taken for 3 units (or more). See Degree Requirements for details.

		Units
BIO 153	Cellular Neuroscience: Cell Signaling and Behavior	4
BIO 154	Molecular and Cellular Neurobiology	4
BIO 222	Exploring Neural Circuits	3
BIO 258	Developmental Neurobiology	4
BIO 263	Neural Systems and Behavior	4
BIOMEDIN 251	Outcomes Analysis	4
CME 100	Vector Calculus for Engineers	5
CME 100A	Vector Calculus for Engineers, ACE	6
CME 106	Introduction to Probability and Statistics for Engineers	4
CME 108	Introduction to Scientific Computing	3
COMM 206	Communication Research Methods	4-5
COMM 220	Digital Media in Society	4-5
COMM 272	Media Psychology	4-5
CS 103	Mathematical Foundations of Computing	3-5
CS 106A	Programming Methodology	3-5
CS 106X	Programming Abstractions (Accelerated)	3-5
CS 107	Computer Organization and Systems	3-5
CS 108	Object-Oriented Systems Design	3-4
CS 109	Introduction to Probability for Computer Scientists	3-5
CS 142	Web Applications	3
CS 147	Introduction to Human-Computer Interaction Design	3-5
CS 148	Introduction to Computer Graphics and Imaging	3-4
CS 154	Introduction to Automata and Complexity Theory	3-4
CS 157	Logic and Automated Reasoning	3
CS 161	Design and Analysis of Algorithms	3-5
CS 170	Stanford Laptop Orchestra: Composition, Coding, and Performance	1-5
CS 181	Computers, Ethics, and Public Policy	4
CS 204	Legal Informatics	2-3
CS 205A	Mathematical Methods for Robotics, Vision, and Graphics	3
CS 221	Artificial Intelligence: Principles and Techniques	3-4
CS 223A	Introduction to Robotics	3
CS 224N	Natural Language Processing with Deep Learning	3-4

CS 224S	Spoken Language Processing	2-4
CS 224U	Natural Language Understanding	3-4
CS 225A	Experimental Robotics	3
CS 225B	Robot Programming Laboratory	3-4
CS 227B	General Game Playing	3
CS 228	Probabilistic Graphical Models: Principles and Techniques	3-4
CS 229	Machine Learning	3-4
CS 247	Human-Computer Interaction Design Studio	3-4
CS 261	Optimization and Algorithmic Paradigms	3
CS 270	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
CS 274	Representations and Algorithms for Computational Molecular Biology	3-4
CS 276	Information Retrieval and Web Search	3
CS 294H	Research Project in Human-Computer Interaction	3
CS 376	Human-Computer Interaction Research	3-4
CS 377		
CS 448B	Data Visualization	3
ECON 102B	Applied Econometrics	5
ECON 102C	Advanced Topics in Econometrics	5
ECON 135	Finance for Non-MBAs	3
ECON 136	Market Design	5
ECON 137	Decision Modeling and Information	5
ECON 141	Public Finance and Fiscal Policy	5
ECON 153		
ECON 155	Environmental Economics and Policy	5
ECON 160	Game Theory and Economic Applications	5
ECON 179	Experimental Economics	5
ECON 190	Introduction to Financial Accounting	5
ECON 289	Advanced Topics in Game Theory and Information Economics	2-5
EDUC 218	Topics in Cognition and Learning: Technology and Multitasking	3
EDUC 247	Moral and Character Education	3
EDUC 298	Seminar on Teaching Introductory Computer Science	1
EDUC 333A	Understanding Learning Environments	3
EDUC 342	Child Development and New Technologies	3
EDUC 375A	Seminar on Organizational Theory	5
EE 263	Introduction to Linear Dynamical Systems	3
EE 364A	Convex Optimization I	3
EE 364B	Convex Optimization II	3
EE 376A	Information Theory	3
ENGR 155C	Introduction to Probability and Statistics for Engineers	4
ENGR 205	Introduction to Control Design Techniques	3
ENGR 209A	Analysis and Control of Nonlinear Systems	3
LINGUIST 106	Introduction to Speech Perception	4
LINGUIST 110	Introduction to Phonology	4
LINGUIST 116	Morphology	4
LINGUIST 120	Introduction to Syntax	4
LINGUIST 130B	Introduction to Lexical Semantics	3-4
LINGUIST 205A	Phonetics	4
LINGUIST 205B	Advanced Phonetics	2-4
LINGUIST 210A	Phonology	3-4
LINGUIST 210B	Advanced Phonology	2-4
LINGUIST 221A		
LINGUIST 221B		
LINGUIST 222A	Foundations of Syntactic Theory I	3-4
LINGUIST 224	Introduction to Lexical Function Grammar	2-4
LINGUIST 224B	Advanced Topics in Lexical Functional Grammar	1-4
LINGUIST 230A	Introduction to Semantics and Pragmatics	4
LINGUIST 230B	Semantics and Pragmatics I	2-4
LINGUIST 232A	Lexical Semantics	2-4
LINGUIST 241	Language Acquisition II	4
LINGUIST 280	From Languages to Information	3-4
LINGUIST 281	Computational Models of Linguistic Formalism	1-4
LINGUIST 282	Computational Theories of Syntax	3-4
LINGUIST 284	Natural Language Processing with Deep Learning	3-4
LINGUIST 286	Information Retrieval and Web Search	3
LINGUIST 288	Natural Language Understanding	3-4
MATH 113	Linear Algebra and Matrix Theory	3
MATH 151	Introduction to Probability Theory	3
MATH 161	Set Theory	3
ME 115A	Introduction to Human Values in Design	3
ME 115B	Product Design Methods	3
MUSIC 128	Stanford Laptop Orchestra: Composition, Coding, and Performance	1-5
MUSIC 220A	Fundamentals of Computer-Generated Sound	2-4
MUSIC 220B	Compositional Algorithms, Psychoacoustics, and Computational Music	2-4
MUSIC 220C	Research Seminar in Computer-Generated Music	2-4
MUSIC 250A	Physical Interaction Design for Music	3-4
MUSIC 251	Psychophysics and Music Cognition	1-5
MUSIC 253	Symbolic Musical Information	2-4
MUSIC 254	Music Query, Analysis, and Style Simulation	2-4
NBIO 206	The Nervous System	6
NBIO 218	Neural Basis of Behavior	5
NBIO 220	Central Mechanisms in Vision-based Cognition	2-4
NENS 220	Computational Neuroscience	4
PHIL 102	Modern Philosophy, Descartes to Kant	4
PHIL 184P	Probability and Epistemology	4
PHIL 185	Theory of Understanding	4
PHIL 194C	Time and Free Will	4
PHIL 194R	Epistemic Paradoxes	4
PHIL 243	Quine	4
PHIL 250	Mathematical Logic	4
PHIL 251	Metalogic	4
PHIL 252	Computability and Logic	4
PHIL 254	Modal Logic	4
PHIL 257	Topics in Philosophy of Logic	3
PHIL 264	Central Topics in the Philosophy of Science: Theory and Evidence	4
PHIL 265	Philosophy of Physics: Philosophical Issues in Quantum Mechanics	4
PHIL 266	Probability: Ten Great Ideas About Chance	4
PHIL 267B	Philosophy, Biology, and Behavior	4
PHIL 270	Ethical Theory	4
PHIL 280		
PHIL 280A	Realism, Anti-Realism, Irrealism, Quasi-Realism	4
PHIL 281	Philosophy of Language	4
PHIL 282	Advanced Philosophy of Language	4
PHIL 284	Epistemology	4
PHIL 284F	Feminist Theories of Knowledge	4

PHIL 286	Philosophy of Mind	4	SOC 121	The Individual in Social Structure: Foundations in Sociological Social Psychology	5
PHIL 287	Philosophy of Action	4	SOC 214	Economic Sociology	4
PHIL 288	Personal Identity	4	SOC 220	Interpersonal Relations	4
PHIL 289	Examples of Free Will	4	SOC 226	Introduction to Social Networks	4
PHIL 350A	Model Theory	3	SOC 227	Bargaining, Power, and Influence in Social Interaction	5
PHIL 351A	Recursion Theory	3	STATS 110	Statistical Methods in Engineering and the Physical Sciences	4-5
PHIL 354	Topics in Logic	1-3	STATS 116	Theory of Probability	3-5
PHIL 355			STATS 141	Biostatistics	3-5
PHIL 366	Evolution and Communication	4	STATS 191	Introduction to Applied Statistics	3-4
PHIL 387	Intention and Normative Judgment	2-4	STATS 200	Introduction to Statistical Inference	3
PHIL 391	Research Seminar in Logic	1-3	STATS 211	Meta-research: Appraising Research Findings, Bias, and Meta-analysis	3
POLISCI 351A	Foundations of Political Economy	3	STATS 217	Introduction to Stochastic Processes I	2-3
POLISCI 352	Introduction to Game Theoretic Methods in Political Science	3-5	STATS 218	Introduction to Stochastic Processes II	3
PSYCH 104			STATS 310A	Theory of Probability I	2-4
PSYCH 110			STATS 310B	Theory of Probability II	2-3
PSYCH 120	Cellular Neuroscience: Cell Signaling and Behavior	4	STATS 310C	Theory of Probability III	2-4
PSYCH 134			STATS 315A	Modern Applied Statistics: Learning	2-3
PSYCH 141	Cognitive Development	3	STATS 315B	Modern Applied Statistics: Data Mining	2-3
PSYCH 143					
PSYCH 152	Mediation for Dispute Resolution	3			
PSYCH 154	Judgment and Decision-Making	3			
PSYCH 167					
PSYCH 202	Cognitive Neuroscience	3			
PSYCH 204	Computation and cognition: the probabilistic approach	3			
PSYCH 204A	Human Neuroimaging Methods	3			
PSYCH 204B	Computational Neuroimaging: Methods & Analyses	3			
PSYCH 205	Foundations of Cognition	1-3			
PSYCH 212	Classic and contemporary social psychology research	1-3			
PSYCH 215	Mind, Culture, and Society	3			
PSYCH 221	Image Systems Engineering	1-3			
PSYCH 223	Social Norms	3			
PSYCH 226	Models and Mechanisms of Memory	1-3			
PSYCH 228	Ion Transport and Intracellular Messengers	3			
PSYCH 232	Brain and Decision Making	3			
PSYCH 239	Formal and Computational Approaches in Psychology and Cognitive Science	3			
PSYCH 245					
PSYCH 250	High-level Vision: From Neurons to Deep Neural Networks	3			
PSYCH 251	Lab in Experimental Methods	4			
PSYCH 252	Statistical Methods for Behavioral and Social Sciences	1-6			
PSYCH 253	High-Dimensional Methods for Behavioral and Neural Data	3			
PSYCH 259					
PSYCH 262					
PSYCH 270	The Self: Representations and Interventions	3			
PSYCH 272					
PSYCH 279	Topics in Cognitive Control	1-3			
PUBLPOL 201	Politics and Public Policy	4-5			
PUBLPOL 202					
PUBLPOL 204	Economic Policy Analysis	4-5			
PUBLPOL 302B	Economic Analysis of Law	3			

# THEATER AND PERFORMANCE STUDIES

Courses offered by the Department of Theater and Performance Studies are listed on the Stanford Bulletin's ExploreCourses web site under the subject codes TAPS (<https://explorecourses.stanford.edu/search?q=TAPS&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-TAPS=on>) and DANCE (<https://explorecourses.stanford.edu/search?q=DANCE&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-DANCE=on&filter-catalognumber-DANCE=on>).

## Mission of the Undergraduate Program in Theater and Performance Studies

The mission of the undergraduate program in Theater and Performance Studies is to provide a strong, non-conservatory program that joins the study and practice of performance within the context of a liberal arts curriculum. The department gives students a strong grasp of historical, cultural, and practical contexts in which live performance develops. With close faculty contact, department majors pursue areas of interest that may include acting, directing, writing, dance, devised theater, design, stage management, performance theory, and cultural studies. During the senior year students complete a senior project as part of fulfilling the 60 units required for the major.

## Learning Outcomes (Undergraduate)

The department expects undergraduate majors in the program to achieve the following learning outcomes:

1. the ability to write analytically about theater and performance
2. the ability to put aesthetic and creative skills into practice
3. the ability to find meaningful ways of integrating theory and practice
4. the ability to research effectively
5. the ability to articulate ideas about theater, dance and live arts.

## Mission of the Graduate Program in Theater and Performance Studies

The mission of the graduate program in Theater and Performance Studies (TAPS) is to educate students who work on the leading edge of both scholarly and performance practice. The Ph.D. program includes the study of critical theory, dramatic literature, performance theory, theater history, and performance making. Graduate students complete a program with a rigorous study of critical theory, textual history, elements of production (directing, acting, choreography, writing, and design) and embodied research.

## Learning Outcomes (Graduate)

The Ph.D. is conferred upon candidates who have demonstrated substantial scholarship and the ability to conduct independent research and analysis in Theater and Performance Studies. Through completion of advanced course work and rigorous skills training, the doctoral program prepares students to make original contributions to the knowledge and production of Theater and Performance Studies, and to interpret and present the results of such research.

## Institute for Diversity in the Arts and Black Performing Arts Division

The Institute for Diversity in the Arts (IDA) is an interdisciplinary program in the humanities that involves students in the study of culture, identity and diversity through artistic expression. The Committee on Black Performing Arts (CBPA) and the Institute for Diversity in the Arts (IDA) merged in Autumn 2005. The mission of IDA/CBPA is to engage artists, students, and the local community collaboratively to create performance and visual art that examines the intersections among race, diversity, and social action through programming that includes artist residencies, classes, workshops, public performances, a lecture series, and symposia.

The division produces annual student productions and is a resource for student organizations promoting artistic expression through the exploration of the impact of ethnic representation in the arts, literature, media, and pop culture. The programs prepare students for work in areas including the arts and community development. Students have gone on to graduate-level critical studies, M.F.A. programs, public service, government and politics, arts administration, and teaching. Students can pursue an IDA concentration through the Comparative Studies in Race and Ethnicity major; students can also emphasize Black performance through the African and African American Studies major.

## Bachelor of Arts in Theater and Performance Studies

The B.A. degree in Theater and Performance Studies provides students with historical, critical, and practical knowledge about theater and performance. Students are encouraged to declare the major in their sophomore year, if not sooner.

## Suggested Preparation for the Major

Prospective majors in the first two years of study at Stanford are encouraged to take part in casting opportunities in department productions.

## Degree Requirement Overview - 60 units total for the Major

The following chart is an outline of the TAPS major degree requirements. All majors must choose a major concentration in either Acting or Theater-Making. Specific requirements for these concentrations can be found in subsequent sections. Students who declared prior to September 2016 should refer to previous guidelines and requirements for the major.

	Units
TAPS 1	4
Introduction to Theater and Performance Studies	4
16 units in Theater and Dance Studies	16
18 units in Practicum	18
8 units in Production	8
10 units of Electives	10
TAPS 200	4
Senior Project	4
<b>Total Units</b>	<b>60</b>

Note: A course may be listed in more than one area; however, each course can only satisfy one major requirement. There is no double credit for a course.

## Concentrations

All TAPS majors are required to select a concentration in Acting or Theater-Making. General guidance on course sequencing is available from the TAPS Director of Undergraduate Studies, Diana Looser; the coordinator of the Acting concentration, Amy Freed; and the coordinator of the Theater-Making concentration, Leslie Hill.

## I. Acting

The Acting concentration develops students' skills in acting for the theater and related performance contexts. In practicum classes, students enhance their creative abilities under the guidance of teaching artists. Students also complete complementary coursework in performance studies and are encouraged to explore playwriting, directing, and/or devising in order to expand their exposure to major ideas and approaches in the field. Students in this concentration are encouraged to take the required course TAPS 120A Acting I: Fundamentals of Acting early in the major as a gateway for their further technique classes.

<b>1. Core</b>		<b>4</b>
TAPS 1	Introduction to Theater and Performance Studies (Must be taken for a letter grade.)	
<b>2. Theater and Dance Studies</b> <sup>1</sup>		<b>16</b>
TAPS 11N	Dramatic Tensions: Theater and the Marketplace	
TAPS 12N	To Die For: Antigone and Political Dissent	
TAPS 20N	Prisons and Performance	
TAPS 21N	The Idea of Virtual Reality	
TAPS 108	Introduction to Feminist, Gender, and Sexuality Studies	
TAPS 150G	Performing Race, Gender, and Sexuality	
TAPS 153M	Mechanics of the Theater: The Technologies of Stagecraft	
TAPS 154G	Black Magic: Ethnicity, Race, and Identity in Performance Cultures	
TAPS 154I		
TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	
TAPS 156V	Vital Signs: Performance in the 21st Century	
TAPS 157	World Drama and Performance	
TAPS 165	Introduction to Comparative Studies in Race and Ethnicity	
TAPS 167	Introduction to Greek Tragedy: Gods, Heroes, Fate, and Justice	
TAPS 167H	Revolutions in Theater	
TAPS 180Q	Noam Chomsky: The Drama of Resistance	
TAPS 201	Theater History	
TAPS 248	Family Drama: American Plays about Families	
TAPS 253T	Virtual Realities: Art, Technology, Performance	
TAPS 258	Black Feminist Theater and Theory	
DANCE 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	
DANCE 161D	Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders	
<b>3. Practicum</b>		<b>18</b>
TAPS 120A	Acting I: Fundamentals of Acting (Gateway, Required)	
TAPS 60		
TAPS 103	Beginning Improvising	
TAPS 104	Intermediate Improvisation	
TAPS 115	Musical Theater	
TAPS 120B	Acting II: Advanced Acting	
TAPS 121C	Physical Characterization	
TAPS 121V	Voice for the Actor	
TAPS 122P	Undergrad Performance Project: Life is a Dream	
TAPS 124D	Acting for Non-Majors	
TAPS 125	Acting Shakespeare	
TAPS 125C	Acting Chekhov	
TAPS 125S	Shakespeare Now: An Actor's Lab	

TAPS 127	Movement for the Actor	
TAPS 127S	Acting Through Song	
TAPS 127W	Introduction to Clown	
TAPS 183C	Interpretation of Musical Theater Repertoire	
TAPS 183E	Singing for Musicals	
TAPS 184C	Dramatic Vocal Arts: Songs and Scenes Onstage	
<b>4. Production</b>		<b>8</b>
TAPS 34	Stage Management Techniques (Required)	
TAPS 39	Theater Crew (Required)	
TAPS 134	Stage Management Project (Required)	
<b>5. Electives</b> <sup>2</sup>		<b>10</b>
<b>6. Capstone Project</b> <sup>3</sup>		<b>4</b>
TAPS 200	Senior Project	
<b>Total Units</b>		<b>60</b>

*Note:* TAPS 121C, TAPS 125, and TAPS 127S will not be offered in 2017-18.

- One of the courses completed for this requirement must be a Writing in the Major course. In 2017-18 the Writing in the Major courses are:
  - TAPS 157 World Drama and Performance
  - TAPS 167H Revolutions in Theater
- All courses in TAPS and DANCE qualify as electives. 4 units of ITALIC or SLE can also count as electives.
- All TAPS Majors must complete a Senior Project that represents significant work in any area of theater and/or performance. The project must be an original contribution and can consist of any of the following: devising a performance, choreographing a dance, stage managing a production, designing a large theater work, performing a major role, writing a play, directing a show, or researching and writing a senior essay. Work for this project normally begins in Spring Quarter of the junior year and must be completed by the end of the senior year. Students receive credit for senior projects through TAPS 200. A minimum of 4 units is required, but additional units are available for larger projects. Students pursuing senior projects must submit a two-page proposal to a faculty adviser of their choice, which must be approved by the Director of Undergraduate Studies Diana Looser and the department faculty no later than the end of Spring Quarter of the junior year.

## II. Theater-Making

This concentration develops students' creative skills in theater-making. The theater-making concentration reflects the collaborative interdisciplinary nature of theater practice, with rich partnerships and dialogues between the crafts of directing, playwriting, producing, design and stagecraft. Students learn skills to build original theater productions. The disciplines grouped under this concentration offer a broad cross-section of theater-making skills and approaches. Students in this concentration are encouraged to take the required courses TAPS 30 Introduction to Theatrical Design and TAPS 101P Theater and Performance Making early in the major as a gateway for their further studies.

		<b>Units</b>
<b>1. Core</b>		<b>4</b>
TAPS 1	Introduction to Theater and Performance Studies (Must be taken for a letter grade.)	
<b>2. Theater and Dance Studies</b> <sup>1</sup>		<b>16</b>
TAPS 11N	Dramatic Tensions: Theater and the Marketplace	
TAPS 12N	To Die For: Antigone and Political Dissent	
TAPS 20N	Prisons and Performance	
TAPS 21N	The Idea of Virtual Reality	

TAPS 108	Introduction to Feminist, Gender, and Sexuality Studies	
TAPS 150G	Performing Race, Gender, and Sexuality	
TAPS 153M	Mechanics of the Theater: The Technologies of Stagecraft	
TAPS 154G	Black Magic: Ethnicity, Race, and Identity in Performance Cultures	
TAPS 154I		
TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	
TAPS 156V	Vital Signs: Performance in the 21st Century	
TAPS 157	World Drama and Performance	
TAPS 165	Introduction to Comparative Studies in Race and Ethnicity	
TAPS 167	Introduction to Greek Tragedy: Gods, Heroes, Fate, and Justice	
TAPS 167H	Revolutions in Theater	
TAPS 180Q	Noam Chomsky: The Drama of Resistance	
TAPS 201	Theater History	
TAPS 248	Family Drama: American Plays about Families	
TAPS 253T	Virtual Realities: Art, Technology, Performance	
TAPS 258	Black Feminist Theater and Theory	
DANCE 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	
DANCE 161D	Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders	
<b>3. Practicum</b>		<b>18</b>
TAPS 30	Introduction to Theatrical Design (Gateway, Required)	
TAPS 101P	Theater and Performance Making (Gateway, Required)	
TAPS 17N	Acting for Activists	
TAPS 21	StoryCraft	
TAPS 28	Makeup for the Stage	
TAPS 31	Introduction to Lighting and Production	
TAPS 32F	Godiva to Gaga: A Survey of Western Fashion and Societal Implications	
TAPS 33	Introduction to Technical Theater and Production	
TAPS 42	Costume Construction	
TAPS 131	Lighting Design	
TAPS 132	Costume Design	
TAPS 133	Stage Scenery Design	
TAPS 133D	Set Design Practicum	
TAPS 135C	Theory & Craft of the Scenographic Model	
TAPS 135M	Introduction to Media Production	
TAPS 136S	Hidden Gems: Bay Area Theater Architecture post 1906	
TAPS 170A	The Director's Craft	
TAPS 170B	Directing Workshop: The Actor-Director Dialogue	
TAPS 174V		
TAPS 175T	Collaborative Theater-Making	
TAPS 176N	The Inside Story	
TAPS 177C	Creating a Musical	
TAPS 177W	Workshop with Young Jean Lee	
TAPS 178B	Intensive Playwriting	
TAPS 178C	Writing a Full-Length Play	
TAPS 178D	Editing a Full-Length Play	
TAPS 177	Dramatic Writing: The Fundamentals	

Up to 4 units of an acting class may count towards this requirement as well.

With the approval of the Director of Undergraduate Studies, students may be able to count a limited number of the following special research or independent study courses towards the practicum requirement:

TAPS 39	Theater Crew	
TAPS 134	Stage Management Project	
TAPS 140	Introduction to Projects in Theatrical Production	
TAPS 190	Special Research	
TAPS 191	Independent Study	
TAPS 231	Advanced Stage Lighting Design	
TAPS 232	Advanced Costume Design	
TAPS 233	Advanced Scene Design	
<b>4. Production</b>		<b>8</b>
TAPS 34	Stage Management Techniques (Required)	
TAPS 39	Theater Crew (Required)	
TAPS 134	Stage Management Project (Required) <sup>2</sup>	
<b>5. Electives<sup>3</sup></b>		<b>10</b>
<b>6. Capstone Project<sup>4</sup></b>		<b>4</b>
TAPS 200	Senior Project	
<b>Total Units</b>		<b>60</b>

*Note: TAPS 28, TAPS 32F, TAPS, TAPS 136S, TAPS 177, and TAPS 178B will not be offered this year.*

<sup>1</sup> One of the courses completed for this requirement must be a Writing in the Major course. In 2017-18 the Writing in the Major courses are:

- TAPS 157 World Drama and Performance
- TAPS 167H Revolutions in Theater

<sup>2</sup> All courses in TAPS and DANCE qualify as electives.

<sup>3</sup> An alternative to TAPS 134 Stage Management Project is completing a mentored project or assistantship in an advanced production role. Students who participate in this option must enroll in an independent study.

<sup>4</sup> All TAPS Majors must complete a Senior Project that represents significant work in any area of theater and/or performance. The project must be an original contribution and can consist of any of the following: devising a performance, choreographing a dance, stage managing a production, designing a large theater work, performing a major role, writing a play, directing a show, or researching and writing a senior essay. Work for this project normally begins in Spring Quarter of the junior year and must be completed by the end of the senior year. Students receive credit for senior projects through TAPS 200. A minimum of 4 units is required, but additional units are available for larger projects. Students pursuing senior projects must submit a two-page proposal to a faculty adviser of their choice, which must be approved by the Director of Undergraduate Studies Diana Looser and the department faculty no later than the end of Spring Quarter of the junior year.

## Honors Program

For a select number of students, the department confers the degree of Bachelor of Arts with Honors in Theater and Performance Studies. To qualify for departmental honors, students must meet the following requirements in addition to the other requirements of the TAPS major:

1. Applying to the honors program involves a written application, including a project proposal and transcript, which establishes the student's work to date in the department and outlines the area of research that the student wishes to pursue. Students must have at least an overall University GPA of 3.3 and a 3.5 GPA in courses counting towards the major.



- Students must have completed a significant portion of their major coursework before enrolling in honors. It is recommended that students have taken courses that have prepared them for advanced study in the proposed area of research.
- Students enroll in TAPS 202 Honors Thesis, which is worth four units total. Students need to enroll in this course each quarter during the senior year (1 unit in Autumn; 1 unit in Winter; 2 units in Spring). It is graded S/NC (grade determined by the student's advisor).
- The honors thesis (described below) is due on May 15th in the Spring quarter and is double-marked by the primary advisor and one other faculty member.
- Entry into the honors program does not guarantee an honors degree. The final decision to confer an honors degree is made by the student's thesis committee upon evaluating the quality of the thesis.

## Honors Thesis

There are two ways to undertake an honors thesis. The first is to write a 40-50 page essay, presenting research on an important issue or subject of the student's choice. The second option is for a student to use their capstone project as a case study. In this situation, the honors thesis will critically analyze the creative work. Generally, these essays tend to be shorter (about 30 pages) because the creative work constitutes part of the honors project. Students are expected to work consistently throughout the year with their advisor, whom they identify at the time of application. Advisors can be selected from Academic Council faculty or artists-in-residence.

## Minor in Theater and Performance Studies

The TAPS Minor is offered with two distinct concentrations: The Theater and Performance Studies concentration provides students with historical, critical, and practical knowledge about theater and performance. The Dance concentration examines the field of dance.

### Minor Requirements – 30 units total for the minor

All minors must choose a concentration in Theater and Performance Studies or Dance. Specific requirements for these concentrations can be found in subsequent sections. Students who declared prior to September 2016 should refer to previous guidelines and requirements for the major. Each course can only satisfy one minor requirement. A student may petition to the department undergraduate adviser to have additional courses offered by the department count towards the requirements. The minor is declared in Axess.

### I. Degree Requirements for the Minor (Theater and Performance Studies Concentration):

	Units
TAPS 1 Introduction to Theater and Performance Studies (Must be taken for a letter grade. )	4
TAPS 39 Theater Crew	1
or TAPS 39D Small Project Stage Management	
4 units in Theater and Dance Studies <sup>1</sup>	4
7 units in Performance Practice <sup>2</sup>	7
14 units of Electives <sup>3</sup>	14
<b>Total Units</b>	<b>30</b>

<sup>1</sup> In 2017-18 the following courses satisfy the Theater and Dance Studies requirement:

- TAPS 11N Dramatic Tensions: Theater and the Marketplace
- TAPS 12N To Die For: Antigone and Political Dissent
- TAPS 20N Prisons and Performance
- TAPS 21N The Idea of Virtual Reality
- TAPS 108 Introduction to Feminist, Gender, and Sexuality Studies
- TAPS 150G Performing Race, Gender, and Sexuality
- TAPS 153M Mechanics of the Theater: The Technologies of Stagecraft
- TAPS 154G Black Magic: Ethnicity, Race, and Identity in Performance Cultures
- TAPS 154I
- TAPS 156 Performing History: Race, Politics, and Staging the Plays of August Wilson
- TAPS 156V Vital Signs: Performance in the 21st Century
- TAPS 157 World Drama and Performance
- TAPS 165 Introduction to Comparative Studies in Race and Ethnicity
- TAPS 167 Introduction to Greek Tragedy: Gods, Heroes, Fate, and Justice
- TAPS 167H Revolutions in Theater
- TAPS 180Q Noam Chomsky: The Drama of Resistance
- TAPS 201 Theater History
- TAPS 248 Family Drama: American Plays about Families
- TAPS 253T Virtual Realities: Art, Technology, Performance
- TAPS 258 Black Feminist Theater and Theory
- DANCE 160M Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture
- DANCE 161D Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders

<sup>2</sup> All theater and dance practice classes (such as those in acting, design, playwriting, directing, and dance practice) may count towards this requirement.

<sup>3</sup> All courses in TAPS and DANCE qualify as electives.

### II. Degree Requirements for the Minor (Dance Concentration):

The Dance concentration offers diverse approaches to dance as a performing art, cultural practice, political act, and embodiment of ideology and beliefs. The minor requirements integrate academic and creative studio work to help students develop a command of dance as an art form and as a subject of critical inquiry. Students study a range of techniques grounded in Western dance practices as well as a variety of global dance forms, and have regular opportunities to perform, choreograph, and collaborate. Guidance on course sequencing is available from the TAPS Director of Undergraduate Studies, Diana Looser and/or from the coordinator of the Dance concentration, Alex Ketley. Students in this concentration are encouraged to take the required course TAPS 160 Performance and History: Rethinking the Ballerina early in the major as a gateway for their further studies.

	Units
<b>1. Core</b>	<b>4</b>
TAPS 1 Introduction to Theater and Performance Studies (Must be taken for a letter grade.)	
<b>2. Theater and Dance Studies</b>	<b>8</b>
DANCE 160 Performance and History: Rethinking the Ballerina (Gateway, Required) <sup>1</sup>	
TAPS 11N Dramatic Tensions: Theater and the Marketplace	
TAPS 12N To Die For: Antigone and Political Dissent	
TAPS 20N Prisons and Performance	
TAPS 21N The Idea of Virtual Reality	
TAPS 108 Introduction to Feminist, Gender, and Sexuality Studies	
TAPS 150G Performing Race, Gender, and Sexuality	
TAPS 153M Mechanics of the Theater: The Technologies of Stagecraft	

TAPS 154G	Black Magic: Ethnicity, Race, and Identity in Performance Cultures	
TAPS 154I		
TAPS 156	Performing History: Race, Politics, and Staging the Plays of August Wilson	
TAPS 156V	Vital Signs: Performance in the 21st Century	
TAPS 157	World Drama and Performance	
TAPS 165	Introduction to Comparative Studies in Race and Ethnicity	
TAPS 167	Introduction to Greek Tragedy: Gods, Heroes, Fate, and Justice	
TAPS 167H	Revolutions in Theater	
TAPS 180Q	Noam Chomsky: The Drama of Resistance	
TAPS 201	Theater History	
TAPS 248	Family Drama: American Plays about Families	
TAPS 253T	Virtual Realities: Art, Technology, Performance	
TAPS 258	Black Feminist Theater and Theory	
DANCE 160M	Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture	
DANCE 161D	Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders	
<b>3. Production</b>		<b>1</b>
TAPS 39	Theater Crew	
<b>4. Technique</b>		<b>8</b>
	Minimum of Six Studio Classes <sup>2</sup>	
<b>5. Choreography, Repertory, Performance</b>		<b>9</b>
DANCE 27	Faculty Choreography	
DANCE 25	Studio to Stage: Student Choreography Projects	
DANCE 30	Chocolate Heads Performance Project: Dance & Intercultural Performance Creation	
DANCE 45	Dance Improv StratLab: Freestyle Improvisation from Contemporary to Hip Hop & Beyond	
DANCE 50	Contemporary Choreography	
DANCE 63	Beginning Dance and Dance Making	
DANCE 100	Dance, Movement and Medicine: Immersion in Dance for PD	
DANCE 102	Musical Theater Dance Styles	
DANCE 106	Choreography Project: Dancing, Recollected	
DANCE 106I	Stanford Dance Community: Inter-Style Choreography Workshop	
DANCE 108	Hip Hop Meets Broadway	
DANCE 123	Hot Mess: Deliberate Failure as Practice	
<b>Total Units</b>		<b>30</b>

*Note: DANCE 63 and DANCE 106 will not be offered in 2017-18.*

<sup>1</sup> DANCE 160 Performance and History: Rethinking the Ballerina will not be offered in 2017-18. Students looking to complete this requirement, may substitute TAPS 161D Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders this year only.

<sup>2</sup> Students pursuing the Dance Concentration must complete six studio dance classes for the Technique requirement:

- At least three classes chosen from a specific dance form (e.g. Contemporary, Modern, Jazz, Hip-Hop, Ballet, or Social), and the attainment of intermediate or advanced level.
- At least two classes in a style other than the student's primary chosen dance form.

## Doctor of Philosophy in Theater and Performance Studies

The mission of the graduate program in Theater & Performance Studies (TAPS) is to educate students who work on the leading edge of both scholarly and performance practice. The Ph.D. program includes the study of critical theory, dramatic literature, performance theory, theater history, and performance making. Graduate students complete a program with a rigorous study of critical theory, textual history, elements of production (directing, acting, choreography, writing, and design) and embodied research.

### Admission

Applicants for the Ph.D. program can visit our Theater and Performance Studies (<http://taps.stanford.edu/phd.html>) web site for information. Online graduate applications are available at the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site. All applicants must submit the following as part of their application: Statement of purpose, Three recommendations, Artistic Statement, Summary of Production Experience and Resume/CV, and Two samples of written critical work, not exceeding 25 pages total. An invitation to interview may be extended by the end of January. Graduate students in the Department of Theater and Performance Studies begin study in Autumn Quarter of each academic year; there are no mid-year admissions.

### University Degree Requirements

University requirements for the Ph.D. are described in the "Graduate Degrees (<http://stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

### Degree Requirements

#### Units and Course Requirements

Stanford Ph.D. students must complete a minimum of 135 units of graduate courses and seminars in support of the degree. Within the 135 unit minimum, TAPS Ph.D. students must complete the following:

	<b>Units</b>
<b>REQUIRED COURSES</b>	
<b>Core Seminars</b>	<b>16</b>
TAPS 311	Performance and Historiography
TAPS 313	Performance and Performativity
TAPS 314	Performing Identities
TAPS 315	Dramaturgy
<b>TAPS Workshops</b>	<b>16</b>
TAPS 371P	Theater and Performance Making <sup>1</sup>
TAPS 372	Directing Workshop: The Actor-Director Dialogue <sup>2</sup>
TAPS 370A	The Director's Craft <sup>3</sup>
TAPS 376	Projects in Performance <sup>4</sup>
<b>Production Requirement</b>	<b>1</b>
TAPS 335	Introduction to Graduate Production
<b>Elective Seminars</b>	<b>16-20</b>
	Four additional graduate seminars within the Department of Theater and Performance Studies to be worked out with the adviser.
<b>Total Units</b>	<b>49-53</b>

<sup>1</sup> In the first year students take TAPS 371P Theater and Performance Making, which focuses on generating original creative work through a range of techniques.

<sup>2</sup> In the first year, students usually take TAPS 372 Directing Workshop: The Actor-Director Dialogue.

- <sup>3</sup> In the second year, students usually take TAPS 370A The Director's Craft. These classes explore the relationship between acting and directing and actors and directors.
- <sup>4</sup> TAPS 376 Projects in Performance is the production and performance of creative work during the Winter quarter of the 2nd year, a project that is approved by the Graduate Studies Committee (GSC) and supervised by a faculty member.

Note: All substitutions to the required courses must be in the department and approved by the Director of Graduate Studies in response to a written request by the student. Students are allowed to take up to 6 units of TAPS 390 Directed Reading, to count towards the 135 units required for graduation.

### Language Requirement

The student must demonstrate reading knowledge of one foreign language in which there is a major body of dramatic literature. The language requirement must be met before the student can be advanced to candidacy. The language requirement may be fulfilled in any of the following ways:

1. achievement of a sufficiently high score (70th percentile) on the foreign language examination prepared by the Educational Testing Service (ETS). Latin and Greek are not tested by ETS.
2. a reading examination given each quarter by the various language departments, except for Latin and Greek.
3. pass with a grade of 'B' or higher a 100-level or higher foreign language course at Stanford.

### Assistantships

Students must participate in seven quarters of assistantship in Theater and Performance Studies:

*Research Assistantship:* Three quarters of research assistantship with faculty members are required. Generally, this requirement is fulfilled in the third year.

*Teaching Assistantship:* Four quarters of supervised TA-ship at half time are a required part of the Ph.D. program. The requirement is normally met by serving as a TA for three courses during the fourth year and one course during the fifth year.

### Examinations

Students must complete three examinations (comprehensive, qualifying, and department oral) by the end of the first three years of study at Stanford.

*First-Year Comprehensive Exam:* The first year exam is based on a reading list of dramatic works, choreography, and theoretical texts in theater and dance which is sent to students in the summer before the first quarter of study begins. The exam is an open book, take-home exam made up of several essay questions. Students sign up for the 2 unit course TAPS 336 Comprehensive 1st Year Exam to prepare.

*Second-Year Qualifying Exam:* The qualifying examination consists of two 20-25 page essays. Each of these essays should demonstrate knowledge of a historical pre-20th century period. Essay topics are chosen in consultation with a faculty adviser. The reading list for each essay must be approved by the end of the first year. These essays should not duplicate any written work from seminars. The Graduate Studies Committee reads and evaluates these essays. The first essay is due in the autumn quarter. Candidates must choose from the following historical periods: Ancient/Classical, Medieval and Renaissance, and 17th-, 18th-, or early 19th-century. The performance project is completed in the winter quarter of the second year, and supervised by one or more faculty members. Faculty work with the student throughout autumn and winter quarters on the production, and attend a combination of dress rehearsals or final performances as part of the evaluation. After the performance, the student participates in a *viva voce*, or talk-back,

with the supervising faculty. Students register for TAPS 376 Projects in Performance for 4 units while completing their 2<sup>nd</sup>-year project.

*Third-Year Department Oral Exam:* This exam is based on a literature review and annotations for three reading lists created by the student in consultation with the 3 faculty members with whom they will meeting about their readings. The form of the exam is an opening 20 minute overview by the student integrating the readings followed by questions from the committee about the reading lists.

### Admission to Candidacy

At the end of the second year of study, the Graduate Studies Committee makes a decision on whether or not to admit an individual student to candidacy. Based on its evaluation of the student, the Graduate Studies Committee certifies the student's qualifications for candidacy. Candidacy is an important decision grounded in an overall assessment of a student's ability to complete the Ph.D. program at a high level. As detailed in the department's Graduate Handbook, there are prerequisites for admission to candidacy: the completion of specified coursework, the first-year qualifying exam, the second-year qualifying papers and the language requirement. However, fulfillment of these prerequisites and grades in courses constitute only a part of the evidence weighed by faculty in making this judgment. Since the Ph.D. is conferred upon candidates who have demonstrated through their dissertation the ability to conduct substantive, original research that contributes to knowledge in theater and performance studies, the candidacy decision also rests upon indicators of the student's ability to conduct work in the field. Upon favorable action, the student files a formal application for candidacy, as prescribed by the University, by the end of Summer Quarter of the second year. By University policy, candidacy is valid for five years unless terminated by the department. Failure to advance to candidacy results in the dismissal of the student from the program.

### Dissertation Prospectus

The dissertation prospectus must be approved by the candidate's adviser and by the departmental Graduate Studies Committee two quarters after taking the department oral. This should be done in, or before, the autumn quarter of the fourth year. Within 30 days of approval, a student should schedule a prospectus colloquium with the proposed reading committee (the dissertation director and two other faculty members). The prospectus must be prepared in close consultation with the dissertation adviser during the months preceding the colloquium. The prospectus should be 5-8 pages and minimally cover three things: the research question and context, the methodology for research, and a complete chapter by chapter plan.

### University Oral Examination

In Theater and Performance Studies, the University oral examination takes the form of a dissertation defense. A full draft of the dissertation must be submitted at least 75 days before the proposed degree conferral. The examining committee consists of five faculty members: one faculty chair from outside the department who does not share an appointment with the department of any of the examiners, the student's primary adviser, two additional readers who are familiar with the dissertation project, and a fifth faculty member attending the oral examination.

### Dissertation

The dissertation is an original work of scholarship created under the supervision of a primary dissertation advisor. The dissertation is the capstone of the Ph.D. in Theater & Performance Studies.

### Satisfactory Progress and Annual Review

The program and progress of each student must be evaluated by the Graduate Studies Committee at the end of each academic year. At the end of the first year, the Graduate Studies Committee evaluates the work of each student in classes, seminars, examinations, and performance. Production planning in the spring of each year for the following season is contingent upon students making satisfactory progress. Continuation in the program depends upon the recommendation of this faculty group.

At the end of the second year, the committee reviews the student's work in consideration of being admitted to candidacy. By the beginning of the fourth year, students are expected to have developed an approved dissertation prospectus. Funding is contingent upon satisfactory progress. Failure to make satisfactory progress may result in dismissal from the program.

## Ph.D. Minor in Theater and Performance Studies

Students pursuing the Ph.D. minor in Theater and Performance Studies must complete a minimum of 20 units. Within the 20 units, students must complete the following:

	<b>Units</b>
TAPS 313 Performance and Performativity	4
TAPS 371P Theater and Performance Making	4
Any additional TAPS courses at the 200- or 300-level to reach the minimum of 20 units total.	12
<b>Total Units</b>	<b>20</b>

An Application for Ph.D. Minor ([http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app\\_phd\\_minor.pdf](http://studentaffairs.stanford.edu/sites/default/files/registrar/files/app_phd_minor.pdf)) outlining a program of study must be approved by the major and minor departments and submitted to the Student Services Center. This form is submitted at the time of admission to candidacy or at the appropriate time thereafter.

*Emeriti: (Professors)* Jean-Marie Apostolides (TAPS; French and Italian), Michael Ramsaur, Alice Rayner; *(Associate Professor)* William S. Eddelman; *(Senior Lecturer)* Patricia Ryan

*Chair:* Branislav Jakovljevic

*Director of Graduate Studies:* Matthew Smith

*Director of Undergraduate Studies:* Diana Looser

*Professors:* Jennifer DeVere Brody (TAPS, Center for Comparative Studies in Race and Ethnicity), Harry J. Elam, Jr. (Vice Provost for Undergraduate Education), Peggy Phelan (TAPS, English, Stanford Arts Institute), Rush Rehm (On leave) (TAPS, Classics), Matthew Smith (TAPS, German Studies)

*Associate Professors:* Jisha Menon, Branislav Jakovljevic

*Assistant Professor:* Diana Looser

*Professor (Teaching):* Janice Ross

*Associate Professors (Teaching):* Helen Paris, Leslie Hill

*Senior Lecturer:* Connie Strayer

*Lecturers:* Kathryn Amarotico-Kostopoulos, Matt Chapman, Diane Frank, Erik Flatmo Gambatese, Aleta Hayes, Stephanie Hunt, Robert Kelley, Alex Ketley, Daniel Klein, Laxmi Kumaran, Anton Pankevich, Richard Powers, Ronnie Reddick, Lisa Rowland, Tony Shayne, Erik Sunderman

*Artist in Residence:* Amy Freed

*Humanities Center Fellow:* Aileen Robinson

*Mellon Post-Doctoral Fellow:* Heather Rastovac Akbarzadeh

*Department Administrator:* Patrice O'Dwyer

*Student Services Officer:* Katie Dooling

*Administrative Associate:* Janet Pineda

## Institute for Diversity in the Arts and Committee on Black Performing Arts

*IDA Faculty Director:* H. Samy Alim (Education and, by courtesy, Anthropology and Linguistics)

*Executive Director:* Jeff Chang

*Associate Director:* A-lan Holt

*Program Coordinator:* Kareem Alston

## Overseas Studies Courses in Theater and Performance Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

# URBAN STUDIES

Courses offered by the Urban Studies Program are listed under the subject code URBANST on the (<https://explorecourses.stanford.edu/search?q=urbanst&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-urbanst=on&filter-catalognumber-urbanst=on>) Stanford Bulletin's ExploreCourses web site.

The Urban Studies program treats urbanism as an interdisciplinary field; it brings together students, faculty, and outside specialists concerned with cities, and the impacts of cities on society and people's lives. The Urban Studies major encourages students to inquire deeply into the nature of cities and the techniques used to modify urban environments. It prepares students to address urbanization, and gives students a knowledge base and theoretical, analytical, and practical skills to understand urban social systems and effect social change.

## Mission of the Undergraduate Program in Urban Studies

Cities are now home to more than half of humanity. The mission of the undergraduate program in Urban Studies is to develop students' understanding of the nature of cities and their impact on the world. The dynamic and complex nature of cities challenges traditional disciplinary boundaries, so the program is interdisciplinary in nature, drawing from fields in the social sciences, history, and education. Courses in the program focus on issues in contemporary urban society, and on the forces and practices that shape urban life. Courses also address how cities have changed over time and how they continue to change today in societies around the world. Through a comprehensive program that includes course work, community engagement, and independent research, a major in Urban Studies prepares students for careers and graduate study in fields including architecture, business, community service, education, environmental planning, law, public policy, real estate development, urban design, and urban planning. It also prepares students to be critical thinkers, engaged citizens, and informed leaders who can help to transform cities for the better.

## Learning Outcomes (Undergraduate)

The program expects its undergraduate majors to be able to demonstrate the following learning outcomes. These learning outcomes are used in evaluating students and the Program in Urban Studies. Students are expected to demonstrate ability:

1. to formulate a research question and assess its significance in relation to one or more relevant scholarly or professional literatures and, where relevant, to theoretical writings.
2. to collect data to answer the proposed research question.
3. to analyze a problem and draw correct inferences using qualitative and/or quantitative analysis.
4. to write clearly and persuasively.

## Coterminal Programs for Urban Studies Majors

Undergraduates in Urban Studies may enter coterminal master's degree programs in a number of departments and schools in the University. In recent years, Urban Studies majors have developed coterminal programs with the departments of Anthropology, Civil and Environmental Engineering, Communication, Earth Systems and Sociology, and with the School of Education. Information and applications for coterminal degree programs are available at Undergraduate Advising and Research. Students should discuss the coterminal program with a program director during their junior year.

University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

## Bachelor of Arts in Urban Studies

The Urban Studies major requires students to complete five types of courses totaling at least 70 units:

1. 23 units in the core
2. 9 units (minimum) of skills courses in at least 3 courses of 3 units each
3. 20 units (minimum) in an area of concentration
4. 3 units (minimum) of an approved service-learning course or internship
5. 10 units in the capstone sequence

If units in these categories total less than 70, the remaining units may be fulfilled by courses in other concentrations or in Urban Studies courses numbered 100 or higher (except URBANST 198 Senior Research in Public Service and URBANST 199 Senior Honors Thesis).

Majors must complete one prerequisite: ECON 1 Principles of Economics; this prerequisite course may be taken S/NC, as the units for this course do not count toward the 70 units required for the major. URBANST 198 Senior Research in Public Service, URBANST 199 Senior Honors Thesis, and prerequisites for required courses and for electives also do not count towards the 70-unit minimum.

Urban Studies students interested in graduate school in business or urban planning are advised to obtain basic quantitative skills by completing MATH 19 Calculus, MATH 20 Calculus, and MATH 21 Calculus, preferably before the junior year.

A course in statistical methods, such as STATS 60 Introduction to Statistical Methods: Precalculus, ECON 102A Introduction to Statistical Methods (Postcalculus) for Social Scientists or SOC 181B Sociological Methods: Statistics, is recommended for students interested in business or urban planning.

Urban Studies students are encouraged to spend at least one quarter studying overseas to learn how cities vary across societies. Some Urban Studies concentration courses, as well as electives, can be satisfied at Stanford overseas campuses. Courses offered overseas vary from year to year, and students should check in advance with Overseas Studies and Urban Studies concerning which courses meet Urban Studies requirements. Students may arrange to fulfill the internship requirement through a placement at one of Stanford's overseas locations.

Courses counted toward the 70-unit graduation requirement for the major must be taken for a letter grade, and a minimum grade of 'C' is required. The only exceptions are Urban Studies courses numbered 100 and higher that are offered only on an S/NC basis, such as URBANST 201A Capstone Internship in Urban Studies. Students may count up to three non-Stanford courses, for a maximum of 15 units, toward the major. These units must first be approved by the Office of Transfer Credit in the Registrar's Office and subsequently approved by the Urban Studies program. Transfer credit is not awarded for internship. Students may not count more than 5 units of URBANST 197 Directed Reading, toward the major without permission of the Director. Qualified students may write a senior honors thesis and graduate with honors; see details in "Honors Program" below. Students interested in declaring Urban Studies as a major are required to meet first with the student services administrator and one of the program's advisers; they then declare the Urban Studies major on Axess.

## Urban Studies Core

Urban Studies majors should complete URBANST 110 Introduction to Urban Studies, before Spring Quarter of the junior year. The following courses, totaling 23 units, are required:

		Units
URBANST 110	Introduction to Urban Studies	4
URBANST 111	Political Power in American Cities	5
URBANST 112	The Urban Underclass	4
URBANST 113	Introduction to Urban Design: Contemporary Urban Design in Theory and Practice	5
URBANST 114 or ANTHRO 42	Urban Culture in Global Perspective Megacities	5

## Skills

A minimum of 9 units in 3 courses of at least 3 units each are required and should be taken before the end of the junior year. The following courses are recommended for most Urban Studies majors.

		Units
SOC 180A	Foundations of Social Research	4
EARTHSYS 144	Fundamentals of Geographic Information Science (GIS)	3-4

ANTHRO 130D Spatial Approaches to Social Science is an approved substitute for EARTHSYS 144.

The additional skills courses vary depending on a student's needs and interests. Student consult with an adviser to determine the best choice. Courses that fulfill the skills requirement are:

		Units
ANTHRO 91	Method and Evidence in Anthropology	5
ANTHRO 93B	Prefield Research Seminar: Non-Majors	5
ANTHRO 102	Urban Ethnography	5
CEE 31	Accessing Architecture Through Drawing	5
CEE 31Q	Accessing Architecture Through Drawing	5
CEE 130	Architectural Design: 3-D Modeling, Methodology, and Process	5
CEE 133F	Principles of Freehand Drawing	3
CEE 139	Design Portfolio Methods	4
EARTHSYS 142	Remote Sensing of Land	4
ECON 102A	Introduction to Statistical Methods (Postcalculus) for Social Scientists	5
ECON 121	Social Science Field Research Methods and Applications	5
ENGR 150	Data Challenge Lab	3-5
HUMBIO 82A	Qualitative Research Methodology	3
HUMBIO 82B	Advanced Data Analysis in Qualitative Research	3
MED 147	Methods in Community Assessment, Evaluation, and Research	3
MS&E 125	Introduction to Applied Statistics	4
PEDS 202C	Qualitative Research Methods and Study Design	3
POLISCI 155	Political Data Science	5
SOC 180B	Introduction to Data Analysis	4
STATS 60	Introduction to Statistical Methods: Precalculus	5
STATS 101	Data Science 101	5
URBANST 123B	Approaching Research in the Community: Design and Methods	3

## Concentrations

Students must complete at least 20 units in one of the following concentrations:

- Cities in Comparative and Historical Perspective,
- Urban Education,
- Urban Society and Social Change
- Urban Sustainability
- Self-Designed

Courses may not be double-counted within the major.

Students should consult an adviser to develop a program that meets their intellectual goals; relevant courses not listed here, may be counted toward the concentration with the prior consent of an adviser.

These concentrations are declared to the department; they are not declared on Axxess, and they do not appear on the transcript or the diploma.

### Cities in Comparative and Historical Perspective

Focus is on how cities have evolved over time, and how they are continuing to change today in societies around the world. Drawing on disciplinary approaches including anthropology, archaeology, art history, geography, and history, students place urban issues in perspective to improve their comprehension of the present as well as the past.

Students in this concentration are encouraged to study off campus, and preferably overseas, for at least one quarter. Many courses offered through the Overseas Studies Program can be counted toward the concentration. Similarly, internships offered at many of Stanford's overseas locations can be used to fulfill the Urban Studies internship requirement.

DLCL 100 CAPITALS: How Cities Shape Cultures, States, and People or URBANST 119, Ancient Urbanism (offered alternate years) is required for the cities in comparative and historical perspectives concentration:

The following courses may be counted toward the Cities in Comparative and Historical Perspective concentration:

		Units
ANTHRO 39	Sense of Place	3
ANTHRO 42	Megacities	5
ANTHRO 112	Public Archaeology: Market Street Chinatown Archaeology Project	4
ANTHRO 149	South Asia: History, People, Politics	5
ARTHIST 3	Introduction to World Architecture	5
ARTHIST 142	Architecture Since 1900	4
ARTHIST 143A	American Architecture	4
CEE 32G	Architecture Since 1900	4
CEE 32Q	Place: Making Space Now	3
CEE 32R	American Architecture	4
CEE 32T	Making and Remaking the Architect: Edward Durrell Stone and Stanford	4
CHINA 159	Beijing and Shanghai: Twin Cities in Chinese History	3-5
CLASSICS 83	The Greeks	4-5
CLASSICS 84	The Romans	3-5
CLASSICS 156	Design of Cities	3-5
COMPLIT 144A		3-5
DLCL 100	CAPITALS: How Cities Shape Cultures, States, and People	3-5
EARTHSYS 112	Human Society and Environmental Change	4

HISTORY 92S		
HISTORY 106A	Global Human Geography: Asia and Africa	5
HISTORY 106B	Global Human Geography: Europe and Americas	5
HISTORY 150C	The United States in the Twentieth Century	5
HISTORY 260	California's Minority-Majority Cities	4-5
ME 120	History and Philosophy of Design	3
ITALIAN 41N		
OSPBER 30	Berlin vor Ort: A Field Trip Module	1
OSPBER 60	Cityscape as History: Architecture and Urban Design in Berlin	5
OSPCPTWN 16	Sites of Memory	3
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3
OSPCPTWN 24B		
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	3
OSPCPTWN 79	Creative Cityness in the Global South	3
OSPFLOR 58	Space as History: Social Vision and Urban Change	4
OSPFLOR 71	A Studio with a View: Drawing, Painting and Informing your Aesthetic in Florence	4
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4
OSPMADRD 60	Integration into Spanish Society: Service Learning and Professional Opportunities	4
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
OSPPARIS 97	Le Grand Paris: Paris of the 21st Century	4
POLISCI 110C	America and the World Economy	5
REES 204	Cities of Empire: An Urban Journey through Eastern Europe and the Mediterranean	3-5
SINY 114	Writing in the City	4
SINY 116	Off the iPhone and Into the City: Creating a Photography Project	4
SLAVIC 165		
URBANST 25Q	The Origins of the Modern American City, 1865-1920	3
URBANST 27Q	Sophomore Seminar: Three Detectives, Three Cities	3
URBANST 105	The Hipster and the City: Race, Ethnicity, Hip-Hop, and Gentrification in Oakland	4
URBANST 145	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
URBANST 150	From Gold Rush to Google Bus: History of San Francisco	4
URBANST 161	U.S. Urban History since 1920	5
URBANST 169	California's Minority-Majority Cities	4-5
URBANST 174	Defining Smart Cities: Visions of Urbanism for the 21st Century	1

### Urban Education

The purpose of this concentration is to prepare students for a career in educational policy and practice in diverse settings. This concentration is a useful basis for graduate study in educational policy, law, or business, and for students who have been admitted by the School of Education to pursue a coterminal master's degree in the Stanford Teacher Education Program (STEP) or the Policy, Organization, and Leadership Studies

Program (POLs). Stanford undergraduates can apply to the Stanford Teacher Education Program (STEP) in their Junior or Senior year.

Coterminal students applying to STEP are encouraged to take EDUC 101 Introduction to Teaching and Learning before applying to the program. Additionally, students interested in STEP Secondary (Single Subject) must demonstrate subject matter competency in their intended teaching area. Transcripts should reflect coursework in the intended teaching subject even if it was not a student's undergraduate major.

For additional information please contact the STEP Admissions Officer at 723-2110, or consult the STEP web site (<http://suse-step.stanford.edu>).

The following course is required for the urban education concentration:

		Units
EDUC 112	Urban Education	3-5

The following courses may be counted toward the urban education concentration:

		Units
EDUC 103A	Tutoring: Seeing a Child through Literacy	3-4
AFRICAST 111	Education for All? The Global and Local in Public Policy Making in Africa	3-5
EDUC 101	Introduction to Teaching and Learning	4
EDUC 103A	Tutoring: Seeing a Child through Literacy	3-4
EDUC 103B	Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices	3-5
EDUC 107	Education and Inequality: Big Data for Large-Scale Problems	3-5
EDUC 149	Theory and Issues in the Study of Bilingualism	3-5
EDUC 201	History of Education in the United States	3-5
EDUC 202	Introduction to Comparative and International Education	4
EDUC 204	Introduction to Philosophy of Education	3
EDUC 216	Education, Race, and Inequality in African American History, 1880-1990	3-5
EDUC 220C	Education and Society	4-5
EDUC 220D	History of School Reform: Origins, Policies, Outcomes, and Explanations	3-5
EDUC 221A	Policy Analysis in Education	4-5
EDUC 277	Education of Immigrant Students: Psychological Perspectives	4
EDUC 283	Child Development In and Beyond Schools	2
HISTORY 11W	Service-Learning Workshop on Issues of Education Equity	1
EDUC 233A	Counseling Theories and Interventions from a Multicultural Perspective	3-5
HUMBIO 142	Adolescent Development	3-4
or PSYCH 60	Introduction to Developmental Psychology	

### Urban Society and Social Change

Focus is on issues in contemporary urban society and the tools and concepts that planners, policy makers, and citizens use to address those issues. Topics include environmental challenges, racial and class inequality, and the provision of adequate urban infrastructure. Students learn how community action, urban planning and design, and organizations in nonprofit, for-profit, and government sectors address urban social and environmental problems. This concentration prepares students to enter graduate programs concerned with urban affairs, community service, and public policy, and to work with local governmental agencies and for-profit and nonprofit organizations engaged in community service and development.

The following course is required for the urban society and social change concentration:

POLISCI 133 Ethics and Politics of Public Service 5

The following courses may be counted toward the urban society and social change concentration:

AFRICAST 111 Education for All? The Global and Local in Public Policy Making in Africa 3-5

ASNAMST 123 Asian Americans and Environmental Justice 3-5

ASNAMST 146S

CEE 32A Psychology of Architecture 3

CEE 32B Design Theory 4

CEE 131A Professional Practice: Mixed-Use Design in an Urban Setting 4

CEE 141A Infrastructure Project Development 3

CEE 141B Infrastructure Project Delivery 3

CEE 246 Entrepreneurship in Civil & Environmental Engineering 3-4

CSRE 100 Grassroots Community Organizing: Building Power for Collective Liberation 3-5

CSRE 157P Solidarity and Racial Justice 4-5

CSRE 196C Introduction to Comparative Studies in Race and Ethnicity 5

EARTHSYS 105 Food and Community: Food Security, Resilience and Equity 2-3

ECON 150 Economic Policy Analysis 4-5

ECON 155 Environmental Economics and Policy 5

EDUC 107 Education and Inequality: Big Data for Large-Scale Problems 3-5

EDUC 216 Education, Race, and Inequality in African American History, 1880-1990 3-5

ENGR 150 Data Challenge Lab 3-5

HISTORY 106A Global Human Geography: Asia and Africa 5

HISTORY 106B Global Human Geography: Europe and Americas 5

HISTORY 255D Racial Identity in the American Imagination 4-5

HUMBIO 122S Social Class, Race, Ethnicity, and Health 4

HUMBIO 127A Community Health: Assessment and Planning I 8

& HUMBIO 127B and Community Health: Assessment and Planning II

HUMBIO 128 Community Health Psychology 4

MS&E 180 Organizations: Theory and Management 4

or SOC 160 Formal Organizations

POLISCI 236 Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector 5

PUBLPOL 102 4-5

PUBLPOL 135 Regional Politics and Decision Making in Silicon Valley and the Greater Bay Area 4

SINY 101 The New York City Seminar 5

PWR 194SS Topics in Writing & Rhetoric: Making Rhetoric Matter: Human Rights at Home 4

SOC 14N Inequality in American Society 4

SOC 45Q Understanding Race and Ethnicity in American Society 4

SOC 118 Social Movements and Collective Action 4

SOC 135 Poverty, Inequality, and Social Policy in the United States 4

SOC 140 Introduction to Social Stratification 3

SOC 141 Controversies about Inequality 5

SOC 146 Introduction to Comparative Studies in Race and Ethnicity 5

SOC 157 Ending Poverty with Technology 5

SOC 160 Formal Organizations 4

POLISCI 121L Racial-Ethnic Politics in US 5

POLISCI 31Q Justice and the City 3

POLISCI 147P The Politics of Inequality 5

SOC 164 Immigration and the Changing United States 4

POLISCI 220 Place-Making Policies 5

POLISCI 236 Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector 5

SOC 166 Mexicans, Mexican Americans, and Chicanos in American Society 5

URBANST 104 Civic Dreams, Human Spaces: Designing Cities for People 4

URBANST 105 The Hipster and the City: Race, Ethnicity, Hip-Hop, and Gentrification in Oakland 4

URBANST 107 Introduction to Urban and Regional Planning 3

URBANST 108 Grassroots Community Organizing: Building Power for Collective Liberation 3-5

URBANST 123 Approaching Research and the Community 2-3

URBANST 126 Spirituality and Nonviolent Urban and Social Transformation 3

URBANST 131 VIP: Very Impactful People - Social Innovation & the Social Entrepreneur 1

URBANST 132 Concepts and Analytic Skills for the Social Sector 4

URBANST 133 Social Entrepreneurship Collaboratory 4

URBANST 136 The Sharing Economy 3

URBANST 137 Innovations in Microcredit and Development Finance 3

URBANST 141 Gentrification 5

URBANST 145 International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development 4-5

URBANST 163 Land Use Control 4

URBANST 164 Sustainable Cities 4-5

URBANST 165 Sustainable Urban and Regional Transportation Planning 4-5

URBANST 166 East Palo Alto: Reading Urban Change 5

URBANST 167 Green Mobilities for the Suburbs of the Future 3

URBANST 168 Housing & Community Development—Policy and Practice 3

URBANST 169 California's Minority-Majority Cities 4-5

URBANST 170 Place-Making Policies 5

URBANST 171 Urban Design Studio 5

URBANST 173 The Urban Economy 4

URBANST 174 Defining Smart Cities: Visions of Urbanism for the 21st Century 1

URBANST 183 Team Urban Design Studio 5

URBANST 187 Housing Justice Research Lab 1-3

### Urban Sustainability

The Urban Sustainability concentration provides the basis for a holistic understanding of cities through the lens of environmental and social sustainability. By combining coursework in urban studies, history, sociology, and design with the STEM fields (science, technology, engineering and mathematics), students in the Urban Sustainability concentration are exposed to the environmental and infrastructural aspects of cities, as well as to issues of human development, public policy, and social equity.



Students in the concentration acquire a foundation in sustainability concepts and skills for research and professional practices. The Urban Sustainability concentration helps prepare students to serve as social change agents in future roles as scholars, urban planners, designers, entrepreneurs, public servants, and advocates, to address the most pressing issues of urban development and its human impacts in cities around the world.

The following course is required for the urban sustainability concentration:

EARTHSYS 112	Human Society and Environmental Change	Units 4
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The following courses may be counted toward the Urban Sustainability Concentration. Students must select at least one course from each of the following categories:

1. environmental sustainability
2. social sustainability
3. project-based courses.

### Environmental Sustainability

Environmental sustainability refers to the biosphere, environmental planning and policy, natural resource planning and development, sustainable building design, and urban infrastructure systems.

		Units
CEE 64	Air Pollution and Global Warming: History, Science, and Solutions	3
CEE 100	Managing Sustainable Building Projects	4
CEE 107A	Understanding Energy	3-5
CEE 165C	Water Resources Management	3
CEE 177X	Current Topics in Sustainable Engineering	1-3
CEE 224S	Sustainable Urban Systems Seminar	1
CEE 171	Environmental Planning Methods	3
CEE 172	Air Quality Management	3
CEE 176A	Energy Efficient Buildings	3-4
CHEMENG 35N	Renewable Energy for a Sustainable World	3
CHEMENG 60Q	Environmental Regulation and Policy	3
EARTHSYS 10	Introduction to Earth Systems	4
EARTHSYS 41N	The Global Warming Paradox	3
EARTHSYS 101	Energy and the Environment	3
EARTHSYS 104	The Water Course	3
EARTHSYS 175		
EARTHSYS 188	Social and Environmental Tradeoffs in Climate Decision-Making	1-2
ECON 17N	Energy, the Environment, and the Economy	3
ECON 155	Environmental Economics and Policy	5
ENGR 90	Environmental Science and Technology	3
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	4-5
URBANST 174	Defining Smart Cities: Visions of Urbanism for the 21st Century	1-2

### Social Sustainability

Social sustainability refers to land use planning and its human impacts, distribution of public goods, human-centered design, human and community development, citizen participation, and social equity.

		Units
ANTHRO 183B	Human Mobility and Adaptability	5
ASNAMST 123	Asian Americans and Environmental Justice	3-5

CSRE 125E	Shades of Green: Redesigning and Rethinking the Environmental Justice Movements	3-5
EARTHSYS 37N	Climate Change: Science & Society	3
EARTHSYS 105	Food and Community: Food Security, Resilience and Equity	2-3
POLISCI 19N	Politics of Energy Efficiency	5
POLISCI 31Q	Justice and the City	3
SINY 122	The Agile City	4
SOC 135	Poverty, Inequality, and Social Policy in the United States	4
URBANST 104	Civic Dreams, Human Spaces: Designing Cities for People	3
URBANST 107	Introduction to Urban and Regional Planning	3
URBANST 163	Land Use Control	4
URBANST 165	Sustainable Urban and Regional Transportation Planning	4-5
URBANST 167	Green Mobilities for the Suburbs of the Future	3
URBANST 168	Housing & Community Development—Policy and Practice	3
URBANST 169	California's Minority-Majority Cities	4-5
URBANST 170	Place-Making Policies	5
URBANST 171	Urban Design Studio	5
URBANST 173	The Urban Economy	4
URBANST 174	Defining Smart Cities: Visions of Urbanism for the 21st Century	1-2
URBANST 183	Team Urban Design Studio	5
URBANST 187	Housing Justice Research Lab	1-3

### Project-Based Courses

Project-based courses enable students to work on a real-life urban sustainability issue in collaboration with local and international community partners. Students grapple with sustainability concepts while practicing community engagement and capacity building, fluency in crosscultural collaboration, human-centered design thinking, and developing a sense of one's place in relation to global society and the praxis of urban sustainability.

		Units
CEE 124	Sustainable Development Studio	1-5
CEE 177X	Current Topics in Sustainable Engineering	1-3
CEE 224X	Disasters, Decisions, Development in Sustainable Urban Systems (CEE)	1-5
CEE 224Y	Sustainable Urban Systems Project	1-5
CEE 224Z	Sustainable Urban Systems Project	1-5
URBANST 145	International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development	4-5
URBANST 164	Sustainable Cities	4-5
URBANST 171	Urban Design Studio	5
URBANST 181	Urban Agriculture in the Developing World	3-4

Students interested in pursuing the concentration in urban sustainability should meet with an Urban Studies adviser to determine an appropriate course of study. Consult the Urban Studies website or see an adviser for sample course plans in this concentration.

### Self-Designed Concentration

Students who wish to concentrate in an area of urban studies other than one of the above concentrations must complete the Urban Studies core, skills, and capstone requirement, and design additional units to bring the total to at least 70 units. The self-designed portion of the major should concentrate on a particular area of urban study, such as urban health care or urban technologies. Additional units must be approved by both the Director of Urban Studies and an academic adviser who is a

member of the Academic Council and has expertise in the particular area of interest to the student. A proposal for a self-designed concentration should include a list of courses and a description of how each course meets the student's educational objectives. A proposal for a self-designed concentration must be accompanied by a letter to the Director of Urban Studies indicating that the academic adviser has examined and approved the student's plan.

Students pursuing a self-designed concentration must submit proposals for approval by the Director of Urban Studies by the beginning of the third quarter of the student's sophomore year. Applications received after that deadline are not considered. Students interested in designing their own concentration are strongly encouraged to meet with the Director of Urban Studies before the end of fall quarter of their sophomore year.

## Service Learning

Urban Studies students are required to engage in a service learning experience as part of their course of study. Students can fulfill their service learning requirement in two ways:

1. enroll in an approved course such as URBANST 164, URBANST 145, SINY 101, or ANTHRO 112; or
2. complete an independent internship in an office of a government agency or non-profit/community organization relevant to the major, while enrolled in URBANST 201A Capstone Internship in Urban Studies before Autumn Quarter of the senior year.

Students planning to carry out an internship should consult with the Program Manager for Service Learning no later than Winter Quarter of junior year and complete the internship before Autumn Quarter of senior year, or three quarters before graduation. Students who intern for a private sector organization may receive credit for URBANST 194, but cannot use URBANST 201A credits to meet the capstone requirement. Urban Studies majors who wish to receive academic credit for additional internship work may enroll in URBANST 194. Students may not count more than 7 units of internship credit, including URBANST 194 Internship in Urban Studies and URBANST 201A Capstone Internship in Urban Studies, toward their major. Students can consult the Haas Center for Public Service for other courses with internship placements at community organizations.

## Capstone

All majors are required to complete a sequence of two seminars, totaling 10 units, in which students design a senior project, and write the results of their project. The capstone seminars can be used to satisfy the Writing in the Major requirement and to complete some work on an honors thesis. URBANST 202 Junior Seminar: Preparation for Research, should be taken in the junior year, and URBANST 203 SENIOR SEMINAR in the senior year. Students who plan to be away during Winter Quarter of their junior year are advised to take URBANST 202 Junior Seminar: Preparation for Research in the Winter Quarter of their sophomore year.

		Units
URBANST 202	Junior Seminar: Preparation for Research	5
URBANST 203	SENIOR SEMINAR	5

## Honors Program

The honors program offers qualified students an opportunity to conduct independent research and to write a thesis summarizing the results. Before being accepted to the honors program in Urban Studies, a student must:

1. declare a major in Urban Studies and complete at least 30 of the 70 required units including all prerequisites and core classes
2. complete URBANST 202 Junior Seminar: Preparation for Research (offered Winter Quarter)
3. have an overall GPA of 3.3 and a GPA of at least 3.5 in Urban Studies

4. submit an application, including a one-page abstract and the signatures of an adviser and, if applicable, a second reader. If the adviser is not a member of Stanford's Academic Council, the student must have a second reader who is an Academic Council member. The application must be submitted to the program office no later than April 30 of the junior year, and it must then be approved by the Director of the Urban Studies honors program.

Honors students are expected to complete a portion of their honors work in URBANST 203 SENIOR SEMINAR, in Autumn Quarter. Additionally, they must register for 5-10 units total in URBANST 199 Senior Honors Thesis, over the course of their senior year. The units of URBANST 199 Senior Honors Thesis are in addition to the 70-units required for the major. Honors students are required to present their theses at the Senior Colloquium in Spring Quarter of senior year.

To graduate with honors, students must receive a grade of at least 'A-' in the honors work and have a GPA of at least 3.5 in courses for the Urban Studies major at the time of graduation.

## Minor in Urban Studies

The minor in Urban Studies is designed to introduce students to several disciplinary approaches to the study of cities, and provides the opportunity to explore one of four specialized options:

- Cities in comparative and historical perspective
- Urban education
- Urban society and social change
- Urban sustainability

The minor in Urban Studies requires completion of seven courses for a letter grade, including the five core courses, the required course in the student's chosen concentration area, and one additional course in that option as listed in the "Bachelor of Arts in Urban Studies (p. 780)" section of this bulletin.

*Co-Director:* Zephyr Frank (History)

*Co-Director:* Michael Kahan (Senior Lecturer, Sociology)

*Executive Committee:* Thomas Hansen (Anthropology), Michael Rosenfeld (Sociology), Barbara Voss (Anthropology), Jeff Wachtel (Knight-Hennessy Scholars Program)

*Affiliated Faculty:* Michelle Anderson (Law), Arnetha Ball (Education), Eric Bettinger (Education), Scott Bukatman (Art and Art History), Albert Camarillo (History, Emeritus), Samuel Chiu (Management Science and Engineering), Rebecca Diamond (Business), Paulla Ebron (Anthropology), Paula Findlen (History), James Fishkin (Communication), Shelley Fisher Fishkin (English), Charlotte Fonrobert (Religious Studies), Richard Ford (Law), Zephyr Frank (History), Angela Garcia (Anthropology), Sharad Goel (Management Science and Engineering), Leah Gordon (Education), David Grusky (Sociology), Thomas Hansen (Anthropology), Allyson Hobbs (History), Ian Hodder (Anthropology), Miyako Inoue (Anthropology), Rishee Jain (Civil and Environmental Engineering), Sarah Jain (Anthropology), Tomás Jiménez (Sociology), David Labaree (Education), Kincho Law (Civil and Environmental Engineering), Raymond Levitt (Civil and Environmental Engineering), Tanya Luhrmann (Anthropology), Pamela Matson (Earth, Energy, and Environmental Sciences), Doug McAdam (Sociology), Raymond McDermott (Education), Daniel McFarland (Education), William McLennan (Business), Ian Morris (Classics), Clayton Nall (Political Science), Josiah Ober (Classics, Political Science), Leonard Ortolano (Civil and Environmental Engineering), Grant Parker (Classics), Peggy Phelan (Theater and Performance Studies), Sean Reardon (Education), Rob Reich (Political Science), Jonathan Rodden (Political Science), Michael Rosenfeld (Sociology), Walter Scheidel (Classics), Gary Segura (Political Science), Michael Shanks (Classics), Jennifer Trimble (Classics), Nancy Brandon Tuma (Sociology, Emerita),

Fred Turner (Communication), Guadalupe Valdes (Education), Barbara Voss (Anthropology), Ali Yaycioglu (History), Cristobal Young (Sociology), Steve Zipperstein (History)

*Lecturers:* Cecil Brown, Deland Chan, Melanie Edwards, Dennis Gale, Dehan Glanz, Radford Hall, Kevin Hsu, Clayton Hurd, Michael Kahan, Patricia Karlin-Neumann, Michael Kieschnick, Joseph Kott, Lawrence Litvak, Carol McKibben, Judith Ned, Marisa Raya, Laura Scher, Frederic Stout, Mark Wolfe

## Overseas Studies Courses in Urban Studies

The Bing Overseas Studies Program (<http://bosp.stanford.edu>) manages Stanford study abroad programs for Stanford undergraduates. Students should consult their department or program's student services office for applicability of Overseas Studies courses to a major or minor program.

The Bing Overseas Studies course search site (<https://undergrad.stanford.edu/programs/bosp/explore/search-courses>) displays courses, locations, and quarters relevant to specific majors.

For course descriptions and additional offerings, see the listings in the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) or Bing Overseas Studies (<http://bosp.stanford.edu>).

		<b>Units</b>
OSPBBER 30	Berlin vor Ort: A Field Trip Module	1
OSPBBER 60	Cityscape as History: Architecture and Urban Design in Berlin	5
OSPCPTWN 16	Sites of Memory	3
OSPCPTWN 24A	Targeted Research Project in Community Health and Development	3
OSPCPTWN 43	Public and Community Health in Sub-Saharan Africa	3
OSPFLOR 58	Space as History: Social Vision and Urban Change	4
OSPFLOR 71	A Studio with a View: Drawing, Painting and Informing your Aesthetic in Florence	4
OSPFLOR 115Y	Building the Cathedral and the Town Hall: Constructing and Deconstructing Symbols of a Civilization	4
OSPMADRD 8A	Cities and Creativity: Cultural and Architectural Interpretations of Madrid	4
OSPMADRD 60	Integration into Spanish Society: Service Learning and Professional Opportunities	4
OSPPARIS 92	Building Paris: Its History, Architecture, and Urban Design	4
OSPPARIS 97	Le Grand Paris: Paris of the 21st Century	4
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	4-5
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5
OSPBBER 30	Berlin vor Ort: A Field Trip Module	1
OSPBBER 60	Cityscape as History: Architecture and Urban Design in Berlin	5
OSPBEIJ 82		
OSPCPTWN 79	Creative Cityness in the Global South	3
OSPSANTG 29	Sustainable Cities: Comparative Transportation Systems in Latin America	4-5
OSPPARIS 97	Le Grand Paris: Paris of the 21st Century	4
OSPSANTG 71	Santiago: Urban Planning, Public Policy, and the Built Environment	4-5

# STANFORD IN WASHINGTON

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*Director:* Adrienne Jamieson

*On Campus Coordinator:* Jill Vizas

The Bing Stanford in Washington program provides highly-qualified undergraduates with an opportunity to work and study in the nation's capital. In addition to providing students with an understanding of public policy making, the program offers an opportunity to take advantage of the city's unique cultural resources.

Central in the student's educational experience is a full-time internship. Students serve as interns at such institutions and agencies as the Senate, the House of Representatives, the Office of Management and Budget, the White House, the National Institutes of Health, the Smithsonian Institution, CNN, World Bank, the departments of State, Justice, Treasury, Education, and Health and Human Services.

In addition to the internship, students also complete an academic course of study consisting of small courses taught by policy experts, and weekly seminars taught by Stanford faculty members. Seminars are generally 3-5 units. Past topics have included congressional oversight and the press; economic growth and development patterns, policies, and prospects; critical health issues in the U.S. and abroad; policy making in the Washington community; and criminal justice policy. Speakers from the Washington policy community frequently join students and faculty for discussions. Students often write a major paper related to their internship for 3-5 units of credit. Course and seminar topics vary according to student and faculty interest.

The Bing Stanford in Washington program offers stretch quarters in the Autumn and Spring (early September to mid-December, and late March to the end of June) and a regular quarter in Winter, which focuses on environmental policy, health policy and the arts. The program is designed for students in their junior year or during the first or second quarter of their senior year. Applications must be completed two quarters in advance, and three quarters in advance if a student is overseas or otherwise not on campus during the qualifying quarter.

Students interested in the program should contact the campus office of the Bing Stanford in Washington program; see contact information above.

## SCHOOL OF LAW

Courses offered by the School of Law are listed on the Stanford Bulletin's ExploreCourses (<http://explorecourses.stanford.edu>) web site under the subject codes LAW and LAWGEN.

The School of Law, established in 1893, provides a legal education for students who are fitted by their maturity and academic training to pursue professional study under University methods of instruction. The curriculum leading to the first professional degree in law, the Doctor of Jurisprudence (J.D.), constitutes an adequate preparation for the practice of law in any English-speaking jurisdiction. Graduate work leading to the degrees of Master of Laws (L.L.M.), Master of the Science of Law (J.S.M.), and Doctor of the Science of Law (J.S.D.), and a non-professional degree, Master of Legal Studies (M.L.S.), is also offered. For the full curriculum, see the Course Schedule & Description on the Law School (<http://www.law.stanford.edu/courses>) web site. Stanford Law School offers joint or dual degree options in combination with other Stanford graduate departments and universities across the country; see the "Joint and Dual Degrees in Law" below.

The school is on a three-term academic calendar. For a complete list of academic dates see the Academic Calendar on the Law School (<https://law.stanford.edu/education/courses/calendar-deadlines>) web site.

For further information about admission, programs, curriculum, and faculty, see the Law School (<https://law.stanford.edu>) web site.

### Joint and Dual Degrees in Law

Formal admission to both the Law School and to the other cooperating school or department in accordance with the established admission standards of each school or department is required. In addition to the established joint degree programs offered, the school considers requests for a dual program on an individually designed basis. For additional information on Law School joint or dual degree programs, see the Law School (<https://law.stanford.edu/education/degrees/joint-degrees-within-stanford-university/#slnav-established-joint-degrees>) web site. See relevant web sites or department sections of this bulletin for degree requirements.

### Graduate School of Business

- See the GSB's M.B.A. web site (<http://www.gsb.stanford.edu/programs/mba>)
- J.D./M.B.A. Master of Business Administration
- J.D./Ph.D. Business Administration

### School of Earth Sciences

- J.D./M.S. Interdisciplinary Program in Environment and Resources (E-IPER)
- J.D./Ph.D. Interdisciplinary Program in Environment and Resources (E-IPER)

### School of Education

J.D./M.A. Education

### School of Engineering

- J.D./M.S. Bioengineering
- J.D./Ph.D. Bioengineering
- J.D./M.S. Computer Science
- J.D./M.S. Electrical Engineering
- J.D./M.S. Management Science and Engineering (MS&E)
- J.D./Ph.D. Management Science and Engineering (MS&E)

### School of Humanities and Sciences

- J.D./Ph.D. Communication
- J.D./M.A. Economics
- J.D./Ph.D. Economics
- J.D./M.A. History
- J.D./Ph.D. History
- J.D./M.A. in degree granting programs in Stanford Global Studies (SGS):
  - African Studies
  - East Asian Studies
  - Latin American Studies
  - Russian, East European and Eurasian Studies
- J.D./M.A. International Policy Studies
- J.D./Ph.D. Modern Thought and Literature
- J.D./Ph.D. Philosophy
- J.D./Ph.D. Political Science
- J.D./Ph.D. Psychology
- J.D./M.P.P. Public Policy
- J.D./Ph.D. Sociology

### School of Medicine

- J.D./M.S. Health Research and Policy (HRP)
- J.D./M.D. Medicine
- J.D./Ph.D. Neurosciences

### Cooperative Programs with Other Universities

Stanford J.D. students have also pursued degrees at other universities such as the Harvard Kennedy School, Johns Hopkins School of Advanced International Studies, and Princeton Woodrow Wilson School. The approval process for such a cooperative program begins after the student has been admitted, independently, to both programs. Students may enroll in either a joint degree among schools at Stanford or in a degree from an external university, but a student may not enroll in both a Stanford JDP and a cooperative program with another university.

### Courses in Law

Some Law courses have special enrollment instructions and restrictions, but many Law courses are open to qualified graduate students in other departments of Stanford University with instructor consent. Non-Law students may not enroll in courses that are part of the required first-year J.D. curriculum. Stanford non-Law students intending to enroll in any course with a LAW subject code must consult the Office of the Law School Registrar in the Stanford Law School Administration Building, room 100, or see the Stanford Law School, Office of the Registrar (<http://www.law.stanford.edu/organizations/offices/office-of-the-registrar>) web site.

*Emeriti: (Professors):* Janet Cooper Alexander, Barbara Allen Babcock, Wayne G. Barnett, Paul Brest, Gerhard Casper, Joshua Cohen, Richard Craswell, Lance E. Dickson, Marc A. Franklin, Jack H. Friedenthal, Ronald J. Gilson, Robert A. Girard, William B. Gould IV, Thomas C. Grey, Thomas C. Heller, Margaret Jane Radin, Byron D. Sher, William H. Simon, Michael S. Wald

*Dean:* M. Elizabeth Magill

*Vice Dean:* Mark G. Kelman

*Associate Dean of Clinical Education:* Juliet M. Brodie

*Associate Dean for Curriculum:* Nora Freeman Engstrom

*Associate Dean for Global Programs:* Robert M. Daines

*Associate Dean for Graduate Studies:* Deborah R. Hensler

*Associate Dean for Strategic Planning:* George Triantis

*Senior Associate Dean for Administration and Chief Financial Officer:* Frank Brucato

*Senior Associate Dean for External Relations:* Julia Erwin-Weiner

*Associate Deans:* Diane Chin, Faye Deal, Sabrina Johnson, Susan Robinson, Jory Steele

*Professors:* Michelle Wilde Anderson, Joseph Bankman, R. Richard Banks (on leave), G. Marcus Cole, Robert M. Daines, Michele Landis Dauber, John J. Donohue III, David Freeman Engstrom (on leave spring), Nora Freeman Engstrom, George Fisher, Richard T. Ford, Barbara H. Fried, Lawrence M. Friedman, Paul Goldstein (on leave spring), Robert W. Gordon, Henry T. Greely, Joseph A. Grundfest, Deborah R. Hensler (on leave autumn), Daniel E. Ho (on leave winter), Pamela S. Karlan, Mark G. Kelman, Amalia D. Kessler, Daniel P. Kessler, Michael Klausner (on leave winter/spring), Mark A. Lemley, Robert MacCoun, M. Elizabeth Magill, Lawrence C. Marshall, Jenny S. Martinez, Michael W. McConnell, Michelle Mello, Bernadette Meyler (on leave autumn), Curtis Milhaupt, Alison D. Morantz, Nathaniel Persily, Joan Petersilia, A. Mitchell Polinsky, Robert L. Rabin (on leave autumn), Deborah L. Rhode (on leave winter), Jane Schacter, David A. Sklansky, Norman W. Spaulding, James F. Strnad II, David Studdert, Alan O. Sykes, Barton H. Thompson, Jr., George Triantis (on leave autumn), Barbara van Schewick, Robert Weisberg

*Associate Professors:* Lisa Larrimore Ouellette, Shirin Sinnar

*Assistant Professors:* Gregory Ablavsky, Rabia Belt, Jacob Goldin, Colleen Honigsberg

*Professors (Teaching):* Juliet M. Brodie, James Cavallaro, Jeffrey L. Fisher, William S. Koski, Phillip R. Malone, Jay A. Mitchell, Deborah A. Sivas (on leave autumn), Jayashri Srikantiah

*Associate Professors (Teaching):* James Sonne, Ronald C. Tyler

*Senior Lecturers:* Janet Martinez, Allen S. Weiner, Beth Williams

*Professors of the Practice of Law:* Lucas Guttentag, Erik G. Jensen, A. Douglas Melamed, David W. Mills, Dan Reicher

*Courtesy Professors:* Jennifer Eberhardt, David Larcker, Jack Rakove

*Courtesy Associate Professor:* Michael Genesereth

*Courtesy Assistant Professor:* Keith Winstein

*Visiting Professors:* Michael Asimow, William Baude, Binyamin Blum, Mariano-Florentino (Tino) Cuéllar, Siegfried Fina, Laurie Hodrick, Joshua Kleinfeld, Burt Neuborne, Rogelio Perez-Perdomo, Jedediah Purdy, Zahr Said

*Thomas C. Grey Legal Research and Writing Instructors:* Sarah Duranske, Mugambi Jouet, Ji Seon Song, Andrea Wang, Justin Weinstein-Tull

*Lecturers:* Adam Abelkop, Fred Alvarez, Marilyn Bautista, Jeanine Becker, Brian Blalock, Lauren Brady, Viola Canales, Lanhee Chen, Isaac Cheng, Ronald Chen, Diane Chin, Cristina Dos Santos, Lisa Douglass, Jason Du Mont, Randee G. Fenner, Jay Finkelstein, Tara Ford, David Forst, Simon Frankel, Laurence Franklin, Michelle Galloway, Albert Gidari, Ben Ginsberg, David Goldberg, Jonathan Greenberg, Margaret Hagen, Timothy H. Hallahan, Adam Halper, David Hayes, Todd Hinnen, Zeba Huq, David Johnson, Danielle Jones, Megan Karsh, Zachary Kaufman, Julie Matlof Kennedy, Sallie Kim, David Kleiman, Matthew Kline, Ken Kuwayti, Robin

John Lee, Stuart Lipton, Goodwin Liu, Suzanne Luban, Grande Lum, Anna-Rose Mathieson, Diego Gil McCawley, Jason Meek, Jeanne Merino, Marion Miller, Dinsha Mistree, Nader Mousavi, Kimi Narita, William Neukom, Jessica Notini, Jef Pearlman, B. Howard Pearson, Lisa M. Pearson, Sara Peters, Brenna Powell, John G. Quigley, Kirupa Pushparaj, Stephan Ray, Mark Reinstra, Susan Robinson, Michael Romano, Betty Rowe, Tom Rubin, Richard Salgado, Ticien Sassoubre, Alicia Seiger, Geoff Sigalet, Rachelle Silverberg, Stephanie Smith, Lance Sorensen, Michelle Sonu, Shanin Specter, Sergio Stone, Kimberly Summe, Laura Tam, Dan, Tan, Alicia Thesing, Valicia Trowbridge, John True, Adine Varah, Claret Vargas, Lisa Weissman Ward, Spencer Williams, Bryan Wilson, Andrew Winden, Joseph Yang, Alex Zhang

*Affiliated Faculty:* Alexandria Boehm (Engineering), Svetlana Bryzgaloval (GSB), Kate Bundorf (Health Research and Policy), Francis "Vic" Stanton (GSB)

# SCHOOL OF MEDICINE

The School of Medicine offers courses of study leading to the M.S., Ph.D., and M.D. degrees.

## Undergraduate Programs in the School of Medicine

Many courses in the School of Medicine are open to any registered Stanford student who has fulfilled the prerequisites, subject to the usual limits of course enrollment and faculty approval. The school also offers courses specifically for undergraduates, as well as graduate-level courses where advanced undergraduates with backgrounds in the life sciences are welcome. Among the undergraduate offerings are numerous Stanford Introductory Seminars for freshmen and sophomores, the Emergency Medical Technician program, Stanford Immersion in Medicine Physician Shadowing, Pre-Vet Advisory, and courses in Community Health, including participation in the Stanford Free Clinics. The school also offers several undergraduate courses through the Department of Biology and the Interdisciplinary Program in Human Biology in the School of Humanities and Sciences. See the school's Undergraduate Studies (<http://med.stanford.edu/education/undergrad-studies.html>) web site for additional information.

## M.S. and Ph.D. Programs in the School of Medicine

The School of Medicine is home to graduate programs covering a broad range of disciplines within biomedicine leading to Ph.D. or M.S. degrees. These programs focus on interdisciplinary training with in-depth investigation of an original problem of fundamental importance to the biosciences. Each degree program sets its own curriculum, but many courses are taught by groups of faculty from multiple programs and departments. Flexibility is a priority to ensure that all students obtain the best possible training for pursuing careers in their areas of interest. The school is dedicated to training students from diverse backgrounds, and to the promotion of diversity in graduate education. Admission is through one of about 15 home programs. These home programs enable students to carry out dissertation research and training with School of Medicine faculty, as well as investigators in the departments of Biology and Biophysics in the School of Humanities and Sciences. Detailed information on School of Medicine M.S. and Ph.D. programs, curricula, and research can be found at Stanford's School of Medicine Master's Degree Programs (<http://med.stanford.edu/education/masters-programs.html>) and Ph.D. Programs (<http://med.stanford.edu/education/phd-programs.html>) web site. Application information can be found at Stanford's Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

## M.D. Program in the School of Medicine

The School of Medicine seeks to attract students who are passionate about scholarship and wish to improve the health of the world's people through research, innovation, and leadership. The Stanford M.D. curriculum provides education in biomedical and clinical sciences along with study and independent research through scholarly concentrations. Emphasis is placed on interdisciplinary learning, with streamlined content and melding of basic science and clinical instruction across the curriculum. Blocks of unscheduled time allow for individual or group study, participation in elective courses, research, and reflection. Alternative pathways through the curriculum include an option of a fifth or sixth year of study as well as opportunities for pursuing a second degree, such as an M.P.H., M.B.A., Master's of Science in Epidemiology or Health Services Research, or a Ph.D.

Broad clinical science education occurs throughout the curriculum with exposure to patient care and the practice of medicine beginning on the first day of medical school. Students begin clinical clerkships in June of the second year. A population health course combines classroom and experiential learning to provide understanding of the socioeconomic determinants of the health of patients and communities.

Scholarly concentrations offer opportunities for developing skills that enhance basic science and clinical training in areas such as bioengineering, biomedical ethics and medical humanities, biomedical informatics, clinical research, community health, health services and policy research, and the molecular basis of medicine. Through the scholarly concentration program, these skills may be applied in clinical areas housed within centers at Stanford such as the Comprehensive Cancer Center, the Cardiovascular Institute, the Neuroscience Institute, the Institute of Immunity, Transplantation, and Infection, and Women's Health at Stanford. Study in a scholarly concentration typically includes course work and research activities. Research for scholarly concentrations is supported through the Medical Scholars program, which funds student research projects at Stanford and overseas.

Students with interests in medical research as a career are encouraged to investigate opportunities available through the Medical Scientist Training Program (MSTP). Stanford also collaborates with the University of California, Berkeley, to offer students opportunities for M.D./M.P.H. training. Details about these programs may be found at Stanford's Dual Degree and Multi-Degree Programs (<http://med.stanford.edu/education/dual-degree-programs.html>) web site.

Stanford is committed to representing the diversity of the U.S. and California populations by seeking a diverse body of students who are interested in the intellectual substance of medicine and committed to advancing the field of health care, broadly defined. Provided an applicant to the school has completed basic courses in physics, chemistry, and biology, the choice of an undergraduate major may reflect other interests, including the arts and humanities. Course work in advanced biology such as biochemistry, molecular biology, or genetics and the behavioral sciences is recommended because of their importance in understanding health care. Breadth of interests and depth of experiences play an important role in the selection of students from among those applicants having superior academic records.

The M.D. degree requires 12 quarters of registration at full Med-MD tuition; the joint M.D./Ph.D. degree requires 15 quarters. Completion of the M.D. degree must be achieved within six years, unless a petition is granted to extend this time frame. For further details on the M.D. degree, including admission requirements, see the Medical Education at Stanford (<http://med.stanford.edu/md>) web site.

## Multiple-Degree Programs in the School of Medicine

### M.D./Ph.D.

Many M.D. students undertake a Ph.D. while they are at Stanford. Popular choices are School of Medicine programs in Bioengineering, Biomedical Informatics, or one of the 13 Biosciences home departments. At the School of Engineering, the Biomechanical Engineering M.D./Ph.D. program also makes a special effort to work with M.D. students.

### Medical Scientist Training Program

The Medical Scientist Training Program (MSTP) provides medical students with an opportunity to pursue an individualized program of research and course work leading to both the M.D. and Ph.D. degrees. It is designed to equip students for careers in academic investigative medicine, and emphasizes flexibility of curricular and research programs for each trainee. Training for a combined M.D.-Ph.D. includes the same content encountered by students who pursue each degree separately, but the total training time is less than the sum of the time normally required

for each degree. The flexible curriculum at Stanford's School of Medicine allows each student, in consultation with a preceptor and other advisers, to pursue a plan of study that satisfies the requirements for the M.D. and allows performance of doctoral-level research leading to the Ph.D. Students interested in joining the MSTP are considered for admission at the time of their application to the School of Medicine M.D. program and are asked to provide supplemental information relevant to their research background. Current Stanford M.D. students may also apply for admission to the MSTP.

### **M.D./M.B.A.**

M.D. students interested in combining their medical training with training in business can take advantage of a dual degree M.D./M.B.A. program that allows students to obtain both degrees after completion of a 5-year curriculum. Students must apply to and be admitted by the Stanford Graduate School of Business, at the time of their admission to the medical school or after beginning their M.D. studies.

### **M.D./M.P.H.**

A unique collaboration with UC Berkeley allows M.D. students to pursue and obtain a Master of Public Health degree while still at the Stanford School of Medicine. This dual degree M.D./M.P.H. program is open to M.D. students who participate in the Scholarly Concentration in Community Health. Students must apply to and be admitted by the UC Berkeley program; course work is undertaken at the UC Berkeley campus.

### **Ph.D./M.S.M.**

The Master of Science in Medicine (<http://msm.stanford.edu>) program admits current Stanford Ph.D. students who have a commitment to translational research, but are not interested in becoming clinicians. The goal of the program is to train researchers in human biology and disease to be better equipped to translate new scientific discoveries into useful medical advances. Students offered admission into any Ph.D. program at Stanford may apply for admission to the master's program. During their first five quarters, students take basic biomedical science courses with Stanford M.D. students. The School of Medicine M.D. curriculum is presented in a succinct format that allows time for students to concurrently complete their Ph.D. course requirements and lab rotations. By early in their second year, students choose a lab for their Ph.D. thesis research and complete their medical course work. They also elect a clinical co-mentor to discuss translational research needs and help to arrange a short clinical experience. Upon completion of the Program., participating students receive an M.S. in Medicine.

### **M.D./M.S. Degrees**

**Health Policy:** the master's degree program in Health Policy seeks to train students in the quantitative analysis of issues in health and medical care. The program is based upon an individual development plan, and includes both course work and completion of a master's project under the direction of a program core faculty member. The typical student in the program is a physician who has completed residency training and is preparing for a research career; the program also admits Stanford medical students and others with a strong background in health policy analysis. The core faculty interests include outcomes research, health economics, health care organization, health care access, quality of care, decision analysis, clinical guidelines, and assessment of patient preferences and quality of life.

**Epidemiology:** The Graduate Interdisciplinary Program in Epidemiology is a research oriented program that offers instruction and research opportunities leading to the M.S. degree in Epidemiology, the study of the distribution and determinants of diseases in populations.

**Biomedical Informatics:** An option for anyone who wishes to either perform research in Biomedical Informatics as clinical faculty at a school of medicine or for those who wish to continue into the health care industry or government. There is high need for trained individuals who

understand the practice of medicine and who are able to develop and implement applications in biomedical informatics.

**Biomechanical Engineering:** Bioengineering is a fusion of engineering and the life sciences that promotes scientific discovery and the invention of new technologies and therapies through research and education. It encompasses both the use of biology as a new engineering paradigm and the application of engineering principles to medical problems and biological systems. The discipline embraces biology as a new science base for engineering.

### **M.D./M.P.P. Degree**

Matriculated M.D. students from Stanford's School of Medicine may apply for admission to the joint M.P.P./M.D. degree program (<http://med.stanford.edu/education/dual-degree-programs.html>). Applications are accepted anytime after a student has completed one year in the M.D. program. Students must obtain the permission of the School of Medicine to participate in the joint degree program. Students are required to devote two continuous years of full-time study to the completion of the first two years of the core M.D. curriculum. Students then devote one continuous academic year of study to the completion of the M.P.P. core curriculum. At other times, the student may be enrolled in either unit and may take courses from either unit to satisfy the joint degree requirements.

### **Departmental Dual Degrees**

**Education:** The Individually designed M.A. in Education is designed for Stanford doctoral students enrolled outside of the School of Education. Individuals enrolled at the doctoral level at Stanford can be considered for this program.

**E-IPER:** Stanford's Emmett Interdisciplinary Program in Environment and Resources (E-IPER) gives students a focused science, engineering, and technology background, allowing them to integrate science with law and business to address critical environmental and sustainability issues.

**Public Policy:** Stanford University offers two master's programs in Public Policy. A Master's of Public Policy (M.P.P.) is a two-year professional degree and the Masters of Arts in Public Policy (M.A.) is a one-year non-professional degree. Students currently enrolled in other Stanford graduate programs, and applicants to those programs, may apply for either of the Public Policy master's programs. M.D. students are eligible to apply for a dual M.A. degree program. See above for the joint M.D./M.P.P. program.

*Dean:* Lloyd Minor

*Senior Associate Dean for Graduate Education and Postdoctoral Affairs:* William Talbot

*Senior Associate Dean for Medical Education:* Charles Prober



# BIOCHEMISTRY

Courses offered by the Department of Biochemistry are listed under the subject code BIOC on the Stanford Bulletin's ExploreCourses web site.

Biochemistry is a department within the School of Medicine, with offices and labs located in the Beckman Center for Molecular and Genetic Medicine at the Stanford Medical Center. Courses offered by the department may be taken by undergraduates as well as graduate and medical school students.

Advanced courses offered in more specialized areas emphasize recent developments in biochemistry, cell biology, and molecular biology. These courses include the physical and chemical principles of biochemistry, enzyme reaction mechanisms, membrane trafficking and biochemistry, molecular motors and the cytoskeleton, mechanisms and regulation of nucleic acid replication and recombination, the biochemistry of bacterial and animal viruses, the molecular basis of morphogenesis, the molecular and cell biology of yeast, and the structure and function of both eukaryotic and prokaryotic chromosomes.

Opportunities exist for directed reading and research in biochemistry and molecular biology, using the most advanced research facilities, including those for light and electron microscopy, chromatography and electrophoresis, protein and nucleic acid purification, rapid kinetic analysis, synthesis and analysis, single molecule analyses using laser light traps, microarray generation and analysis, and computer graphic workstation facilities for protein and nucleic acid structural analysis. Ongoing research uses a variety of organisms from bacteria to animal cells.

## Doctor of Philosophy in Biochemistry

Requirements for the M.S. and Ph.D. degrees are described in the "Graduate Degrees (p. 50)" section of this bulletin. The department does not offer undergraduate degrees.

The Department of Biochemistry offers a Ph.D. program which begins in the Autumn Quarter of each year. The program of study is designed to prepare students for productive careers in biochemistry; its emphasis is training in research, and each student works closely with members of the faculty. In addition to the requirement for a Ph.D. dissertation based on original research, students are required to complete six advanced courses in biochemistry and related areas among the 135 total units required for the Ph.D. Selection of these courses is tailored to fit the background and interests of each student. A second requirement involves the submission of two research proposals which are presented by the student to a small committee of departmental faculty members who are also responsible for monitoring the progress of student curricular and research programs, and a journal club presentation. All Ph.D. students are expected to participate actively in the department's seminar program, and students are encouraged to attend and to present papers at regional and national meetings in cellular biochemistry and molecular biology. Teaching experience is an integral part of the Ph.D. curriculum and is required for the degree.

The Department of Biochemistry offers an M.S. degree only to students already enrolled in the Ph.D. program. Students should contact the Graduate Studies adviser for more details.

Those applying for graduate study should have at least a baccalaureate degree and should have completed work in cell and developmental biology, basic biochemistry and molecular biology, and genetics. Also required are: at least one year of university physics; differential and integral calculus; and organic, inorganic, and physical chemistry. The department is especially interested in those applicants who have research experience in biology or chemistry. Students must submit an

application, including transcripts and letters of recommendation, by December for admission in the following Autumn Quarter.

Applications should be submitted at the Office of Graduate Admissions (<http://gradadmissions.stanford.edu>) web site. Applicants are notified by March 31 of decisions on their applications. Stanford University requires scores from the Graduate Record Examination (GRE) (verbal, quantitative, and analytical), and applicants are encouraged to submit scores from the GRE Subject Test in biochemistry, biology, or chemistry. Applicants should take the October GRE exam.

All applicants are urged to compete for non-Stanford fellowships or scholarships, and U.S. citizens should complete an application for a National Science Foundation Predoctoral Traineeship. Students are provided with financial support to cover normal living expenses; Stanford tuition costs are paid. Applicants for admission to the department are considered without regard to race, color, creed, religion, sex, age, national origin, or marital status.

Postdoctoral research training is available to graduates who hold a Ph.D. or an M.D. degree. Qualified individuals may write to individual faculty members for further information.

At present, the primary research interests of the department are the structure and function of proteins and nucleic acids, the biochemistry and control of development processes, molecular motors and the cytoskeleton, the trafficking of proteins between membrane-bound organelles, the control and regulation of gene expression, bioinformatics/protein structure design, and the application of microarrays to problems in human health and disease.

*Emeriti: (Professors):* Robert L. Baldwin, Paul Berg, Patrick O. Brown, Douglas L. Brutlag, David S. Hogness, A. Dale Kaiser, I. Robert Lehman

*Chair:* Suzanne R. Pfeffer

*Professors:* Steven Artandi, Philip Beachy, Gilbert Chu, Ronald W. Davis, James E. Ferrell, Jr., Daniel Herschlag, Peter Kim, Mark A. Krasnow, Suzanne R. Pfeffer, James A. Spudich, Julie A. Theriot

*Associate Professors:* Rhiju Das, Pehr A. B. Harbury, Rajat Rohatgi, Aaron F. Straight

*Assistant Professors:* Onn Brandman, Lingyin Li, Julia Salzman, Ellen Yeh

*Courtesy Professors:* Chaitan S. Khosla, Sharon Long

# BIOMEDICAL ETHICS

The Stanford University Center for Biomedical Ethics (SCBE) is dedicated to interdisciplinary research and education, and provides clinical and research ethics consultation. SCBE serves as a scholarly resource on emerging ethical issues raised by medicine and biomedical research.

SCBE offers a scholarly concentration in Biomedical Ethics and Medical Humanities (BEMH) to medical students. This program allows medical students to study in depth the moral, social, and humanistic dimensions of medicine and biomedical science. Using cross-disciplinary methods such as those from philosophy, social science, film, literature, art, and law, students examine the meaning and implications of medicine and medical research.

## Degree Requirements

Students who pursue Biomedical Ethics and Medical Humanities in conjunction with an application area, such as Immunology, are required to complete 6 units including:

		Units
INDE 212	Medical Humanities and the Arts	2
PEDS 251A	Medical Ethics I	2

Students may select the other two core BEMH units from a wide variety of University, Medical School, and Law School courses. Students interested in completing all 12 units in the BEMH scholarly area may do the same. Students are encouraged to go through the various offerings and devise a course plan to present to the director, David Magnus, and Audrey Shafer.

Additional information on requirements for the scholarly concentration, is available at the BEMH (<http://bioethics.stanford.edu/education/bemh>) web site.

*Director:* David C. Magnus

*Director Emeritus:* Thomas A. Raffin

*Associate Director:* Mildred K. Cho

*Participating Faculty and Staff:* Danton S. Char, Julie A. Collier, Steven Goodman, Maren Grainger-Monsen, Henry Greely, Alvan A. Ikoku, Katrina A. Karkazis, Sandra S. Lee, Jose R. Maldonado, Michelle M. Mello, Kelly E. Ormond, Laura W. Roberts, Christopher T. Scott, Audrey Shafer, Abraham C. Vergheze

# BIOMEDICAL INFORMATICS

Courses offered by the Program in Biomedical Informatics are listed under the subject code BIOMEDIN on the Stanford Bulletin's ExploreCourses web site.

The program in Biomedical Informatics emphasizes research to develop novel computational methods that can advance biomedicine. Students receive training in the investigation of new approaches to conceptual modeling and to development of new algorithms that address challenging problems in the biological sciences and clinical medicine. Students with a primary interest in developing new informatics methods and knowledge are best suited for this program. Students with a primary interest in the biological or medical application of existing informatics techniques may be better suited for training in the application areas themselves.

## Graduate Programs in Biomedical Informatics

The Biomedical Informatics Program is interdepartmental and offers instruction and research opportunities leading to M.S. and Ph.D. degrees in Biomedical Informatics. All students are required to complete the core curriculum requirements, and also to complete additional course work to fulfill degree requirements and pursue their technical interests and goals as specified for each degree program.

The program can provide flexibility and can complement other opportunities in applied medical research at Stanford. Special arrangements may be made for those with unusual needs or those simultaneously enrolled in other degree programs within the University. Similarly, students with prior relevant training may have the curriculum adjusted to eliminate requirements met as part of prior training.

The University requirements for the M.S. degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

## Master of Science in Biomedical Informatics (Academic)

This degree is designed for individuals who wish to undertake in-depth study of biomedical informatics with research on a full-time basis. Normally, a student spends two years in the program and implements and documents a substantial project by the end of the second year. The first year involves acquiring the fundamental concepts and tools through course work and research project involvement. Academic M.S. students are expected to devote 50 percent or more of their time participating in research projects. Research rotations are not required, but can be done with approval of the academic adviser or training program director. Graduates of this program are prepared to contribute creatively to basic or applied projects in biomedical informatics. This degree requires a written research paper to be approved by two faculty members.

## Master of Science in Biomedical Informatics (Professional/Honors Cooperative Program)

This degree is designed primarily for the working professional who already has advanced training in one discipline and wishes to acquire interdisciplinary skills. Although many classes necessary for the degree are available online, some requirements may be fulfilled through implementation of an alternative plan to be approved by the program. The professional M.S. is offered in conjunction with Stanford Center for Professional Development (SCPD), which establishes the rates of tuition and fees. The program uses the honors cooperative program (HCP) model, which assumes that the student is working in a corporate setting and is enrolled in the M.S. on a part-time basis. The student has up to five years to complete the program. Research projects are optional; if interested, the student must make arrangements with program faculty.

Graduates of this program are prepared to contribute creatively to basic or applied projects in biomedical informatics.

## Master of Science in Biomedical Informatics (Coterminal)

The coterminal degree program allows Stanford University undergraduates to study for a master's degree while completing their bachelor's degree(s) in the same or a different department. See the "Coterminal Degrees (p. 46)" section of this bulletin for additional information. For University coterminal degree program rules and University application forms, see the Registrar's web site (<https://registrar.stanford.edu/students/coterminal-degree-programs/applying-coterm>).

The coterminal Master of Science program follows the same program requirements as the Master of Science (Professional), except for the requirement to be employed in a corporate setting. The coterminal degree is available only to current Stanford undergraduates. Coterminal students are enrolled full-time and courses are taken on campus. Research projects are optional; if interested, the student must make arrangements with program faculty. Graduates of this program are prepared to contribute creatively to basic or applied projects in biomedical informatics.

## Application to the Coterminal Program

For complete information, see the program's Coterminal Master's Degree (<http://bmi.stanford.edu/prospective-students/masters-degree-coterminal-biomedical-informatics.html>) page.

1. Submit the University Coterminal Online Application (<https://applyweb.com/stanterm>).
2. Submit the program's Coterminal Supplemental Application Form (<http://bmi.stanford.edu/prospective-students/FilesProspectiveStudents/CotermSupplementApp.doc>).
3. Submit your academic resume or curriculum vitae.
4. Submit a one-page Statement of Purpose describing how and why the BMI program is well matched to your interests.

Applicants to the coterminal M.S. programs are not required to submit GRE scores. GRE scores are recommended, especially if you have relatively little prior course work in quantitative and computational areas. The TOEFL is not required.

## Advising

Upon acceptance into the program, students are assigned a BMI academic adviser. The student revises the program proposal at this time. Students should contact the BMI program office for advice about coterminal status between acceptance and the first appointment with the BMI academic adviser.

## University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to

the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

## Core Curriculum and Program Requirements in Biomedical Informatics

### Core Curriculum in Biomedical Informatics (31 units)

Students are expected to participate regularly in BIOMEDIN 201 Biomedical Informatics Student Seminar and a research colloquium. Regardless of whether they are enrolled, they should attend all meetings throughout their graduate training, and attend a research colloquium appropriate to their interests. All students are expected to fulfill the following requirements:

#### • Core Biomedical Informatics (9 or more units)

Students are expected to complete the core offerings in biomedical informatics. These courses should be taken for a grade.

- BIOMEDIN 212 Introduction to Biomedical Informatics Research Methodology
- and two of the courses listed below. Additional core course requirements are listed under the M.S. degree program.

BIOMEDIN 210	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
BIOMEDIN 214	Representations and Algorithms for Computational Molecular Biology	3-4
BIOMEDIN 215	Data Driven Medicine	3
BIOMEDIN 217	Translational Bioinformatics	4
BIOMEDIN 260	Computational Methods for Biomedical Image Analysis and Interpretation	3-4

#### • Computer Science, Statistics, Mathematics & Engineering (18 units)

Students are expected to create a program of study with graduate-level courses in computer science, statistics and other technical informatics-related disciplines to achieve in-depth mastery. The program of study may focus on aspects of these disciplines including machine learning, statistical modeling, artificial intelligence, data mining, image analysis, human-computer interaction and data visualization. A complete list of courses accepted for this requirement is on the BMI website. The following are required:

- CS 161 Design and Analysis of Algorithms
- STATS 200 Introduction to Statistical Inference
- STATS 315A Modern Applied Statistics: Learning is strongly recommended.
- No more than 9 units in courses numbered 100-199, and the rest should be 200 or above.
- CS 106A Programming Methodology and CS 106B Programming Abstractions cannot be counted for this requirement.
- All courses should be formal classroom-based courses, not research units.
- Up to 6 units of this portion of the core curriculum may be taken on a Satisfactory/No credit basis.

#### • Social and Ethical Issues (4 units)

Students are expected to be familiar with issues regarding responsible conduct of research, reproducibility of research, and

ethical, legal, social, organizational and behavioral aspects of the impact of biomedical informatics technologies on society. Courses that fulfill this requirement can be found by entering "bmi::ethics" in the Explore Courses search box. PhD students and Academic M.S. students should take MED 255 The Responsible Conduct of Research in their first year. These courses may be taken on a Satisfactory/No credit basis.

		Units
BIOE 122	Biosecurity and Bioterrorism Response	4-5
BIOE 131	Ethics in Bioengineering	3
BIOE 450	Advances in Biotechnology	3
BIOMEDIN 254	Quality & Safety in U.S. Healthcare	3
BIOMEDIN 256	Economics of Health and Medical Care	5
BIOMEDIN 432	Analysis of Costs, Risks, and Benefits of Health Care	4
BIOS 224	Big Topics in Stem Cell Ethics	2
BIOS 258	Ethics, Science, and Society	1
CS 181	Computers, Ethics, and Public Policy	4
CS 181W	Computers, Ethics, and Public Policy	4
CSB 272	Research Ethics	1
EMED 122	Biosecurity and Bioterrorism Response	4-5
EMED 222	Biosecurity and Bioterrorism Response	4-5
GENE 210	Genomics and Personalized Medicine	3
HRP 209	Health Law: The FDA	2-3
HRP 210	Health Law and Policy	3
HRP 211	Law and the Biosciences: Neuroscience	3
UHRP 221	Law and the Biosciences: Genetics	3
HRP 254	Quality & Safety in U.S. Healthcare	3
HRP 256	Economics of Health and Medical Care	5
HRP 273	Essentials of Clinical Research at Stanford	1
HRP 392	Analysis of Costs, Risks, and Benefits of Health Care	4
HUMBIO 174	Foundations of Bioethics	3
INDE 212	Medical Humanities and the Arts	2
ME 208	Patent Law and Strategy for Innovators and Entrepreneurs	2-3
MED 242	Physicians and Human Rights	1
MED 255	The Responsible Conduct of Research	1
MED 255C	The Responsible Conduct of Research for Clinical and Community Researchers	1
MS&E 256	Technology Assessment and Regulation of Medical Devices	3
MS&E 278	Patent Law and Strategy for Innovators and Entrepreneurs	2-3
NBIO 101	Social and Ethical Issues in the Neurosciences	2-4
PEDS 251A	Medical Ethics I	2
PEDS 251B	Medical Ethics II	2
PUBLPOL 122	Biosecurity and Bioterrorism Response	4-5
PUBLPOL 222	Biosecurity and Bioterrorism Response	4-5
SURG 255	Quality & Safety in U.S. Healthcare	3

## Program Requirements for the Academic M.S., HCP Professional M.S., and Coterminal M.S. Degrees

Students enrolled in any of the M.S. degrees must complete the program requirements in order to graduate.

- The core curriculum generally entails a minimum of 31 units of course work, but can require more or less depending upon the courses chosen and the previous training of the student.
- M.S. candidates should complete additional course work and program requirements as outlined below. No one is required to take courses in an area in which he or she has already been adequately trained; under such circumstances, students are permitted to skip courses or substitute more advanced work using a formal annual process administered by the BMI executive committee. Students design appropriate programs for their interests with the assistance and approval of their Biomedical Informatics academic adviser.
- At least 21 units of formal letter-graded coursework are expected for all MS and PhD candidates.

Programs of at least 45 Stanford units that meet the following guidelines are normally approved:

1. Completion of the core curriculum with overall GPA of 3.0.
2. Two additional BMI core offerings from among BIOMEDIN 210 Modeling Biomedical Systems: Ontology, Terminology, Problem Solving, BIOMEDIN 214 Representations and Algorithms for Computational Molecular Biology, BIOMEDIN 215 Data Driven Medicine, BIOMEDIN 217 Translational Bioinformatics and BIOMEDIN 260 Computational Methods for Biomedical Image Analysis and Interpretation (6-7 units) that were not taken to satisfy the core curriculum. These courses should be taken for a grade.
3. Unrestricted Electives needed to complete 45 units. Students may fulfill this requirement with any Stanford graduate courses, including courses taken to satisfy program prerequisites.
4. At least 23 units of courses must be at the level 200 or above.
5. A cumulative GPA of 3.0 or greater to remain in good academic standing.
6. Students are expected to participate regularly in BIOMEDIN 201 Biomedical Informatics Student Seminar and a research colloquium. HCP professional masters students who are able to attend classes on campus should participate regularly.
7. Academic M.S. students who are funded by the program are required to be a teaching assistant for one course; those students may register for 1-3 units of BIOMEDIN 290 Biomedical Informatics Teaching Methods .
8. HCP professional masters students who are local are encouraged to participate in on-campus coursework and seminars.
9. Masters students should sign up for BIOMEDIN 801 TGR Master's Project for their project units after completing their 45-unit residency requirement.

## Doctor of Philosophy in Biomedical Informatics

Individuals wishing to prepare themselves for careers as independent researchers in biomedical informatics, with applications experience in bioinformatics, clinical informatics, or imaging informatics, should apply for admission to the doctoral program. The University's basic requirements for the doctorate (residence, dissertation, examination, and so on) are discussed in the "Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees>)" section of this bulletin.

The Core Curriculum in Biomedical Informatics (31 units) is outlined below. The Ph.D. program requires an additional 21 units of coursework, to complete a total of 52 units.

### Core Curriculum in Biomedical Informatics (31 units)

Students are expected to participate regularly in BIOMEDIN 201 Biomedical Informatics Student Seminar and a research colloquium. Regardless of whether they are enrolled, they should attend all meetings throughout their graduate training, and attend a research colloquium appropriate to their interests. All students are expected to fulfill the following requirements:

#### • Core Biomedical Informatics Courses (9 or more units)

Students are expected to complete the core offerings in biomedical informatics. These courses should be taken for a grade.

- a. BIOMEDIN 212 Introduction to Biomedical Informatics Research Methodology
- b. and two of the courses listed below.

Course	Description	Units
BIOMEDIN 210	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
BIOMEDIN 214	Representations and Algorithms for Computational Molecular Biology	3-4
BIOMEDIN 215	Data Driven Medicine	3
BIOMEDIN 217	Translational Bioinformatics	4
BIOMEDIN 260	Computational Methods for Biomedical Image Analysis and Interpretation	3-4

#### • Computer Science, Statistics, Mathematics & Engineering (18 units)

Ph.D. students are expected to create a program of study with graduate-level courses in computer science, statistics and other technical informatics-related disciplines to achieve in-depth mastery. The program of study may focus on aspects of these disciplines including machine learning, statistical modeling, artificial intelligence, data mining, image analysis, human-computer interaction and data visualization. A complete list of courses accepted for this requirement is on the BMI website. The following are required:

- a. CS 161 Design and Analysis of Algorithms
- b. STATS 200 Introduction to Statistical Inference
- c. STATS 315A Modern Applied Statistics: Learning is strongly recommended.
- d. No more than 9 units in courses numbered 100-199, and the rest should be 200 or above.
- e. CS 106A Programming Methodology and CS 106B Programming Abstractions cannot be counted for this requirement.
- f. All courses should be formal classroom-based courses, not research units.
- g. Up to 6 units of this portion of the core curriculum may be taken on a Satisfactory/No credit basis.

#### • Social and Ethical Issues (4 units)

Students are expected to be familiar with issues regarding responsible conduct of research, reproducibility of research, and ethical, legal, social, organizational and behavioral aspects of the impact of biomedical informatics technologies on society. Courses that fulfill this requirement can be found by entering "bmi::ethics" in the Explore Courses search box. PhD students should take MED 255 The Responsible Conduct of Research in their first year. These courses may be taken on a Satisfactory/No credit basis.

Course	Description	Units
BIOE 122	Biosecurity and Bioterrorism Response	4-5
BIOE 131	Ethics in Bioengineering	3
BIOE 450	Advances in Biotechnology	3
BIOMEDIN 254	Quality & Safety in U.S. Healthcare	3

BIOMEDIN 256	Economics of Health and Medical Care	5
BIOMEDIN 432	Analysis of Costs, Risks, and Benefits of Health Care	4
BIOS 224	Big Topics in Stem Cell Ethics	2
BIOS 258	Ethics, Science, and Society	1
CS 181	Computers, Ethics, and Public Policy	4
CS 181W	Computers, Ethics, and Public Policy	4
CSB 272	Research Ethics	1
EMED 122	Biosecurity and Bioterrorism Response	4-5
EMED 222	Biosecurity and Bioterrorism Response	4-5
GENE 210	Genomics and Personalized Medicine	3
HRP 209	Health Law: The FDA	2-3
HRP 210	Health Law and Policy	3
HRP 211	Law and the Biosciences: Neuroscience	3
HRP 221	Law and the Biosciences: Genetics	3
HRP 254	Quality & Safety in U.S. Healthcare	3
HRP 256	Economics of Health and Medical Care	5
HRP 273	Essentials of Clinical Research at Stanford	1
HRP 392	Analysis of Costs, Risks, and Benefits of Health Care	4
HUMBIO 174	Foundations of Bioethics	3
INDE 212	Medical Humanities and the Arts	2
ME 208	Patent Law and Strategy for Innovators and Entrepreneurs	2-3
MED 242	Physicians and Human Rights	1
MED 255	The Responsible Conduct of Research	1
MED 255C	The Responsible Conduct of Research for Clinical and Community Researchers	1
MS&E 256	Technology Assessment and Regulation of Medical Devices	3
MS&E 278	Patent Law and Strategy for Innovators and Entrepreneurs	2-3
NBIO 101	Social and Ethical Issues in the Neurosciences	2-4
PEDS 251A	Medical Ethics I	2
PEDS 251B	Medical Ethics II	2
PUBLPOL 122	Biosecurity and Bioterrorism Response	4-5
PUBLPOL 222	Biosecurity and Bioterrorism Response	4-5
SURG 255	Quality & Safety in U.S. Healthcare	3

## Program Requirements for the Biomedical Informatics PhD:

1. Completion of the Core Curriculum (31 or more units) described above.
2. Additional technical electives (6 units) drawn from the courses in Computer Science, Mathematics, Statistics, and Engineering as specified for the Core Curriculum above.
3. Domain biology or medicine (6 units). Students should take classes relevant to their application area interests.
4. The above three requirements should be completed by the end of the second year of graduate study.
5. Unrestricted electives (9 units). Students may fulfill this requirement with any Stanford graduate courses, including courses taken to satisfy program prerequisites.
6. A cumulative GPA of 3.0 or greater to remain in good academic standing.
7. In the first year, at least two research rotations are required.
8. Each student is required to be a teaching assistant for two courses as assigned by the Biomedical Informatics Executive Committee; one should be completed in the first two years of study. Students may

register for up to 3 units of BIOMEDIN 290 Biomedical Informatics Teaching Methods to obtain credit for teaching assistantships.

9. Doctoral students are generally advanced to Ph.D. candidacy after passing the qualifying exam, which takes place by the end of the second year of training. A student's academic adviser has primary responsibility for the adequacy of the program, which is regularly reviewed by the Biomedical Informatics Executive Committee. The student must fulfill these requirements and apply for admission to candidacy for the Ph.D. by the beginning of the third year.
10. During the third year of training, each doctoral student is required to give a thesis pre-proposal seminar that describes evolving research plans.
11. The most important requirement for the Ph.D. degree is the dissertation. Each student must secure the agreement of a member of the BMI advising faculty to act as the doctoral dissertation adviser or co-adviser.
12. After application for Terminal Graduate Registration (TGR) status and completion of 135 units, the Ph.D. candidate should register each quarter for BIOMEDIN 802 TGR PhD Dissertation so that their research effort may be counted toward the degree.
13. Before the end of the fourth year, each student must orally present a written thesis proposal for the written dissertation and must orally defend the thesis proposal before a University oral examination committee that includes at least one member of the BMI Advising Faculty. The committee determines whether the student's general knowledge of the field and the details of the planned thesis are sufficient to justify proceeding with the dissertation.
14. At the completion of training, while still matriculated and shortly prior to deposit of the dissertation, the student gives a final talk describing his or her final research results. No official additional oral examination is required upon completion of the written dissertation; the oral defense of the dissertation proposal satisfies the University oral examination requirement.
15. The student is expected to demonstrate an ability to present scholarly material and research in a lecture at a formal seminar.
16. The student is expected to demonstrate an ability to present scholarly material in concise written form. Each student is required to write a paper suitable for publication, usually discussing his or her doctoral research project. This paper must be approved by the student's adviser as suitable for submission to a refereed journal before the doctoral degree is conferred.
17. The dissertation must be accepted by a doctoral dissertation reading committee composed of the principal dissertation adviser and two other readers. A fourth reader may be added at the discretion of the student and the principal adviser.

## Ph.D. Minor in Biomedical Informatics

For a Ph.D. minor in Biomedical Informatics (BMI), a candidate must complete a minimum of 20 unduplicated units of biomedical informatics course work, including 12 units in BMI core courses from:

		Units
BIOMEDIN 210	Modeling Biomedical Systems: Ontology, Terminology, Problem Solving	3
BIOMEDIN 212	Introduction to Biomedical Informatics Research Methodology	3
BIOMEDIN 214	Representations and Algorithms for Computational Molecular Biology	3-4
BIOMEDIN 215	Data Driven Medicine	3
BIOMEDIN 217	Translational Bioinformatics	4
BIOMEDIN 260	Computational Methods for Biomedical Image Analysis and Interpretation	3-4

The candidate must complete the one-unit MED 255 The Responsible Conduct of Research or an approved substitute.

The remaining units must be courses that would count towards the BMI master's degree, taken from these areas:

- Computer Science, Probability, Statistics, Machine Learning, Mathematics, Engineering
- Biomedicine
- Other BMI courses from the list above

Students are expected to participate regularly in BIOMEDIN 201 (p. 794) Biomedical Informatics Student Seminar.

Courses used for the BMI Ph.D. minor may not be double-counted to meet the requirements of a master's or Ph.D. degree.

All courses used for the BMI Ph.D. minor, except MED 255, must be taken for a letter grade and passed with an overall GPA of 3.0 or better.

This degree offering became effective in Autumn Quarter 2010-11. Courses taken at Stanford prior to that date may be counted towards the BMI Ph.D. minor degree.

## Application Process

Stanford Ph.D. students apply using the Application for Ph.D. Minor (<https://stanford.app.box.com/v/app-phd-minor>) form and must provide an unofficial Stanford transcript as well as a statement of purpose for adding the Ph.D. minor degree. Submit the form and accompanying materials to the Biomedical Informatics program.

## Advising

A minor program adviser is assigned from the Biomedical Informatics Executive Committee or advising faculty upon admission to the program.

*Committee:* Russ B. Altman (Chair and Program Director), Mark A. Musen (Co-Director), Steven C. Bagley (Executive Director), Manisha Desai, Teri Klein, Daniel L. Rubin, Nigam Shah, Dennis P. Wall

### *Participating Faculty and Staff by Department\**

*Biochemistry:* Douglas Brutlag (Professor Emeritus), Rhiju Das (Associate Professor), Ronald Davis (Professor), James Ferrell (Professor), Julia Salzman (Assistant Professor), Julie Theriot (Professor)

*Bioengineering:* Russ B. Altman (Professor), Kwabena Boahen (Professor), Markus Covert (Associate Professor), Scott Delp (Professor), Ingmar Riedel-Kruse (Assistant Professor)

*Biology:* Hunter Fraser (Associate Professor), Dmitri Petrov (Professor), Jonathan Pritchard (Professor)

*Biomedical Data Science:* Russ B. Altman (Professor), Euan Ashley (Associate Professor), Serafim Batzoglou (Professor), Carlos Bustamante (Professor), Manisha Desai (Professor), Bradley Efron (Professor), Andrew Gentles (Assistant Professor), Olivier Gevaert (Assistant Professor), Trevor Hastie (Professor), Tina Hernandez-Boussard (Associate Professor), Iain Johnstone (Professor), Purvesh Khatri (Assistant Professor), Teri Klein (Professor), Philip Lavori (Professor), Ying Lu (Professor), Mark A. Musen (Professor), Richard Olshen (Professor Emeritus), Sylvia Plevritis (Professor), Daniel L. Rubin (Associate Professor), Chiara Sabatti (Professor), Julia Salzman (Assistant Professor), Nigam Shah (Associate Professor), Lu Tian (Associate Professor), Robert Tibshirani (Professor), Dennis P. Wall (Associate Professor), Wing H Wong (Professor), James Zou (Assistant Professor)

Richard Olshen (Professor), Chiara Sabatti (Associate Professor), Robert Tibshirani (Professor), Dennis P. Wall (Associate Professor)

*Chemical and Systems Biology:* Joshua Elias (Assistant Professor), James Ferrell (Professor)

*Chemistry:* Vijay Pande (Professor)

*Computer Science:* Serafim Batzoglou (Professor), Gill Bejerano (Associate Professor), David Dill (Professor), Ronald Dror (Associate Professor), Leonidas Guibas (Professor), Anshul Kundaje (Assistant Professor), Terry Winograd (Professor Emeritus)

*Dermatology:* Paul Khavari (Professor)

*Developmental Biology:* Gill Bejerano (Associate Professor)

*Electrical Engineering:* Kwabena Boahen (Professor)

*Energy Resources Engineering:* Margot Gerritsen (Associate Professor)

*Genetics:* Russ B. Altman (Professor), Euan Ashley (Associate Professor), Steven C. Bagley (Senior Research Engineer), Michael Bassik (Assistant Professor), Ami Bhatt (Assistant Professor), Carlos Bustamante (Professor), J. Michael Cherry (Professor, Research), Stanley N. Cohen (Professor), Christina Curtis (Assistant Professor), Ronald Davis (Professor), William Greenleaf (Assistant Professor), Karla Kirkegaard (Professor), Teri E. Klein (Senior Research Scientist), Anshul Kundaje (Assistant Professor), Jin Billy Li (Assistant Professor), Stephen B. Montgomery (Assistant Professor), Jonathan Pritchard (Professor), Gavin Sherlock (Professor), Arend Sidow (Professor), Michael P. Snyder (Professor), Hua Tang (Professor)

*Health Research and Policy:* Trevor Hastie (Professor), Mark Hlatky (Professor)

*Management Science and Engineering:* Margaret Brandeau (Professor), Ross D. Shachter (Associate Professor)

*Medicine:* Russ B. Altman (Professor), Euan Ashley (Associate Professor), Ami Bhatt (Assistant Professor), Jayanta Bhattacharya (Professor), Catherine Blish (Assistant Professor), Carol Cain (Adjunct Assistant Professor), Stanley Cohen (Professor), Christina Curtis (Assistant Professor), Manisha Desai (Professor), Michel Dumontier (Associate Professor), Andrew Gentles (Assistant Professor), Olivier Gevaert (Assistant Professor), Mary Goldstein (Professor), Summer Han (Assistant Professor), Tina Hernandez-Boussard (Associate Professor), Michael Higgins (Adjunct Associate Professor), Mark Hlatky (Professor), Hanlee P. Ji (Associate Professor), Purvesh Khatri (Assistant Professor), Teri Klein (Professor), Lianne Kurina (Associate Professor, Teaching), Curtis Langlotz (Professor), Henry Lowe (Associate Professor), Mark A. Musen (Professor), Douglas K. Owens (Professor), Natalie Pageler (Clinical Associate Professor), David Relman (Professor), Daniel L. Rubin (Associate Professor), Robert W. Shafer (Professor, Research), Nigam Shah (Associate Professor), Samson Tu (Senior Research Engineer), P.J. Utz (Professor)

*Mechanical Engineering:* Scott Delp (Professor)

*Microbiology and Immunology:* Karla Kirkegaard (Professor), Garry Nolan (Professor), David Relman (Professor), Julie Theriot (Professor)

*Neurosurgery:* Summer Han (Assistant Professor)

*Operations, Information and Technology:* Mohsen Bayati (Associate Professor)

*Pathology:* Stephen B. Montgomery (Assistant Professor), Arend Sidow (Professor)

*Pediatrics:* Gill Bejerano (Associate Professor), Natalie Pageler (Clinical Associate Professor), Jonathan Palma (Clinical Assistant Professor), Dennis P. Wall (Associate Professor)

*Psychiatry and Behavioral Sciences:* Vinod Menon (Professor, Research)

*Psychology:* Russell Poldrack (Professor)

*Radiation Oncology:* Lei Xing (Professor)

*Radiology:* Sam (Sanjiv) Gambhir (Professor), Curtis Langlotz (Professor), Parag Mallick (Assistant Professor, Research), Sandy A. Napel (Professor), David Paik (Adjunct Assistant Professor), Sylvia Plevritis (Professor), Daniel L. Rubin (Associate Professor)

*Statistics:* Bradley Efron (Professor), Trevor J. Hastie (Professor), Susan Holmes (Professor), Iain Johnstone (Professor), Art Owen (Professor), Chiara Sabatti (Professor), Robert Tibshirani (Professor), Wing H Wong (Professor)

*Structural Biology:* Michael Levitt (Professor)

*Surgery:* Tina Hernandez-Boussard (Associate Professor), Thomas Krumel (Professor)

\* Research opportunities are not limited to faculty and departments listed.



# CANCER BIOLOGY

Courses offered by the Cancer Biology Program are listed under the subject code CBIO on the Stanford Bulletin's ExploreCourses web site.

The Cancer Biology Program at Stanford University is an interdisciplinary program leading to the Ph.D. degree. During the past three decades, understanding of cancer has increased with the discovery of oncogenes, tumor suppressor genes, pathways of DNA damage and repair, chromatin remodeling, cell cycle regulation, angiogenesis, and responses to hypoxia, and recent glimpses into the molecular basis of metastasis and cancer stem cell biology. In addition, methods of parallel analysis, including genomics and proteomics approaches, have begun to refine and redefine the taxonomy of cancer diagnosis. This explosion of basic and clinical science has resulted in the first successful cancer chemotherapies and immunotherapies based on the knowledge of specific molecular targets. Stanford presents a unique environment to pursue interdisciplinary cancer research because the schools of Medicine, Humanities and Sciences, and Engineering are located on a single campus.

The goal of the Cancer Biology Ph.D. program is to provide students with education and training that enables them to make significant contributions to this field. Course work during the first year is designed to provide a broad understanding of the molecular, genetic, cell biological, and pathobiological aspects of cancer. Students also learn about the current state of the epidemiology, clinical diagnosis, treatment, and prevention of human cancers. Equally important during the first year is a series of three rotations in research laboratories chosen by each student. By the end of first year, each student chooses a research adviser and begins work on the dissertation project. A qualifying examination must be completed by the end of the second year. An annual Cancer Biology conference provides students with an opportunity to present their research to one another and to faculty. The expected time to degree is four to five years.

Students are not limited to a single department in choosing their research adviser. The Cancer Biology Ph.D. program currently has approximately 65 graduate students located in basic science and clinical departments throughout the School of Medicine and the School of Humanities and Sciences.

## Doctor of Philosophy in Cancer Biology

University requirements for the Ph.D. are described under the "Graduate Degrees (p. 50)" section of this bulletin.

A small number of applicants are admitted to the program each year. Applicants should have completed an undergraduate major in the biological sciences; applicants with undergraduate majors in physics, chemistry, or mathematics may be admitted if they complete background training in biology during the first two years of study. During the first year, each student is required to complete a minimum of three, one quarter laboratory rotations. Students must choose a dissertation adviser prior to the end of Summer Quarter, first year, but not before the end of Spring Quarter.

The requirements for the Ph.D. degree are as follows:

1. Training in biology equivalent to that of an undergraduate biology major at Stanford.
2. Completion of the following courses:

### REQUIRED

BIOS 200	Foundations in Experimental Biology (for students entering in 2012 or later. Students who entered in 2011 or earlier took GENE 203, Advanced Genetics.)	5
CBIO 240	Molecular and Genetic Basis of Cancer	4
CBIO 242	Cellular and Clinical Aspects of Cancer	4
CBIO 280	Cancer Biology Journal Club (required for first- and second-year graduate students in Autumn, Winter, and Spring quarters, totaling 6 units)	1
CBIO 245	Lecture Seminar Series in Cancer Biology Program (required for first- and second-year graduate student in Autumn, Winter, and Spring quarters, totaling to 6 units)	1
MED 255	The Responsible Conduct of Research	1

### ELECTIVES (TOTAL OF 10 UNITS)

#### Computational/Systems Cancer Biology Track

##### Core Knowledge

STATS 60	Introduction to Statistical Methods: Precalculus	5
GENE 218	Computational Analysis of Biological Information: Introduction to Python for Biologists	2
BIOS 205	Introduction to R for Data Analysis	1
NENS 230	Analysis Techniques for the Biosciences Using MATLAB	2
CS 106A	Programming Methodology	3-5
GENE 211	Genomics	3
CBIO 243	Principles of Cancer Systems Biology	3
BIOS 201	Next Generation Sequencing and Applications	2

##### Additional Courses

CS 106B	Programming Abstractions	3-5
STATS 116	Theory of Probability	3-5
STATS 202	Data Mining and Analysis	3
STATS 216	Introduction to Statistical Learning	3
BIOMEDIN 214	Representations and Algorithms for Computational Molecular Biology	3-4
IMMUNOL 207	Essential Methods in Computational and Systems Immunology	3
CS 161	Design and Analysis of Algorithms	3-5
GENE 245	Statistical and Machine Learning Methods for Genomics	3

##### Other Cancer Biology Related Graduate-Level

BIO 214	Advanced Cell Biology	4
S BIO 241	Biological Macromolecules	3-5
CSB 210	Cell Signaling	4
IMMUNOL 201	Advanced Immunology I	3
DBIO 201	Cells and Signaling in Regenerative Medicine.	2
MI 215	Principles of Biological Technologies	3
CBIO 275	Tumor Immunology	2

3. Other elective course is determined in consultation with the student's adviser and/or the Program Director.
4. Presentation of research results at the annual Cancer Biology Conference and Pizza Talks.
5. Completion of a qualifying examination in Cancer Biology is required for admission to Ph.D. candidacy. The exam consists of an F31

**Units** NRSA-style written grant proposal not to exceed seven pages (excluding references) and an oral examination. The examining committee consists of three faculty members from the Cancer Biology Program and does not include the student's dissertation adviser. The composition of this committee is chosen by the student and dissertation adviser and must be submitted to and approved

by the program director prior to the end of Autumn Quarter, second year. The qualifying examination must be taken prior to the end of Spring Quarter, second year. If necessary, one retake is permitted prior to the end of Summer Quarter, second year. After the qualifying examination has been completed, the student is required to form a dissertation reading committee that includes the student's adviser and three other members of the Academic Council with appropriate expertise. Each student is required to arrange annual meetings (more frequently, if necessary) of the dissertation reading committee, at which time progress during the past year and a plan of study for the coming year are presented orally and discussed. Completion of each annual committee meeting must be communicated in writing to the program director by the adviser by the end of Spring Quarter each year.

The major accomplishment of each successful Ph.D. student is the presentation of a written dissertation resulting from independent investigation that contributes to knowledge in the area of cancer biology. An oral examination is also required for the Ph.D. degree. In the Cancer Biology Program, a public seminar (one hour) is presented by the Ph.D. candidate, followed by a closed-door oral examination. The oral examination committee consists of at least four examiners (the members of the doctoral dissertation reading committee) and a chair. The oral examination chair must be from outside the Cancer Biology Program faculty and may not have a full or joint appointment in the adviser's or student's home department. However, a courtesy appointment does not affect eligibility. The oral examination chair may be from the same department as any other member(s) of the examination committee. All members of the oral examination committee are normally members of the Academic Council, as the oral examination chair must be. With the prior approval of the program director or school dean, one of the examiners may be a person who is not a member of the Academic Council if that individual contributes expertise not otherwise available. Official responsibility for selecting the oral examination chair rests with the program. Cancer Biology delegates this to the student and dissertation adviser.

*Program Co-Directors:* Laura Attardi (Radiation Oncology and Genetics) and Julien Sage (Pediatrics and Genetics)

*Executive Committee on Cancer Biology:* Laura Attardi (Radiation Oncology and Genetics), Edward Graves (Radiation Oncology), Peter Jackson (Microbiology and Immunology; Pathology), Julien Sage (Pediatrics and Genetics), Monte Winslow (Genetics)

*Admissions Committee on Cancer Biology:* Steven Artandi (Medicine, Hematology), Laura Attardi (Radiation Oncology and Genetics), Howard Chang (Dermatology), Katrin Chua (Medicine, Endocrinology), Michael Cleary (Pathology), Max Diehn (Radiation Oncology), Michelle Monje (Neurology), Sylvia Plevritis (Radiology), Erinn Rankin (Radiation Oncology and Obstetrics and Gynecology), Julien Sage (Pediatrics and Genetics)

## Participating Departments and Faculty

*Biochemistry:* Philip Beachy (Professor), Mark Krasnow (Professor), Julia Salzman (Assistant Professor)

*Bioengineering:* Jennifer Cochran (Associate Professor)

*Biology (School of Humanities and Sciences):* Scott J. Dixon (Assistant Professor), Judith Frydman (Professor), Or Gozani (Professor), Ashby Morrison (Assistant Professor), Jan M. Skotheim (Associate Professor), Tim Stearns (Professor)

*Biomedical Data Science:* Aaron Newman (Assistant Professor)

*Chemical And Systems Biology:* James K. Chen (Professor), Karlene Cimprich (Professor), Mary Teruel (Assistant Professor)

*Dermatology:* Howard Y. Chang (Professor), Paul A. Khavari (Professor), Carolyn Lee (Assistant Professor), Anthony Oro (Professor), Kevin Wang (Assistant Professor)

*Developmental Biology:* Margaret Fuller (Professor), Roeland Nusse (Professor)

*Genetics:* Michael Bassik (Assistant Professor), Anne Brunet (Professor), Christina Curtis (Assistant Professor), Monte Winslow (Assistant Professor)

*Medicine/Endocrinology/Gerontology/Metabolism:* Katrin Chua (Associate Professor)

*Medicine/Gastroenterology and Hepatology:* Anson Lowe (Associate Professor)

*Medicine/Hematology:* Steven Artandi (Professor), Calvin Kuo (Professor), Ravindra Majeti (Associate Professor)

*Medicine/Oncology:* Ash Alizadeh (Assistant Professor), Gilbert Chu (Professor), Michael Clarke (Professor), Dean Felsher (Professor), Hanlee Ji (Associate Professor), Ronald Levy (Professor), Beverly S. Mitchell (Professor; Director, Stanford Cancer Institute)

*Microbiology and Immunology:* Helen M. Blau (Professor), Peter Jackson (Professor), Garry Nolan (Professor)

*Neurology and Neurosurgery:* Michelle Monje (Assistant Professor)

*Neurosurgery:* Albert J. Wong (Professor)

*Orthopaedic Surgery:* Nidhi Bhutani (Assistant Professor)

*Otolaryngology:* John Sunwoo (Associate Professor)

*Pathology:* Jeff Axelrod (Professor), Sean Bendall (Assistant Professor), Matthew Bogoy (Professor), Michael Cleary (Professor), Gerald Crabtree (Professor), Edgar Engleman (Professor), Andrew Fire (Professor), Joseph Lipsick (Professor), Bingwei Lu (Professor), Jonathan Pollack (Professor), Irving Weissman (Professor; Virginia & D.K. Ludwig Professor for Clinical Investigation in Cancer Research, Professor of Developmental Biology)

*Pediatrics/Cancer Biology:* Julien Sage (Professor; Co-Director of Stanford Cancer Biology Program)

*Pediatrics/Human Gene Therapy:* Mark Kay (Professor)

*Pediatrics/Hematology/Oncology:* Matthew Porteus (Associate Professor), Kathleen Sakamoto (Professor)

*Radiation Oncology/Radiation Biology:* Laura Attardi (Professor; Co-Director of Stanford Cancer Biology Program), Amato Giaccia (Professor), Sharon Pitteri (Assistant Professor)

*Radiation Oncology/Radiation Physics:* Edward Graves (Associate Professor)

*Radiation Oncology/Radiation Therapy:* Max Diehn (Assistant Professor), Susan Knox (Associate Professor), Quynh-Thu Le (Professor)

*Radiology/Diagnostic Radiology:* Parag Mallick (Assistant Professor, Research), Sylvia Plevritis (Professor)

# CHEMICAL AND SYSTEMS BIOLOGY

Courses offered by the Department of Chemical and Systems Biology are listed under the subject code CSB on the (<https://explorecourses.stanford.edu/search?q=CSB&view=catalog&page=0&catalog=71&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&filter-coursestatus-Active=on&collapse=&filter-catalognumber-CSB=on&filter-catalognumber-CSB=on>) Stanford Bulletin's ExploreCourses web site.

The department emphasizes individualized training at the interface of physical science and biomedical science. The program encourages students to draw upon a variety of modern scientific techniques, ranging from recent advances in molecular biology and protein biochemistry to synthetic organic chemistry and single cell imaging. Graduate students in the department take courses in signal transduction networks, chemical biology, and other areas of importance to their research goals.

## Master of Science in Chemical and Systems Biology

Students in the Ph.D. program may apply for an M.S. degree after having satisfactorily completed the course and laboratory requirements of the first two years. The degree also requires a written thesis based on literature or laboratory research. Postdoctoral research training is available to graduates having the Ph.D. or M.D. degree.

## Doctor of Philosophy in Chemical and Systems Biology

University requirements for the Ph.D. are described in the "Graduate Degrees (<http://exploreddegrees.stanford.edu/schoolofmedicine/chemicalandsystemsbiology/%20/graduatedegrees>)" section of this bulletin.

The Department of Chemical and Systems Biology offers interdisciplinary training to prepare students for independent careers in biomedical science. The main focus of the program is cell signaling, chemical biology, and systems biology.

The program leading to the Ph.D. degree includes formal and informal study in chemical biology, systems biology, drug discovery, biochemistry, and other areas of relevance to the interests of particular students. First-year students spend one quarter in each of three different laboratories, working closely with other graduate students, a professor, and postdoctoral fellows on various research projects. During the fourth quarter, the student chooses a faculty mentor with whom to undertake thesis research, based on available positions and the student's interest. During or before the eighth quarter of study, students must pass a qualifying exam which consists of an oral exam on general knowledge and a defense of a research proposal. Course requirements are fulfilled during the first two years of study; the later years of the four- to six-year program are devoted to full-time dissertation research. Close tutorial contact between students and faculty is stressed throughout the program.

Research opportunities also exist for medical students and undergraduates. The limited size of the labs in the department allows for close tutorial contact between students, postdoctoral fellows, and faculty.

The department participates in the four quarter Health and Human Disease and Practice of Medicine sequence which provides medical

students with a comprehensive, systems-based education in physiology, pathology, microbiology, and pharmacology.

*Emeriti: (Professors)* Robert H. Dreisbach, Avram Goldstein, Dora B. Goldstein, Stuart Kim, Tag E. Mansour, Oleg Jardetzky, Richard A. Roth, James P. Whitlock

*Chair:* James K. Chen

*Professors:* James K. Chen, Karlene A. Cimprich, James E. Ferrell, Jr., Tobias Meyer, Daria Mochly-Rosen, Thomas J. Wandless, Joanna K. Wysocka

*Associate Professor (Teaching):* Kevin Grimes

*Assistant Professors:* Joshua Elias, Daniel F. Jarosz, Lei Stanley Qi, Mary Teruel

*Courtesy Professors:* Carolyn Bertozzi, Matthew Bogoy, Brian Kobilka, Beverly S. Mitchell, Paul A. Wender

*Courtesy Associate Professors:* Markus W. Covert, Justin Du Bois, Michael Z. Lin, Jan M. Skotheim, Aaron F. Straight, Marius Wernig

# COMMUNITY HEALTH & PREVENTION RESEARCH

Courses offered by the Stanford Prevention Research Center within the Department of Medicine are listed under the subject code CHPR (<https://explorecourses.stanford.edu/search?q=CHPR&view=catalog&page=0&academicYear=&filter-term-Autumn=on&filter-term-Winter=on&filter-term-Spring=on&filter-term-Summer=on&collapse=&filter-catalognumber-CHPR=on&filter-departmentcode-CHPR=on&filter-coursestatus-Active=on&filter-catalognumber-CHPR=on>) on the Stanford Bulletin's ExploreCourses website.

The Master of Science (M.S.) in Community Health and Prevention Research (CHPR) covers the study and treatment of leading risk behaviors (e.g., poor diet, physical inactivity, tobacco use, stress, distress) to prevent the prevailing causes of morbidity and mortality (e.g., cardiovascular disease, cancer, diabetes, lung disease, mental illness) with a focus on engaging and advancing health in diverse communities.

Community health and prevention research are complementary fields increasingly integrated to promote health and prevent chronic diseases in individuals, families, local communities, states, and countries, globally. Community health refers to the scientific discipline of safeguarding and enhancing the wellbeing of diverse communities and populations through education, the promotion of healthy lifestyle habits, and the extensive study of disease and disease determinants. Prevention research is a multidisciplinary scientific field that aims to enhance the health of populations through the study of genetic, behavioral, lifestyle, environmental, and policy factors that lead to disease or vitality.

The M.S. in CHPR is designed for students pursuing health-related careers focusing on chronic disease prevention, health and wellness promotion, and the pursuit of health equity. We anticipate the M.S. in CHPR will be attractive to Stanford's current (coterminal) undergraduates and graduate students, students in the health professions (e.g., medical students), health care providers seeking a second degree, and individuals who will later seek advanced degrees in medicine, nursing, or health/science-related doctoral programs.

The M.S. in CHPR is available to:

1. Current Stanford undergraduates (who must complete the M.S. as a coterminal master's program)
2. Current Stanford graduate students (i.e., master's, doctoral, and medical students)
3. External applicants.

All students in the program must complete the M.S.'s core curriculum and program requirements.

The University requirements for the M.S. degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

## Master of Science in Community Health and Prevention Research

The Stanford Prevention Research Center within the Department of Medicine offers a Master of Science (M.S.) in Community Health and Prevention Research (CHPR). The M.S. in CHPR is available to external applicants, to current undergraduates via the coterminal master's program, and to graduate students at Stanford.

The purpose of the M.S. in CHPR is to:

- engage students from a range of backgrounds in didactic and experiential learning opportunities with the goal of gaining an in-depth understanding of community health and prevention research applications in diverse practice settings
- prepare future public health professionals to responsibly and effectively address health challenges faced by diverse communities across the life course.

In the M.S. in CHPR, students:

- study patterns of chronic diseases in diverse communities and settings and examine how prevention can optimize health and promote health equity at the individual, family, community, and population level
- critically interpret and evaluate research on community health and prevention
- become involved in research teams that encourage health equity promotion and social responsibility
- gain and hone methodological skills including research study design, study implementation, and data analysis related to community health and prevention research
- utilize course work and implementation science in a community-based research internship with the expectation that they design, implement, and assess health and wellness solutions addressing preventable community health challenges
- complete a master's thesis.

## Admission for External Applicants

The application deadline for Autumn 2018-19 entry into the M.S. program is January 16, 2018 at 11:59 p.m. Pacific Standard Time (PST).

### • Knight-Hennessy Scholars

- The Knight-Hennessy Scholars program (<https://knight-hennessy.stanford.edu>) awards up to 100 high-achieving students every year with full funding to pursue a graduate education at Stanford, including the M.S. in CHPR. To be considered, you must apply to Knight-Hennessy Scholars by September 27, 2017, and separately apply to the CHPR program by November 6, 2017 at 11:59 p.m. Pacific Standard Time (PST).

All applicants (not including coterminal applicants) must submit the following required application materials as part of their application. Instructions on how to submit these application materials can be found on Stanford's Graduate Admissions web site (<https://gradadmissions.stanford.edu/applying>).

- 3 letters of recommendation
  - At least one letter of recommendation should be from a faculty member at the last school you attended as a full-time student (unless you have been out of school for more than five years).
- GRE scores (valid MCAT or DAT scores may be submitted in lieu of GRE scores)
- TOEFL scores (if necessary)
- Resume or curriculum vitae (CV)
- Statement of purpose
  - The statement of purpose should describe succinctly your reasons for applying to the proposed program at Stanford, your preparation for this field of study, research interests, future career plans, and other aspects of your background and interests which may aid the admissions committee in evaluating your aptitude and motivation for graduate study.
- Official transcript(s) from all postsecondary institutions you have attended as a full-time student for one year (i.e., three quarters or two semesters) or longer.

- You must upload one scanned version of your official transcript(s) in the online application and mail one official copy to the Stanford Prevention Research Center within the Department of Medicine.
- \$125 application fee
  - This application fee is assessed regardless of admission decision.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

### Coterminal Admission

The application deadline for Autumn 2018-19 entry into the M.S. program is January 16, 2018 at 11:59 p.m. Pacific Standard Time (PST).

Stanford undergraduates may apply to the M.S. program once the following conditions have been met:

- Applicants must have earned 120 units toward graduation (UTG) as shown on the undergraduate unofficial transcript. This includes allowable Advanced Placement (AP) and transfer credit.
- Applicants must have a major(s) declared.
- Applicants must have completed six non-Summer quarters at Stanford (or two non-Summer quarters at Stanford for transfer students).

As part of their program application, applicants must submit the following required application materials. Instructions on how to submit these application materials can be found on the Current Stanford Students (<https://gradadmissions.stanford.edu/applying/current-stanford-students>) page of the Graduate Admissions web site.

- Application for admission to coterminal master's program
- Statement of purpose
  - The statement of purpose should describe succinctly your reasons for applying to the proposed program at Stanford, your preparation for this field of study, research interests, future career plans, and other aspects of your background and interests which may aid the admissions committee in evaluating your aptitude and motivation for graduate study.
- Resume or curriculum vitae (CV)
- Preliminary program proposal

- Two letters of recommendation from Stanford professors
- 1 copy of your Stanford transcript (unofficial transcripts are acceptable)
- \$125 application fee (this fee is assessed by the Registrar's Office to those accepted and matriculated into the program).

### Admission for Current Stanford Graduate Students

- Current Stanford graduate students include master's, doctoral, and medical students who are currently enrolled in a graduate degree program at Stanford. Current Stanford postdoctoral scholars must apply as external applicants.
- The application deadline for Autumn 2018-19 entry into the M.S. program is January 16, 2018 at 11:59 p.m. Pacific Standard Time (PST).
- On a case-by-case basis, current Stanford graduate students may be allowed to apply to the program after the application deadline.

*Required Application Materials:* Instructions on how to submit these application materials can be found on the CHPR program web site (<http://CHPR.stanford.edu>). (<http://prevention.stanford.edu/education/chpr.html>)

- Completed Current Graduate Student Online Application Form ([https://stanfordmedicine.qualtrics.com/SE/?SID=SV\\_ellAYRZnPUqkPGJ](https://stanfordmedicine.qualtrics.com/SE/?SID=SV_ellAYRZnPUqkPGJ))
- Resume/CV
- Transcript (unofficial transcripts are acceptable)
- Valid GRE, MCAT, or GMAT scores (i.e., the test scores students submitted to their original graduate program at Stanford)
- Statement of Purpose
  - The Statement of Purpose should describe succinctly the reasons for applying to the proposed program at Stanford, preparation for this field of study, research interests, future career plans, and other aspects of the applicant's background and interests which may aid the admissions committee in evaluating aptitude and motivation for graduate study.
- 2 letters of recommendation from Stanford professors
- \$125 application fee

### Core Curriculum and Program Requirements (45 units)

To complete the M.S. in CHPR, students must complete a minimum of 45 units, conduct a two-quarter community-based research internship, and write a master's thesis. All students in the M.S. in CHPR must also fulfill the course requirements below. Students are advised to check the prerequisites for all CHPR courses, especially the Biostatistics and Research Methods courses.

Units

#### CHPR Foundation Core

Take 5-6 courses, 13-14 total units

Students are only required to take CHPR 201 if they have not taken CHPR 226/HUMBIO 126 or equivalent.

CHPR 201	Introduction to Science of Healthy Living (Autumn)	1
CHPR 225	The Role of Causal Inference, Study Design, & Outcomes in Community Research (Autumn)	3
CHPR 228	Theoretical Foundations and Design of Behavioral Intervention Trials (Autumn)	3
CHPR 240	Prevention Research: the Science of Healthy Living (Autumn)	3
CHPR 255	The Responsible Conduct of Research for Clinical and Community Researchers (Autumn, Winter, Spring)	1
CHPR 260	Prevention Across Medical Disciplines: Evidence-based Guidelines (Winter)	3

**Biostatistics and Research Methods**

Take 3 of the 6 courses or other approved Biostatistics and Research Methods courses, minimum 9 total units

CHPR 206	Meta-research: Appraising Research Findings, Bias, and Meta-analysis (Winter)	3
CHPR 247	Methods in Community Assessment, Evaluation, and Research (Spring)	3
CHPR 290	Advanced Statistical Methods for Observational Studies (CHPR students must take course for 3 units) (Spring)	2-3
HRP 234	Engineering Better Health Systems: modeling for public health (formerly CHPR 254)	4
HRP 258	Introduction to Probability and Statistics for Clinical Research (Spring)	3
HRP 259	Introduction to Probability and Statistics for Epidemiology (Autumn)	3-4

**Community-Based Research Internship**

Take course for 2 consecutive non-summer quarters, 6 total units

CHPR 299	Community-based Research Internship (Autumn, Winter, Spring)	1-6
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**Master's Thesis**

Take course for 1 or more quarters, minimum 3 total units

CHPR 399	Community Health and Prevention Research Master's Thesis Writing (Autumn, Winter, Spring, Summer)	1-3
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**Community-Based Research Internship**

Students must complete a consecutive two-quarter long community-based research internship under the supervision of an SPRC mentor. Students will receive 6 total units for their internships, which are all unpaid positions. The primary learning goal of these internships is for students to apply their coursework and implementation science in a community or lab setting by engaging community members and faculty to create innovative, research-based, chronic disease prevention solutions addressing community health challenges.

- CHPR students (not including coterminal students) must enroll in CHPR 299 Community-Based Research Internship during the Winter and Spring quarters.
- Coterminal students must fulfill the following requirements in order to enroll in CHPR 299 Community-Based Research Internship:
  - Complete or be enrolled in one of the following courses:
    - CHPR 225 The Role of Causal Inference, Study Design, & Outcomes in Community Research
    - CHPR 228 Theoretical Foundations and Design of Behavioral Intervention Trials
  - Complete or be enrolled in at least 1 approved Biostatistics and Research Methods course.
- For the 2018-19 academic year, the earliest that incoming students may begin their community-based research internships is in the Winter Quarter.
- For incoming coterminal students who plan to begin their community-based research internships in the Winter Quarter 2018, it is highly recommended that they follow the below sequence:
  - Autumn Quarter:
    - Take both of the following courses:
      - CHPR 225 The Role of Causal Inference, Study Design, & Outcomes in Community Research
      - CHPR 228 Theoretical Foundations and Design of Behavioral Intervention Trials
    - Take the following Biostatistics and Research Methods course:

- HRP 234 Engineering Better Health Systems: modeling for public health

## b. Winter Quarter:

- If a Biostatistics and Research Methods course was not taken in the Autumn quarter, students must take the following Winter Quarter course:
  - CHPR 206 Meta-research: Appraising Research Findings, Bias, and Meta-analysis.

**Master's Thesis**

Students are required to complete and present a master's thesis. The master's thesis allows students to demonstrate knowledge, application, and thoughtful scholarly communication of theoretical principles central to community health interventions, study design, research and analytic methods, as well as depth in a substantive area of community health and prevention research. The thesis is intended to be 30 pages in length (i.e., article-length), double-spaced, including supporting tables, figures, and references. The thesis can take one of the following forms:

- Analysis of original data collected via a student's internship
- Comprehensive literature review with meta-analysis of data or critical reanalysis of data
- Evaluation of a methodological problem using data
- Comprehensive literature review with a grant proposal (NIH-style format) for a new study to bridge a gap in existing knowledge
- Organizational health improvement and evaluation plan written for a student's internship organization
- CHPR mentor approved, independently designed thesis.

The program encourages students to use extant data sets for their projects. Students are not limited to quantitative data sets; many SPRC faculty possess qualitative data sets that may be analyzed for an M.S. thesis project. Students also have the option of collecting original data, for example, through the use of surveys. Students are encouraged to develop their thesis into a manuscript for publication or a credible research grant application, and mentorship is provided to do so.

*Director of the Stanford Prevention Research Center:* John Ioannidis

**Core Faculty and Academic Staff**

*Professors:* John Ioannidis, Randall Stafford, Marcia Stefanick

*Associate Professor:* Judith J. Prochaska (Program Faculty Director)

*Assistant Professors:* Mike Baiocchi, Sanjay Basu

*Senior Research Scientists:* Wes Alles, Michaela Kiernan

*Instructor:* Lisa Goldman Rosas

# COMPARATIVE MEDICINE

Courses offered by the Department of Comparative Medicine are listed under the subject code COMPMED on the Stanford Bulletin's ExploreCourses web site.

The Department of Comparative Medicine at Stanford is an academic, basic science department, the department is comprised of thirteen faculty, ten of whom are veterinarians. All of our faculty members are immersed in laboratory animal science and translational research.

They teach at the undergraduate, graduate, professional and post-graduate levels. Our clinical and basic science faculty welcome, review and accept student candidates for participation in research projects. The Department of Comparative Medicine was established at Stanford in 1990.

The Department's faculty are also engaged in collaborative and comparative research, with animal model expertise and programs in veterinary pathology, pain and anesthesia, rodent reproductive biology, infectious disease, cancer, bioengineering, animal welfare and neuroscience. In addition, the veterinary faculty in the Department of Comparative Medicine have oversight responsibility for the campus-wide animal research program and provide clinical service in the Veterinary Service Center. Our mission is to advance human and animal health through outstanding research, veterinary care and training.

## Master of Science in Laboratory Animal Science

This degree is designed for individuals who wish to undertake in-depth study of biomedical research focusing on animal modeling and bi-methodology, laboratory animal science, organizational management and facility design, regulation and compliance, and animal welfare.

The first year involves acquiring concepts and tools through course work and research project involvement. All first- and second-year students are expected to devote 50 percent or more of their time participating in research projects. Research rotations are not required, but can be done with approval of the academic adviser or training program director. This degree requires a master's thesis project to be approved by two faculty members.

### Admissions Requirements

Applicants must have a bachelor's degree from an accredited U.S. college or university or an equivalent international institution. Applicants should have completed courses in at least two of the following areas:

- Genetics
- Molecular Biology
- Chemistry
- Physiology

Official transcripts from all postsecondary institutions where courses were attempted or completed are also required. Applicants must submit GRE scores obtained within the last five years and three letters of reference must be provided with at least one from a science professor.

### Degree Requirements:

1. At least 45 units of academic work, all of which must be in courses at or above the 100 level, 36 units of which must be at or above the 200 level.
2. At least 3 quarters of graduate research.
3. COMPMED 200 One Health Journal Club.

4. Students must complete a master's thesis, which may take the following form:
  - a. Original analysis of original data
  - b. A comprehensive literature review with a meta-analysis of data or a critical reanalysis of data.
  - c. Evaluation of a methodological problem using real data
  - d. A comprehensive literature review with a grant proposal (NIH style format) for a new study to bridge a gap in the existing knowledge.

## Master of Science in Laboratory Animal Science (Coterminal)

The coterminal degree program allows Stanford University undergraduates to study for a master's degree while completing their bachelor's degree(s) in the same or a different department. See the "Coterminal Degrees (p. 46)" section of this bulletin for additional information.

The coterminal Master of Science program follows the same program requirements as the Master of Science. The coterminal degree is available only to current Stanford undergraduates. Coterminal students are enrolled full-time and courses are taken on campus. Their added year focuses on biostatistics, the research laboratory experience, and animal modeling. The specific curriculum is tailored to the students' needs. This degree requires a written research paper to be approved by two faculty members.

Programs of at least 45 Stanford units that meet the following guidelines are normally approved:

1. Completion of the core requirements with overall GPA of 3.0.
2. Students are expected to participate regularly in Comparative Medicine journal club, and attendance at the Laboratory Animal Medicine seminar series.
3. *Electives*: additional courses to bring the total to 45 or more units taken at Stanford to fulfill the University's residency requirement.

### University Coterminal Requirements

Coterminal master's degree candidates are expected to complete all master's degree requirements as described in this bulletin. University requirements for the coterminal master's degree are described in the "Coterminal Master's Program (p. 46)" section. University requirements for the master's degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

After accepting admission to this coterminal master's degree program, students may request transfer of courses from the undergraduate to the graduate career to satisfy requirements for the master's degree. Transfer of courses to the graduate career requires review and approval of both the undergraduate and graduate programs on a case by case basis.

In this master's program, courses taken three quarters prior to the first graduate quarter, or later, are eligible for consideration for transfer to the graduate career. No courses taken prior to the first quarter of the sophomore year may be used to meet master's degree requirements.

Course transfers are not possible after the bachelor's degree has been conferred.

The University requires that the graduate adviser be assigned in the student's first graduate quarter even though the undergraduate career may still be open. The University also requires that the Master's Degree

Program Proposal be completed by the student and approved by the department by the end of the student's first graduate quarter.

*Chair:* Sherril Green

*Professors:* Donna M. Bouley, Paul Buckmaster, Sherril Green, Shaul Hestrin

*Associate Professors:* Corinna Darian-Smith, Stephen Felt, Joseph Garner

*Assistant Professors:* Megan Albertelli, Thomas Cherpes, Monika Huss, Claude Nagamine, Cholawat Pacharinsak, Jose Vilches-Moure,

*Courtesy Professor:* Hannes Vogel

*Courtesy Associate Professor:* Mehrdad Shamloo



# DEVELOPMENTAL BIOLOGY

Courses offered by the Department of Development Biology are listed under the subject code DBIO on the Stanford Bulletin's ExploreCourses web site.

A fundamental problem in biology is how the complex set of multicellular structures that characterize an adult animal is generated from the fertilized egg. Recent advances at the molecular level, particularly with respect to the genetic control of development, have been explosive. These advances represent the beginning of a major movement in the biological sciences toward the understanding of the molecular mechanisms underlying developmental decisions and the resulting morphogenetic processes. This new thrust in developmental biology derives from the extraordinary methodological advances of the past decade in molecular genetics, immunology, and biochemistry. However, it also derives from groundwork laid by the classical developmental studies, the rapid advances in cell biology and animal virology, and from models borrowed from prokaryotic systems. Increasingly, the work is directly related to human diseases, including oncogene function and inherited genetic disease.

The Department of Developmental Biology includes a critical mass of scientists who are leading the thrust in developmental biology and who can train new leaders in the attack on the fundamental problems of development. Department labs work on a wide variety of organisms from microbes to worms, flies, and mice. The dramatic evolutionary conservation of genes that regulate development makes the comparative approach of the research particularly effective. Scientists in the department labs have a very high level of interaction and collaboration. The discipline of developmental biology draws on biochemistry, cell biology, genetics, molecular biology, and genomics. People in the department have a major interest in regenerative medicine and stem cell biology.

The department is located in the Beckman Center for Molecular and Genetic Medicine within the Stanford University Medical Center.

## Master of Science in Developmental Biology

University requirements for the M.S. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

Students in the Ph.D. program in Developmental Biology may apply for an M.S. degree, assuming completion of their course requirements and preparation of a written proposal. The master's degree awarded by the Department of Developmental Biology does not include the possibility of minors for graduate students enrolled in other departments or programs.

Students are required to take, and satisfactorily complete, at least three lecture courses offered by the department, including DBIO 210 Developmental Biology. In addition, students are required to take three courses outside the department. Students are also expected to attend Developmental Biology seminars and journal clubs. In addition, the candidate must complete a research paper proposing a specific experimental approach and background in an area of science relative to developmental biology.

## Doctor of Philosophy in Developmental Biology

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The graduate program in Developmental Biology leads to the Ph.D. degree. The department also participates in the Medical Scientists

Training Program (MSTP (<http://mstp.stanford.edu>)) in which individuals are candidates for both the M.D. and Ph.D. degrees.

### Units

Students are required to complete at least five courses, including:

DBIO 210	Developmental Biology	4
DBIO 215	Frontiers in Biological Research (1 unit per quarter; students are required to take at least two quarters)	2
An advanced graduate course in genetics or genomics;		
An advanced graduate course in cell biology of biochemistry;		
A course in quantitative or computational biology.		

Students are expected to attend Developmental Biology seminars and journal clubs.

Completion of a qualifying examination is required for admission to Ph.D. candidacy. The examination consists of an off-topic proposal on a subject different from the dissertation research. The final requirements of the program include presentation of a PhD dissertation as the result of independent investigation and constituting a contribution to knowledge in the area of developmental biology. The student must pass the University oral examination, taken only after the student has substantially completed research. The examination is preceded by a public seminar in which the research is presented by the candidate. The oral examination is conducted by a dissertation reading committee.

*Emeriti: (Professors)* David S. Hogness, A. Dale Kaiser, Stuart Kim, Harley McAdams, Ellen Porzig

*Chair:* Roeland Nusse

*Associate Chair:* David Kingsley

*Professors:* Ben Barres, Philip Beachy, Gerald Crabtree, James Chen, Margaret Fuller, Seung Kim, David Kingsley, Roeland Nusse, Lucy Shapiro, William Talbot, Anne Villeneuve, Irving Weissman, Joanna Wysocka

*Associate Professors:* Gill Bejerano

*Assistant Professors:* Maria Barna, Alistair Boettiger, Daniel Jarosz

# GENETICS

Courses offered by the Department of Genetics are listed under the subject code GENE on the Stanford Bulletin's ExploreCourses web site.

An underlying theme in the department is that genetics is not merely a set of tools but a coherent and fruitful way of thinking about biology and medicine. To this end, the department emphasizes a spectrum of approaches based on molecules, organisms, populations, and genomes. It provides training through laboratory rotations, dissertation research, seminar series, didactic and interactive course work, and an annual three-day retreat of nearly 200 students, faculty, postdoctoral fellows, and research staff.

The mission of the department includes education and teaching as well as research; graduates from our program pursue careers in many different venues including research in academic or industrial settings, health care, health policy, and education. The department is especially committed to increasing diversity within the program, and to the training of individuals from traditionally underrepresented minority groups.

## Master of Science in Human Genetics

The University requirements for the M.S. are described in the "Graduate Degrees (<http://www.stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

The Department of Genetics offers an M.S. in Human Genetics, which is accredited by the American Board of Genetic Counseling. This program prepares students to practice in the healthcare profession of genetic counseling. The program is a full time two-year program, and accepts students to begin the program only in Autumn Quarter. Students must be admitted directly into this program, and cannot automatically transfer from the Ph.D. programs within the department, or vice versa. While courses are oriented primarily towards genetic counseling students, they may also be taken by medical students, other graduate students, residents or post-doctoral fellows, and (with permission) undergraduates.

The degree requires the completion of clinical rotations and an approved research project.

Students must also complete:

		Units
GENE 271	Human Molecular Genetics	3
GENE 272	Introduction to Medical Genetics	2-3
GENE 273	Introduction to Clinical Genetics Testing	2
GENE 274A	A Case Based Approach to Clinical Genetics	2
GENE 274B	A Case Based Approach to Clinical Genetics	2
GENE 275	Role Play and Genetic Counseling Observations	2
GENE 276	Genetic Counseling Clinical Rotations	4-7
GENE 278	Prenatal Genetic Counseling	1
GENE 279	Pediatric and Adult Genetic Counseling	1
GENE 280	Metabolic Genetic Counseling	1
GENE 281	Cancer Genetic Counseling	1
GENE 282A	Genetic Counseling Research Seminar	1
GENE 282B	Genetic Counseling Research Seminar	1
GENE 283	Genetic Counseling Research	1-8
GENE 284	Medical Genetics Seminar	1
GENE 285A	Genetic Counseling Seminar	3
GENE 285B	Genetics Counseling Seminar	3
GENE 285C	Genetic Counseling Seminar	3
GENE 286	Advanced Genetic Counseling Seminar	2

- required course work:
- several additional required courses (bioethics, research ethics and developmental biology),
- and are encouraged to take 2-4 elective courses of their choice, including a research methods elective.

Faculty members include members of the Stanford faculty from Genetics, Pediatrics, Obstetrics, Pathology, Developmental Biology, Biomedical Ethics, Law, and Psychology, and practicing genetic counselors and clinical geneticists in various medical centers across the Bay Area.

Applications are due in December (see web site) for admission in the following Autumn Quarter. Applicants should demonstrate a combination of academic preparation, exposure to genetic counseling, and counseling and/or laboratory experiences. Exposure to persons with disabilities or chronic illness is also helpful. Additional information about the program is available at Stanford's Master's Program in Human Genetics (<http://www.med.stanford.edu/genetic-counseling>) web site.

## Doctor of Philosophy in Genetics

University requirements for the Ph.D. degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The Ph.D. program in the Department of Genetics offers graduate students the opportunity to pursue a discipline that encompasses both a set of tools and a coherent way of thinking about biology and medicine. All major areas of genetics and genomics are represented in the department, including human genetics (molecular identification of Mendelian traits and the pathophysiology of genetic disease, gene therapy, genetic epidemiology, analysis of complex traits, genome functional analysis and human evolution), and application of model organisms such as bacteria, yeast, flies, worms, and mice to basic and translational areas of biomedical research. The department is especially strong in genomic and bioinformatic approaches to genome biology and evolution, and includes several genome-scale databases and Centers such as the Center for Genomics and Personalized Medicine (SCGPM), Saccharomyces Genome Database (SGD), the Stanford Microarray Database (SMD), and the Pharmacogenetics and Pharmacogenomics Knowledge Base (PharmGKB), the ENCODE project and the Stanford Genome Technology Center (SGTC).

Exposure to the intellectual scope of the department is provided by laboratory rotations, dissertation research, advanced courses in genetics and other areas of biomedical science, seminar series, journal clubs, and an annual three-day retreat of faculty, students, postdoctoral fellows, and staff scientists. Emphasis is placed on interactions and collaborations among students, postdoctoral students, and faculty within the department and throughout the campus.

During their first year, graduate students in the department take graduate courses and sample areas of research by carrying out rotations in three or four laboratories. At the end of the first three quarters, students may select a laboratory in which to do their dissertation research. While the dissertation research is generally performed in one laboratory, collaborative projects with more than one faculty member are encouraged. In addition to interacting with their faculty adviser, graduate students receive advice regularly from other faculty members who serve as members of their dissertation committee. Study for the Ph.D. generally requires between four and five years of graduate work, most of which is focused on dissertation research.

Students are generally enrolled in the program to receive the Ph.D. degree, although a limited number of M.D. candidates can combine research training in genetics with their medical studies. Ph.D. candidates who have passed the qualifying exam in the second year can opt to receive the M.S. as a terminal degree.

There are opportunities for graduate students to teach in graduate-level and professional-school courses. In addition, students have the opportunity to participate in educational outreach activities coordinated by the department, which include opportunities to interact with secondary school students and teachers, lay groups, and local science museums.

Students who have recently received a bachelor's, master's, M.D., or Ph.D. degree in related fields may apply for graduate study. Prospective students must have a background in biology, mathematics, physics, and chemistry. Decisions for admission are based on comparison of the relative merits of all the candidates' academic abilities and potential for research and the department's interest in promoting a diverse learning environment. Interviews take place in late February or early March and successful applicants are offered admission by early spring. Students who wish to pursue a combined M.D./Ph.D. degree are considered for admission into the graduate program in the department after they have been admitted to the M.D. program in the School of Medicine.

Students begin graduate studies in Autumn Quarter. Prospective students are encouraged to start the application process early to ensure that they are able to submit a complete application by the December deadline. All students accepted into the Ph.D. program in the Department of Genetics are provided with full tuition and a stipend. Two training grants from the National Institutes of Health provide major support for the graduate training program in the department. Other student support is provided by departmental funds and from research grants, both federal and private, of the faculty. In addition, a number of graduate students are funded by fellowships, including those from the National Science Foundation and the Stanford Graduate Fellows program.

*Emeritus:* (Professor) Greg Barsh, Uta Francke

*Chair:* Michael Snyder

*Professors:* Russ Altman, Anne Brunet, Carlos Bustamante, Michele Calos, Stanley Cohen, Ronald Davis, Andrew Fire, James Ford, Judith Frydman, Margaret Fuller, Aaron Gitler, Mark Kay, Stuart Kim, Karla Kirkegaard, Joseph Lipsick, Hiromitsu Nakauchi, Jonathan Pritchard, John Pringle, Julien Sage, Matthew Scott, Arend Sidow, Tim Stearns, Lars Steinmetz, Hua Tang, Alice Ting, Alex Urban, Anne Villeneuve

*Professor (Research):* Leonore Herzenberg, J. Michael Cherry

*Professors (Teaching):* Kelly Ormond

*Associate Professors:* Euan Ashley, Laura Attardi, Julie Baker, William Greenleaf, Gavin Sherlock, Zijie Sun, Douglas Vollrath

*Associate Professor (Clinical):* Mary Ann Campion

*Assistant Professors:* Maria Barna, Michael Bassik, Ami Bhatt, Christina Curtis, Polly Fordyce, , Anshul Kundaje, Jin Billy Li, Stephen Montgomery, Monte Winslow

*Assistant Professor (Clinical):* Andrea Hanon-Kahn

# HEALTH AND HUMAN PERFORMANCE

Health and Human Performance (HHP) is organizationally housed within the Department of Athletics, Physical Education, and Recreation and more specifically within Recreation and Wellness. The program offers experiences for academic credit as well as non-credit opportunities. Its academic pursuits are offered in partnership with the Department of Medicine. The academic units housed within HHP include Kinesiology, Outdoor Education, Physical Education, Wellness Education, and Lifeworks.

## Purpose Statement

Through integrating theory, research, and experiential practice we create innovative, transformative learning environments focusing on holistic student development.

## Values

Inspiring a healthier Stanford by inviting students into an intentional process grounded in the following values:

*Actualization:* Supporting self-efficacy through empowerment, learning experiences, and realization of the human potential.

*Balance:* Creating opportunities for individuals to recognize and utilize the essential elements of well-being.

*Community:* Providing inclusive opportunities for healthy social engagement and relationship building.

*Leadership:* Developing change agents who can apply learned knowledge and skills towards active citizenship.

*Innovation:* Designing effective ways of learning and promoting human flourishing in a hyper-complex, ever-accelerating culture experience.

## Kinesiology

Focuses on the anatomy, physiology, and mechanics of human movement and their applications to exercise and lifetime physical activities. Offers 1-3 unit courses using the seminar, laboratory, and workshop as the primary component types.

## Leadership Innovations

Fosters transformational leaders of character who through the facilitation of critical collaborative environments are prepared to be agents of positive change. Offers 1-3 unit courses using the lecture, seminar, discussion, and workshop as the primary component types.

## Lifeworks

Fosters transformational student leaders and future citizens of character who through the facilitation of creative expression, mindfulness, and collaborative environments are prepared to be agents of positive change. Offers 1-3 unit courses using the lecture, seminar, discussion, and workshop as the primary component types.

## Outdoor Education

Develops outdoor leaders who use risk, challenge, and experience as educational tools with a variety of applications. Offers 1-3 unit courses using the lecture, seminar, and workshop as the primary component types.

## Physical Education

Provides physical activity courses where knowledge associated with the proper performance of an activity is presented and discussed. Offers 1-2 unit courses using activity as the primary component type.

## Wellness Education

Inspires a healthier, more vibrant university through teaching effective wellness theories and practices that promote flourishing and empower students to positively transform their lives and communities. Offers 1-3 unit courses using the lecture, seminar, discussion, and workshop as the primary component types.

*Director:* Christopher Pelchat (Outdoor Education)

*Associate Director:* Aneel Chima (Wellness Education)

*Associate Director:* Tia Lillie (Kinesiology)

*Associate Director:* New Hire (Lifeworks)

*Lecturers:* Diane Boxill (Wellness Education), Russ Carpenter (Writing and Rhetoric), Logan Chapman (Outdoor Education), Orgyen Chowang (Wellness Education), Robert Cusick (Wellness Education), Dustin DiPerna (Wellness Education), Sue Lowley (Outdoor Education), Fred Luskin (Wellness Education), Emily McCune (Outdoor Education), Stephen Murphy-Shigematsu (Wellness Education), Katherine Nobles (Wellness Education), Pamela Pasma (Wellness Education), Carole Pertofsky (Wellness Education), John Rettger (Wellness Education), Tia Rich (Wellness Education), Jennifer Robinson (Wellness Education), Mikey Siegel (Wellness Education), Antja Thompson (Emergency Medicine), Andrew Toddhunter (Biology), Meag-gan Walters (Wellness Education), Peter Wright, (Outdoor Education), Donovan Yisrael (Wellness Education)

*Instructors:* Gong Chen (Physical Education), Maithill Gavankar (Physical Education), Austin Lee (Physical Education), Ying Mitchell (Physical Education), Erick Schlimmer (Physical Education), Tom Sarsfield (Physical Education), Matt Thornton (Physical Education), Todd Vas Dias (Physical Education), Nick Wooters (Physical Education)

# HEALTH RESEARCH AND POLICY

Courses offered by the Department of Health Research and Policy are listed under the subject code HRP on the Stanford Bulletin's ExploreCourses web site.

The Department of Health Research and Policy has two principal areas of scholarly interest:

1. Epidemiology is the study of the distribution and determinants of illness and impairment in human populations. Epidemiology training provides analytic tools for clinical and translational research, including studies of disease etiology, prevention, and therapy.
2. Health Policy/Health Services Research is concerned with many aspects of health policy analysis in the public and private sectors.

## Graduate Programs in Health Research and Policy

The Program in Epidemiology and the Program in Health Policy are housed in the Department of Health Research and Policy. These programs offer master's degrees and doctoral degrees in Epidemiology and Clinical Research and in Health Policy.

For additional information, send email to [hrpadmissions@stanford.edu](mailto:hrpadmissions@stanford.edu).

The department offers a Master of Science in Health Policy and a Master of Science in Epidemiology & Clinical Research.

## Master of Science in Health Policy

University requirements for the M.S. degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The master's degree program in Health Policy seeks to train students in the quantitative analysis of issues in health and medical care. The program is based upon an individual development plan, and includes both course work and completion of a master's project under the direction of a program core faculty member. The typical student in the program is a physician who has completed residency training and is preparing for a research career; the program also admits Stanford medical students and others with a strong background in health policy analysis. The core faculty interests include outcomes research, health economics, health care organization, health care access, quality of care, decision analysis, clinical guidelines, and assessment of patient preferences and quality of life.

To receive the degree, students are expected to demonstrate knowledge of issues in health policy and the quantitative skills necessary for research in this area. Students must take at least 45 units of course work and write a University thesis. The course work requirements are:

### Required Courses:

		Units
HRP 261	Intermediate Biostatistics: Analysis of Discrete Data	3
HRP 262	Intermediate Biostatistics: Regression, Prediction, Survival Analysis	3
HRP 391	Health Law: Finance and Insurance	3
HRP 392	Analysis of Costs, Risks, and Benefits of Health Care	4
Required for students funded by NIH training grants:		
MED 255	The Responsible Conduct of Research	1

OR		
MED 255C	The Responsible Conduct of Research for Clinical and Community Researchers	1

### Concentration Requirements:

		Units
Choose 1 of the following Concentration Courses:		
HRP 218	Methods for Health Care Delivery Innovation, Implementation and Evaluation	2
HRP 252	Outcomes Analysis	4
HRP 256	Economics of Health and Medical Care	5
HRP 263	Advanced Decision Science Methods and Modeling in Health	3

### Thesis Units:

		Units
At least 12 units of thesis units:		
HRP 399	Graduate Research	1-18

### Pre-approved electives include:

Additional approved elective courses to complete the program total of at least 45 units. Other electives, consistent with the student's individual development plan, may be approved by the student's faculty adviser and the program director.

		Units
HRP 206	Meta-research: Appraising Research Findings, Bias, and Meta-analysis	3
HRP 219	Evaluating Technologies for Diagnosis, Prediction and Screening	3
HRP 223	Introduction to Data Management and Analysis in SAS	2
HRP 229	Spectrum Scholars Seminar	1
HRP 234	Engineering Better Health Systems: modeling for public health	4
HRP 249	Topics in Health Economics I	2-5
HRP 254	Quality & Safety in U.S. Healthcare	3
HRP 251	Design and Conduct of Clinical Trials	3
HRP 258	Introduction to Probability and Statistics for Clinical Research	3
HRP 259	Introduction to Probability and Statistics for Epidemiology	3-4
HRP 264	Foundations of Statistical and Scientific Inference	1
GSBGEN 551	Innovation and Management in Health Care	2
MED 236	Economics of Infectious Disease and Global Health	3
MED 273	Biodesign for Mobile Health	3
STATS 216	Introduction to Statistical Learning	3
STATS 266	Advanced Statistical Methods for Observational Studies	2-3

For additional information on course requirements and admissions process, please see our department website ([http://med.stanford.edu/hsr/grad\\_programs/mshsr.html](http://med.stanford.edu/hsr/grad_programs/mshsr.html)).

Please address inquiries to the HRP Education Program Manager at 650-723-5456 or [hrpadmissions@stanford.edu](mailto:hrpadmissions@stanford.edu).

## Master of Science in Epidemiology and Clinical Research

University requirements for the M.S. degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The Graduate Program in Epidemiology offers instruction and interdisciplinary research opportunities leading to the M.S. degree in Epidemiology and Clinical Research. Epidemiology is the study of the distribution and determinants of illness and impairment in human populations. Epidemiologic methods are used by clinical investigators and by other scientists who conduct observational and experimental research on the identification, prevention, and treatment of human disorders.

Core and affiliated faculty come from the Department of Health Research and Policy and other Stanford University departments. The program has particular strengths in cancer epidemiology, cardiovascular disease epidemiology, epidemiologic methods, genetic epidemiology, global health, infectious disease epidemiology, musculoskeletal disease epidemiology, neuroepidemiology, and reproductive epidemiology and women's health. Students can select an optional concentration in global health or infectious diseases.

The mission of the Stanford University School of Medicine is to be a premier research-intensive medical school that improves health through leadership, diversity, and collaborative discoveries and innovation in patient care, education and research. The Graduate Program in Epidemiology fosters this mission through the training of physician investigators in techniques of clinical research. The department also welcomes students from other disciplines who would benefit from formal training in epidemiologic methods. The master's degree in Epidemiology and Clinical Research provides students with the skills essential to patient-oriented clinical research, including epidemiologic methods and statistical analysis.

For undergraduates at Stanford University, the program offers a coterminal M.S. in Epidemiology and Clinical Research. Coterminal students have the opportunity to pursue epidemiological research at the intersection of public health, disease treatment, and disease prevention. Additional information on our coterminal M.S. can be found on our department website (<http://med.stanford.edu/epidemiology/coterm.html>).

To receive the M.S. degree, students are expected to obtain a grounding in epidemiologic methods and applied biostatistics and to demonstrate research skills through the completion of a thesis. The master's degree program is typically completed in two years (four to six quarters).

Students must complete at least 45 units of approved course work as well as a master's thesis which is usually based on original research related to clinical epidemiology.

### Epidemiologic methods:

		Units
HRP 225	Design and Conduct of Clinical and Epidemiologic Studies	3-4
HRP 226	Intermediate Epidemiologic and Clinical Research Methods	3
HRP 251	Design and Conduct of Clinical Trials	3
HRP 267	Life Course Epidemiology	2

### Biostatistics:

		Units
HRP 239	Statistical Methods for Group Comparisons and Causal Inference	3

HRP 259	Introduction to Probability and Statistics for Epidemiology	3-4
HRP 261	Intermediate Biostatistics: Analysis of Discrete Data	3
HRP 262	Intermediate Biostatistics: Regression, Prediction, Survival Analysis	3

### Research seminar:

		Units
HRP 236	Epidemiology Research Seminar (at least 3 units)	1

### Research:

		Units
HRP 399	Graduate Research (at least 12 units)	1-18

### Research conduct:

		Units
MED 255	The Responsible Conduct of Research	1

Note that HRP 267 and HRP 239 are not required courses; HRP 251 is recommended but not required for coterminal students and students in designated tracks.

Other approved selective and elective courses to complete the program total of at least 45 units.

Students in Global Health and Infectious Diseases concentrations have other requirements; HRP 251 is not required for students in these concentrations.

Students are assigned a methodology mentor from the Division of Epidemiology and they also select a research mentor, who may be from another department. For physicians, the research mentor is often a faculty member from the department of the student's clinical specialty.

See the Division of Epidemiology web site ([http://med.stanford.edu/epidemiology/grad\\_programs/MS-overview](http://med.stanford.edu/epidemiology/grad_programs/MS-overview)) for additional information regarding our program and admissions process.

Address inquiries to the HRP Education Program Manager at 650-723-5456 or [hrpadmissions@stanford.edu](mailto:hrpadmissions@stanford.edu).

## Coterminal Master of Science in Epidemiology and Clinical Research

The coterminal master's degree is available only to current Stanford undergraduates. The MS entails a minimum of 45 units of course work but can require more depending upon the courses chosen and the previous training of the student; a minimum of 12 units must be applied towards the master's thesis.

The coterminal Master of Science program follows the same program requirements as the Master of Science (academic), except that the student is not required to take the course in Clinical Trials. Students who desire to concentrate in a specific area can participate in one of the track areas (Infectious Diseases, Global Health), although this is not required. To pursue a research project, the student must make arrangements with program faculty. Coterminal students are enrolled full-time and courses are taken on campus. Graduates of this program are prepared to contribute creatively to basic or applied projects in epidemiology and clinical research. The department anticipates that many go on to Ph.D. programs, M.D. degrees, or to pursue careers in public health, pharma or biotech.

Coterminal students must have at least one quarter of overlap in the undergraduate and graduate career prior to conferring their

undergraduate degree. See the "Coterminal Degrees (p. 46)" section of this bulletin for additional details. See also the Registrar's coterminal degrees (<https://registrar.stanford.edu/students/coterminal-degree-programs>) pages.

## Funding Sources

Access to financial aid and other options for coterminal students depends on the number of units and quarters as a registered student at Stanford. Coterminal students have full access to undergraduate sources of financial aid until their twelfth quarter or four years of study. Coterminal students who have completed 180 units are eligible for University fellowships and assistantships. However, many federal and private fellowships and assistantships are awarded only to students who have received the bachelor's degree. Even after the conferral of the bachelor's degree, there is no guarantee that a coterminal student be awarded financial support via a RA-ship, TA-ship, or fellowship.

Coterminals may choose to obtain their bachelor's degree early after completion of requirements. However, all classes after conferral of the degree may only be counted towards the graduate degree. Part of the strategy that allows coterminals maximal flexibility in their course of study is their dual status as both undergraduate and graduate student.

For additional information on the application process, see the department's coterminal page (<http://med.stanford.edu/epidemiology/co-term.html>). Address inquiries to the HRP Education Program Manager at 650-723-5456 or [hrp.admissions@stanford.edu](mailto:hrp.admissions@stanford.edu).

## Ph.D. in Epidemiology and Clinical Research Overview

The field of epidemiology is poised to undergo major changes, and this Ph.D. program offers a cutting-edge curriculum that reflects this shift. Driven by technological advancements, the availability of very large datasets, and the omics revolution, epidemiology is moving toward what some have called Big Epidemiology, where epidemiologists partner with other scientists to study vast amounts of data. Thus, this program will train epidemiologists and clinical researchers to be savvy in technology, computing, data mining, bioinformatics, and genomics. The curriculum capitalizes on Stanford's unique strengths in these disciplines.

After matriculating, students will meet with their academic advisers to plan out an individually tailored curriculum. Students who matriculate with prior training in epidemiology and statistics may replace introductory core courses with more advanced courses, subject to approval. Beyond core course requirements, students select electives that delve deeper into a particular area of specialization of their choosing. Innovative online learning approaches will help meet the needs of physician-students, who will also be busy with clinical duties.

Students will take core courses in epidemiology and biostatistics. In addition to these core courses, Ph.D. students must additionally take 3 "big epidemiology" elective courses in three key areas:

1. an advanced quantitative course (encompassing statistics, computer science, or economics)
2. a big data course
3. a genetics/genomics/bioinformatics course

## Degree Requirements

University requirements for the Ph.D. are described in the "Graduate Degrees (<http://stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

Ph.D. students must complete a minimum of 135 units (as per University requirements), including 45 course units exclusive of HRP 236

Epidemiology Research Seminar, HRP 299 Directed Reading in Health Research and Policy, and HRP 399 Graduate Research .

Units

### Epidemiologic methods sequence

HRP 225	Design and Conduct of Clinical and Epidemiologic Studies	3-4
HRP 226	Intermediate Epidemiologic and Clinical Research Methods	3-4
HRP 251	Design and Conduct of Clinical Trials (Required of students in the clinical research concentration; other doctoral students may opt to replace HRP251 with an alternate epidemiology course.)	3

### Biostatistics sequence

HRP 259	Introduction to Probability and Statistics for Epidemiology	3-4
HRP/STATS 261	Intermediate Biostatistics: Analysis of Discrete Data	3
HRP 262	Intermediate Biostatistics: Regression, Prediction, Survival Analysis	3

### "Big Epidemiology" elective course

Take one of the following advanced quantitative courses		3-4
Any 200-level STATS course (other than STATS 260)		
STATS 116	Theory of Probability	
HRP 216	Analytical and Practical Issues in the Conduct of Clinical and Epidemiologic Research	
HRP 252	Outcomes Analysis	
HRP 392	Analysis of Costs, Risks, and Benefits of Health Care	
HRP/MED 206/STATS 211	Meta-research: Appraising Research Findings, Bias, and Meta-analysis	
CHPR 290	Advanced Statistical Methods for Observational Studies	

### Big data course

Take one of the following big data courses		3-4
BIOMEDIN 215	Data Driven Medicine	
CS 246	Mining Massive Data Sets	
STATS 202	Data Mining and Analysis	
CS 229	Machine Learning	
COMM 382	Research in Computational Social Science	

### Genetics/genomics/bioinformatics course

Take one of the following genetics/genomics/bioinformatics courses		3-4
BIOMEDIN 217/CS 275	Translational Bioinformatics	
GENE 244	Introduction to Statistical Genetics	
HUMBIO 151R	Biology, Health and Big Data	
GENE 224	Principles of Pharmacogenomics	
BIOMEDIN/DBIO/CS 273A	The Human Genome Source Code	
GENE 210/DBIO 220	Genomics and Personalized Medicine	
STATS 345	Statistical and Machine Learning Methods for Genomics	
or GENE 245	Statistical and Machine Learning Methods for Genomics	

### Other core courses/requirements

MED 255	The Responsible Conduct of Research	1
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### Electives

Take electives chosen in consultation with the academic adviser to total 135 units. 64-71

**Total Units Required** 135

### Additional Requirements

- Attendance at one meeting of the Human Subjects Panel (Institutional Review Board).
- Attendance at one meeting of the GCRC Protocol Review Committee.
- R Proficiency: students must show proficiency in the computing language R or must take an approved course in R.
- Attendance at the twice monthly Epidemiology and Clinical Research PhD workshops.
- Doctoral students fulfill the remaining University unit requirements through doctoral dissertation work.

See the department's website ([http://med.stanford.edu/epidemiology/grad\\_programs/phd-ecr.html](http://med.stanford.edu/epidemiology/grad_programs/phd-ecr.html)) for additional information on degree requirements and admissions process. Address inquiries to the HRP Education Program Manager at 650-723-5456 or [hrradmissions@stanford.edu](mailto:hrradmissions@stanford.edu).

## Ph.D. in Health Policy

Stanford Health Policy, through the Department of Health Research and Policy at the Stanford University School of Medicine, offers a Ph.D. program which promises to educate students to be scholarly leaders in the field of health policy, and to be highly knowledgeable about the theoretical and empirical approaches that can be applied in the development of improvements in health policy and the health care system. The curriculum offers courses across a wide range of health policy areas including health economics, health insurance and government program operation, health financing, international health policy and economic development, cost-effectiveness analysis and the evaluation of new technologies, relevant statistical and methodological approaches, and health policy issues related to public health concerns such as obesity and chronic disease.

In addition to taking a set of core courses, students are expected to complete course work in one of two tracks:

- Health Economics*: including the economic behavior of individuals, providers, insurers, and governments and how their actions affect health and medical care.
- Decision Sciences*: with quantitative techniques to assess the effectiveness and value of medical treatments and for decision making about medical care at the individual and/or collective level.

## Requirements

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

Additional requirements:

### First Year

- Completion of first-year course work with minimum grades of 'B-' and an overall/average GPA of a B (3.0).
- Individual development plan (IDP) meeting with primary adviser within the first quarter.
- Meeting with adviser(s) on a regular basis, to be determined with adviser(s).
- Completion of course work in the responsible conduct of research.

### Second Year

- Completion of second-year course work with minimum grades of 'B-' and an overall/average GPA of a B (3.0).
- Final course work (for both first and second year) must total at least 75 units for both core and track specific courses.
- Individual development plan (IDP) meeting with primary adviser before the end of Autumn Quarter.
- Meeting with adviser(s) on a regular basis, to be determined with adviser(s).
- Completion of second-year paper and funding proposal as part of the second-year tutorial.
- Taking and passing the written qualifying exam.

### Third and Fourth Years

- Advancement to Ph.D. Candidacy (see below).
- Taking and passing the department Ph.D. oral exam (see below).
- Individual development plan (IDP) meeting with primary adviser before the end of Autumn Quarter.
- Meeting with adviser(s) on a regular basis, to be determined with adviser(s).

### Course Work

Complete course work in one of the following two tracks.

#### Health Economics Track

##### Statistical Data Analysis, Econometrics, and Causal Inference

		Units
Required - one year sequence in econometrics:		
ECON 270	Intermediate Econometrics I	2-5
ECON 271	Intermediate Econometrics II	2-5
ECON 272	Intermediate Econometrics III	2-5
OR		
MGTECON 603	Econometric Methods I	4
MGTECON 604	Econometric Methods II	3
MGTECON 605	Econometric Methods III	3

##### Micro-Economics

Required - one year sequence in microeconomics:		
ECON 202	Microeconomics I	2-5
ECON 203	Microeconomics II	2-5
ECON 204	Microeconomics III	2-5

Or equivalent: GSBGEN 675 or MGTECON 600 can be substituted for ECON 202 and/or MGTECON 601 can be substituted for ECON 203.

##### Discipline-Specific Courses

Required:		
HRP 249	Topics in Health Economics I	2-5

Choose 4 courses in the following 4 fields in economics:

Development Economics		
Public Finance		
Labor Economics		
Industrial Organization		

##### Health Policy

Required:		
HRP 252	Outcomes Analysis	4
HRP 256	Economics of Health and Medical Care	5
HRP 392	Analysis of Costs, Risks, and Benefits of Health Care	4

Choose 3 additional health-related courses such as:

HRP 391	Health Law: Finance and Insurance	3
LAW 3002	Health Law: Quality and Safety of Care	3



**Practice of Research**

Required:

First-year core tutorial (HRP 201A, HRP 201B, and HRP 201C)

Second-year core tutorial (HRP 800)

Health Economics Seminar

Research in Progress Seminar

**Decision Science Track****Statistical Data Analysis, Econometrics, and Casual Inference**

Required: at least two quarters of one of the two following sequences:

ECON 270 Intermediate Econometrics I 2-5

ECON 271 Intermediate Econometrics II 2-5

ECON 272 Intermediate Econometrics III 2-5

Or

MGTECON 603 Econometric Methods I 4

MGTECON 604 Econometric Methods II 3

MGTECON 605 Econometric Methods III 3

**Micro-Economics**

Required, at least one quarter:

GSBGEN 675 Microeconomic Theory 3

Or

MGTECON 600 Microeconomic Analysis I 4

MGTECON 601 Microeconomic Analysis II 3

Or

ECON 202N Microeconomics I For Non-Economics PhDs 2-5

ECON 203N Microeconomics II For Non-Economics PhDs 2-5

Or

ECON 202 Microeconomics I 2-5

ECON 203 Microeconomics II 2-5

**Discipline-Specific Courses**

Required:

HRP 263 Advanced Decision Science Methods and Modeling in Health 3

HRP 206 Meta-research: Appraising Research Findings, Bias, and Meta-analysis 3

Choose 4 methods courses such as:

MS&amp;E 201 Dynamic Systems 3-4

MS&amp;E 211 Introduction to Optimization 3-4

MS&amp;E 223 Simulation 3

MS&amp;E 252 Decision Analysis I: Foundations of Decision Analysis 3-4

MS&amp;E 263 Healthcare Operations Management 3

**Health Policy**

Required:

HRP 252 Outcomes Analysis 4

HRP 256 Economics of Health and Medical Care 5

HRP 392 Analysis of Costs, Risks, and Benefits of Health Care 4

Choose 3 additional health-related courses such as:

HRP 391 Health Law: Finance and Insurance 3

LAW 3002 Health Law: Quality and Safety of Care 3

**Practice of Research**

Required:

First-year core tutorial (HRP 201A, HRP 201B, HRP 201C)

Second-year core tutorial (HRP 800)

## Research in Progress Seminar

**GPA/Grade Requirement**

Failure to meet grade/GPA requirements (i.e., minimum grade of 'B-' in all courses and an overall minimum GPA of 3.0, equivalent to a grade of 'B') means the student is out of compliance with program requirements. In this case, the executive committee may ask the candidate to leave the program or may require other corrective courses of action, including, but not limited to, retaking a course. If progress remains unsatisfactory, the committee may ask the candidate to leave the program.

Units

**Ph.D. Candidacy Requirements**

- Approval by adviser(s).
- Satisfactory completion of course work in first two years (maintaining GPA of 'B' (3.0) or better and course grades 'B-' or better). Final course work must total at least 75 units for both core and track specific courses.
- Satisfactory completion of program requirements (such as individual development plans, responsible conduct of research course work).
- Submission, and approval by adviser, of the second-year paper by the second-year student.
- Passing of the written qualifying exam.
- Submission of PhD Candidacy form (<https://registrar.stanford.edu/resources-and-help/student-forms/graduate-student-forms>). Candidacy is valid for five calendar years (through the end of the quarter in which candidacy expires), unless terminated by the department for unsatisfactory progress. An extension of candidacy may be obtained for a maximum of one additional year.
- It is the responsibility of the student to initiate the required paperwork and committee meetings required by Stanford University.

**Written Qualifying Exam**

As part of their advancement to Ph.D. candidacy (as listed above), students must take and pass a written qualifying exam. This is offered approximately two weeks after the end of Spring Quarter in the students' second year.

Material covers broader health policy concepts such as ones covered in the first-year tutorial) as well as track specific topics in Economics and Decision Sciences.

**Oral Exam**

- In accordance with the Stanford University Graduate Academic Policies and Procedures (GAP) (<https://gap.stanford.edu/handbooks/gap-handbook/chapter-4/subchapter-7/page-4-7-1>) manual, students must take and pass an oral examination as part of the Ph.D. degree requirements.
- The oral examination (colloquially known as the "proposal defense") will be focused mainly on the student's dissertation proposal. As well as examining feasibility and understanding of the dissertation proposal, it tests the candidate's command of the field of study.
- Students are required to take the oral exam after passing their written qualifying exam, and when the adviser believes that the student is ready.
- The oral exam must be taken and passed no later than the end of Spring Quarter of the student's third year.
- The student's oral exam committee is chaired by an out-of-department chairperson. The other members of the oral exam committee are the student's primary adviser and at least three core faculty members. All committee members are normally on the Stanford University Academic Council, and the chair must be a member. Emeritus faculty are also eligible to serve as examiners or chair of the committee.

- The University Oral Examination form should be submitted to the education program manager/student services officer at least two weeks prior to the examination date.
- Students provide committee members with a written abstract & summary of their dissertation proposal three weeks ahead of their oral exam date; exact length to be agreed upon with the student's primary adviser (estimate: 2000-5000 words in length).
- In general, the primary adviser should read and approve the proposal document before it is sent to the committee. This is to ensure that the student and the adviser have a clear and shared understanding of the proposed work plan, and that it has been captured by the student in the written proposal document.

## Ph.D. Dissertation

- Must present a Ph.D. dissertation that is the result of independent investigation and that constitutes a contribution to knowledge in health services research and health policy.
- Must select a primary dissertation adviser and at least two additional faculty members to serve on the dissertation committee.
- Presentation of a prospectus outlining the proposed research to the committee.
- Receipt of written approval from the dissertation committee chair.
- Submission of a final draft of the work signed by all members of the dissertation committee.

## Advising

All matriculating students are assigned a faculty adviser from the group of core faculty to help them design their academic program. Students remain with this adviser until the time that they have developed other arrangements for advising (with the approval of both the old and new advisers).

Students are expected to identify a group of normally three thesis advisers before or, at the latest, shortly after the time that they advance to candidacy for the degree. This group consists of one primary and two secondary advisers, who may or may not be the same as the initially assigned faculty adviser. The primary adviser must be from the group of core faculty, unless specific approval of the executive committee is obtained. Such approval would not be routinely granted. However, in rare cases, it may be optimal for a student's progress to implement a co-primary mentor arrangement in which a core faculty member from health policy and another faculty member from outside the core faculty jointly serve as primary mentors. This arrangement might occur in rare circumstances with students seeking to integrate areas of science into their policy training that are outside the expertise of the core faculty.

Secondary advisers are normally expected to come from the core faculty, but could include faculty from outside the core group upon approval of the executive committee. Students are encouraged to seek advisers with complementary expertise as needed, and the Director of Graduate Studies and executive committee monitor advising arrangements to ensure that students receive adequate supervision.

See the department's website ([http://med.stanford.edu/epidemiology/grad\\_programs/phd-ecr.html](http://med.stanford.edu/epidemiology/grad_programs/phd-ecr.html)) for additional information on degree requirements and admissions process. Address inquiries to the HRP Education Program Manager at 650-723-5456 or [hrpadmissions@stanford.edu](mailto:hrpadmissions@stanford.edu).

## Health Research and Policy

Chair: Laurence Baker

Professors: Laurence Baker, Mark Cullen, Steven Goodman, Victor W. Henderson, Mark Hlatky, Abby C. King, Michelle Mello, Julie Parsonnet, Alice S. Whittemore

Associate Professor: Kate Bundorf, Allison Kurian, Lorene M. Nelson, Kristin Sainani

Associate Professor (Clinical): Rita Popat

Assistant Professors: Maria Polyakova, Maya Rossin-Slater, Julia Simard

Emeriti: (Professors) Dan Bloch, Jennifer Kelsey

Courtesy Professors: Jay Bhattacharya, Manisha Desai, Robert Haile, Bonnie Halpern-Felsher, Paul Heidenreich, Mary Leonard, Ying Lu, Stephen Luby, Alex Macario, Gary Shaw

Courtesy Associate Professors: Jeremy Goldhaber-Fiebert, Angelle LaBeaud, Jennifer Lee, Grant Miller, Minang Turakhia

Courtesy Assistant Professor: Jason Andrews, Michael Baiocchi, Sanjay Basu, David Rehkopf, Eric Sun

Senior Lecturer: Irene Corso

Lecturers: Corinna Haberland

Adjunct Professor: Paul-Andre Genest, Eugene Lewit, Henrik Sorensen

## Health Services Research

Director: Kate Bundorf (Associate Professor, Health Research and Policy)

Core Faculty and Academic Teaching Staff: Laurence Baker (Professor, Health Research and Policy), Kate Bundorf (Associate Professor, Health Research and Policy), Irene Corso (Sr Lecturer, Health Research and Policy), Corinna Haberland (Lecturer, Health Research and Policy), Mark Hlatky (Professor, Health Research and Policy, and Medicine), Michelle Mello (Professor, Law, and Health Research and Policy), Maria Polyakova (Assistant Professor, Health Research and Policy), Maya Rossin-Slater (Assistant Professor, Health Research and Policy)

Affiliated Faculty and Staff by Department:

Anesthesiology, Perioperative, and Pain Medicine: Alex Macario (Professor), Eric Sun (Assistant Professor)

Law: Michelle Mello (Professor)

Medicine: Jay Bhattacharya (Professor), Jeremy Goldhaber-Fiebert (Associate Professor), Paul Heidenreich (Professor), Mark Hlatky (Professor), Grant Miller (Associate Professor)

## Epidemiology

Director: Steven Goodman (Professor, Medicine, and Health Research and Policy)

Core Faculty and Academic Teaching Staff: Mark Cullen (Professor, Medicine, Health Research and Policy, and Biomedical Data Science), Steven Goodman (Professor, Medicine, and Health Research and Policy), Victor W. Henderson (Professor, Health Research and Policy, and Neurology), Abby C. King (Professor, Health Research and Policy, and Medicine), Allison Kurian (Associate Professor, Medicine, and Health Research and Policy), Lorene M. Nelson (Associate Professor, Health Research and Policy), Julie Parsonnet (Professor, Medicine, and Health Research and Policy), Rita A. Popat (Clinical Associate Professor, Health Research and Policy), Kristin L. Sainani (Associate Professor, Health Research and Policy), Julia Simard (Assistant Professor, Health Research and Policy), Alice S. Whittemore (Professor, Health Research and Policy, and Biomedical Data Science)

Affiliated Faculty and Staff by Department:  
Biomedical Data Science: Ying Lu (Professor)

Medicine: Jason Andrews (Assistant Professor), Michael Baiocchi (Assistant Professor), Sanjay Basu (Assistant Professor), Ann Hsing (Professor), Robert Haile (Professor), Jennifer Lee (Associate Professor), Mary Leonard (Professor), Stephen Luby (Professor), David Rehkopf (Assistant Professor)

Pediatrics: Bonnie Halpern-Felsher (Professor), Angelle LaBeaud (Associate Professor), Gary Shaw (Professor)

# IMMUNOLOGY

Courses offered by the Immunology Program are listed under the subject code IMMUNOL on the Stanford Bulletin's ExploreCourses web site.

Stanford Immunology is home to faculty, students, postdocs, and staff who work together to produce internationally recognized research in many areas of immunology. The long tradition of collaboration among the immunology laboratories at Stanford fosters productive interdisciplinary research, with an emphasis on the application of current approaches to problems in cellular, molecular and clinical immunology. Faculty research interests include both bench-to-bedside and basic science research. Graduate students and postdoctoral scholars receive outstanding training through their participation in research, teaching, seminars, journal clubs, and the annual Stanford Immunology Scientific Conference.

## Mission of the Ph.D. Program in Immunology

The Immunology doctoral program offers instruction and research opportunities leading to a Ph.D. in Immunology. Two tracks are offered:

1. Track 1: Molecular, Cellular, and Translational Immunology
2. Track 2: Computational and Systems Immunology

The goal of the Ph.D. Program in Immunology is to develop investigators who have a strong foundation in Immunology and related sciences in order to carry out innovative research. The program features a flexible choice of courses and seminars combined with extensive research training in the laboratories of participating Immunology faculty. Specifically, immunology graduate students:

1. acquire a fundamental, broad, and comprehensive body of knowledge and skills through an extensive curriculum.
2. identify important scientific questions, design, and conduct experiments using the most appropriate methods.
3. read and critically analyze current literature in immunology and other relevant fields.
4. present research findings and communicate ideas effectively to a variety of audiences.
5. prepare manuscripts that will be published in leading journals.
6. learn to teach effectively.

## Master of Science in Immunology

Students in the Ph.D. program in Immunology may apply for an M.S. degree in Immunology only under special circumstances, assuming completion of appropriate requirements. Students must complete:

1. At least 45 units of academic work, all of which must be in courses at or above the 100 level, 36 units of which must be at or above the 200 level.
2. 3 quarters of graduate research (IMMUNOL 399 Graduate Research), consisting of rotations in the labs of three faculty members.
3. Participation in the Immunology journal club (IMMUNOL 305 Immunology Journal Club), and attendance at the Immunology seminar series and at the annual Stanford Immunology Scientific Conference.
4. First Year Rotations Presentations and General Advising Sessions, June. Students present on one of three lab rotations.
5. Students must submit a master's thesis paper on one of their rotations. This requirement may be waived under special circumstances.

Course work in Immunology as follows:

## Track: Molecular, Cellular and Translational Immunology

		Units
BIOS 200	Foundations in Experimental Biology	5
IMMUNOL 201	Advanced Immunology I	3
IMMUNOL 202	Advanced Immunology II	3
IMMUNOL 203	Advanced Immunology III	3
IMMUNOL 311	Seminar in Immunology	1
IMMUNOL 305	Immunology Journal Club	1
IMMUNOL 399	Graduate Research	1-15
BIO 141	Biostatistics	3-5
MED 255	The Responsible Conduct of Research	1
Take one of the following courses:		
MI 210	Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites	4
BIO 214	Advanced Cell Biology	4
IMMUNOL 206	Introduction to Applied Computational Tools in Immunology	2

## Track: Computational and Systems Immunology

		Units
BIOS 200	Foundations in Experimental Biology	5
IMMUNOL 201	Advanced Immunology I	3
IMMUNOL 202	Advanced Immunology II	3
IMMUNOL 206	Introduction to Applied Computational Tools in Immunology	2
IMMUNOL 207	Essential Methods in Computational and Systems Immunology	3
IMMUNOL 310	Seminars in Computational and Systems Immunology	1
BIOMEDIN 212	Introduction to Biomedical Informatics Research Methodology	3
BIOMEDIN 214	Representations and Algorithms for Computational Molecular Biology	3-4
IMMUNOL 399	Graduate Research	1-15
MED 255	The Responsible Conduct of Research	1

## Doctor of Philosophy in Immunology

The University's basic requirements for the Ph.D. degree are outlined in the "Graduate Degrees (p. 50)" section of this bulletin.

## Admissions

Students seeking admissions to the Immunology Ph.D. Program typically have an undergraduate major in biological sciences, but majors from other areas are acceptable if the applicants have sufficient coursework in biology, chemistry, general physics, and mathematics (through calculus). Applications are evaluated by the Immunology Graduate Program committee based upon: GRE scores; grades; evidence of research experience; letters of recommendation, including letters from research sponsor(s); and commitment to a career in biomedical research. The GRE Subject test is not required. Applicants should plan on taking the GRE at least one month prior to the application deadline of Friday, December 1, 2017 to ensure that official scores are available when applications are evaluated. Candidates who are selected to visit Stanford and interview are notified in January. The selected applicants are invited to the Biosciences interview session, February 28-March 4, 2018 (Wednesday-Sunday). This is the program's only interview session.

Interested Stanford medical students are welcome to apply to the program and should also submit a formal application by Friday, December 1, 2017.

Prospective graduate students must apply via Stanford's online graduate application.

## Financial Aid

Students admitted to the program are offered financial support for tuition, a living stipend, insurance coverage, and for first-year graduate students, a small allowance for books/travel. Applicants are urged to apply for independent fellowships such as from the National Science Foundation or National Defense Science and Engineering Graduate Fellowships. NSF Fellowship applications are due in November of the year prior to matriculation in the graduate program, and only one more NSF application is permitted in the first or second year. Immunology graduate students may continue to apply for outside fellowships after matriculation. Admitted students are typically offered financial support in the form of Stanford Graduate Fellowships, NIH traineeships, or research assistantships.

## General Requirements

### Immunology Startup and the First-Year Advising Process

Since students enter with differing backgrounds, each student is assisted by the first-year adviser in selecting courses and lab rotations in the first year and in choosing a lab for the dissertation research. In addition, the Immunology Startup, a five-day introduction to immunology in early September, exposes incoming Immunology Ph.D. students to a variety of techniques and concepts. Students learn basic laboratory techniques in immunology and participate in in-depth discussions with faculty.

All students must be enrolled in exactly 10 units during Autumn, Winter, Spring, and Summer quarters until reaching Terminal Graduate Residence (TGR) status in the spring or summer quarter of their fourth year.

Students are required to pass all courses in which they are enrolled; required and elective courses must be taken for a letter grade. Students must earn a grade of 'B-' or better in all courses applicable to the degree that are taken for a letter grade. Satisfactory completion of each year's general and track specific requirements listed below is required. During the first year, degree progress is monitored closely by the first-year adviser in quarterly meetings and by the Stanford Graduate Program Committee in a final advising session in June.

First-year students are required to complete three rotations in at least two immunology labs. In the spring quarter, two mini-rotations of six weeks each may be arranged.

A specific program of study for each student is developed individually with the first-year adviser.

### Core Courses:

All students in the two tracks, Molecular, Cellular, and Translational Immunology (MCTI) and Computational and Systems Immunology (CSI) are required to enroll in the following core courses:

		Units
BIOS 200	Foundations in Experimental Biology	5
IMMUNOL 201	Advanced Immunology I	3
IMMUNOL 202	Advanced Immunology II	3
IMMUNOL 305	Immunology Journal Club	1
IMMUNOL 311	Seminar in Immunology	1
BIO 141	Biostatistics	3-5
IMMUNOL 399	Graduate Research	1-15
IMMUNOL 290	Teaching in Immunology	1-15
MED 255	The Responsible Conduct of Research	1

Immediately after the final examination period in Spring Quarter of the first year, first-year immunology graduate students are required to give a presentation on one of their three rotations to the Immunology graduate program committee (qualifying examination process, part I).

After the rotation presentation, the first-year student will meet with the Stanford graduate program committee in a one-on-one advising session to review degree progress and choice of a Ph.D. thesis lab. The general oral examination and the Ph.D. thesis dissertation proposal constitute Part II of the qualifying examination process. The student is required to pass the oral examination and write a thesis dissertation proposal which is presented to and evaluated by a qualifying examination committee composed of three faculty members, two of whom may be from the Immunology program faculty and the third faculty member from a department outside the program. The Ph.D. adviser need not be present for Part II, but is required to submit an evaluation and grade for the Ph.D. thesis dissertation proposal. Upon successful completion of Part II, the student files a petition for Ph.D. candidacy.

Candidates for Ph.D. degrees at Stanford must satisfactorily complete a program of study that includes 135 units of graduate course work and research. At least 3 units must be taken with each of four different Stanford faculty members. Students in the MCTI track are expected to complete all their core course requirements by the end of their second year; students in the CSI track should complete their course work by the end of the third year.

The dissertation reading committee (generally known as the Ph.D. thesis committee) must be comprised of at least four faculty members who guide the student in the Ph.D. research, and read and approve the final dissertation. Typically three of the four dissertation reading committee members are from the Immunology program faculty.

The student must meet with the dissertation reading committee at least once a year. In the first through third years, the student must meet with the dissertation committee at least once a year. In the fourth and fifth years, the student is expected to meet twice a year with the Ph.D. thesis committee. In addition, a secondary adviser is assigned who can provide additional advice on issues such as career path choices and other non-academic issues.

*Individual Development Plan:* Graduate students are required to meet with their faculty mentors once a year to discuss an individual development plan" (IDP). The IDP is intended to help the students take ownership of their training and professional development. The goals of the IDP are to: 1) pause, reflect and intentionally think on short-, mid- and long-term goals; 2) identify resources that help to achieve these goals; and 3) have open and direct dialogue with the Ph.D. thesis adviser and establish clear expectations and steps.

## Track Specific Requirements

In addition to the general requirements listed above, students must also complete requirements within their track. Written petitions for exemptions to core curriculum and lab rotation requirements are considered only in the first year by the advising committee and the chair of the Graduate Program committee. Approval is contingent upon special circumstances and is not routinely granted.

### Molecular, Cellular, and Translational Immunology

MCTI first-year students are required to take the following courses in their first year for a letter grade:

		Units
IMMUNOL 203	Advanced Immunology III	3
Take one of the following courses:		
MI 210	Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites	4
BIO 214	Advanced Cell Biology	4
IMMUNOL 206	Introduction to Applied Computational Tools in Immunology	2

**Electives:**

One elective (see elective list below)

		Units
IMMUNOL 275	Tumor Immunology	3
CSB 210	Cell Signaling	4
SBIO 241	Biological Macromolecules	3-5
DBIO 210	Developmental Biology	4
CBIO 240	Molecular and Genetic Basis of Cancer	4

**Computational and Systems Immunology**

The CSI curriculum trains students to be computational and experimental scientists, who are expected to identify important problems in immunology and to devise integrated computational/ experimental plans for addressing them.

**CSI Core (Required):**

Students in the CSI track are required to take the following core courses in their first and second years, unless demonstrated by proficiency or coursework. Petitions to exempt from the courses CS 106A, CS 109, and CS 161 must be approved by the Chair of the CSI track.

		Units
CS 106A	Programming Methodology	3-5
CS 109	Introduction to Probability for Computer Scientists	3-5
CS 161	Design and Analysis of Algorithms	3-5
IMMUNOL 206	Introduction to Applied Computational Tools in Immunology	2
IMMUNOL 207	Essential Methods in Computational and Systems Immunology	3
IMMUNOL 310	Seminars in Computational and Systems Immunology	1
BIOMEDIN 214	Representations and Algorithms for Computational Molecular Biology	3-4

**CSI Electives:**

Two electives (see elective list below):

		Units
BIOMEDIN 212	Introduction to Biomedical Informatics Research Methodology	3-5
BIOMEDIN 217	Translational Bioinformatics	4
BIOMEDIN 260	Computational Methods for Biomedical Image Analysis and Interpretation	3-4
CME 206	Introduction to Numerical Methods for Engineering	3
CME 263	Introduction to Linear Dynamical Systems	3
CME 309	Randomized Algorithms and Probabilistic Analysis	3
CME 334	Advanced Methods in Numerical Optimization	3
CME 364A	Convex Optimization I	3
CME 372	Applied Fourier Analysis and Elements of Modern Signal Processing	3
EE 376A	Information Theory	3
EE 278	Introduction to Statistical Signal Processing	3
EE 378A	Statistical Signal Processing	3
STATS 116	Theory of Probability	3-5
STATS 201	Design and Analysis of Experiments	3-5
STATS 202	Data Mining and Analysis	3
STATS 216	Introduction to Statistical Learning	3
STATS 217	Introduction to Stochastic Processes I	2-3
Other		

**Journal Clubs**

Both MCTI and CSI students are required to attend the IMMUNOL 305 Immunology Journal Club for their first through third years. Attendance is optional for fourth year and above graduate students.

**Immunology and CSI Seminar Series**

Graduate seminars are an important means of attaining a broad and comprehensive exposure to all areas in immunology as well as gaining a professional perspective and competence in the field. First-year students are required to attend all immunology seminars (IMMUNOL 311 Seminar in Immunology) IMMUNOL 311A. Students in their second year and above are required to attend 50% of the seminar series each academic year. Students in the CSI track are required to attend the Computational and Systems Immunology Seminar Series (IMMUNOL 310 Seminars in Computational and Systems Immunology) held every Summer Quarter.

**Immunology Scientific Retreat**

The annual Retreat is held at the Asilomar Conference Grounds, Pacific Grove, CA, and is attended by students, staff, postdocs and faculty of the Stanford immunology community. All immunology graduate students are required to attend. In the third through fifth years, students will present a poster and give a talk on their graduate research.

**Teaching Assistantships**

Teaching experience and training are part of the graduate curriculum. Each student assists in teaching two courses in the immunology core or electives. A TA match process is held in summer quarter in order to match the graduate student's research and teaching preferences to the appropriate courses. Before beginning their assigned teaching assistantships, students are required to attend a TA orientation workshop held by VPTL once a year in late September.

**First Author Paper Submission**

By the fourth or fifth year, graduate students are expected to submit a first author paper for publication. This milestone should be completed before defending a Ph.D. thesis.

**Doctoral Dissertation**

Before embarking on the dissertation defense process, the graduate student must submit a Petition to Defend to the Director of the Immunology Graduate Program. Important milestones and degree requirements must be met before proceeding to the oral examination. A substantial draft of the dissertation must be turned in to the student's oral examination committee at least one month before the oral exam is scheduled to take place. At the time of the Ph.D. orals defense, an orals chair is chosen to lead the orals committee, which is a distinct committee, but the basic membership is identical to that of the dissertation reading committee. The minimum number of faculty committee members for the orals committee is five. The final written dissertation must be approved by the student's reading committee and submitted to the Registrar's Office. Upon completion of this final requirement, a student is eligible for conferral of the Ph.D. degree.

**Faculty**

*Director, Executive Committee for the Immunology Program:* Patricia Jones (Professor, Biology)

*Director, Immunology Graduate Program:* Olivia Martinez (Professor, Research, Surgery, Transplantation)

**Participating Departments and Faculty (Molecular, Cellular, Translational Immunology Track)**

*Biochemistry:* Peter Kim (Professor), Lingyin Li (Assistant Professor)

*Bioengineering:* Stephen Quake (Professor, and Applied Physics and Physics)

*Biology:* Patricia P. Jones (Professor)

*Chemistry:* Carolyn Bertozzi (Professor, of Radiology and of Chemical and Systems Biology)

*Genetics:* Leonore A. Herzenberg (Professor, Research), Karla Kirkegaard (Professor, and of Microbiology & Immunology), Michael Snyder (Professor)

*Medicine/Biomedical Informatics Research:* Andrew Gentles (Assistant Professor, Research), Purvesh Khatri (Assistant Professor, Research)

*Medicine/Blood and Bone Marrow Transplantation Program:* Everett Meyer (Assistant Professor), David Miklos (Associate Professor), Robert Negrin (Professor), Judith Shizuru (Professor)

*Medicine/Cardiovascular Medicine:* Joseph Wu (Professor, and Radiology)

*Medicine/Endocrinology:* Joy Wu (Assistant Professor)

*Medicine/Gastroenterology and Hepatology:* Aida Habtezion (Associate Professor)

*Medicine/Hematology:* Ravi Majeti (Associate Professor)

*Medicine/Immunology and Rheumatology:* C. Garrison Fathman (Professor), Jorg Goronzy (Professor), William Robinson (Associate Professor), Samuel Strober (Professor), Paul J. Utz (Professor), Cornelia Weyand (Professor)

*Medicine/Infectious Diseases:* Catherine Blish (Assistant Professor), Paul Bollyky (Assistant Professor), Prasanna Jagannathan (Assistant Professor), Taia T. Wang (Assistant Professor)

*Medicine/Oncology:* Ash Alizadeh (Associate Professor), Gilbert Chu (Professor, and Biochemistry), Dean Felsher (Professor, and Pathology), Ronald Levy (Professor), Shoshana Levy (Professor, Research)

*Medicine/Nephrology:* Jonathan Maltzman (Associate Professor)

*Medicine/Pulmonary and Critical Care Medicine:* Mark Nicolls (Professor)

*Microbiology and Immunology:* John Boothroyd (Professor), Yueh-Hsiu Chien (Professor), Mark M. Davis (Professor, and Director, Institute for Immunity, Transplantation and Infection), Juliana Idoyaga (Assistant Professor), Holden Maecker (Associate Professor, Research), Hugh McDavitt (Professor, Emeritus), Denise Monack (Professor), Garry P. Nolan (Professor), David Schneider (Professor)

*Molecular and Cellular Physiology:* K. Christopher Garcia (Professor, and Structural Biology), Richard S. Lewis (Professor)

*Neurology and Neurological Sciences:* May Han (Assistant Professor), Lawrence Steinman (Professor, and Pediatrics), Tony Wyss-Coray (Professor)

*Neurosurgery:* Theo Palmer (Associate Professor)

*Otolaryngology/Head and Neck Surgery (ENT):* Jayakar Nayak (Assistant Professor), John B. Sunwoo (Associate Professor)

*Pathology:* Robert Michael Angelo (Assistant Professor), Sean Bendall (Assistant Professor), Scott Boyd (Associate Professor), Eugene C. Butcher (Professor), Michael Cleary (Professor), Gerald R. Crabtree (Professor, and Developmental Biology), Edgar G. Engleman (Professor, and Medicine/Immunology and Rheumatology), Andrew Fire (Professor, and Genetics), Stephen Galli (Professor), Sara Michie (Professor), Bali Pulendran (Professor), Raymond A. Sobel (Professor), Irving Weissman

(Professor, and Director, Stem Cell and Regenerative Medicine Institute, and of Developmental Biology, Biology)

*Pediatrics:* David B. Lewis (Professor, Immunology and Allergy), Crystal Mackall (Professor, Hematology/Oncology, and of Medicine), Maria Grazia Roncarolo (Professor, Stem Cell Transplantation, and of Medicine/ Blood and Marrow Transplantation), Elizabeth Mellins (Professor, Human Gene Therapy), Kari Nadeau (Professor, Allergy and Clinical Immunology, of Otolaryngology, Head & Neck Surgery)

*Psychiatry and Behavioral Sciences:* Emmanuel Mignot (Professor, Sleep Medicine)

*Radiology:* Parag Mallick (Assistant Professor, Research, and of Diagnostic Radiology)

*Structural Biology:* Peter Parham (Professor, and Microbiology and Immunology), Theodore Jardetzky (Professor)

*Surgery/Multi-Organ Transplantation:* Sheri Krams (Associate Professor, Research), Olivia Martinez (Professor, Research)

## Participating Departments and Faculty (Computational and Systems Immunology)

*Bioengineering:* Stephen Quake (Professor, and Applied Physics and Physics)

*Genetics:* Michael Snyder (Professor), Karla Kirkegaard (Professor, and of Microbiology & Immunology)

*Med/Biomedical Informatics Research:* Purvesh Khatri (Assistant Professor, Research)

*Med/Immunology and Rheumatology:* Paul J. Utz (Professor)

*Med/Oncology:* Ash Alizadeh (Assistant Professor)

*Microbiology and Immunology:* John Boothroyd (Professor), Mark M. Davis (Professor, and Director, Institute for Immunity, Transplantation and Infection), Holden Maecker (Associate Professor, Research), Garry Nolan (Professor)

*Pathology:* Sean Bendall (Assistant Professor), Scott Boyd (Associate Professor), Andrew Fire (Professor, and of Genetics)

*Radiology:* Parag Mallick (Assistant Professor, Research, and of Diagnostic Radiology)

## Affiliate Members:

*Biochemistry:* Ron Davis (Professor, and of Genetics)

*Bioengineering:* Russ Altman (Professor, and of Genetics and Computer Science)

*Health and Research Policy - Biostatistics:* Robert Tibshirani (Professor, and Statistics)

# MICROBIOLOGY AND IMMUNOLOGY

Courses offered by the Department of Microbiology and Immunology are listed under the subject code MI on the Stanford Bulletin's ExploreCourses web site.

## Graduate Programs in Microbiology and Immunology

The Department of Microbiology and Immunology offers a program of training leading to the Ph.D. degree, as well as research training, courses, and seminars for medical students and postdoctoral fellows. Research interests focus on two broad areas: host/parasite interactions, and the function of the immune system. Laboratories investigate mechanisms of pathogenesis and the physiology of viruses, bacteria, and protozoan parasites, as well as the lymphocyte function in antigen recognition, immune response, and autoimmunity.

## Master of Science

A regular M.S. program is not offered, although this degree is awarded under special circumstances. Candidates for master's degrees are expected to have completed the preliminary requirements for the B.S. degree, or the equivalent. In addition, the candidate is expected to complete 45 quarter units of work related to microbiology; at least 25 of these units should concern research devoted to a thesis. The thesis must be approved by the student's committee.

## Doctor of Philosophy in Microbiology and Immunology

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

## Application, Admission, and Financial Aid

Prospective Ph.D. candidates should have completed a bachelor's degree in a discipline of biology or chemistry, including course work in biochemistry, chemistry, genetics, immunology, microbiology, and molecular biology.

Applicants must file a report of scores on the general subject tests of the Graduate Record Examination (GRE). It is strongly recommended that the GRE be taken before October so that scores are available when applications are evaluated.

In the absence of independent fellowship support, entering predoctoral students are fully supported with a stipend and tuition award. Highly qualified applicants may be honored by a nomination for a Stanford Graduate Fellowship. Successful applicants have been competitive for predoctoral fellowships such as those from the National Science Foundation.

## Program for Graduate Study

The Ph.D. degree requires course work and independent research demonstrating an individual's creative, scholastic, and intellectual abilities. On entering the department, students meet an advisory faculty member; together they design a timetable for completion of the degree requirements. Typically, this consists of first identifying gaps in the student's undergraduate education and determining courses that should be taken. Then, a tentative plan is made for two to four lab rotations (one rotation per quarter). During the first year of graduate study in the department, each student also takes seven upper-level (200-series) courses.

## Course requirements:

		Units
BIOS 200	Foundations in Experimental Biology	5
BIO 214	Advanced Cell Biology	4
MED 255	The Responsible Conduct of Research	1
MI 210	Advanced Pathogenesis of Bacteria, Viruses, and Eukaryotic Parasites	4
MI 215	Principles of Biological Technologies	3
MI 250	Frontiers in Microbiology and Immunology (Taken once in the first year and once in the second year for a total of 2 units.)	1
MI 214	Immunology: Homeostasis and Disease	3

## Recommended course:

		Units
BIO 230	Molecular and Cellular Immunology	4

## One elective from the following:

		Units
DBIO 210	Developmental Biology	4
CSB 210	Cell Signaling	4
CSB 220	Chemistry of Biological Processes	3
GENE 205	Advanced Genetics	3
IMMUNOL 202	Advanced Immunology II	3
MCP 256	How Cells Work: Energetics, Compartments, and Coupling in Cell Biology	4
MI 221	Gut Microbiota in Health and Disease	2-3
MI 245	Computational Modeling of Microbial Communities	4
S BIO 241	Biological Macromolecules	3-5
STATS 141	Biostatistics	3-5

Prior approval from the student's adviser and department graduate program director is required for courses not from the elective list.

In Autumn Quarter of the second year, each student defends orally a formal research proposal on a topic outside the intended thesis project. This qualifying examination proposal is due to the graduate program steering committee by September 1. In Spring Quarter of the second year, a research proposal based on the student's own thesis topic is defended to the thesis committee. The written thesis proposal is due May 1 and the oral defense is presented and completed by the end of the Spring Quarter. Based on successful performance on these proposals, the student is admitted to candidacy. Teaching experience and training are also part of the graduate curriculum. Graduate students are required to act as teaching assistants for one course. In addition, first- and second-year graduate students are required to participate in a bi-weekly journal club. Additional information on program requirements can be found on the Microbiology and Immunology (<http://med.stanford.edu/microimmuno.html>) web site.

*Emeriti: (Professors)* Stanley Falkow, Hugh O. McDevitt, Edward S. Mocarski

*Chair:* David Schneider

*Associate Chair:* Peter Sarnow

*Professors:* Ann Arvin, Helen Blau, Matthew Bogyo, John C. Boothroyd, Yueh-Hsiu Chien, Wah Chiu, Mark M. Davis, Stephen J. Galli, Harry B. Greenberg, Peter Jackson, Karla Kirkegaard, A. C. Matin, Denise Monack, Garry Nolan, Peter Parham, Phillip Pizzo, Charles Prober, David Relman, Peter Sarnow, David Schneider, Gary K. Schoolnik, Julie Theriot, Lucy S. Tompkins



*Professor (Teaching):* Robert D. Siegel

*Associate Professors:* Manuel Amieva, Jeffrey Glenn, K.C. Huang, Upinder Singh, Justin Sonnenburg

*Assistant Professors:* Paul Bollyky, Jan Carette, Elizabeth Egan, Shirit Einav, Juliana Idoyaga, Ellen Yeh

*Institute for Immunity, Transplantation and Infection*

*Director, Human Immune Monitoring Center and Professor (Research):*  
Holden Maecker

# MOLECULAR AND CELLULAR PHYSIOLOGY

Courses offered by the Department of Molecular and Cellular Physiology are listed under the subject code MCP on the Stanford Bulletin's ExploreCourses web site.

The Department of Molecular and Cellular Physiology is located in the Beckman Center for Molecular and Genetic Medicine.

A central goal of physiology in the post-genomic era is to understand how thousands of encoded proteins serve to bring about the highly coordinated behavior of cells and tissues. Research in the department approaches this goal at many levels of organization, ranging from single molecules and individual cells to multicellular systems and the whole organism. The faculty share common interests in the molecular mechanisms of cell signaling and behavior, with a special focus on structure/function analysis of ion channels and G-protein coupled receptors, and their roles at the cellular, organ, and whole-organism levels; the molecular basis of sensory transduction, synaptic transmission, plasticity and memory; the role of ion channels and calcium in controlling gene expression in neural and immune cells; and the regulation of vesicle trafficking and targeting, cell polarity, and cell-cell interactions in the nervous system and in epithelia. Research programs employ a wide range of approaches, including molecular and cell biology, biochemistry, genetics, biophysics, x-ray crystallography and solution NMR, electrophysiology, and in vitro and in vivo imaging with confocal and multi-photon microscopy.

## Graduate Programs in Molecular and Cellular Physiology

The department offers required and elective courses for students in the School of Medicine and is also open to other qualified students with the consent of the instructor. Training of medical, graduate, and postdoctoral students is available. The program offers a course of study leading to the Ph.D. degree. No B.S. is offered, and an M.S. is offered only in the unusual circumstance where a student completes the course work, rotation, and the written section of the qualifying exam, but is unable to complete the requirements for the Ph.D.

## Application and Admission

Applications are made through the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

Applicants are assessed based on their undergraduate transcripts, test scores, research experience, statement of purpose and letters of recommendation that document exceptional potential, ability, or achievements.

Students admitted to the program are offered financial support covering tuition, a living stipend, and insurance coverage. Applicants are urged to apply for independent fellowships such as from the National Science Foundation. Fellowship applications are due in November of the year prior to matriculation in the graduate program, but MCP graduate students may continue to apply for outside fellowships after matriculation. Because of the small number of department-funded slots, students who have been awarded an outside fellowship have an improved chance of acceptance into the program.

Upon matriculation, each student is assisted in selecting courses and lab rotations in the first year and in choosing a lab for the dissertation research. Once a dissertation adviser has been selected, a dissertation committee is composed to include the dissertation adviser and two additional MCP/Non-MCP faculty, to guide the student during their dissertation research. The student must meet with the dissertation committee at least once a year.

## Doctor of Philosophy in Molecular and Cellular Physiology

Candidates for Ph.D. degrees at Stanford must satisfactorily complete a program of study that includes 135 units of graduate course work and research.

Study toward the Ph.D. is expected to occupy five years, including summers. The MCP course requirements for the program are as follows:

- MCP 221 Advanced Cell Biology
- MCP 207 MCP Bootcamp
- MCP 256 How Cells Work: Energetics, Compartments, and Coupling in Cell Biology
- BIOS 200 Foundations in Experimental Biology
- MED 255 The Responsible Conduct of Research, if funded on NSF or NIH training grants
- Advanced graduate courses or mini-courses for a minimum of 6 units total. These courses do not need to be MCP courses but must be in relevant scientific topic and approved by the Director of Graduate Studies.
- Two of the following courses:
  - BIOC 241 Biological Macromolecules
  - GENE 205 Advanced Genetics
  - NBIO 206 The Nervous System
  - BIO 230 Molecular and Cellular Immunology

Students are also required to participate in the Molecular and Cellular Physiology Seminar Series and attend the department scientific meeting.

Courses taken to meet program requirements must be taken for a letter grade and students must earn a minimum grade of at least a 'B' in every individual required course. Students must also maintain a minimum GPA of 3.0 by University policy. Failure to maintain the required grades and grade point average is taken as evidence of unsatisfactory progress in the program.

Students should complete their required courses within the first two years of study. Exceptions may be made in cases where it was impossible to schedule courses because they were not offered within a student's first two years. Students may petition the MCP graduate committee for variances in the specific courses required, and such petitions may be granted in special circumstances, in cases where a student's progress is otherwise exemplary.

## Qualifying Examination

All students in the program must pass a qualifying examination to advance to candidacy for the Ph.D. It is expected that students take the qualifying examination by the end of the Autumn Quarter in the second year of study. Failure to take the qualifying exam by the end of Autumn Quarter of the second year of study is taken as evidence of unsatisfactory progress in the program. In any case where a student thinks they need additional time to schedule and take their exam, a request must be submitted in writing to the Director of Graduate Studies (DGS) by November 15 of Autumn Quarter. The DGS may opt to grant additional time in compelling circumstances that do not indicate poor progress, or may refer the matter to the graduate committee for further action.

Students are given two chances to unconditionally pass the qualifying examination. Failure to achieve an unconditional pass of the qualifying

examination by the end of the Spring Quarter of the second year is grounds for dismissal from the program.

Students form a qualifying examination committee consisting of at least 3 faculty members (members of the academic council, including the dissertation advisor), at least one of whom must be a member of MCP. This committee should be formed by the end of Spring Quarter of the first year of study. The composition of this committee should be approved by the Director of Graduate Studies. Students should also check with the department's student services office to make sure to file all required paperwork by the end of Spring Quarter. The University maintains certain deadlines for filing for candidacy, and it is the student's responsibility to be aware of these deadlines.

### **Dissertation and University Oral Examination**

The results of independent, original work by the students are presented in a dissertation. The oral examination is largely a defense of the dissertation.

### **Advisers and Advisory Committees**

A graduate advisory committee, currently professors Feng, Kobilka, Maduke and Madison, advises students during the period before the formation of their qualifying committees.

### **Financial Aid**

Students may be funded by their advisers' research grants, by training grants, by department funds, or by extramural funds. Students are encouraged to obtain funding from outside sources such as NIH and NSF.

*Chair:* Miriam B. Goodman

*Professors:* Axel T. Brunger, K. Christopher Garcia, Miriam B. Goodman, Brian K. Kobilka, Richard S. Lewis, Georgios Skiniotis, Thomas C. Sudhof

*Associate Professors:* V. Daniel Madison, Merritt C. Maduke

*Assistant Professors:* Liang Feng, Lucy E. O'Brien

*Joint Professors:* Steve Chu, W. James Nelson, William Weis

*Courtesy Professors:* John Huguenard, Beth Pruitt, Anthony J. Ricci, Ron Dror

*Courtesy Assistant Professor:* Gregory Scherrer

*Emeritus Faculty:* Stephen J. Smith, Richard W. Tsien

# NEUROBIOLOGY

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Courses offered by the Department of Neurobiology are listed under the subject code NBIO on the Stanford Bulletin's ExploreCourses web site.

## Graduate Program in Neurobiology

Graduate students in the Department of Neurobiology obtain the Ph.D. degree through the interdepartmental Neurosciences Ph.D. program (p. 828). Accepted students receive funding for tuition and a living stipend. Applicants should familiarize themselves with the research interests of the faculty and, when possible, indicate their preference on the application form which is submitted directly to the Neurosciences Program.

Medical students also are encouraged to enroll in the Ph.D. program. The requirements of the Ph.D. program are fitted to the interests and time schedules of the student. Postdoctoral training is available to graduates holding Ph.D. or M.D. degrees, and further information is obtained directly from the faculty member concerned.

Research interests of the department include information processing in vertebrate retina; structure, function, and development of auditory and visual systems; development and regeneration in the central and peripheral nervous system; neural mechanisms mediating higher nervous system functions, including perception, learning, attention and decision making.

## Faculty

*Emeritus:* Denis Baylor, Uel J. McMahan, Eric Shooter, Lubert Stryer

*Chair:* Ben Barres

*Professors:* Eric I. Knudsen, Thomas Clandinin, Tirin Moore, William T. Newsome

*Associate Professors:* Stephen Baccus, Jennifer Raymond

*Assistant Professor:* Lisa Giocomo, Michael Z. Lin

# NEUROSCIENCES

Courses offered by the Neurosciences Program are listed under the subject code NEPR on the Stanford Bulletin's ExploreCourses web site.

## Master of Science in Neurosciences

The Neurosciences IDP does not offer a terminal M.S. degree. An M.S. degree may only be pursued in combination with a doctoral degree from another department within the University or with an advanced degree from one of the University's professional schools.

Students interested in pursuing the M.S. must meet with the Neurosciences IDP Program Director and provide an unofficial Stanford transcript as well as a Statement of Purpose for adding the M.S. degree.

The Neurosciences IDP does not offer a coterminal master's degree.

### Requirements

- Courses used for the Neurosciences M.S. may not be double-counted to meet the requirements of a Ph.D. degree.
- All courses used for the Neurosciences M.S. must be taken for a letter grade and passed with a 3.0 (B) or better.
- Course requirements must be completed before the student applies for Terminal Graduate registration (TGR) Status

Students from other Stanford Ph.D. or professional degree programs may elect to take the M.S. degree in Neurosciences when they have met the following requirements:

1. Completion of a minimum of 45 unduplicated units of neurosciences course work, including the following Neuroscience courses or approved substitutes:

NEPR 202	Neurosciences Development Core	2
NEPR 203	Neuroscience Systems Core	2
NEPR 204	Neuroscience Molecular Core	2
NEPR 205	Neurosciences Anatomy Core	2
NEPR 207	Neurosciences Cognitive Core	2
NEPR 208	Neuroscience Computational Core	2
NEPR 213	Neurogenetics Core	2
NEPR/ COMP MED 201	Neuro-Cellular Core	2
NEPR 214/ NENS 207	Neuroscience Core Curriculum: Translational Neuroscience	2
NEPR 212	Responsible Conduct of Neuroscience Research	1

2. At least 3 quarters of MCP 300: Neuroscience Journal Club and Professional Development Series
3. A minimum of four (4) upper-level neuroscience courses that may be selected based on the interests and needs of the student with prior approval of the Program Director
4. A Stanford statistics course such as STATS 216: Introduction to Statistical Learning, or petition to receive credit for a different Stanford course
5. In addition to required coursework, students pursuing the M.S. in Neurosciences must sit for a Qualifying Exam that includes a written proposal for a thesis project and oral examination.
6. Students must also complete the proposed thesis project.

## Doctor of Philosophy in Neurosciences

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The interdepartmental Neurosciences Program offers instruction and research opportunities leading to a Ph.D. in Neurosciences. The requirements for a Ph.D. degree follow those of the University and in addition are tailored to fit the background and interests of the student. Qualified applicants should, where possible, apply for the predoctoral fellowships in open competition, especially those from the National Science Foundation.

### Admissions

Applications are made through the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site and are due in early December each year. Applicants should familiarize themselves with the research interests of the faculty and indicate their preferences clearly on the application form. Admitted students are notified from early March through mid-April. Accepted students receive an award covering tuition, a basic health plan, and a living stipend.

### Course Requirements

Since students enter with differing backgrounds, and the labs in which they may elect to work cover several different disciplines, the specific program for each student is developed individually with an advisory committee. Students rotate through at least three labs during the first year while taking core modules. Passing of a comprehensive oral qualifying examination given by the student's advisory committee must be taken by the end of the second year, and is required for admission to Ph.D. candidacy. The student is required to present a Ph.D. dissertation, which is the result of independent investigation contributing to knowledge in an area of neuroscience, and to defend his or her dissertation in a University oral examination, which includes a public seminar. Students must also publish a first-author paper in a major scientific journal and submit a written dissertation prior to completing the Ph.D. degree.

Medical students may participate in this program provided they meet the prerequisites and satisfy all the requirements of the graduate program as listed above. The timing of the program may be adjusted to fit their special circumstances.

- Stanford Intensive Neuroscience (SIN) Boot Camp
- Nine (9) Neuroscience Core Modules:
  - a. NEPR 202 Neurosciences Development Core
  - b. NEPR 203 Neuroscience Systems Core
  - c. NEPR 204 Neuroscience Molecular Core
  - d. NEPR 205 Neurosciences Anatomy Core
  - e. NEPR 207 Neurosciences Cognitive Core
  - f. NEPR 208 Neuroscience Computational Core (Prerequisite: NBIO 228: Math Tools for Neuroscientists)
  - g. NEPR 213 Neurogenetics Core
  - h. COMP MED 201 Neuro-Cellular Core (same as NEPR 201 Neuro-Cellular Core)
  - i. NEPR 214 Neuroscience Core Curriculum: Translational Neuroscience (same as NENS 207 Neuroscience Core Curriculum: Translational Neuroscience)
- NEPR 212 Responsible Conduct of Neuroscience Research
- Nine (9) quarters of NEPR 280 Neuroscience Journal Club and Professional Development Series
- Statistics Course (STATS 216 Introduction to Statistical Learning or similar)
- Four (4) advanced level courses.

### Students Enrolled Starting Autumn 2014 and Earlier

- Introduction to Neurobiology (NBIO 206 The Nervous System or equivalent).
- Nine (9) quarters of NBIO 300/MCP 300

- Five (5) advanced level courses within - and at least one course in each of - the following three areas:

1. Systems, Computational, Cognitive and Behavioral Neuroscience. Courses at this level focus on the computations performed by neural circuits and the role such computations play in behavior, perceptions, and plasticity. Students can expect to learn how neurons: Organize circuits into larger functional units; Represent and transform information; Produce myriad movement; and Subserve higher-level processing related to perception, reasoning and learning. Predominant methods in this area include modeling single cells and circuits, design of behavioral paradigms, and statistical analysis of behavioral and electrophysiological data.

Courses offered this academic year that can fulfill this include:

- COMPMED 207 Comparative Brain Evolution
- NBIO 258 Information and Signaling Mechanisms in Neurons and Circuits
- NENS 220 Computational Neuroscience
- PSYCH 202 Cognitive Neuroscience
- PSYCH 204A Human Neuroimaging Methods
- PSYCH 232 Brain and Decision Making
- PSYCH 251 Lab in Experimental Methods
- PSYCH 266 Current Debates in Learning and Memory

Courses offered in previous years that fulfilled this requirement include:

- NBIO 218 Neural Basis of Behavior
- NBIO 220 Central Mechanisms in Vision-based Cognition
- NENS 205 Neurobiology of Disease Seminar

2. Cellular, Molecular and Developmental Neuroscience. Courses in this area address fundamental mechanisms that enable cells of the nervous system to develop, function in adulthood, change during learning and memory, and/or malfunction in disease states. Students can expect to learn core concepts in: Cell-cell communication; Intracellular signal transduction; Transcriptional and translational control; mRNA and protein trafficking; Membrane biophysics; and Cell motility. Dominant methods include molecular biology, genetics, cell biology, electrophysiology, and subcellular or multicellular imaging.

Courses offered this academic year that can fulfill this include:

- BIO 214 Advanced Cell Biology/BIOC 224 Advanced Cell Biology/MCP 221 Advanced Cell Biology
- BIO 254 Molecular and Cellular Neurobiology
- BIOS 200 Foundations in Experimental Biology
- GENE 221 Current Issues in Aging
- NBIO 254 Molecular and Cellular Neurobiology
- NBIO 258 Information and Signaling Mechanisms in Neurons and Circuits
- PSYCH 204B Computational Neuroimaging: Methods & Analyses

Courses offered in previous years that fulfilled this requirement include:

- MCP 216 Genetic Analysis of Behavior (NBIO 216)
- NBIO 216 Genetic Analysis of Behavior (MCP 216)
- BIO 217
- COMPMED 215 Synaptic Properties and Neuronal Circuits

- MCP 256 How Cells Work: Energetics, Compartments, and Coupling in Cell Biology/MCP 156 How Cells Work: Energetics, Compartments, and Coupling in Cell Biology
- NBIO 218 Neural Basis of Behavior
- NBIO 220 Central Mechanisms in Vision-based Cognition

3. Translational Neuroscience. Courses in this area address fundamental concepts in studying disorders of the human brain and the peripheral nervous system and their treatment. Students can expect to learn about basic themes in: Pathophysiological mechanisms; Modeling of human diseases; Approaches to designing diagnoses and treatments; Implementing diagnoses and treatments. The courses highlight studies of human diseases that use genetics, molecular biology, psychological testing, and functional imaging.

Courses offered this academic year that can fulfill this include:

- BIO 267 Molecular Mechanisms of Neurodegenerative Disease / NENS 267 Molecular Mechanisms of Neurodegenerative Disease
- GENE 210 Genomics and Personalized Medicine / DBIO 220 Genomics and Personalized Medicine

Courses offered in previous years that fulfilled this requirement include:

- CSB 278 Systems Biology
- IMMUNOL 285 Brain and the Immune System
- NENS 205 Neurobiology of Disease Seminar

The previously-approved courses from outside the Neuroscience core listed below can satisfy the remaining elective requirements:

- BIO 217
- BIO 222 Exploring Neural Circuits
- BIO 230 Molecular and Cellular Immunology
- BIO 245 Ecology and Evolution of Animal Behavior
- BIO 258 Developmental Neurobiology
- BIOC 224 Advanced Cell Biology/BIO 214 Advanced Cell Biology/MCP 221 Advanced Cell Biology
- BIOE 291 Principles and Practice of Optogenetics for Optical Control of Biological Tissues
- BIOE 332
- BIOS 200 Foundations in Experimental Biology
- BIOS 210 Axonal Transport and Neurodegenerative Diseases
- BIOS 241 Dissecting algorithms for RNA Sequencing
- COMPMED 207 Comparative Brain Evolution
- COMPMED 215 Synaptic Properties and Neuronal Circuits
- CS 221 Artificial Intelligence: Principles and Techniques
- CS 229 Machine Learning
- CSB 210 Cell Signaling
- DBIO 201 Cells and Signaling in Regenerative Medicine.
- DBIO 210 Developmental Biology
- EE 263 Introduction to Linear Dynamical Systems/CME 263 Introduction to Linear Dynamical Systems
- MCP 221 Advanced Cell Biology/BIO 214 Advanced Cell Biology/BIOC 224 Advanced Cell Biology
- MCP 222 Imaging: Biological Light Microscopy

- NENS 267 Molecular Mechanisms of Neurodegenerative Disease/BIO 267 Molecular Mechanisms of Neurodegenerative Disease
- PSYCH 204 Computation and cognition: the probabilistic approach
- RAD 227 Functional MRI Methods/BIOPHYS 227 Functional MRI Methods

The previously-approved courses from outside the Neuroscience core listed below satisfied the remaining elective requirements:

- BIO 222 Exploring Neural Circuits
- CS 379 Interdisciplinary Topics
- IMMUNOL 285 Brain and the Immune System
- MUSIC 257 Neuroplasticity and Musical Gaming
- NENS 204 Stroke Seminar

Other courses not listed here can satisfy program requirements with prior approval of the Program Director.

The School of Law and the Neurosciences IDP offer a joint program leading to a J.D. degree combined with a Ph.D. in Neurosciences. The joint degree program provides an opportunity for students to develop expertise in both fields, and, in some cases, to prepare themselves intensively for careers in areas relating to both neuroscience and law.

Students interested in the joint degree program must apply and gain entrance separately to the School of Law and the Neurosciences IDP and, as an additional step, must secure permission from both academic units to pursue degrees in those units as part of a joint degree program. Interest in either joint degree program should be noted on the student's admission applications and may be considered by the admission committee of each program. Alternatively, an enrolled student in either the Law School or the Neurosciences IDP may apply for admission to the other program and for joint degree status in both academic units after commencing study in either program.

Joint degree students may elect to begin their course of study in either the School of Law or the Neurosciences IDP. Faculty advisers from each academic unit will participate in the planning and supervising of the student's joint program. Students must be enrolled full time in the Law School for the first year of law school and must be enrolled full time in the Neurosciences IDP for the first two years of that program, or until the student has passed the Qualifying Exam. At all other times, enrollment may be in the School of Medicine or the Law School, and students may choose courses from either program regardless of where enrolled. Students must satisfy the requirements for both the J.D. and the Ph.D. degrees as specified in the *Stanford Bulletin* or elsewhere.

The Law School shall approve courses from the Neurosciences IDP that may count toward the J.D. degree, and the Neurosciences IDP shall approve courses from the Law School that may count toward the Ph.D. degree in Neurosciences. In either case, approval may consist of a list applicable to all joint degree students or may be tailored to each individual student's program. The total minimum number of university residency units required for both degrees is 190. No more than 54 units of approved courses may be counted toward both degrees.

Director: Anthony J. Ricci (Edward C. and Amy H. Sewall Professor in the School of Medicine and, Professor, by courtesy, of Molecular and Cellular Physiology)

Anesthesia: Bruce MacIver, Gregory Scherrer

Applied Physics: Surya Ganguli

Biochemistry: Suzanne Pfeffer

Bioengineering: Kwabena Boahen, Karl Deisseroth

Biology: Xiaoke Chen, Russ Fernald, H. Craig Heller, Liqun Luo, Susan McConnell, Mark Schnitzer, Carla Shatz, Kang Shen, Marc Tessier-Lavigne

Chemical and Systems Biology: Joanna Wysocka

Comparative Medicine: Paul Buckmaster, Shaul Hestrin

Developmental Biology: Seung Kim

Education: Candace Thille

Electrical Engineering: Krishna Shenoy

Genetics: Michael Bassik, Anne Brunet, Aaron Gitler

Medicine-Hematology: Steven Artandi

Molecular and Cellular Physiology: Axel Brunger, Miriam Goodman, Richard Lewis, Daniel Madison, Merritt Maduke, Thomas Sudhof

Neurobiology: Stephen Baccus, Ben Barres, Thomas Clandinin, Shaul Druckmann, Lisa Giocomo, Keren Haroush, Michael Lin, Tirin Moore, William Newsome, Jennifer Raymond

Neurology and Neurological Sciences: Katrin Andreasson, Marion Buckwalter, Michael Greicius, Ting-Ting Huang, John Huguenard, Michelle Monje-Deisseroth, Josef Parvizi, David Prince, Thomas Rando, Richard Reimer, Tony Wyss-Coray, Yanmin Yang

Neurosurgery: E.J. Chichilnisky, Jun Ding, Julia Kaltschmidt, Paul Nuyujukian, Theo Palmer, Giles Plant, Ivan Soltesz, Gary Steinberg, Suzanne Tharin, Xinnan Wang, Bradley Zuchero

Ophthalmology: Jeffrey Goldberg, Yang Hu, Y. Joyce Liao, Sui Wang

Otolaryngology: Alan Cheng, Nicolas Grillet, Lloyd Minor, Anthony Ricci

Pathology: Isabella Graef, Bingwei Lu, Marius Wernig

Pediatrics (Systems Medicine): Dennis Wall

Psychiatry: Nirao Shah

Psychiatry and Behavioral Sciences: Lu Chen, Luis de Lecea, Amit Etkin, Robert Malenka, Vinod Menon, Karen Parker, Sergiu Pasca, Allan Reiss, Lea Williams

Psychology: Justin Gardner, Ian Gotlib, Kalanit Grill-Spector, Brian Knutson, James McClelland, Anthony Norcia, Russell Poldrack, Anthony Wagner, Brian Wandell, Daniel Yamins

Radiology: Raag Airan, Jennifer McNab

# OBSTETRICS AND GYNECOLOGY

Courses offered by the Department of Obstetrics and Gynecology are listed under the subject code OBGYN on the Stanford Bulletin's ExploreCourses web site.

The Department of Obstetrics and Gynecology does not offer degrees; however, qualified medical, graduate, or undergraduate students with an interest in basic research in reproductive biology may apply to arrange individual projects under the supervision of the faculty. The focus for the Division of Reproductive, Stem Cell and Perinatal Biology is the study of the molecular and cellular biology of male and female reproductive organs.

*Chair:* Leslee L. Subak, M.D., Professor

*Vice Chair:* Maurice L. Druzin, M.D., Professor

## Division of Gynecology

Paul Blumenthal, M.D., M.P.H., Professor – Director

Paula Hillard, M.D., Professor, Associate Chair of Pediatric Gynecology

Deirdre Lum, M.D., Clinical Assistant Professor

Kate Shaw, M.D., Clinical Assistant Professor

Linh Tran-Ito, M.D., Clinical Assistant Professor

Navdeesh Reiners, M.D., Clinical Assistant Professor

John Wachtel, M.D., Clinical Instructor

Michelle Solone, M.D., Clinical Instructor

Leah Millheiser, M.D., Clinical Assistant Professor

## Division of Family Planning

Paul Blumenthal, M.D., M.P.H., Professor, Director

Kate Shaw, M.D., Clinical Associate Professor - Assistant Director of Family Planning and Director of Ryan Residency

Fred Hopkins, M.D., M.P.H., Clinical Associate Professor

Michele Hugin, M.D., Clinical Associate Professor

Amy Voedisch, M.D., Clinical Assistant Professor

Jennifer Conti, M.D., Clinical Associate Professor

Lisa Goldthwaite, M.D., Clinical Assistant Professor, Director of Ryan Residency Training Program in Family Planning

Wing Kay Fok, M.D., Clinical Instructor

Erica Cahill, M.D., Clinical Instructor

## Division of Gynecologic Oncology

Oliver Dorigo, M.D., Ph.D., Associate Professor; Director

Amer Karam, M.D. Clinical Associate Professor, Associate Director, Director of Outreach

Jonathan Berek, M.D., M.M.S., Professor

Nelson N.H. Teng, M.D., Ph.D., Associate Professor

Trung Nguyen, M.D., Clinical Assistant Professor

Valerie Sugiyama, M.D., Clinical Assistant Professor

Diana English, M.D., Clinical Assistant Professor

Erin Rankin, Ph.D., Assistant Professor

Wendy Fantl, Ph.D., Assistant Professor

## Division of Reproductive Endocrinology and Infertility

Valerie Baker, M.D., Professor; Director

Barry Behr, Ph.D., H.C.L.D., Professor (non-clinical)

Amin Milki, M.D., Professor

Lynn Westphal, M.D., Professor, Director, REI Fellowship

Ruth Lathi, M.D., Associate Professor, Director, Clinical Operations

Steven Nakajima, M.D., Clinical Professor

## Division of Female Pelvic Medicine & Reconstructive Surgery/Urogynecology

Bertha Chen, M.D., Professor; Chief

Eric Sokol, M.D., Associate Professor; Co-Director of FPMRS Fellowship

Lisa Rogo-Gupta, M.D., Clinical Assistant Professor, Director of Ambulatory Gyn, Director of Visiting Clerkship

## Division of Maternal-Fetal Medicine

Yasser El-Sayed, M.D., Professor; Director

Maurice Druzin, M.D., Professor

Deirdre Lyell, M.D., Professor

Yair Blumenfeld, M.D., Associate Professor

Jane Chueh, M.D., Clinical Professor

Mark Boddy, M.D., Clinical Associate Professor

Martha Rode, M.D., Clinical Associate Professor

Amen Ness, M.D., Clinical Professor

Natali Aziz, M.D., Clinical Associate Professor

Katherine Bianco, M.D., Clinical Assistant Professor

Ronald Gibbs, M.D., Clinical Professor

## Division of General Obstetrics

Yasser El-Sayed, M.D., Professor; Director

Kay Daniels, M.D., Clinical Professor

Jeffrey Faig, M.D., Clinical Professor

Laura Brodzinsky, M.D., Clinical Associate Professor

Kimberly Harney, M.D., Clinical Associate Professor – (Co-clerkship director)

Caroline Bowker, M.D., Clinical Associate Professor

Susan Crowe, M.D., Clinical Associate Professor



Cynthia DeTata, M.D., Clinical Assistant Professor – (Co-clerkship director)

Sylvie Blumstein, M.D., Clinical Assistant Professor

**Division of Reproductive, Stem Cell and Perinatal Biology (Research)**

Virginia Winn, M.D., Ph.D., Associate Professor; Director

Aaron J. Hsueh, Ph.D., Professor

Vittorio Sebastiano, Ph.D., Assistant Professor

# PATHOLOGY

Courses offered by the Department of Pathology are listed under the subject code PATH on the Stanford Bulletin's ExploreCourses web site.

## Programs of Study in Pathology

The Department of Pathology offers advanced courses in aspects of pathology. The department does not offer advanced degrees in pathology, but qualified graduate students who are admitted to department-based or interdepartmental graduate programs may elect to pursue their thesis requirements in the department's research laboratories. The discipline of pathology has served as a bridge between the preclinical and clinical sciences and is focused on the application of advances in the basic biological sciences, both to the diagnosis of human disease and the elucidation of the mechanisms of normal molecular, cellular, and organ structure and function that manifest themselves in clinical disease. Accordingly, the department's research interests extend from fundamental molecular biology to clinical-pathological correlations, with an emphasis on experimental oncology.

Investigation in the department includes basic studies in areas using molecular biological, biochemical, and genetic cell biological techniques: DNA replication in yeast and cultured eukaryotic cells, cell cycle control in animal cells and yeast, identification and pathogenetic role of chromosomal aberrations in human malignancies and mechanisms of activation of oncogenes in human and animal cells, lymphocyte and neutrophil-interactions with endothelial cells, cell type specification and signal transduction pathways leading to specific gene expression or modulation of cytoskeletal behavior; cytoskeletal architecture, cell-matrix interaction, developmental biology of hematopoietic stem cells and thymus, regulation of the immune system, mechanisms of immune and other responses in the central nervous system, and neuro-degenerative diseases. Various studies focus on the development of novel diagnostic and immunotherapeutic treatment modalities and techniques for solid tumors, lymphomas, HIV, and genetic diseases. Research training in all of these areas is available for qualified medical and graduate students by individual arrangement with the appropriate faculty member.

A summary of the research interests of the department faculty is available at Sanford's School of Medicine (<http://pathology.stanford.edu>) web site.

*Emeriti: (Professor)* Ellen Jo Baron, Susan Galel, Sharon Geaghan, Michael Hendrickson, Richard L. Kempson, Jon Kosek, Roger Warnke

*Chair:* Stephen J. Galli

*Professors:* Daniel Arber, Jeffrey D. Axelrod, Gerald J. Berry, Matt Bogyo, Eugene C. Butcher, Athena Cherry, Michael L. Cleary, Gerald R. Crabtree, Edgar G. Engleman, Dean Felsher, Marcelo Fernandez-Vina, Andrew Fire, Steven Foung, Stephen J. Galli, Lawrence Tim Goodnough, John Higgins, Neeraja Kambham, Christina Kong, Teri Longacre, Joseph S. Lipsick, Bingwei Lu, Sara Michie, Yasodha Natkunam, Donald P. Regula, Robert V. Rouse, Kang Shen, Iris Schrijver, Hua Shan, Richard K. Sibley, Raymond Sobel, Dolly Tyan, Matt van de Rijn, Hannes Vogel, Irving L. Weissman, Eduardo Zambano, James Zehnder

*Associate Professors:* Kim Allison, Jeffrey D. Axelrod, Matt Bogyo, Niaz Banaie, Andrew Connolly, Tina Cowan, Jonathan R. Pollack, Arend Sidow, Marius Wernig, Robert West

*Assistant Professors:* Sean Bendall, Scott Boyd, Ann Folkins, Isabella Graef, Dita Gratzinger, F. Kim Hazard, Kristin Jensen, Chia-Sui Kao, Jinah Kim, Jason Merker, Stephen Montgomery, Robert Ohgami, Benjamin Pinsky, Ed Plowey, Erich Schwartz, Gerlinde Wernig, Monte Winslow, Ellen Yeh

*Courtesy Professors:* Donna Bouley, John Day, Bertil Glader

*Courtesy Associate Professor:* Euan Ashley, Robert Shafer

*Courtesy Assistant Professor:* Michaela Liedtke, Michelle Monje-Deisseroth

*Clinician Educators:* Jennifer Andrews, Raffick Bowen, Susan Atwater, David Bingham, Brittany Holmes, Christian Kunder, Steven Long, Melanie Manning, Roberto Novoa, David Oh, Tho Pham, Kerri Rieger, Matthew Rumery, Darren Salmi, Neil Shah, Run Shi, Carlos Suarez, Brent Tan, Eric Yang

*Instructors:* Mike Angelo, Joseph Hernandez, Marisa Juntilla, Franklin Mullins, Justin Odegaard, Riccardo Sibiliano, Albert Tsai, Kitchener Wilson

*Adjunct Clinical Faculty:* Swaroop Aradhya, Robert Archibald, Jerome S. Burke, Glenn Cockerham, Seth Haber, Maie K. Herrick, Paul W. Herrmann, Michelle Jorden, Charles Lombard, Robert Luo, Gregory Moes, Joseph O'Hara, William Rueh, Matrina Schmidt, Thomas W. Rogers

*Clinical Educators (Affiliated):* Melissa Clark, Dean Fong, Barbara Egbert

# PHYSICIAN ASSISTANT STUDIES

Courses offered by the Master of Science in Physician Assistant Studies program are listed under the subject code PAS (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=PAS&filter-departmentcode-PAS=on&filter-coursestatus-Active=on>) on the Stanford Bulletin's Explore Courses web site.

The Master of Science (M.S.) in Physician Assistant Studies program is a 30-month program (with one summer break) that includes streamlined courses with innovative content delivery, a state-of-the-art simulation lab, and world-class clinical anatomy experiences as well as early exposure to patient care. Students receive mentorship and support in their academic and research focus areas by clinically practicing Stanford PAs. During the didactic work, PA students are located at the School of Medicine and enroll as a cohort in a clinically focused curriculum. A substantial portion of their courses are integrated with medical students, allowing for an invaluable interprofessional education experience. During their clerkship year, students rotate through Stanford-affiliated hospitals and ambulatory practices as well as select sites throughout California. In an innovative approach to PA education that encourages the next generation of PA leaders, students are required to select one area of scholarly concentration and complete a capstone project. The areas of scholarly concentration include:

- Community Health
- Health Services and Policy Research
- Clinical Research
- Medical Education.

Upon completion of this 30-month program, students are prepared to sit for the Physician Assistant National Certification Examination (PANCE).

The Master of Science in Physician Assistant Studies program is open to external as well as internal applicants. Advanced placement and coterminal degrees for Stanford University undergraduates are not available at this time. Individuals who wish to apply to the program should do so via the Central Application Service for Physician Assistants (CASPA) (<https://caspa.liasoncas.com>). The application window typically opens at the end of April and closes on September 1.

The University requirements for the M.S. degree are described in the "Graduate Degrees (p. 50)" section of this bulletin.

## Master of Science in Physician Assistant Studies

The Master of Science (M.S.) in Physician Assistant (PA) Studies program is for individuals who wish to pursue a career as a PA. The program is available to external and internal candidates. Advanced placement and coterminal degrees for Stanford University undergraduates are not available at this time.

The first five quarters of the 30-month program involve acquiring fundamental medical knowledge through course work in clinical anatomy, the basic sciences, pharmacology, and pathophysiology and disease management, as well as attaining core skills in medical interviewing and the physical examination. The last four quarters of the program are dedicated to experiential learning through clinical rotations in inpatient and outpatient medicine, pediatrics, women's health, emergency medicine, surgery, and behavioral medicine, as well as elective rotations.

## Admission

- Applicants must have received an undergraduate degree from a regionally accredited U.S. college or university by July 15 of the year of matriculation; no specific discipline or major is prescribed.
- Prior healthcare experience (> 500 hours) through either prior employment and/or volunteer work is strongly recommended.
- The Graduate Record Examination (GRE) is required. Note that GRE scores are only valid for five years and must be current at the time of application.
- Candidates are required to submit a personal statement of no more than 5,000 characters and three letters of reference as part of the application process via CASPA (<https://caspa.liasoncas.com>).
- Candidates are also required to answer four questions in CASPA (<https://caspa.liasoncas.com>) specifically designed for the Stanford School of Medicine M.S. in PA Studies program. The questions relate to future PA practice, leadership potential, area of scholarly interest, and contributions to diversity.

It is strongly recommended that students complete the following coursework prior to applying to the program:

- Anatomy
- Physiology
- Chemistry
- General Statistics or Biostatistics
- Psychology
- Three upper-division science courses (e.g., in cell biology, genetics, or microbiology) are recommended before matriculation.

## Degree Requirements

All students in the program must complete the Master of Science in PA Studies program core curriculum (160 units) and additional work in an area of scholarly interest (6 units).

Upon completion of the didactic coursework (5 quarters), students begin 12 months of clinical clerkship within the Stanford Healthcare Community and in other select clinical sites.

Students choose an area of scholarly concentration which include:

- Community Health
- Health Services and Policy Research
- Clinical Research
- Medical Education

All students must complete a capstone project in their area of scholarly interest.

## Leadership

*Associate Dean for PA Education and Program Director:* Susan Fernandes  
*Associate Program Director:* Rhonda Larsen  
*Medical Director:* Andrew Nevins  
*Associate Medical Director:* Ian Nelligan

## Core Faculty

*Director of Pre-Clerkship Education:* Nicole Burwell  
*Director of Clerkship Education:* Andrew Chastain  
*Early Clinical Experience Coordinator:* Lucinda Hirahoka

## Educators for Care PA (E4C-PA) Faculty

Chad Anderson  
 Camille Bloom

Jennifer Hunter  
Courtney Nelson  
Kendra Patton  
Adam Seligman

# RADIATION ONCOLOGY

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Courses offered by the Department of Radiation Oncology are listed under the subject code RADO on the Stanford Bulletin's ExploreCourses web site.

Radiation Oncology focuses on the use of radiation for cancer therapy and research. The department does not offer degrees; however, its faculty teach courses open to medical students, graduate students, and undergraduates. The department also accepts students in other curricula as advisees for study and research. Graduate students in Biophysics and Cancer Biology may perform their thesis research in the department. Undergraduates may arrange individual research projects under supervision of faculty.

At the present time, the major areas of basic research investigation in the department include: DNA repair in mammalian cells after ionizing irradiation; studies of the mechanism of tumor hypoxia in animal tumors; development of new anti-cancer drugs to exploit tumor hypoxia; cytogenetic and molecular methods of predicting the sensitivity of individual tumors to cancer therapy; radiolabeled monoclonal antibodies for cancer detection and treatment; studies of oxygen levels in human tumors using polarographic electrodes; clinical trials of a new hypoxic cytotoxic agent (tirapazamine); studies of the late effects of cancer therapy; and techniques of conformal and intensity modulated radiation therapy.

## Faculty

*Emeriti:* Malcolm A. Bagshaw, Peter Fessenden, Don R. Goffinet, George M. Hahn, Kendric Smith

*Chair:* Richard T. Hoppe

*Professors:* J. Martin Brown, Sarah S. Donaldson, Amato J. Giaccia, Steven L. Hancock, Richard T. Hoppe, Quynh-Thu Le, Daniel S. Kapp, Steven A. Liebel

*Associate Professors:* Iris C. Gibbs, Paul Keall, Christopher R. King, Susan J. Knox, Gary Luxton, Lei Xing

*Assistant Professors:* Laura Attardi, Daniel Chang, Nicholas Denko, Edward Graves, Albert C. Koong

*Consulting Professor:* Robert M. Sutherland

# RADIOLOGY

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Web Site: <http://www-radiology.stanford.edu>

Courses offered by the Department of Radiology are listed under the subject code RAD on the Stanford Bulletin's ExploreCourses web site.

The Department of Radiology does not offer degrees. However, its faculty teach courses open to medical students, graduate students, and undergraduates. The department also accepts students in other curricula as advisees for study and research. Undergraduates may also arrange individual research projects under the supervision of the department's faculty. This discipline focuses on the use of radiation, ultrasound, and magnetic resonance as diagnostic, therapeutic, and research tools. The fundamental and applied research within the department reflects this broad spectrum as it relates to anatomy, pathology, physiology, and interventional procedures. Original research and development of new clinical applications in medical imaging is supported within the Radiological Sciences Laboratory.

## Faculty

*Emeriti: (Professors)* Herbert L. Abrams, Ronald Castellino, Barton Lane, Gerald Friedland, David A. Goodwin, Michael L. Goris, Henry H. Jones, William Marshall, I. Ross McDougall, Robert E. Mindelzun, Matilde Nino-Murcia, William H. Northway, Bruce R. Parker, Lewis Wexler, Leslie M. Zatz

*Chair:* Sanjiv Sam Gambhir

*Professors:* Patgrick Barnes, Richard A. Barth, Christopher F. Beaulieu, Bruce Daniel, Huy M. Do, Michael Federle, Nancy Fischbein, Dominik Fleischmann, Sanjiv Sam Gambhir, Gabriela Gayer, Gary H. Glover, Garry E. Gold, Robert J. Herfkens, Lawrence Hofmann, Dave Hovsepian, Debra M. Ikeda, R. Brooke Jeffrey, Peter Kane, Ralph Lachman, Barton Lane, Ann Leung, Craig Levin, Michael Marks, Tarik Massoud, Michael Moseley, Peter Moskowitz, Sandy Napel, Beverley Newman, Norbert J. Pelc, Allan Reiss, Brian Rutt, George Segall, F. Graham Sommer, Daniel Spielman, Daniel Y. Sze, Volney Van Dalsem, Joseph Wu

*Professor (Research):* R. Kim Butts-Pauly, Sylvia Plevritis

*Associate Professors:* Sandip Biswal, Francis Blankenberg, Frandics P. Chan, Terry Desser, Andrei H. Iagaru, Nishita Kothary, William Kuo, David Larson, John Louie, Eric W. Olcott, Sunita Pal, Andrew Quon, Geoffrey Riley, Erika Rubesova, Kathryn J. Stevens, Shreyas Vasanaawala, Juergen Willmann, Dorcas Yao, Greg Zaharchuk

*Associate Professors (Research):* Roland Bammer, Zhen Cheng, Heike Daldrup-Link, Rebecca Fahrig, Brian Hargreaves, Sylvia Plevritis, Jianghong Rao

*Assistant Professors:* Robert Dodd, Pejman Ghanouni, Howard Harvin, Gloria Hwang, Aya Kamaya, Sirisha Komakula, Jafi Lipson, Amelie Lutz, Payam Massaband, Erik Mittra, Zina Payman, Peter Poulos, Jianghong Rao, Daniel Rubin, Lisa Schmelzel, Rajesh Shah, Lewis Shin, Minal Vasanaawala, David Wang, Joseph Wu, Kristen Yeom, Michael Zeineh, Ashwini, Zenoos

*Assistant Professors (Research):* Frederick T. Chin, Parag Mallick, Jennifer McNab, David Paik, Ramasamy Paulmurugan, Sharon Pitteri

*Clinical Instructors:* Bao Do, H. Henry Guo, Stefan Hura, Linda Morimoto

# STEM CELL BIOLOGY AND REGENERATIVE MEDICINE

Courses offered by the Program in Stem Cell Biology and Regenerative Medicine are listed under the subject code STEMREM on the Stanford Bulletin's Explore Courses web site.

## Graduate Program in Stem Cell Biology and Regenerative Medicine

The Stanford Stem Cell Biology and Regenerative Medicine (SCBRM) program is dedicated to doctoral education that translates basic science to clinical applications, typically referred to as Translational Science, and of intense interest internationally in medical schools and universities. Our doctoral program provides exceptional didactic education and research experience in the basic sciences underlying stem cell biology. In addition, program participants will receive specialized training in the development and clinical application of discoveries in the basic sciences to achieve regenerative therapies. Thus, our graduates will be uniquely positioned to develop successful translational careers in Stem Cell Biology and Regenerative Medicine, and will emerge prepared to deliver on their passion to improve the human condition. The core curriculum is combined with unique research and clinical/professional immersion rotations to provide opportunities for doctoral students to specialize in the broad subject of translational medicine and yet focus specifically on fundamentals of SCBRM. The curriculum combines education in genetics and developmental biology with an introductory laboratory-based stem cell course, an advanced course in stem cell biology and regenerative medicine, and a clinical rotation with alternative opportunities in law, business and/or engineering.

The mission of the SCBRM graduate program is to produce future leaders in translational science through a combination of basic science and clinical/professional immersion. The program aims to be innovative and to change the landscape for graduate education in the biomedical sciences by having the immersion tailored to each student's translational goals. The program accommodates students who wish to focus primarily at the basic science level alongside those who wish to focus specifically on innovation such as a new device to solve a clinical problem. In the former case, the student might seek out a primary mentor affiliated with the basic sciences and take electives that reflect the more basic interest. In the latter case, the student might select an elective with an engineering focus and seek out primary mentorship with a more clinically or engineering focused mentor. In this way, graduates from our doctoral program receive exceptional didactic education and research experience and are well positioned to develop successful translational careers in SCBRM by applying their knowledge and passion to improve human health.

## Master of Science in Stem Cell Biology and Regenerative Medicine

University requirements for the M.S. degree are described in the "Graduate Degree (p. 50)s" section of this bulletin.

Students in the Ph.D. program in SCBRM may apply for an M.S. degree in SCBRM, assuming completion of appropriate requirements. The program does not accept applications for a standalone M.S. degree.

To receive an M.S. in Stem Cell Biology and Regenerative Medicine, Students must complete the following:

1. Four full-tuition quarters of residency as a graduate student at Stanford.

2. At least 45 units of academic work, all of which must be in courses at or above the 100 level, 16 units of which must be at or above the 200 level.
3. Four quarters of graduate research, consisting of rotations in the labs of at least three SCBRM faculty members.
4. Course work in Stem Cell Biology and Regenerative Medicine as well as other core requirements:
  - a. STEMREM 200 Stem Cell Intensive hands-on immersion to learn basic methods of tissue culture, mouse embryo fibroblast (MEF) preparation, embryonic stem and induced pluripotent stem (ES/iPS) cell culture, differentiation, DNA isolation, polymerase chain reaction (PCR), sequencing, and basic microscopy.
  - b. BIOS 200 Foundations in Experimental Biology focuses on the broad themes of Evolution, Energy and Information.
  - c. STEMREM 201A Stem Cells and Human Development: From Embryo to Cell Lineage Determination and STEMREM 201B Stem Cells and Human Development Laboratory develop a fundamental understanding of introductory stem cell principles in human development, aging, and disease accompanied by a laboratory-based module with immersion in stem cell-based methods (embryology, embryonic stem cells, reprogramming, adult stem cells).
  - d. STEMREM 202 Stem Cells and Translational Medicine, advanced topics related to individual organ systems, cancer stem cells, translational principles of medicine and immunology as related to regenerative medicine, as well as bioengineering and bioinformatics as related to stem cell biology.
  - e. STEMREM 203 Stem Cells Immersion: Applications in Medicine, Business and Law, students specialize and choose a clinical immersion, rotation in a biotechnology company or venture firm, or further delve into cutting edge technologies, bioinformatics, materials and/or engineering approaches for stem cell applications in industry, diagnostics and medicine.
  - f. STEMREM 250 Regenerative Medicine Seminar Series, a forum for researchers to meet and discuss Stem Cell Biology and Regenerative Medicine and to spark collaborations. 6 units of this course is required.
  - g. STEMREM 280 Stem Cell Biology and Regenerative Medicine Journal Club, review and discussion of current literature in both basic and translational medicine as it relates to stem cell biology and/or regenerative medicine.

STEMREM 200	Stem Cell Intensive	1
BIOS 200	Foundations in Experimental Biology	6
STEMREM 201A	Stem Cells and Human Development: From Embryo to Cell Lineage Determination	1-2
STEMREM 201B	Stem Cells and Human Development Laboratory	3
STEMREM 202	Stem Cells and Translational Medicine	3-5
STEMREM 203	Stem Cells Immersion: Applications in Medicine, Business and Law	3
STEMREM 250	Regenerative Medicine Seminar Series	1
STEMREM 280	Stem Cell Biology and Regenerative Medicine Journal Club	2
BIOC 224/ BIO 214/ MCP 221	Advanced Cell Biology	4
GENE 205	Advanced Genetics	3
MED 255	The Responsible Conduct of Research	1
DBIO 210	Developmental Biology	4
STEMREM 399	Graduate Research	1-18
Total Units		33-53

Units

- h. Students are also required to take 2 electives, totaling a minimum of 6 units.
  - i. Biochemistry proficiency is required by the end of the second year, as well as a total of 80 units and completed qualifying examinations. Students who do not pass the qualifying examination may retake a full qualifying exam, be retested in a few areas, or be asked to redo their presentation.
5. Participation and attendance at the annual SCBRM Retreat.
  6. The qualifying examination process in SCBRM before admission to Ph.D. candidacy has two parts:
    - Part I: a comprehensive written exam in the form of a 5-page NIH grant proposal
    - Part II: a 15-minute oral presentation of the proposal to the thesis committee followed by open questions from the qualifying exam committee on the proposal or encompassing areas of research/academic scholarship that are deemed relevant to the proposal.

Students who do not pass the qualifying exam may retake the full qualifying exam, be retested in a sub-area, or be asked to redo their presentation. Those students who fail the qualifying exam twice may be awarded a master's degree based on completion of course work and rotations. In addition, students who choose to voluntarily leave the program are also awarded a master's degree based on completion of the qualifying exam.

## Doctor of Philosophy in Stem Cell Biology and Regenerative Medicine

University requirements for the Ph.D. are discussed in the "Graduate Degrees (p. 50)" section of this bulletin.

The Stem Cell Biology and Regenerative Medicine curriculum, combined with the research and rotation opportunities, provides a flexible educational opportunity for doctoral students to specialize in the broad subject of translational medicine while being focused more specifically on the fundamentals of Stem Cell Biology and Regenerative Medicine while training in the laboratories of participating SCBRM faculty. The goal of the SCBRM program is to provide an avenue for graduate education to translate the best of basic research into a clinical setting.

### Application and Admission

Applications are made through the Graduate Admissions (<http://gradadmissions.stanford.edu>) web site.

Applicants will be assessed based on their undergraduate transcripts, test scores, research experience, statement of purpose and letters of recommendation that document exceptional potential, ability, or achievements.

Students admitted to the program are offered financial support covering tuition, a living stipend, and insurance coverage. Applicants are urged to apply for independent fellowships such as from the National Science Foundation. Fellowship applications are due in November of the year prior to matriculation in the graduate program, but SCBRM graduate students may continue to apply for outside fellowships after matriculation. Because of the small number of department-funded slots, students who have been awarded an outside fellowship have an improved chance of acceptance into the program. Upon matriculation, each student is assisted in selecting courses and lab rotations in the first year and in choosing a lab for the dissertation research. Once a dissertation adviser has been selected, a dissertation committee is composed to include the dissertation adviser and two additional SCBRM faculty, to guide the student during their dissertation research. The student must meet with the dissertation committee at least once a year.

## Degree Requirements

Candidates for Ph.D. degrees at Stanford must satisfactorily complete a program of study that includes 135 units of graduate course work and research.

Requirements for the Ph.D. degree in SCBRM include:

1. Completion of at least 3 research rotations in the labs of SCBRM faculty members.
2. Completion of the following courses:
  - a. STEMREM 200 Stem Cell Intensive hands-on immersion to learn basic methods of tissue culture, mouse embryo fibroblast (MEF) preparation, embryonic stem and induced pluripotent stem (ES/iPS) cell culture, differentiation, DNA isolation, polymerase chain reaction (PCR), sequencing, and basic microscopy.
  - b. BIOS 200 Foundations in Experimental Biology focuses on the broad themes of Evolution, Energy and Information.
  - c. STEMREM 201A Stem Cells and Human Development: From Embryo to Cell Lineage Determination and STEMREM 201B Stem Cells and Human Development Laboratory develop a fundamental understanding of introductory stem cell principles in human development, aging, and disease accompanied by a laboratory-based module with immersion in stem cell-based methods (embryology, embryonic stem cells, reprogramming, adult stem cells).
  - d. STEMREM 202 Stem Cells and Translational Medicine advanced topics related to individual organ systems, cancer stem cells, translational principles of medicine and immunology as related to regenerative medicine, as well as bioengineering and bioinformatics as related to stem cell biology.
  - e. STEMREM 203 Stem Cells Immersion: Applications in Medicine, Business and Law students specialize and choose a clinical immersion, rotation in a biotechnology company or venture firm, or further delve into cutting edge technologies, bioinformatics, materials and/or engineering approaches for stem cell applications in industry, diagnostics and medicine.
  - f. STEMREM 250 Regenerative Medicine Seminar Series a forum for researchers to meet and discuss Stem Cell Biology and Regenerative Medicine and to spark collaborations. 6 units of this course is required.
  - g. STEMREM 280 Stem Cell Biology and Regenerative Medicine Journal Club review and discussion of current literature in both basic and translational medicine as it relates to stem cell biology and/or regenerative medicine.
3. Students have the option to select from the following courses in the first year:

		Units
STEMREM 200	Stem Cell Intensive	1
BIOS 200	Foundations in Experimental Biology (Offered in Autumn and Spring)	6
STEMREM 201A	Stem Cells and Human Development: From Embryo to Cell Lineage Determination	1-2
STEMREM 201B	Stem Cells and Human Development Laboratory	3
STEMREM 202	Stem Cells and Translational Medicine	3-5
STEMREM 203	Stem Cells Immersion: Applications in Medicine, Business and Law	3
STEMREM 250	Regenerative Medicine Seminar Series	1
STEMREM 280	Stem Cell Biology and Regenerative Medicine Journal Club	2
BIOC 224/ BIO 214/ MCP 221	Advanced Cell Biology	4
GENE 205	Advanced Genetics	3
MED 255	The Responsible Conduct of Research	1



DBIO 210	Developmental Biology	4
STEMREM 399	Graduate Research	1-18
Total Units		33-53

4. Students are also required to take 2 electives, totaling a minimum of 6 units.
5. Biochemistry proficiency is required by the end of the second year, as well as a total of 80 units and completed qualifying examinations. Students who do not pass the qualifying examination may retake a full qualifying exam, be retested in a few areas, or be asked to redo their presentation.
6. STEMREM 802 TGR Dissertation.

Students unable to meet Ph.D. milestones after remediation are offered a M.S. degree if they have completed all requirements.

*Program Director:* Theo D. Palmer

*Program Co-Director:* Vittorio Sebastiano

*Teaching Faculty:*

- Arash A. Alizadeh (Assistant Professor, Medicine/Oncology and Member of Bio-X, Child Health Research Institute and Stanford Cancer Institute)
- Philip A. Beachy (Professor, Institute for Stem Cell Biology and Regenerative Medicine, Department of Biochemistry and Developmental Biology and Member of Bio-X and Stanford Cancer Institute)
- Samuel Cheshier (Assistant Professor, Neurosurgery and (by courtesy) Neurology & Neurological Sciences and Member of Bio-X, Child Health Research Institute and Stanford Cancer Institute)
- Michael F. Clarke (Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Medicine/Oncology and Member of Bio-X and Stanford Cancer Institute)
- Tushar Desai (Assistant Professor, Medicine/Pulmonary & Critical Care Medicine and Member of Bio-X, Child Health Research Institute and Stanford Cancer Institute)
- Maximilian Diehn (Assistant Professor, Radiation Oncology/Radiation Therapy and Member of Bio-X and Stanford Cancer Institute)
- Margaret T. Fuller (Professor, Developmental Biology, Genetics and Obstetrics & Gynecology/Reproductive Biology and Member of Bio-X, Child Health Research Institute and Stanford Cancer Institute)
- Sarah C. Heilshorn (Associate Professor, Materials Science and Engineering and (by courtesy) Chemical Engineering and Member of Bio-X, Child Health Research Institute and Stanford Neurosciences Institute)
- Stefan Heller (Professor, Otolaryngology/Head and Neck Surgery and Member of Bio-X, Stanford Cancer Institute and Stanford Neurosciences Institute)
- Michael T. Longaker (Professor, Surgery/Plastic and Reconstructive Surgery, and (by courtesy) Bioengineering and Materials Science and Engineering and Member of Bio-X, Child Health Research Institute and Stanford Cancer Institute)
- Ravindra Majeti (Associate Professor, Medicine/Hematology and Member of Bio-X and Stanford Cancer Institute)
- Michelle Monje-Deisseroth (Assistant Professor, Neurology & Neurological Sciences and Member of Bio-X, Child Health Research Institute, Stanford Cancer Institute and Stanford Neurosciences Institute)
- Hiromitsu Nakauchi (Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Genetics and Member of Bio-X)
- Roeland Nusse (Professor, Developmental Biology and Member of Bio-X and Stanford Cancer Institute)
- Anthony Oro (Professor, Dermatology and Member of Bio-X, Child Health Research Institute and Stanford Cancer Institute)
- Theo D. Palmer (Associate Professor, Neurosurgery and Member of Bio-X, Child Health Research Institute, Stanford Cancer Institute and Stanford Neurosciences Institute)
- Sergiu Pasca (Assistant Professor, Psychiatry & Behavioral Sciences/Stanford Center for Sleep Sciences & Medicine and Member of Bio-X, Child Health Research Institute and Stanford Neurosciences Institute)
- Matthew Porteus (Associate Professor, Pediatrics/Stem Cell Transplantation and Member of Bio-X, Cardiovascular Institute, Child Health Research Institute and Stanford Cancer Institute)
- Maria Grazia Roncarolo (Professor, Pediatrics/Stem Cell Transplantation and Medicine/Blood & Marrow Transplantation and Member of Bio-X, Child Health Research Institute and Stanford Cancer Institute)
- Vittorio Sebastiano (Assistant Professor, Obstetrics & Gynecology/Reproductive Biology and Member of Bio-X and Child Health Research Institute)
- Judith Shizuru (Professor, Medicine/Blood & Marrow Transplantation and Member Stanford Cancer Institute)
- Irving L. Weissman (Professor, Institute for Stem Cell Biology and Regenerative Medicine, Department of Pathology and Developmental Biology and (by courtesy) Department of Biology and Member of Bio-X and Stanford Cancer Institute)
- Marius Wernig (Associate Professor, Institute for Stem Cell Biology and Regenerative Medicine and Department of Pathology and (by courtesy) Chemical & Systems Biology and Member of Bio-X, Child Health Research Institute, Stanford Cancer Institute and Stanford Neurosciences Institute)
- Joseph C. Wu (Professor, Medicine/Cardiovascular Medicine and Radiology and Director, Cardiovascular Institute and Member of Bio-X, Child Health Research Institute and Stanford Cancer Institute)
- Sean M. Wu (Associate Professor, Medicine/Cardiovascular Medicine and (by courtesy) Pediatrics and Member of Bio-X, Cardiovascular Institute and Child Health Research Institute)
- Joanna Wysocka (Professor, Chemical & Systems Biology and Developmental Biology and Member Bio-X and Stanford Cancer Institute)

# STRUCTURAL BIOLOGY

Courses offered by the Department of Structural Biology are listed under the subject code SBIO on the Stanford Bulletin's ExploreCourses web site.

The department offers course work and opportunities for research in structural biology.

The emphasis of research in the department is on understanding fundamental cellular processes in terms of the structure and function of biological macromolecules and their assemblies. Techniques used include standard methods of biochemistry, cell culture, single-molecule fluorescence spectroscopy, genetic engineering, and three dimensional structure determination by x-ray diffraction, nuclear magnetic resonance spectroscopy and electron microscopy, coupled with the development of computational methods.

## Doctor of Philosophy in Structural Biology

University requirements for the Ph.D. are described in the "Graduate Degrees (p. 50)" section of this bulletin.

The graduate program in Structural Biology leads to the Ph.D. degree. The department also participates in the Medical Scientists Training Program (MSTP) in which individuals are candidates for both Ph.D. and M.D. degrees.

The graduate program is intended to prepare students for careers as independent investigators in cell and molecular biology. The principal requirement of a Ph.D. degree is the completion of research constituting an original and significant contribution to the advancement of knowledge.

**The requirements and recommendations for applying to the Ph.D. program in the Department of Structural Biology include:**

		Units
CHEM 131	Organic Polyfunctional Compounds	3
CHEM 171	Physical Chemistry I	4
CHEM 173	Physical Chemistry II	3
CHEM 175	Physical Chemistry III	3
BIOC 200	Applied Biochemistry	2

**Ph.D. students in the Department of Structural Biology are required to complete all the following requirements:**

		Units
BIOS 200	Foundations in Experimental Biology	5
SBIO 241	Biological Macromolecules	3-5
or BIOE 300A	Molecular and Cellular Bioengineering	
SBIO 242	Methods in Molecular Biophysics (offered every other year)	3
BIOPHYS 250	Seminar in Biophysics	1
MED 255	The Responsible Conduct of Research	1

AND, at least 3 additional graduate level courses in physical or biological science, with

at least 1 course in physical science

at least 1 course in literature-based biological science

1. Training in a major with connections to biophysics (e.g., physics, chemistry, or biology, with a quantitative background equivalent to that of an undergraduate physics or chemistry major at Stanford).
2. Opportunities for teaching are available during the first nine quarters at the discretion of the advising committee.

3. The student must prepare a dissertation proposal defining the research to be undertaken including methods of procedure. This proposal should be submitted by the end of summer quarter of the second year, and it must be approved by a committee of at least three members including the principal research adviser and at least one member from the Department of Structural Biology. The candidate must defend the dissertation proposal in an oral examination. The dissertation reading committee normally evolves from the dissertation proposal review committee.
4. The student must present a Ph.D. dissertation as the result of independent investigation and expressing a contribution to knowledge in the field of structural biology.
5. The student must pass the University oral examination, taken only after the student has substantially completed the research. The examination is preceded by a public seminar in which the research is presented by the candidate.

Applicants to the program should have a bachelor's degree and should have completed at least a year of course work in biology, mathematics, organic chemistry, physical chemistry, and physics. Application forms must be received by the department before December 15 for notification by April 15. Application to the National Science Foundation for fellowship support is also encouraged. Remission of fees and a personal stipend are available to graduate students in the department. Prospective applicants should contact the Department of Structural Biology for further information.

Current topics of research in the department lie in the areas of gene expression; theoretical, crystallographic, and genetic analysis of protein structure; and cell-cell interaction. See Stanford's School of Medicine (<http://www.med.stanford.edu/school/structuralbio>) web site for further information.

*Chair:* William I. Weis

*Associate Chair:* Michael Levitt

*Professors:*

- K. Christopher Garcia
- Theodore Jardetzky
- Roger D. Kornberg
- Michael Levitt
- Peter Parham
- Joseph D. Puglisi
- Soichi Wakatsuki
- William I. Weis

*Associate Professor (Research):*

- Yahli Lorch

*Assistant Professor (Research):*

- Elizabetta Viani Puglisi

*Assistant Professor:*

- Adam de la Zerda

*Courtesy Professor:*

- Axel Brunger
- Vijay Pande

*Courtesy Associate Professor:*

- Zev Bryant

## OTHER OFFICES

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These pages list various offices, centers, laboratories, and institutes of direct relevance to study at Stanford. The listings are not all-inclusive.

- A comprehensive list of Stanford offices is available on the University's A to Z Index page (<http://www.stanford.edu/atoz>).
- A comprehensive list of Independent Labs, Institutes and Centers (<http://doresearch.stanford.edu/research-scholarship/interdisciplinary-laboratories-centers-and-institutes>)

# ATHLETICS

## Contacts

Office: Arrillaga Family Sports Center  
 Mail Code: 94305-6150  
 Phone: (650) 723-4591  
 Web Site: <http://gostanford.com>

## Our Mission

From its founding in 1891, Stanford University's leaders have believed that physical activity is valuable for its own sake and that vigorous exercise is complementary to the educational purposes of the university. Within this context for human development, it is the mission of Stanford Athletics to offer a wide range of high quality programs which will encourage and facilitate all participants to realize opportunities for championship athletic participation, physical fitness, health and well being.

## Principles That Guide Us

### We Will Teach

- By encouraging our student-athletes to capture all the joy, power and extraordinary personal growth that comes to those who compete and support athletic excellence.
- By hiring and retaining the best coaches and staff members available and arming them with the tools to achieve at the highest level.
- By fostering and nurturing a coaching, physical education and recreation staff that is committed to teaching with integrity and ambition and that performs in a manner which is consistent with the academic priorities of Stanford University.
- By recognizing the need to work as a team while valuing each individual's unique characteristics and abilities.
- By committing ourselves to the personal development and well being of our student-athletes and staff. Those who participate at all levels will learn the benefits of teamwork, discipline, goal setting, physical fitness, healthy lifestyles, character development, self confidence, sportsmanship, and an appreciation for lifelong learning.

### We Will Lead

- By being the model of success, of universal opportunity, and of unwavering commitment to the ideal of the scholar-athlete.
- By operating with integrity as we follow the spirit and the letter of each rule. Integrity will be displayed in our policies, performances and programs.
- By continuing our long history of conference and national prominence through a commitment to cutting edge involvement in athletic issues.

### We Will Win

- By maximizing our effort in every competition, on every team and in every setting where skill, determination and hard work combine to achieve singularly successful results.
- By having an uncompromising commitment to Conference and National championships and by providing each student-athlete with the tools necessary to be successful at the highest levels of both academic and athletic performance.
- By creating a commitment to a university-wide wellness culture that will allow Stanford students, faculty and staff to maximize their health and fitness opportunities throughout their lives.

## We Will Serve

- By respecting, honoring and responding to the needs of our student-athletes, coaches, colleagues, advocates and members of our larger community.
- By encouraging innovation and creativity. We will harness technology to extend our reach and to interface with our various internal and external constituencies.
- Through fiscal responsibility in all elements of departmental operations.
- By advancing outreach as a fundamental component of the department, we will strive to enhance the overall mission of the University through competitive excellence, effective outreach and an on-going commitment to customer service.
- By utilizing the department resources and physical facilities to serve the campus community, our alumni and our supporters throughout the world.
- By valuing our heritage, and in doing so we commit ourselves to championship caliber athletic achievement and the on-going enhancement of the traditions of Stanford Athletics, including leadership, individual and team achievement and intense pride and loyalty.

## Courses

Courses offered for intercollegiate and club sport athletes are listed under the subject code ATHLETIC (<https://explorecourses.stanford.edu/search?view=catalog&academicYear=&page=0&q=ATHLETIC&filter-departmentcode-ATHLETIC=on&filter-coursestatus-Active=on>) on the Stanford Bulletin's ExploreCourses (<https://explorecourses.stanford.edu/browse>) web site. Courses are activity classes (ACT) and carry 1-2 units of credit for satisfactory completion of work. Although there is no limitation on the number of activity classes in which a student may enroll, no more than 8 units of these activity classes (and/or other University activity classes) may be applied toward undergraduate graduation requirements. See the "Credit (p. 35)" tab of the "Undergraduate Degrees (p. 29)" section of this bulletin for complete information. Course fees, as applicable, are posted to the student's University account.

## Men's Intercollegiate Teams

Below are links to the website of each Men's Team with information about rosters, coaches, schedules, statistics, news, history, tickets, promotions, and additional information.

- Baseball (<http://www.gostanford.com/index.aspx?path=bsb>)
- Basketball (<http://www.gostanford.com/index.aspx?path=mbsb>)
- Cross Country (<http://www.gostanford.com/index.aspx?path=xc>)
- Fencing (<http://www.gostanford.com/index.aspx?path=fenc>)
- Football (<http://www.gostanford.com/index.aspx?path=football>)
- Golf (<http://www.gostanford.com/index.aspx?path=mgolf>)
- Gymnastics (<http://www.gostanford.com/index.aspx?path=mgym>)
- Rowing (<http://www.gostanford.com/index.aspx?path=mrow>)
- Sailing (<http://www.gostanford.com/index.aspx?path=sail>)
- Soccer (<http://www.gostanford.com/index.aspx?path=msoc>)
- Swimming and Diving (<http://www.gostanford.com/index.aspx?path=mswim>)
- Tennis (<http://www.gostanford.com/index.aspx?path=mten>)

- Track and Field (<http://www.gostanford.com/index.aspx?path=track>)
- Volleyball (<http://www.gostanford.com/index.aspx?path=mvball>)
- Water Polo (<http://www.gostanford.com/index.aspx?path=mwpolo>)
- Wrestling (<http://www.gostanford.com/index.aspx?path=wrestling>)

## Women's Intercollegiate Teams

Below are links to the website of each Women's Team with information about rosters, coaches, schedules, statistics, news, history, tickets, promotions, and additional information.

- Basketball (<http://www.gostanford.com/index.aspx?path=wbball>)
- Beach Volleyball (<http://www.gostanford.com/index.aspx?path=bvball>)
- Cross Country (<http://www.gostanford.com/index.aspx?path=xc>)
- Fencing (<http://www.gostanford.com/index.aspx?path=fenc>)
- Field Hockey (<http://www.gostanford.com/index.aspx?path=fhockey>)
- Golf (<http://www.gostanford.com/index.aspx?path=wgolf>)
- Gymnastics (<http://www.gostanford.com/index.aspx?path=wgym>)
- Lacrosse (<http://www.gostanford.com/index.aspx?path=wlox>)
- Rowing (<http://www.gostanford.com/index.aspx?path=wrow>)
- Lightweight Rowing ([http://www.gostanford.com/index.aspx?path=row\\_lt](http://www.gostanford.com/index.aspx?path=row_lt))
- Sailing (<http://www.gostanford.com/index.aspx?path=sail>)
- Soccer (<http://www.gostanford.com/index.aspx?path=wsoc>)
- Softball (<http://www.gostanford.com/index.aspx?path=softball>)
- Squash (<http://www.gostanford.com/index.aspx?path=wsquash>)
- Swimming and Diving (<http://www.gostanford.com/index.aspx?path=wswim>)
- Synchronized Swimming (<http://www.gostanford.com/index.aspx?path=syncswim>)
- Tennis (<http://www.gostanford.com/index.aspx?path=wten>)
- Track and Field (<http://www.gostanford.com/index.aspx?path=track>)
- Volleyball (<http://www.gostanford.com/index.aspx?path=wvball>)
- Water Polo (<http://www.gostanford.com/index.aspx?path=wwpolo>)

## Academic Services

Undergraduate Advising and Research (UAR) (<https://undergrad.stanford.edu>) provides academic advising, programming, and support for students as they shape their Stanford education. In guiding students to engage with faculty and in supporting students' personal and intellectual development, UAR encourages students to explore the full breadth and depth of their intellectual opportunities, to find their intellectual homes, and to discover a sense of belonging at Stanford. Academic advisers for student-athletes are housed in the Athletic Academic Resource Center (AARC) and are the primary undergraduate advising contact for varsity student-athletes. AARC advisers are full-time, professional staff within Undergraduate Advising and Research who partner closely with colleagues across campus to

provide a comprehensive network of support that promotes a student's academic success and furthers his or her intellectual goals.

## Sports Performance

Stanford's Sports Medicine Program is dedicated to providing the best possible medical care for the student athlete's injuries and illnesses. The program is unique in its team approach to health care, as the Team Physicians (<http://ortho.stanford.edu/lacob/physicians.html>), Athletic Trainers ([http://www.stanfordmedicine.com/?page\\_id=53](http://www.stanfordmedicine.com/?page_id=53)), Physical Therapists (<http://www.stanfordmedicine.com/physical-therapy>), and Sports Scientists (<http://ortho.stanford.edu/humanperformance/personnel.html>) all collaborate on the care provided to each athlete. The team physicians provide diagnosis, treatment, arrange for consultations, order lab tests, x-rays and MRIs, and make decisions on the participation status. Athletic trainers work under the supervision of our team physicians to provide prevention, evaluation, and treatment of athletic injuries. Physical therapists design specific programs for rehabilitation and communicate directly with the athletic trainer, physician, and sports performance coaches. Sport Scientists work with coaches and athletes to test and analyze athletes using state-of-the-art motion capture, biomechanics and physiology equipment.

## Sports Psychology Services

The mission of Stanford Athletics Sport Psychology Services is to provide psychological services to Stanford University student-athletes that foster mental health and well-being, promote excellence in educational and athletic goals, and contribute to a safe, welcoming, and multiculturally aware athletic department and campus community.

Stanford Athletics has had an ongoing and collaborative relationship with the Department of Psychiatry and Behavioral Sciences to provide integrated behavioral health services to Stanford student-athletes, including a full-service sport psychology program.

- *Dr. Kelli Moran-Miller* (<http://www.gostanford.com/staff.aspx?staff=208>), Director of Sport Psychology for Stanford Athletics, is a licensed psychologist, a certified consultant with the Association of Applied Sport Psychology, and a member of the USOC registry. She uses a strengths-based, solution-focused, and student-centered approach to assist student-athletes in the achievement of personal, educational, and sport goals. Her office is in the Sports Medicine Center.
- *Dr. Lisa Post*, Director of Sports Medicine in Psychiatry, is a licensed psychologist who specializes in working with collegiate and professional athletes and coordinates referrals and care within the Department of Psychiatry and Behavioral Sciences. Her office is on campus at 401 Quarry.

## Services

Sport Psychology Services offers confidential personal counseling, performance psychology consulting, psychological rehabilitation from injury, career counseling, medication evaluation and management, and specialized care referrals. Team-centered workshops for varsity teams, crisis intervention, and consultation with coaches and athletic department staff also are available.

*Individual sessions* provide a unique opportunity to explore issues that may be preventing you from reaching your potential athletically, academically, or personally.

*Team-centered workshops* are designed to address the unique goals of the participating team and to provide memorable active learning experiences to build team unity, reinforce team mission and vision, clarify team goals, roles, and responsibilities or teach mental skills.

*Athletic Director:* Bernard Muir

*Deputy Athletics Director: Patrick Dunkley*

*Deputy Athletics Director: Ray Purpur*

*Senior Associate Athletic Director - CFO: Brian Talbott*

*Senior Associate Athletic Director - Development: Heather Owen*

*Senior Associate Athletic Director - Intercollegiate Sports: Earl Koberlein*

*Senior Associate Athletic Director - Senior Woman Administrator: Beth Goode*

*Senior Associate Athletic Director - Facilities, Operations, and Events: Jamie Breslin*

*Senior Associate Athletic Director - Recreation and Wellness: Eric Stein*

*Associate Athletics Director - Compliance Services: Lorne Robertson*

*Associate Athletics Director - External Relations: Tommy Gray*

# CENTERS, LABORATORIES, INSTITUTES

Independent research laboratories, centers, and institutes perform multidisciplinary research that extends beyond the scope of any one of the University's organized schools. The listings are not all-inclusive. A comprehensive list of Stanford offices is available on the University's A to Z Index page (<http://www.stanford.edu/atoz>).

The following tabs contain information on programs for undergraduates:

- Arts Institute (p. 404)
  - Interdisciplinary Honors in the Arts Program
  - Arts Immersion
  - Creative Cities
- Center for Spatial and Textual Analysis (CESTA) (<https://cesta.stanford.edu>)
  - Graduate Certificate of Digital Humanities
- Center for the Study of Poverty and Inequality (CPI) (p. 847)
  - Certificate Program on Poverty and Inequality
- Freeman Spogli Institute for International Studies (FSI) (p. 849)
  - Interschool Honors Program in Democracy, Development, and the Rule of Law
  - Interschool Honors Program in International Security Studies

## Office of Vice Provost and Dean of Research

*Vice Provost and Dean of Research:* Ann M. Arvin

Office: 450 Serra Mall, Main Quadrangle, Building 60  
 Mail Code: 94305-2064  
 Phone: 650-723-8789 / Fax 650-723-0662  
 Web Site: <http://stanford.edu/dept/DoR>  
 Office Fax: 650-723-0662

The following independent Laboratories, Centers, and Institutes report to the Vice Provost and Dean of Research:

### Biological and Life Sciences

- Bio-X, the interdisciplinary program related to bioengineering, biomedicine, and biosciences, <http://biox.stanford.edu>
- Spectrum (formerly the Stanford Center for Clinical and Translational Education and Research), <http://spectrum.stanford.edu>

### Environmental Sciences

- Precourt Institute for Energy, <http://pie.stanford.edu/>
  - Precourt Energy Efficiency Center, <http://peec.stanford.edu>
  - Global Climate and Energy Project (G-CEP), <http://gcep.stanford.edu>
- Woods Institute for the Environment, <http://woods.stanford.edu>

### Humanities and Social Sciences

- Center for Advanced Study in the Behavioral Sciences (CASBS), <http://www.casbs.org>
- Center for the Study of Language And Information (CSLI), <http://www-csli.stanford.edu>
- Freeman Spogli Institute for International Studies (FSI), <http://fsi.stanford.edu>
  - Center on Democracy, Development, and the Rule of Law (CDDRL), <http://cddrl.stanford.edu>

- Stanford Health Policy (Center for Health Policy/Center for Primary Care and Outcomes Research), <http://healthpolicy.stanford.edu>
- Center for International Security and Cooperation (CISAC) <http://cisac.stanford.edu>
- Walter H. Shorenstein Asia-Pacific Research Center (Shorenstein APARC), <http://aparc.stanford.edu>
- The Europe Center, <http://tec.stanford.edu>
- Program on Food Security and the Environment, <http://fse.stanford.edu>
- Inter-University Center for Japanese Language Studies (IUC), <http://www.stanford.edu/dept/IUC>
- Program on Energy and Sustainable Development (PESD), <http://pesd.stanford.edu>
- Stanford Program on International and Cross-Cultural Education (SPICE), <http://spice.stanford.edu>
- Human-Sciences and Technologies Advance Research Institute (H-STAR), <http://hstar.stanford.edu>
  - Media-X, <http://mediax.stanford.edu>
  - Stanford Center for Innovations in Learning (SCIL), <http://scil.stanford.edu>
- Stanford Center on Longevity (SCL), <http://longevity.stanford.edu>
- Stanford Humanities Center, <http://shc.stanford.edu>
- Stanford Institute for Economic Policy Research (SIEPR), <http://siepr.stanford.edu>

### Physical Sciences

- Edward L. Ginzton Laboratory, <http://stanford.edu/group/ginzton>
- Geballe Laboratory for Advanced Materials (GLAM), <http://stanford.edu/group/glam>
- Kavli Institute for Particle Astrophysics and Cosmology (KIPAC), <http://www-group.slac.stanford.edu/kipac>, operated jointly with SLAC National Accelerator Laboratory
- Photon Ultrafast Laser Science and Engineering (PULSE), <http://pulse.slac.stanford.edu>, operated jointly with SLAC National Accelerator Laboratory
- Stanford Institute for Materials and Energy Sciences (SIMES), <http://simes.slac.stanford.edu>, operated jointly with SLAC National Accelerator Laboratory
- W. W. Hansen Experimental Physics Laboratory (HEPL), <http://hepl.stanford.edu>

## Centers Reporting to the Dean of Humanities and Sciences

- Center for Space Science and Astrophysics (<http://www.stanford.edu/group/CSSA>)
- Center for Spatial and Textual Analysis (CESTA) (<https://cesta.stanford.edu>)
  - CESTA offers a graduate Certificate of Digital Humanities program
- Institute for Research in the Social Sciences (<http://iriss.stanford.edu>) (IRiSS)
  - Stanford Center for Population Research (<http://iriss.stanford.edu/scpr>) (SCPR)
  - Stanford Center for the Study of Poverty and Inequality (<http://iriss.stanford.edu/CPI>) (CPI)
  - Stanford Center for American Democracy (<https://iriss.stanford.edu/ANES>) (SCAD)
  - Stanford Center on Philanthropy and Civil Society (<http://pacscenter.stanford.edu>) (PACS)

- Center for Computational Social Science (<https://css-center.stanford.edu>)
- Immigration and Integration Policy Lab (<http://immigrationlab.stanford.edu>)
- Center for the Advancement of Research through Online Learning (CAROL)
- Michelle R. Clayman Institute for Gender Research (<http://gender.stanford.edu>)
- Morrison Institute for Population and Resource Studies (<http://www.stanford.edu/group/morrinst>)
- Stanford Arts Institute (<http://arts.stanford.edu/arts-institute>)

Arts Institute information can now be found under the School of Humanities and Sciences (p. 404) in the menu on the left.

## Stanford Center on Poverty and Inequality Certificate Program on Poverty and Inequality

The Stanford Center on Poverty and Inequality (CPI) monitors and publicizes trends in poverty and inequality, publishes the country's leading magazine on poverty and inequality (*Pathways Magazine*), supports research on the causes of poverty and inequality, and examines the effects of public policy on poverty and inequality. The center carries out these activities with ten research groups addressing the following topics:

- poverty measurement and trends
- educational access and achievement
- income inequality
- social mobility
- safety net use
- recession and recovery effects
- spatial segregation
- racial and ethnic inequality
- discrimination, poverty, and the labor market
- Hispanic poverty, inequality, and mobility.

The Certificate in Poverty and Inequality recognizes undergraduates who have developed expertise in one or more of these research areas. The certificate is conferred as soon as the coursework and research requirements listed below are completed. Although the certificate does not appear on an official University transcript, it provides formal recognition of a rigorous program of study in the field of poverty and inequality.

### Admission

Applications to the CPI certificate program are available on the CPI web site (<http://www.stanford.edu/group/scspi>) and may be filed at any time. Admitted students are assigned an adviser who assists in planning coursework and providing research opportunities within CPI. Contact CPI ([inequality@stanford.edu](mailto:inequality@stanford.edu)) with any questions.

### Requirements

The student's course and research plan, which is submitted with the application, should meet the four requirements listed below.

1. **Core Foundation Course:** (SOC 140 Introduction to Social Stratification. This required introductory course examines the causes and consequences of poverty, inequality, and mobility. It is available as both a regular and online course.
2. **Elective Foundation Course:** The second foundation course is selected from among the normative, empirical, and policy courses listed below. These courses examine the principles by which certain types of living conditions may be deemed unjust or impoverished (i.e., normative analysis), the social processes and forces by which

poverty and inequality are generated and maintained (i.e., empirical analysis), and the types of policies and interventions that might reduce or increase poverty and inequality (i.e., policy analysis).

### Elective Foundation Courses

Normative Foundation		
ETHICSOC 136R	Introduction to Global Justice	4
ETHICSOC 171	Justice	4-5
INTNLREL 136R	Introduction to Global Justice	4
PHIL 76	Introduction to Global Justice	4
PHIL 171	Justice	4-5
POLISCI 136R	Introduction to Global Justice	4
PUBLPOL 103C	Justice	4-5
Empirical Foundation		
SOC 141	Controversies about Inequality	5
SOC 144	Inequality and the Workplace	5
Policy Foundation		
ECON 11N	Understanding the Welfare System	3
SOC 135	Poverty, Inequality, and Social Policy in the United States	4

3. **Research Project:** Students must complete a research paper on poverty or inequality. Students are invited to join one of the ten CPI research groups and become involved in an ongoing CPI research project that might become the basis for their research paper. Alternatively, students write an independent research paper rather than joining a CPI Research Group. The research paper may either take the form of a research proposal or an empirical research project based on quantitative or qualitative methods. This paper should be completed while the student is enrolled in Independent Study with a CPI faculty affiliate (<http://www.stanford.edu/group/scspi>).
4. **Additional Elective:** Students must take an elective course with a poverty or inequality focus. This requirement may be satisfied by taking an additional foundation course from the list provided above or by taking any of the preapproved elective courses listed below. Additionally, other unlisted courses addressing issues of poverty and inequality may also satisfy this requirement, although such courses require CPI approval (which is requested by submitting the Course Approval Form (<http://www.stanford.edu/group/scspi>)). It is recommended that approval be secured in advance of taking an unlisted course. If a new applicant to the certificate program wishes to count a completed course toward the requirements, that should be indicated on the application form and, if necessary, the Course Approval Form (<http://www.stanford.edu/group/scspi>) should be filled out).

### Preapproved Elective Courses

Poverty		
EARTHSYS 106	World Food Economy	5
ECON 11N	Understanding the Welfare System	3
ECON 106	World Food Economy	5
SOC 135	Poverty, Inequality, and Social Policy in the United States	4
Educational Access and Achievement		
ECON 146	Economics of Education	5
EDUC 102	Examining Social Structures, Power, and Educational Access	2-4
EDUC 173	Gender and Higher Education: National and International Perspectives	4
EDUC 181	Multicultural Issues in Higher Education	4
EDUC 221A	Policy Analysis in Education	4-5
EDUC 232	Culture, Learning, and Poverty	2-3

Units

Units



FEMST 173		
SOC 132	Sociology of Education: The Social Organization of Schools	4
SOC 134	Gender and Education in Global and Comparative Perspectives	4
SOC 173	Gender and Higher Education: National and International Perspectives	4
Income Inequality		
AMSTUD 50N	The Literature of Inequality: Have and Have-Nots from the Gilded Age to the Occupy Era	3
POLISCI 127P	Economic Inequality and Political Dysfunction	5
SOC 14N	Inequality in American Society	4
SOC 117D	Recognizing Inequality	3
SOC 141	Controversies about Inequality	5
Social Mobility		
EDUC 102	Examining Social Structures, Power, and Educational Access	2-4
SOC 144	Inequality and the Workplace	5
Safety Net		
ECON 11N	Understanding the Welfare System	3
PUBLPOL 101	Politics and Public Policy	4-5
Recession and Recovery		
ECON 110	History of Financial Crises	5
SOC 114D	Sociology of the Great Recession	5
Spatial Segregation		
SOC 149	The Urban Underclass	4
Racial and Ethnic Income Inequalities		
CSRE 45Q	Understanding Race and Ethnicity in American Society	4
CSRE 145	Race and Ethnic Relations in the USA	4
NATIVEAM 139	American Indians in Contemporary Society	4
SOC 45Q	Understanding Race and Ethnicity in American Society	4
SOC 46N	Race, Ethnic, and National Identities: Imagined Communities	3
SOC 139	American Indians in Contemporary Society	4
SOC 145	Race and Ethnic Relations in the USA	4
SOC 148	Comparative Ethnic Conflict	4
Discrimination and the Labor Market		
ECON 11N	Understanding the Welfare System	3
ECON 118	Development Economics	5
ECON 145	Labor Economics	5
SOC 142	Sociology of Gender	3
SOC 144	Inequality and the Workplace	5
Poverty, Inequality, and Mobility among Hispanics		
CHILATST 125S	Chicano/Latino Politics	5
POLISCI 125S	Chicano/Latino Politics	5
SOC 166	Mexicans, Mexican Americans, and Chicanos in American Society	5

## Graduate Certificate in Digital Humanities Overview

The Center for Spatial and Textual Analysis (CESTA) offers a Graduate Certificate in Digital Humanities (GCDH) to meet a growing need among the humanities for training in digital methods by leveraging existing resources at Stanford University. The Graduate Certificate in Digital Humanities allows graduate students to acquire and deepen their technical and conceptual skills as well as to strengthen their position

in the competitive job market within and beyond the academy. The certificate program has been established as a pilot program from 2014-17.

Completion of the program results in a Certificate, signed by the CESTA director and the chair of the doctoral student's home department.

The Graduate Certificate in Digital Humanities is issued by the Center for Spatial and Textual Analysis (CESTA) and will not appear on any University record, including the student's transcript.

### Contact

Office: Wallenberg Hall, 450 Serra Mall, Building 160  
Mail Code: 94305-2084

Phone: (650) 721-1385. Fax: (650) 725-5916

Email: mattbryant.stanford@gmail.com

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

### Staff

*Core Faculty:* Mark Algee-Hewitt, Franco Moretti, Richard White, Dan Edelstein, Paula Findlen, Giovanna Ceserani, Walter Scheidel, Elaine Treharne, Amir Eschel, Zephyr Frank

*Affiliated CESTA Faculty:* Allyson Hobbs, Edith Scheffer, Caroline Winterer, Mark McGurl, Ana Minian, Mikael Wolfe.

*CESTA Staff, Affiliates, and others:* Celena Allen (GIS), Erik Steiner (visualization design and cartography), Ryan Heuser (programming), Nicole Coleman (information design and visualization), Jason Heppler (digital history), Elijah Meeks (information design), Karl Grossner (information design and cartography).

### Admission

Admission to the program is on a rolling basis, and students may apply at any time. Submit a letter of interest and any supporting information to CESTA Lab Manager Matt Bryant ([mattbryant.stanford@gmail.com](mailto:mattbryant.stanford@gmail.com)) at [mattbryant.stanford@gmail.com](mailto:mattbryant.stanford@gmail.com). For more information about the new GDCH program or CESTA in general, see the program's web site (<http://cesta.stanford.edu/gcdh>) or contact Matt Bryant ([mattbryant.stanford@gmail.com](mailto:mattbryant.stanford@gmail.com)) at [mattbryant.stanford@gmail.com](mailto:mattbryant.stanford@gmail.com).

### Course work

Students wishing to take part in the first cohort starting in 2014-15 and thereafter are expected to complete one GCDH-approved graduate core course for a letter grade, and one additional approved elective course. The approved core courses for the first year of the program are:

- HISTORY 401A
- ENGLISH 303C
- DLCL 396 Humanities+Design: Visualizing the Grand Tour (same as CLASSICS 396, HISTORY 336E)

Students who have completed any of the core courses, or equivalent courses taught by members of the program, in past years are eligible to move to the next step in the GCDH program.

Following or concurrent with the completion of the required core course, students must complete the following two certificate components:

1. Additional course work (1 or more classes, may be taken credit/no credit, and must be approved in advance by the committee in charge) in computer science, information design, statistics, network analysis, linguistics, or other fields approved by the student's supervisor and the CESTA committee in charge. A list of course recommendations is forthcoming.
2. One of the following:
  - a. Independent research project and portfolio including a finished project which is evaluated and approved by an Academic Council

supervisor and accepted as an affiliated project in one of CESTA's labs. The duration of such projects must be a minimum of one academic quarter. Students may take up to 5 units of credit of directed reading for the purpose of completing the independent research project. Final projects are included in the student's ePortfolio and published on the CESTA web site.

- b. Supervised collaborative research in a CESTA lab with the expectation that the student's participation culminates in a digital humanities product substantially of the authorship of the student; this must be a minimum of two quarters in duration. The student's portion of the research is included in the ePortfolio and published on the CESTA web site.

## Freeman Spogli Institute for International Studies (FSI)

### Contacts

Office: Encina Hall Center, First Floor, 616 Serra Street  
Mail Code: 94305-6055  
Phone: 650-723-4581 / Fax 650-725-2592  
Web Site: <http://fsi.stanford.edu/>

The Freeman Spogli Institute for International Studies (FSI) provides opportunities for undergraduate research through the CDDRL Undergraduate Honors Program and the CISAC Interschool Honors Program in International Security Studies.

## Interschool Honors Program in Democracy, Development, and the Rule of Law

*Director:* Stephen J. Stedman

The Center on Democracy, Development, and the Rule of Law (CDDRL) Undergraduate Senior Honors Program provides students majoring in any Stanford academic department the opportunity to conduct an independent honors thesis focused on the fields of democracy, development, and the rule of law. Students are required to complete a three quarter long honors research seminar that begins Spring Quarter of the junior year. They will spend the last quarter of the senior year working independently with their faculty adviser to complete and submit their honors thesis ahead of their formal defense in mid-May. Upon fulfilling individual department course requirements and completing the honors program, students graduate with a certificate in Honors in Democracy, Development, and the Rule of Law.

Students interested in the program consult with their prospective honors advisers in their junior year to determine the tentative thesis topic, which should have some degree of policy relevance. Prerequisites for the program include; a 3.5 grade-point average at the time they apply; a strong overall academic record; sufficient depth and breadth in the fields of democracy, economic and social development, rule of law, and human rights course work; and demonstrated skills in writing and conducting independent research.

Students are required to attend honors college in Washington, D.C. in September before Autumn Quarter classes begin. Applicants are discouraged from studying abroad during the duration of the CDDRL Undergraduate Honors program.

### Required Course Work

Two courses that explore the areas of democracy, development, and the rule of law to be approved by the faculty director. CDDRL's flagship undergraduate lecture course taught during Autumn Quarter, which ideally should be completed before the student enters the honors

program. DDRL Honors Research Methods Seminars meet on a weekly basis to present their project theses and receive feedback.

### Typical Schedule for CDDRL Honors Program

Junior	Units		
	Autumn	Winter	Spring
Select one of the following:		5	
Democracy, Development, and the Rule of Law (INTNLREL 114D)			
Democracy, Development, and the Rule of Law (POLISCI 114D)			
DDRL 189 Honors Research Methods			3
Year Total:		5	3
<hr/>			
Senior	Units		
	Autumn	Winter	Spring
DDRL 190 Honors Research Workshop		3	
DDRL 190 Honors Research Workshop			3
DDRL 191 Independent Study (Optional) <sup>1</sup>			
Year Total:		3	3
<hr/>			
Total Units in Sequence:			14

<sup>1</sup> Optional any quarter during senior year for 1-5 units, repeatable once for credit.

Admitted students must be able to fulfill all course requirements in their individual majors by the time they graduate, in addition to the units required for the honors program. For more information, contact Alice Kada, CDDRL Administrative Manager at [akada@stanford.edu](mailto:akada@stanford.edu) or go to <http://cddrl.stanford.edu/>.

## Interschool Honors Program in International Security Studies

*Co-Directors:* Coit D. Blacker, Amy Zegart

The Center for International Security and Cooperation (CISAC) coordinates a University-wide Interschool Honors Program in International Security Studies. Students chosen for the honors program intern with a security-related organization, attend the program's honors college in Washington, D.C., in September, participate in a year-long core seminar, and under the direction of a faculty advisor produce an honors thesis relevant to international security policy. Upon fulfilling individual department course requirements and completing the honors program, students graduate in their major with the award of Honors in International Security Studies. To be considered for the program, students must demonstrate sufficient depth and breadth of international security course work.

			Units
Successful applicants to the program are expected to have taken:			
MS&E 193	Technology and National Security		3
POLISCI 114S	International Security in a Changing World		5
and at least one related course such as			4-5
ECON 106	World Food Economy		5
HISTORY 103F	The Changing Face of War: Introduction to Military History		5
HISTORY 204E			4-5
HUMBIO 129S	Global Public Health		4
INTNLREL 114D	Democracy, Development, and the Rule of Law		5
INTNLREL 140A	International Law and International Relations		5
LAW 5013	International Law (formerly LAW 479)		4
MS&E 93Q	Nuclear Weapons, Energy, Proliferation, and Terrorism		3

MS&E 190	Methods and Models for Policy and Strategy Analysis	3
MS&E 295	Energy Policy Analysis	3
POLISCI 42Q	The Rwandan Genocide	5
POLISCI 110D	War and Peace in American Foreign Policy	5
POLISCI 116	The International History of Nuclear Weapons	5
PUBLPOL 101/ POLISCI 102	Politics and Public Policy	4-5
PUBLPOL 102		
SOC 160	Formal Organizations	4

Students in the program enroll in IIS 199 Interschool Honors Program in International Security Studies, in Autumn, Winter, and Spring quarters for 3-5 credits for quarter (9-12 total credits). Information about and applications to this program may be obtained from the Center for International Security and Cooperation, C206-10, Encina Hall Central, telephone (650) 725-5365 or [http://cisac.stanford.edu/docs/undergraduate\\_honors\\_program](http://cisac.stanford.edu/docs/undergraduate_honors_program).

## Center for Space Science and Astrophysics

*Emeriti:* (Professors) Robert Cannon, (Professors, Research) Donald L. Carpenter, Aldo V. daRosa, Daniel B. DeBra, W.Gary Ernst, Von R. Eshleman, Antony Fraser-Smith, Robert A. Helliwell, Bruce B. Lusignan, Ronald J. P. Lyon, Laurence A. Manning, Bradford W. Parkinson, J. David Powell, Peter A. Sturrock, G. Leonard Tyler, Robert V. Wagoner

*Director:* Roger W. Romani

*Associate Directors:* Umran S. Inan, Philip H. Scherrer

*Professors:* Roger Blandford (Physics, SLAC), Elliot Bloom (SLAC), Lambertus Hesselink (Electrical Engineering), Umran S. Inan (Electrical Engineering), Steven Kahn (Physics, SLAC), Tune Kame (SLAC), Peter F. Michelson (Physics), Vahé Petrosian (Physics), Roger W. Romani (Physics), Norman H. Sleep (Geophysics), Guenther Walther (Statistics), Howard Zebker (Electrical Engineering, Geophysics)

*Associate Professors:* Tom Abel (Physics, SLAC), Steve Allen (Physics, SLAC), Sarah Church (Physics),

*Assistant Professors:* Stefan Funk (Physics, SLAC), Chao-Lin Kuo (Physics, SLAC), Risa Wechsler (Physics, SLAC)

*Professors (Research):* C-W. Francis Everitt (HEPL), Philip H. Scherrer (Physics)

*SLAC Staff Physicist:* Grzegorz Madejski

Center Offices: Varian, Room 340

Mail Code: 94305-4060

Phone: (650) 723-1439

Email: [danav@stanford.edu](mailto:danav@stanford.edu)

Web Site: <http://www.stanford.edu/dept/astro>

The Center for Space Science and Astrophysics is an interdepartmental organization coordinating research in space science and astrophysics. Its members are drawn from the Department of Geological and Environmental Sciences in the School of Earth Sciences; the departments of Aeronautics and Astronautics, Electrical Engineering, and Mechanical Engineering in the School of Engineering; the departments of Applied Physics, Physics, and Statistics in the School of Humanities and Sciences; the W. W. Hansen Experimental Physics Laboratory; and the SLAC National Accelerator Laboratory. Its membership also

includes all faculty and appropriate staff at the Kavli Institute for Particle Astrophysics and Cosmology, located at SLAC and the Physics department.

The facilities of the center are available to any interested and qualified student, who must be admitted by and registered in a department. The departments of Aeronautics and Astronautics, Applied Physics, Electrical Engineering, Mechanical Engineering, and Physics offer opportunities leading to an M.S. or Ph.D. degree for work in space science or astrophysics. The center also offers opportunities to undergraduates who may, for instance, participate in research projects in their junior or senior years, on a part-time basis during the school year or on a full-time basis during the summer. The Astronomy Course Program operates a small student observatory where students may gain practical experience in astronomical observing.

### Other Academic Programs and Centers, and Independent Research Laboratories, Centers, and Institutes

- Hoover Institution on War, Revolution and Peace, <http://www.hoover.org>
- SLAC National Accelerator Laboratory (SLAC), <http://www.slac.stanford.edu>
- Stanford Synchrotron Radiation Laboratory (SSRL), <http://ssrl.slac.stanford.edu>

## CONTINUING STUDIES

The Continuing Studies Program provides adults from the surrounding communities the opportunity to take courses for the purpose of intellectual enrichment. Courses and events are offered in all four academic quarters, with over 400 courses planned throughout the year. The Continuing Studies Program, except for the MLA program, is a non-degree granting program.

The instructors are largely drawn from the ranks of the University's professoriate and academic staff. The program presents a wide variety of courses, with a central concentration in the liberal arts, including literature, history, art and architecture, and music.

Tuition discounts are available to University employees, Stanford students and faculty, Stanford Alumni Association members, educators, and those over age 65.

For a list of offered courses, see the Courses tab the Continuing Studies web site (<http://continuingstudies.stanford.edu>).

## Master of Liberal Arts Program

*Associate Dean and Director:* Linda Paulson

*Participating Faculty:* Jonathan Berger (Music), Russell Berman (Comparative Literature, German Studies), Jay Bhattacharya (Medicine), George Brown (English, emeritus), Eamonn Callan (Education), William Chace (English, emeritus), James Daughton (History), Gerald Dorfman (Hoover Institution, Political Science), William Durham (Anthropology), Michele Elam (English), Paula Findlen (History), Larry Friedlander (English), Kenneth Fields (English), Hester Gelber (Religious Studies), Albert Gelpi (English, emeritus), Barbara Gelpi (English, emerita), Denise Gigante (English), Robert Gregg (Religious Studies, emeritus), Tom Grey (Music), Hans Ulrich Gumbrecht (French and Italian), Van Harvey (Religious Studies, emeritus), Allyson Hobbs (History), Gavin Jones (English), Charles Junkerman (Continuing Studies Program), Nancy Kollmann (History), Herbert Lindenberger (English, emeritus), Marsh McCall (Classics, emeritus), Mark Mancall (History, emeritus), Scotty McLennan (Religious Life), Thomas Mullaney (History), Alexander Nemerov (Arts), David Palumbo-Liu (Comparative Literature), Linda Paulson (English), Grant Parker (Classics), Arnold Rampersad (Humanities, emeritus), Rush Rehm (Drama, Classics), John Rick (Anthropology), John Rickford (Linguistics), David Riggs (English, Emeritus), Eric Roberts (Engineering), Paul Robinson (History, emeritus), Jeremy Sabol (SLE), Ramón Saldivar (English), Paul Seaver (History, emeritus), Thomas Sheehan (Religious Studies), Robert Siegel (Microbiology and Immunology), Peter Stansky (History, emeritus), Stephen Stedman (Freeman Spogli Institute for International Studies), Barton Thompson (Law), Peter Vitousek (Biology), Caroline Winterer (History), Yvonne Yarbro-Bejarano (Latin American Cultures), Ernlé Young (Medicine, emeritus), Steven Zipperstein (Jewish Culture and History)

Program Offices: 365 Lasuen Street, Littlefield Center, Level G  
Mail Code: 2078  
Phone: (650) 725-0061 Fax: (650) 725-4248  
Email: [mlaprogram@stanford.edu](mailto:mlaprogram@stanford.edu)  
Web Site: <http://mla.stanford.edu>

Courses offered by the Master of Liberal Arts Program are listed under the subject code MLA on the Stanford Bulletin's ExploreCourses web site.

## Program Description

The Master of Liberal Arts (MLA) program aims to provide a flexible, interdisciplinary program for returning adult students who seek a broad education in the liberal arts. The underlying premise of the MLA program is that knowledge gained through an interdisciplinary course of study leads to intellectual independence and satisfaction not always found in

discipline-based programs of study. The goals of the MLA program are to develop advanced critical thinking, to foster intellectual range and flexibility, and to cultivate an individual's ability to find the connections among different areas of human thought: art, history, literature, music, philosophy, political science, science, and theology.

The program is designed with part-time students in mind: seminars meet in the evening, and students complete the degree in 4-5 years. All master's seminars are taught by members of the Stanford faculty. Seminar size is limited to 20 students.

## Learning Outcomes (Graduate)

The purpose of the Master of Liberal Arts Program is to address subjects that cross disciplinary boundaries; to develop an understanding of the strength and the shortcomings of disciplinary evaluation; to help students to refine their skills in writing, research, critical thinking, collaborative work, and collegial discussion. While students are not being groomed for academic careers, graduates of the program have used their experience to gain acceptance into Ph.D. programs at Stanford and elsewhere. Students who complete the MLA program are well positioned to advance in careers that require the careful analytical and rhetorical training they receive. This training is achieved through the completion of four foundations courses, which together emphasize the program's goals as stated above; seven seminars that offer a more specific engagement with interdisciplinary subject matter; and a master's thesis, accomplished under the direction of a Stanford faculty member who is expert in the subject of the thesis.

## Degree Requirements

Candidates for the MLA degree must complete a minimum of 50 units of course work with at least a grade point average of 3.3 (B+). These units must include a three-quarter foundation course (equal to 12 units total), one 4-unit core introductory seminar for second-year students, at least seven 4-unit MLA seminars, and a 6-unit master's thesis. Students must also fulfill distribution requirements in each of the following areas: humanities; social science or social policy; and science, engineering, or medicine.

## Foundation Course

During the Autumn, Winter, and Spring quarters following admission to the program, a three quarter foundation course is required of all students. The purpose of this course is to lay the groundwork for the interdisciplinary, intercultural studies the student will shortly undertake. The foundation course introduces students to the broad framework of history, literature, philosophy, political science, and art.

## Core Seminar

During the first quarter of the second year, students take the core introductory seminar, MLA 102 An Introduction to Interdisciplinary Graduate Study. This seminar prepares students for interdisciplinary graduate work at Stanford. Students concentrate on writing a critical graduate paper, conducting library research, presenting the results of their research, and productively participating in a collaborative seminar.

## MLA Seminars

Students are required to take at least seven MLA seminars of 4 units each. Each year, at least nine seminars are offered in the MLA program. Each MLA course requires a substantial seminar paper. Students are encouraged to use these papers as a way to investigate new fields of interest, as well as a way to develop different perspectives on issues in which they have an ongoing interest.

## Master's Thesis

The MLA program culminates in the master's thesis. Students approaching the end of the program write a thesis, approximately 75-100 pages in length, that evolves out of work they have pursued during their

MLA studies. The thesis is undertaken with the prior approval of the MLA program, and under the supervision of a Stanford faculty member. During the process of writing the thesis, students are members of a work-in-progress group, which meets regularly to provide peer critiques, motivation, and advice. Each student presents the penultimate draft of the thesis to a colloquium of MLA faculty and students, in preparation for revising and submitting the final draft to the adviser and to the MLA program.

## Enrollment Requirements

MLA students must enroll for each academic year from the time of original matriculation until conferral of the degree. To remain active, students must either:

1. complete a minimum of two courses (eight units) in one academic year, defined as from the beginning of Autumn Quarter through the end of the following Summer Quarter; or,
2. be actively working on their thesis and regularly attend a minimum of three quarters of the work-in-progress meetings from the time the student enrolls in work-in-progress through graduation.

## Timeline for Completion

All requirements for the Master of Liberal Arts degree must be completed within five years after the student's first term of enrollment in the program. If extraordinary circumstances prevent completion within five years, a student may submit a written petition for a maximum one-year extension to the Associate Dean and Director. This petition is reviewed by a committee which makes a recommendation to the Director; the final decision is at the discretion of the Director. To be considered, the petition must be submitted on or before May 1 of the student's fifth year in the program.

## Registration

Master of Liberal Arts students enroll in courses through Stanford's Axess (<http://axess.stanford.edu>) system.

## Summer Session

*Associate Dean & Director of Stanford Summer Session:* Larry Lagerstrom

## Contact

Program Offices: 365 Lasuen Street and 220 Panama Street  
 Mail Code: 94305-6079  
 Phone: (650) 723-3109 (Summer Session); (650) 725-7250 (High School Summer College); Fax: (650) 725-6080  
 Email: [summersession@stanford.edu](mailto:summersession@stanford.edu) (Summer Session);  
[summercollege@stanford.edu](mailto:summercollege@stanford.edu) (<http://exploreddegrees.stanford.edu/>  
[continuingstudies/summercollege@stanford.edu](http://continuingstudies/summercollege@stanford.edu)) (High School Summer College)  
 Web Site: [summer.stanford.edu](http://summer.stanford.edu) (<http://summer.stanford.edu>)

Students attending Stanford Summer Session are either matriculated Stanford students, visiting undergraduate or graduate students, or enrolled in the High School Summer College.

Degree-seeking Stanford students should indicate on Axess during Spring Quarter that they intend to register for Summer Quarter. Separate application is not required.

Visiting undergraduate or graduate students are not presently candidates for a Stanford degree. These are students and adults who have taken at least one course at another college or university. These students must complete a short application, available at [summer.stanford.edu](http://summer.stanford.edu) (<http://summer.stanford.edu>). Qualified high school students who are at least sixteen years old may apply to the High School Summer College (<http://summer.stanford.edu/programs>) program.

Students in Stanford Summer Session, in general, enjoy the privileges of students in the regular degree programs, except that work completed cannot be applied toward a Stanford degree or credential unless and until the student has been admitted to regular Stanford student standing. Admission as a visiting student does not imply later admission to matriculated status. However, should the visiting student matriculate at a later date through normal admission procedures, the summer work may be applied toward the requirements for a Stanford degree or credential at the discretion of the University or academic department.

Visiting undergraduate and graduate students and students in the High School Summer College are not matriculated Stanford University students, and not all University student policies apply to such students. The University reserves the right, at its discretion, to withhold registration from or require withdrawal from Stanford Summer Session for these students or applicants.

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

For more information, contact Summer Session by email, mail, phone, or fax using the listings above. Information is updated annually in January and may also be found online at <http://summer.stanford.edu>. Information is updated annually in January and may also be found online at [summer.stanford.edu](http://summer.stanford.edu) (<http://summer.stanford.edu>).

## Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, veteran status, or marital status to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, marital status or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence.

The following person has been designated to handle inquiries regarding this nondiscrimination policy: Stanford's Director of the Diversity and Access Office, Rosa Gonzalez, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email). Stanford's Title IX Coordinator, Catherine Glaze, has been designated to handle inquiries regarding sexual harassment and sexual violence: Kingscote Gardens (2nd floor), 419 Lagunita Drive, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), [titleix@stanford.edu](mailto:titleix@stanford.edu) (email).

Individuals may also file complaints directly with the Office for Civil Rights, within the United States Department of Education, by following the information on this web site: <https://www2.ed.gov/about/offices/list/ocr/complaintintro.html>

*Dean and Associate Provost:* Charles Junkerman

*Associate Dean and Director:* Dan Colman

# LIBRARIES AND COMPUTING

## Stanford University Libraries and Academic Information Resources

*University Librarian and Director of Academic Information Resources:*

Michael A. Keller

*Web Site:* <http://library.stanford.edu>

Stanford University Libraries and Academic Information Resources (SULAIR) includes more than 30 libraries and programs supporting research, teaching, and learning at Stanford University. SULAIR acquires and delivers library collections in all formats, establishes policies and standards to guide the use of academic information resources, develops training and support programs for academic uses of computers, and maintains a broad array of electronic information resources, including the online library catalog and several hundred article and indexing databases and electronic journal subscriptions.

In each library unit, knowledgeable professional staff provide assistance in locating and using print and online information resources. Subject specialists and reference librarians are available for individual consultation, group classes, demonstrations, and special workshops by request.

Libraries throughout campus provide group and individual study spaces, public computers, personal laptop connections, photocopy machines, and digital scanners for use by Stanford faculty, staff, and students.

For information about library hours, see the Library Hours (<http://libraryhours.stanford.edu>) web site.

In support of the University's academic mission, Academic Computing Services provides technology expertise, resources and services to students and faculty. Academic Computing Services supports the use of technology in teaching, learning, research, and community; operates and manages technology-enabled teaching and learning environments including classrooms and public study spaces, the Multimedia Studio in Meyer Library, the Digital Language Lab, and computer clusters in Green Library, Tresidder Union, and the student residences; provides technology education, consulting support, and multimedia services at Meyer and in the residences; provides faculty-specific computing resources through the Academic Technology Specialist Program and Academic Technology Lab; and provides technology support to Stanford University Libraries' services.

Information about the library collections, facilities, services, and policies is available at the Libraries & Academic Information Resources (<http://library.stanford.edu>) web site.

Further information about library services and resources is available from the Information Center staff in Cecil H. Green Library (<http://infocenter.stanford.edu>) and from reference staff in all University libraries.

### Central Campus Libraries

The Cecil H. Green Library (East and Bing Wings) maintains research collections in the humanities, social sciences, area studies, and interdisciplinary areas. These collections number approximately 2.8 million volumes. Major services in Green Library include: the Information Center, the Media Microtext Center, the Jonsson Reading Room, the Lane Reading Room, the Bender Room, Loan Desk and Privileges, Interlibrary Services, course reserves, the Department of Special Collections, and the University Archives.

The J. Henry Meyer Memorial Library houses the East Asia Library as well as the Academic Computing Services group of SULAIR and provides

study, multimedia, consulting, and instructional support services. In addition, Meyer Library houses the University's Digital Language Lab, technology enabled study spaces and classrooms, the Academic Technology Lab, and the central offices of Student Computing and Academic Computing Services.

### Branch Libraries

Humanities and Social Sciences Branch Libraries include the Art and Architecture Library, Cubberley Education Library, East Asia Library, Music Library, and Archive of Recorded Sound.

Science Branch Libraries include the Branner Earth Sciences Library, Engineering Library, Falconer Biology Library, Mathematical and Computer Sciences Library, Harold A. Miller Library at the Hopkins Marine Station, Physics Library, and Swain Library of Chemistry and Chemical Engineering.

For a complete list of campus libraries, see the Libraries and Collections (<http://libraries.stanford.edu>) web site.

### Coordinate Libraries

**J. Hugh Jackson Library** (<http://www.gsb.stanford.edu/jacksonlibrary>), **Graduate School of Business**

*Director:* Kathy Long

**Lane Medical Library** (<http://lane.stanford.edu>)

*Director:* Debra Ketchell

**Crown Law Library** (<http://www.law.stanford.edu/library>)

*Director:* Paul Lomio

**SLAC Research Library** (<http://www-group.slac.stanford.edu/library>)

*Director of Technical Information Services:* Patricia Kreitz

### Hoover Institution Library and Archives

*Director:* John Raisian

*Web Site:* <http://www.hoover.org/library-and-archives>

Since its founding by Herbert Hoover in 1919 as a special collection dealing with the causes and consequences of World War I, the Hoover Institution has become an international center for documentation, research, and publication on political, economic, social, and educational change in the 20th and 21st centuries.

The Hoover Library and Archives include one of the largest private archives in the world and contain outstanding area collections on Africa, East Asia, Eastern Europe, Russia and the former Soviet Union, Latin America, the Middle East, North America, and Western Europe.

Holdings include government documents, files of newspapers and serials, manuscripts, memoirs, diaries, and personal papers of men and women who have played significant roles in the events of these centuries, the publications of societies and of resistance and underground movements, the publications and records of national and international bodies, both official and unofficial, and books and pamphlets, many of them rare and irreplaceable. The materials are open to all Stanford students, faculty, and staff, to scholars from outside the University, and to the public at large.

### Information Technology Services (IT Services)

*Web Site:* <http://itservices.stanford.edu>

IT Services manages the University's central information technology infrastructure and provides hundreds of services and applications for use in academic and business activities. Support is provided in four layers:

- Participation and client-focused leadership in institutional IT planning, including strategies for data center expansion, centrally managed storage and backup, and business continuity and disaster recovery.
- Applications and services for departments and end-users including email, calendaring, wireless connectivity, web authentication, and Windows and Linux server hosting. These services are supported by a help desk, contract-support consultants, online self-help, and training.
- Applications and services that support other campus service providers, including the help desk, change management, and network registration systems.
- A communications and collaboration infrastructure robust enough to support advanced network, voice, and web-based services.

To learn about the variety of information technology resources available at Stanford, see the Information Technology Services (<http://computing.stanford.edu>) web site. For assistance with technology services at Stanford, contact the Stanford IT Help Desk at (650) 725-HELP (5-4357) or submit a request through the HelpSU (<http://helpsu.stanford.edu>) web site.

# RECREATION

Stanford Recreation is organizationally housed within The Department of Athletics, Physical Education, and Recreation and more specifically within Recreation and Wellness. Recreation offers sports, fitness, health and well-being programs to meet the diverse needs of the Stanford community. Through collaborative team efforts, Recreation takes pride in presenting high quality and fun programs focusing on providing excellent service. A wide-breadth of programs and services are offered by Recreation in aquatics, club sports, fitness facilities, group exercise and personal training, intramural sports, membership and recreation services, recreation classes, and youth programs.

## Purpose

Stanford Recreation is committed to provide diverse recreational opportunities that inspire health and well-being for our community.

## Values

Inspiring a healthier Stanford by:

- Providing inclusive programs and facilities that welcome the entire Stanford community.
- Creating a collaborative growth-oriented team.
- Offering industry leading and highest quality programs and instruction.
- Maximizing fun and enjoyment through friendly and positive interactions in health, well-being and sports.

## AOERC

285 Santa Teresa St

The Arrillaga Outdoor Education and Recreation Center (AOERC) includes a 14,000 square foot fitness center which offers the latest in cardio and strength training equipment, enclosed indoor cycling studio, 50m pool, three basketball courts, the largest indoor collegiate climbing wall in the United States and more.

## ACSR

341 Galvez St.

The Arrillaga Center for Sports and Recreation (ACSR) includes an 11,000 square foot fitness center with our Olympic Lifting platforms and several pieces of adaptive equipment. The ACSR also has three basketball courts, a mat room, and seven squash courts.

## Outdoor Center

Located in the AOERC, the Outdoor Center is home to a full-service rental and retail facility, a lounge, an outdoor resource library and a multimedia classroom. The lounge serves as a central meeting space for Stanford community members who are interested in outdoor adventures. For current hours please visit [outdoorcenter.stanford.edu](http://outdoorcenter.stanford.edu) as hours can change during the quarter.

## Climbing Walls

The AOERC Climbing Wall and the ACSR Bouldering Wall are open to all Stanford community members regardless of experience. A valid SUID is required in order to access the facilities. Belay classes are available for free and climbing shoes are available to rent for \$2.00. For current hours please visit [climbing.stanford.edu](http://climbing.stanford.edu) as hours change quarter to quarter.

## Recreation Services

Desk Staff are your first point of contact at the entrances and also in the Fitness Centers of the ACSR & AOERC. We provide services and access for Stanford community members including Daily Recreation Facility Pass sales, equipment checkout and locker rentals. Please let us serve you if you have any questions or needs.

## ID Card Policy

All recreational facilities require a SUID Card or approved facility access card for access. Guest passes can be purchased by Stanford affiliates. All guest pass users must carry a government issued photo ID at all times while using the facilities. For more ID Card Information, please see the Member Services section of [recreation.stanford.edu](http://recreation.stanford.edu).

## Lockers

Recreational-use lockers and showers are available at the Ford Center and the Arrillaga Outdoor Education and Recreation Center (AOERC). There are no lockers at the Arrillaga Center for Sports and Recreation (ACSR). The following are our locker rental fees:

\$20/quarter or \$50/year for Students

\$30/quarter or \$70/year for Faculty/Staff

\*Payable by credit card or check. All lockers are available for rental at both the ACSR and AOERC Front Desks.

Day-use lockers are available at the AOERC, the ACSR and the Avery Aquatic Center. These lockers use keypad locks and do not require you to bring your own lock. Day-use lockers are free of charge and please note they will be cleared out each night at the close of business and any left behind contents will be added to the lost and found.

## Aquatics

We offer recreational swimming at two outdoor campus locations. The Avery Aquatic Center (AAC) is located in the center of the Stanford Athletics' facilities and is home to the Men's and Women's Swimming, Diving and Water Polo Teams, as well as the Synchronized Swimming team. In addition to hosting Rec Swim, the AAC has hosted the Intramural Swim Meet and Inner-tube Water Polo Tournament. The Avery Recreation Pool, located at the Arrillaga Outdoor Education and Recreation Center (AOERC) is a 50 meter pool set up in short course yards, used for recreational swimming and instructional classes. Stanford Recreation provides aquatic activities including Masters Swimming, Lifeguard Classes, Club Water Polo and several P.E. swim classes. Recreation instructional and fitness swimming classes are offered at the Avery Recreation Pool and include a BeWell rate for eligible staff.

For employment opportunities, contact information, and further details, please visit [recreation.stanford.edu/aquatics](http://recreation.stanford.edu/aquatics).

## Adventure Pursuits

The Stanford Adventure Program (SAP) is the organization that advises adventure experiences for Recreation & Wellness, Student Activities & Leadership (SAL), Stanford School of Medicine, Residential Education, the Haas Center and other formal SAP campus partners. SAP's student leadership model follows the Voluntary Student Organization structure established by SAL.

- *Outdoor Trips*: provides students the opportunity to participate in peer led adventure activities such as day trips and weekend experiences in a multitude of mediums including backpacking, rock climbing, surfing, kayaking, skiing, etc.



- *Outdoor House*: a new community within Suites founded with the intentions of creating a place for people to explore, educate and connect via their interests in adventures and the outdoors.
- *Stanford Outdoor Outreach Program (SOOP)*: enhances interpersonal relationships, fosters community, and instills personal confidence in San Francisco Bay Area youth through facilitated outdoor experiences.
- *Stanford Pre-Orientation Trips (SPOT)*: immersive experiences that take place the week before New Student Orientation and are designed to ease the transition of students to life at Stanford as well as foster Stanford Identity, community, and personal growth.

Visit [adventure.stanford.edu](http://adventure.stanford.edu) for more information.

## Club Sports

We brings together 27 diverse sports and more than 1,200 athletes with the common goal of creating an environment that fosters student development and leadership through sports. Teams compete in intercollegiate competitions at the highest level, while offering opportunities for participants of all skill levels, from beginners to experienced players.

Teams include the following: Archery, Badminton, Baseball, Basketball, Climbing, Cheer, Cycling, Equestrian, Golf, Hockey, Hurling, Judo, Lacrosse, Polo, Rugby, Running, Ski & Snowboard, Soccer, Squash, Swimming, Table Tennis, Taekwondo, Tennis, Triathlon, Ultimate, Volleyball, & Water Polo.

Visit [clubsports \(http://exploreddegrees.stanford.edu/recreation/clubsports.stanford.edu\)](http://clubsports.stanford.edu) for more information.

## Martial Arts

The Stanford Martial Arts Program (SMAP) is an umbrella organization that supports the various member martial art groups on campus. The main goals are to educate the Stanford community through outreach programming about the variety of martial arts instruction on campus, serve as a centralized communications network between the different groups and preserve the martial arts as a vital and distinctive component of Stanford life. SMAP has 12 distinct martial art offerings covering a wide variety of technical, physical and cultural skills.

Here are the following teams and clubs that are affiliated with the Stanford Martial Arts Programs: Aikido, Capoeira, Eskrima, Judo, Jujitsu, Kendo, Muay Thai Kickboxing, JKA Shotokan Karate, Taekwondo, Wing Chun Kung Fu, & Wushu.

Visit [smap.stanford.edu \(http://exploreddegrees.stanford.edu/recreation/smap.stanford.edu\)](http://smap.stanford.edu) for more information.

## Group Fitness Classes

Pay a single fee for one of two pass options and drop-in to any of our select classes, such as F45, Cardio Dance and more, throughout the quarter.

## Personal Training

Work with one of our experienced and certified trainers to tailor a fitness program for you.

## Fitness Assessments

Measure your health status and learn how you can achieve your fitness and wellness goals.

## Olympic Lifting Classes

Learn proper lifting etiquette from our experienced staff and receive an annual Olympic Lifting sticker to use our platforms

## Intramural Sports

IM's at Stanford include formal competition in a variety of team and individual sports using league, single elimination tournament, one day special event tournament, and ladder play structure. Registration occurs during the second week of classes during the Autumn, and during finals for the Winter and Spring. Mandatory Captains meetings can be completed during the registration period.

Our IM Sports leagues include the following: Flag Football (fall), Indoor Volleyball (winter), Basketball (winter), Outdoor Soccer (spring) and more.

For Intramural leagues information and further details, please visit [recreation.stanford.edu/intramurals](http://recreation.stanford.edu/intramurals).

*Senior Associate Athletic Director - Recreation and Wellness*: Eric Stein

*Director of Recreation*: Rick Craig

*Senior Associate Director of Competitive Sports*: Christian Obando

*Assistant Director of Competitive Sports*: New Hire

*Associate Director of Recreation*: Daralisa Kelley

*Assistant Director of Aquatics*: Alisha Garcia

*Assistant Director of Fitness*: Zach Trahan

*Assistant Director of Youth Programs*: New Hire

*Associate Director of Recreation Services*: Robin Embry

*Assistant Director of Recreation Facilities*: Ebone Cobb

*Director of Wellness*: Jen Sexton

*Assistant Director of BeWell*: Syrous Parsay

*Assistant Director of BeWell*: New Hire

*Senior Associate Director of Adventure Programs*: Sue Lowley

*Assistant Director of Outdoor Programs*: Emily McCune

*Assistant Director of Indoor Climbing*: Phil Sandlin

*Assistant Director of Leadership Engagement*: Andrew De Torres

*Senior Associate Director of Business Operations*: Dennis Phan

## Recreation Classes

Our classes provide participants with professional instruction in a safe and fun workout environment. Our Recreation Class offerings are non-credit classes. Stanford students, Faculty/Staff and Stanford community members are eligible to participate in Recreation Classes. Recreation classes that are offered throughout the academic year are the following:

- *Ashtanga Yoga*: taught in the Mysore style (a guided self practice), by Russell Case, authorized Level II Instructor by Pattabhi Jois and the Ashtanga Yoga Research Institute in Mysore India.
- *Golf*: covering all basic rules and etiquette of the sport including the fundamentals of grip, stance, alignment, posture and putting.
- *Gymnastics*: introducing participants to all gymnastics apparatus including floor exercise, vault, high bar, uneven bars, trampoline, rings, tumble track, pommel horse, balance beam and parallel bars.

- *Olympic Weightlifting*: develop the skills and strength necessary to perform the Olympic Lift (snatch, clean and jerk).
- *Squash*: learn the rules, tactics and techniques of this fast-paced game that will help to boost your skills on the courts.
- *Tennis*: helping to improve your forehand, backhand, serve and net play while simulating real game situations and explaining the rules of the game.

In addition, we often release occasional courses that will be offered throughout the academic year. Occasional courses that could be offered include our Pre- & Post-Natal Fitness Program, the Private Pilates Training Program and our Train to Run Program. Visit [recreationclasses.stanford.edu](http://recreationclasses.stanford.edu) (<http://exploreddegrees.stanford.edu/recreation/recreationclasses.stanford.edu>) for more information on all class offerings and registration details.

# SERVICES AND PROGRAMS

## Bookstore

Web Site: <http://stanfordbookstore.com>

Organized in 1897, Stanford Bookstore, (650) 329-1217, located at 519 Lasuen Mall (White Plaza), provides a diverse selection of books, course materials, and supplies to the students, faculty, staff, and community in and surrounding Stanford. The bookstore carries over 130,000 titles, including a wide selection of medical books and books written by Stanford authors, making it one of the largest bookstores in the nation. The bookstore also carries medical instruments, Stanford logo apparel, gifts and souvenirs, periodicals, and features a café that provides an enhanced shopping experience. The Computer Store, in the main branch, sells academically priced computer hardware and software. Other services include shipping of purchases, gift cards, book buyback, fax service, postage stamp sales, an ATM, and Enterprise Rent-A-Car hotline.

There are four branches in addition to the Stanford Bookstore that also serve the community: the Stanford Athletics Shop (formerly the Track House Sports Shop), (650) 327-8870, underneath the Cobb Track and Angell Field bleachers, is the headquarters for Stanford Athletic Gear; Tresidder Express convenience store, (650) 723-9224 in Tresidder Union; the Stanford Shop, (650) 614-0295, at the Stanford Shopping Center, provides Stanford apparel; and the Bookshop, (650) 725-2775, at the Cantor Center for the Arts, carries books on the arts, fine gifts, apparel, and jewelry.

## Stanford Conference Services

Phone: (650) 723-3126

Email: [conferenceinquiries@stanford.edu](mailto:conferenceinquiries@stanford.edu)

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

A conference is defined as any student, youth, or adult group that convenes for part of a day (including a luncheon), overnight, or for several days, outside the regular or summer academic sessions for registered students. Policies concerning conferences are the responsibility of the offices of the President and the Provost.

To make arrangements for hosting a new, academically sponsored residential summer conference during the mid-June through late-August time frame, contact Stanford Conference Services by phone or email as listed above. Stanford Conference Services also offers meeting planning services on a year-round basis for academically sponsored conference groups seeking assistance with planning and managing residential and non-residential conferences. In addition, conference organizers seeking to conduct conferences outside of the late August to early June time frame can also contact the non-academic facilities scheduling in the Office of the University Registrar, (650) 723-6755 or [reg-events@stanford.edu](mailto:reg-events@stanford.edu), or contact Stanford Events, (650) 723-2551 or [stanfordevents@stanford.edu](mailto:stanfordevents@stanford.edu).

Academic sponsorship by a Stanford dean or department head is required for first time conferences hosted by University departments or by conferences hosted by external organizations interested in meeting at Stanford. Conferences initiated by University departments or external organizations must demonstrate consistency with the University's academic mission. For summer conferences, the sponsoring department submits its proposal to the Director of Stanford Conference Services for review in terms of available facilities and for the approval of the President's Office. At least half of the participants in any summer conference at Stanford hosted by an external organization must be housed in Stanford's campus residences and participate in daily meal plans provided by Stanford Dining. On-campus residential housing

and dining services are normally available from the Sunday following Commencement through late August.

Summer conference groups should contact Stanford Conference Services concerning arrangements for tables, chairs, audio-visual aids, signage, janitorial services, trash pick-up and removal, sprinkler shutoffs, and other conference-related products/services. During the academic year, housing arrangements for University-sponsored visitors can be made through the Stanford Guest House (<http://guesthouse.stanford.edu>) web site or call (650) 926-2800.

## Ombuds

Interim Stanford University Ombuds: Rosan Gomperts

Phone: (650) 723-3682

Fax: (650) 725-7288

Mail Code: 94305-8200

Email: [rosang@stanford.edu](mailto:rosang@stanford.edu)

Web Site: <http://stanford.edu/dept/ombuds>

School of Medicine Ombuds: James Laflin

Office: Medical School Office Building, 1265 Welch Road, Suite X301, MC: 5404

Phone: (650) 498-5744

Fax: (650) 498-5865

Mail Code: 94305-5404

Email: [jlafin@stanford.edu](mailto:jlafin@stanford.edu)

Web Site: <http://med.stanford.edu/ombuds>

The charge to the Ombuds office at Stanford is: "The Ombudsperson's task is to protect the interests and rights of members of the Stanford community from injustices or abuses of discretion, from gross inefficiency, from unnecessary delay and complication in the administration of University rules and regulations, and from inconsistency, unfairness, unresponsiveness, and prejudice in the individual's experience with University activities. The Ombudsperson's office exists to receive, examine, and channel the complaints and grievances of members of the Stanford community, and to secure expeditious and impartial redress."

Any troublesome matter in the University community may be discussed in confidence with the University Ombuds. Services of the office are available to students, staff, and faculty. Although possessing no decision making authority, the Ombuds has wide powers of inquiry. The Ombuds refers matters to the proper person or office expeditiously and also provides conflict resolution services. For the role of the office of the Ombuds in cases of sexual harassment, see the "Non-Academic Regulations (p. 79)" section of this bulletin.

## Police Services

Department Office: Corner of Campus Drive and Serra Street

Phone: (650) 723-9633

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

The Stanford Department of Public Safety is a full service police department that operates 24 hours a day, 7 days a week. For police, fire, or ambulance response, dial 9-1-1, or 9-9-1-1 from a University phone. Emergency assistance can also be obtained by using one of the nearly 100 Blue Emergency Phone Towers strategically placed around campus.

The department is composed of the following divisions:

The Field Services Division consists of sworn and non-sworn officers who patrol the campus and respond to calls for service. Sworn officers receive their police powers through the Santa Clara County Sheriff's Office. Sworn officers have the legal authority to stop vehicles, make arrests, and enforce all laws. Non-sworn officers assist the sworn officers

with security patrols, evidence collection, crime prevention presentations, and other assigned tasks.

Community Service Division: Community Service Officers (CSOs) enforce the parking rules and regulations on campus, and provide traffic control at special events, construction zones, and accident scenes. CSOs also provide building security during emergency or critical incidents.

The Support Services Division provides logistical, technical, and accounting support to the department. Special events are handled through this division as well. Special Events Personnel (SEPs) provide security at campus events including athletic events, concerts, student-sponsored events, and dignitary visits. SEPs are available for hire by groups needing security at their University events. Contact the special events office at (650) 723-4924, or email [event\\_security@stanford.edu](mailto:event_security@stanford.edu), for more information.

The Administrative Support Division supports the department through training, recruiting, payroll, human resources, and other business functions.

For additional safety information or to view the yearly crime statistics, see the Stanford Safety and Security Almanac, available free from the Public Safety (<http://police.stanford.edu>) web site.

## Office for Religious Life

Office: Memorial Church  
Phone: (650) 723-1762  
Web Site: <http://religiouslife.stanford.edu>

The mission of the Office for Religious Life (ORL) is to guide and enhance spiritual, religious, and ethical life within the Stanford University community. Multifaith exploration and dialogue, central in Stanford's history from its founding, is a vital part of both its ethos and education.

The ORL is committed to welcoming students of all genders and sexual identities, all religious and non-religious traditions, and all cultural backgrounds, striving to ensure that students, faculty, and staff have access to supportive contexts in which to pursue their spiritual journeys on the Stanford campus.

The ORL oversees and provides support for Stanford Associated Religions (SAR), more than thirty religious organizations that offer their spiritual services to the campus, as well as the Center for Inter-Religious Community, Learning, and Experiences (the CIRCLE). Located on the third floor of the remodeled Old Union, the CIRCLE offers an interfaith sanctuary, a seminar room, a common room, a student lounge, a non-lending library, and offices housing many SAR member groups.

## Stanford Alumni Association

Web Site: <http://stanfordalumni.org>  
Phone: (800) 786-2586 or (650) 723-2021

The Stanford Alumni Association (SAA) seeks to serve all Stanford alumni and students by offering programs and services such as reunions, regional events, Stanford Magazine, online services, volunteer and learning opportunities, and the alumni directory.

The Stanford Alumni Association's alumni and student class outreach department (ASCO) provides undergraduates and graduate students with networking opportunities, celebratory and social events, and programs that enhance their Stanford experience and help connect them to the 200,000 alumni worldwide who make up the Stanford alumni community. ASCO programs bring students and alumni together through Reunion Homecoming Weekend each autumn and Commencement weekend in the spring, along with alumni networking events throughout the year.

For students, SAA sponsors events such as student tailgates, alumni panels, Senior Send-off, Senior Dinner on the Quad, and Class Day. The Alumni Association gives out the J.E. Wallace Sterling Award and the Stanford Award of Excellence annually to honor graduating seniors for exemplary service to the University. For more information on student programs at the Stanford Alumni Association (<http://police.stanford.edu>) web site.

## Office of Special Events & Protocol and the Stanford Ticket Office

The Office of Special Events & Protocol (OSEP) (<https://osep.stanford.edu>) and Stanford Ticket Office (STO) (<http://tickets.stanford.edu>) are divisions of the Office of Public Affairs (<http://publicaffairs.stanford.edu>). OSEP manages the University's public ceremonies such as Commencement, Baccalaureate, New Student Orientation Convocation, and the Founders' Celebration. The organization also designs and produces other high-profile university events hosted by the President and Provost, such as the Roundtable at Stanford, international symposia and visits to campus by foreign delegations and heads of state.

OSEP also serves in an advisory capacity and/or can provide direct planning expertise to campus schools, departments, and student groups. The department has final approval authority of Stanford facility and open space use for non-academic events on campus. For information or event planning assistance, information about policies, procedures, and University facilities, see the OSEP (<https://osep.stanford.edu>) web site, or call (650) 724-1387.

The STO is the University's official full-service box office that provides online, in-person and by phone ticketing services, as well as day-of-event staffing support to hundreds of events throughout the year. Important arts organizations and venues it serves include Stanford Live, Stanford Jazz and Music Departments, the Bing Concert Hall, Frost Amphitheater, and Memorial Auditorium. The Stanford Ticket Office also provides professional ticketing and registration services to all academic departments, institutes, and student groups for lectures, festivals, concerts, and various high profile public events. For more information, see the Stanford Ticket Office (<http://tickets.stanford.edu>) web site, or call (650) 725-ARTS (2787).

## Diversity and Access Office

*Director of the Diversity and Access Office:* Rosa Gonzalez  
Office: 419 Lagunita Drive, Suite 130  
Mail Code: 94305-8550  
Phone: (650) 723-0755; TTY: (650) 723-1216  
Email: [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu), [disability.access@stanford.edu](mailto:disability.access@stanford.edu)  
Web Site: <https://diversityandaccess.stanford.edu/>

The Diversity and Access Office ensures compliance with Titles VI and VII of the Civil Rights Act, the Equal Pay Act, the Americans with Disabilities Act (ADA) and Sections 503 and 504 of the Rehabilitation Act, the Age Discrimination in Employment Act, and Executive Order 11246, the California Fair Employment and Housing Act (FEHA), and the Unruh Civil Rights Act, among other laws.

The Diversity and Access Office was created to advance Stanford University's equal opportunity and affirmative action goals and commitment to diversity. The office also ensures University compliance with federal, state and local regulations concerning nondiscrimination and disability access. The Director of the Diversity and Access Office is responsible for administering the ADA/Section 504 Grievance Procedure (Student) and the Student Non-Academic Grievance Procedure. Finally, the office also provides an array of services and resources designed to ensure equal opportunity and address bias and discrimination prohibited by law or official University policy, as well as assists individuals with

disabilities who have requests for accommodations in the workplace and access to Stanford facilities, programs, and activities.

## Nondiscrimination Policy

Stanford University admits qualified students of any race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, veteran status, or marital status to all the rights, privileges, programs, and activities generally accorded or made available to students at the University. Consistent with its obligations under the law, Stanford prohibits unlawful discrimination on the basis of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity or expression, veteran status, marital status or any other characteristic protected by applicable law in the administration of the University's programs and activities; Stanford also prohibits unlawful harassment including sexual harassment and sexual violence.

The following person has been designated to handle inquiries regarding this nondiscrimination policy: Stanford's Director of the Diversity and Access Office, Rosa Gonzalez, Kingscote Gardens, 419 Lagunita Drive, Suite 130, Stanford, CA 94305-8550; (650) 723-0755 (voice), (650) 723-1791 (fax), [equal.opportunity@stanford.edu](mailto:equal.opportunity@stanford.edu) (email). Stanford's Title IX Coordinator, Catherine Glaze, has been designated to handle inquiries regarding sexual harassment and sexual violence: Kingscote Gardens (2nd floor), 419 Lagunita Drive, Stanford, CA 94305, (650) 497-4955 (voice), (650) 497-9257 (fax), [titleix@stanford.edu](mailto:titleix@stanford.edu) (email).

Individuals may also file complaints directly with the Office for Civil Rights, within the United States Department of Education, by following the information on this web site: <https://www2.ed.gov/about/offices/list/ocr/complaintintro.html>

## Awards and Honors

### Faculty and Staff Awards

#### Kenneth M. Cuthbertson Award

The Kenneth M. Cuthbertson Award was established in 1981 to recognize exceptional service to Stanford University. It was established by members of the faculty who wish to remain anonymous. All members of the Stanford community are eligible for the award; the sole criterion is the quality of the contribution that the recipients have made to the University. The award provides a way of honoring members of the staff and faculty for their efforts on behalf of the University.

Ordinarily, one award is made each year. The award was first presented in 1981 to the person for whom it is named. Kenneth M. Cuthbertson was one of the early architects of Stanford's long-term financial planning and fundraising program. His service to Stanford set an enduring standard for those who will come after him. The award is made annually at the University Commencement Ceremony.

#### Lloyd W. Dinkelspiel Awards

The Lloyd W. Dinkelspiel Awards recognize distinctive and exceptional contributions to undergraduate education at Stanford University. The two principal awards are made to the faculty or staff members adjudged to have made the most distinctive contribution to the development and enrichment of undergraduate education in its broadest sense. Two awards are also made to graduating seniors who combine academic achievement with effective contributions to undergraduate student life. Preference is given to service in the School of Humanities and Sciences in the area of liberal education. The awards are made from an endowment fund established in memory of Lloyd W. Dinkelspiel, a Stanford alumnus and trustee. The awards are made annually at the University Commencement Ceremony.

#### Walter J. Gores Awards

The Walter J. Gores Faculty Achievement Awards for excellence in teaching were established by bequest of Walter J. Gores, Stanford Alumnus of the Class of 1917 and a professor at the University of

Michigan for 30 years. Teaching is understood in its broadest sense and includes, in particular, lecturing, leading discussions, tutoring, and advising at the undergraduate or graduate levels. Any member of the teaching staff of the University is eligible for an award, including all faculty of professorial rank, instructors, lecturers, teaching fellows, and teaching and course assistants. Ordinarily, awards are made to a senior faculty member (associate or full professor) or senior lecturer; a junior faculty member or member of the teaching staff; and a teaching assistant (graduate or undergraduate student). The awards are made annually at the University Commencement Ceremony.

#### Allan Cox Medal For Faculty Excellence Fostering Undergraduate Research

The Allan Cox Medal for Faculty Excellence Fostering Undergraduate Research is awarded annually to a faculty member who has established a record of excellence directing undergraduate research over a number of years. It may also go to a faculty member who has done an especially outstanding job with just one or two undergraduates who have demonstrated superior work. The medal was established in memory of the former professor of Geophysics and Dean of the School of Earth Sciences, a strong supporter of faculty-student research collaboration.

#### Herbert Hoover Medal For Distinguished Service

David Starr Jordan's belief that every academic degree should represent work actually done in or under the direction of the institution granting it has meant that, since its founding, Stanford has awarded no honorary degrees. As a means of recognizing extraordinary individuals who deserve special acknowledgment, the Stanford Alumni Association in 1962 voted to establish the Herbert Hoover Medal for Distinguished Service. The name pays tribute to the former President's example of service to his University, to his country, and to the cause of world humanitarianism. Indeed, Mr. Hoover was the first award recipient. The gold medal is presented following selection by an anonymous committee appointed by the Chair of the Board of Directors of the Alumni Association.

### Student Awards

#### Boothe Prize for Excellence in Writing

Awarded during the freshman year, the Boothe Prize recognizes excellence in writing. Students are selected for this honor on the basis of essays written for courses fulfilling the Introduction to the Humanities or Writing and Rhetoric requirements. The prize is named for Mr. and Mrs. D. Power Boothe, Jr., whose gifts to the University reflect their interest in the humanities.

#### Deans' Award for Academic Achievement

The Deans of Earth Sciences, Engineering, and Humanities and Sciences recognize from five to ten undergraduate students each year for their academic endeavors. Honorees are cited for noteworthy accomplishments which represent more than a high grade point average or success in course work. Faculty nominate students who have exceptional tangible achievements in classes or independent research, national academic competitions, a presentation or publication for a regional or national audience, or exceptional performance in the creative arts.

#### Firestone Medal for Excellence in Research

The Firestone Medal is awarded to seniors in recognition of excellence in undergraduate research. Departments in the School of Humanities and Sciences nominate students who have completed outstanding honors projects in the social, physical, and natural sciences.

#### Robert M. Golden Medal for Excellence in the Humanities and Creative Arts

The Golden Medal recognizes outstanding achievement in the humanities and the creative arts. Seniors receive these medals upon nomination by their major department.

### Hoefler Prize for Excellence in Undergraduate Writing

The Hoefler Prize recognizes students and faculty for their work in courses that meet the University Writing Requirement for writing in the major. Prizes are awarded in each of the five areas of the undergraduate curriculum: humanities, social sciences, natural sciences, engineering, and earth sciences.

### Frederick Emmons Terman Engineering Scholastic Award

The School of Engineering annually presents the Terman Award to seniors for outstanding academic achievement. The awardees share their award with a high school teacher of their nomination.

### Phi Beta Kappa

Phi Beta Kappa is a nationwide society honoring students for the excellence and breadth of their undergraduate scholarly accomplishments. Membership in the Stanford Chapter (Beta of California) is open to undergraduates of all majors. To be elected to Phi Beta Kappa at Stanford, a student must achieve academic distinction in the major as well as in courses across a broad range of fields.

Approximately a tenth of the members of a graduating class are elected to Phi Beta Kappa. Of this number, about one fifth are chosen in their junior year, the remainder in their senior year.

The chapter's election guidelines define breadth of study as excellence beyond the major field. To be considered for election, a student must have taken at least three courses of 3 units or more at Stanford by the time elections are held early in the Spring Quarter with a letter grade of 'B-' or better in each of the following three major domains of knowledge: humanities; science, engineering, and math; and social sciences. Students who transfer in their junior year must have taken at least two courses at Stanford in two of the major domains and at least one course in the third domain, and must have completed a minimum of 75 units of academic work at Stanford by the end of Winter Quarter. Students who transfer in their sophomore year must have taken at least two courses at Stanford in each of the major domains.

There is no direct correlation between Stanford University General Education Requirements (GERs) and Phi Beta Kappa breadth requirements. The elections committee analyzes the content of individual courses to determine which major domain requirement they may satisfy. IHUM, PWR, and first-year language courses do not satisfy the PBK breadth criterion.

A grade of '+' or 'CR' is not considered a sign of distinction. Minimally satisfying the breadth criterion is not considered a sign of distinction.

The academic records of eligible students are automatically reviewed, so no special action is required for students wishing to be considered for membership. Anonymity in the election process is ensured by removal of the students' names from their academic records before consideration. Students who desire that their records not be made available for consideration by the Stanford chapter of Phi Beta Kappa should inform the Registrar, 630 Serra Street, Suite 120, Stanford, CA 94305-6032.

## Exchange Programs and Cross-enrollment Agreements

Stanford has exchange programs and cross-enrollment agreements with a number of other colleges and universities. The purpose of these programs and agreements is to offer Stanford students courses and training that are not available in the Stanford curriculum.

### Undergraduate

Stanford has exchange programs with four colleges and universities that allow students to exchange schools for a quarter/semester or for a year, depending on the school. These programs are best suited to students in their junior year, when the major area of study has been determined.

Stanford students register for zero units at Stanford during the quarter(s) in which they are attending another college or university and pay the regular Stanford tuition. Courses taken at the other institution are treated as transfer credit back to Stanford. Students should contact the External Credit Evaluation section of the Office of the University Registrar to determine whether the courses taken through an exchange program may qualify for credit toward a Stanford degree. Only the number of units accepted in transfer, not the course titles or the grades received, are recorded on the Stanford transcript.

Exchange programs are currently available at three historically black institutions: Howard University in Washington D.C.; and Morehouse College and Spelman College in Atlanta, Georgia. The exchange program at Dartmouth College in Hanover, New Hampshire, focuses on Native American Studies. Further information is available at the Undergraduate Advising and Research Center.

### Graduate

The Exchange Scholar Program is open to doctoral students in programs other than the Graduate School of Business or Stanford Law School who have completed one full year of study at one of the participating institutions. These students may apply to study at Stanford, and Stanford students may apply to one of these other institutions, for a maximum of one academic year (Autumn, Winter, and Spring quarters) to take advantage of particular educational opportunities not available on the home campus. The participating institutions are Brown University, University of Chicago, Columbia University, Cornell University, Harvard University, Massachusetts Institute of Technology, Princeton University, Stanford University, University of Pennsylvania, and Yale University. Further information on the program may be obtained from the Office of the University Registrar, or the graduate dean's office at participating institutions. Some institutions may place restrictions on specific departments.

Stanford also has separate exchange programs with the University of California, Berkeley, the University of California, San Francisco, and the University of California, Santa Cruz for students in marine sciences. Further information may be obtained at the Office of the University Registrar.

## Cross-Enrollment

See the "ROTC section (p. 130)" of this bulletin for information on ROTC cross-enrollment programs.

## Office of Special Events & Protocol Office of Special Events & Protocol and the Stanford Ticket Office

The Office of Special Events & Protocol (OSEP) (<https://osep.stanford.edu>) and Stanford Ticket Office (STO) (<http://tickets.stanford.edu>) are divisions of the Office of Public Affairs (<http://publicaffairs.stanford.edu>). OSEP manages the University's public ceremonies such as Commencement, Baccalaureate, New Student Orientation Convocation, and the Founders' Celebration. The organization also designs and produces other high-profile University events hosted by the President and Provost, such as the Roundtable at Stanford, international symposia, and visits to campus by foreign delegations and heads of state.

OSEP also serves in an advisory capacity and/or can provide direct planning expertise to campus schools, departments, and student groups.

The department has final approval authority of Stanford facility and open space use for non-academic events on campus. For information or event planning assistance, information about policies, procedures, and

University facilities, see the OSEP (<https://osep.stanford.edu>) web site, or call (650) 724-1387.

The STO is the University's official full-service box office that provides online, in-person and by phone ticketing services, as well as day-of-event staffing support to hundreds of events throughout the year. Important arts organizations and venues it serves include Stanford Live, Stanford Jazz and Music Departments, the Bing Concert Hall, Frost Amphitheater, and Memorial Auditorium. The Stanford Ticket Office also provides professional ticketing and registration services to all academic departments, institutes, and student groups for lectures, festivals, concerts, and various high profile public events. For more information, see the Stanford Ticket Office (<http://tickets.stanford.edu>) web site, or call (650) 725-ARTS (2787).

# STUDENT AFFAIRS

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

Student Affairs is led by the Vice Provost for Student Affairs. There are six main units in Student Affairs:

1. BEAM, Stanford Career Education
2. Community Engagement and Diversity
3. Dean of Students
4. Office of Residential Education
5. Student and Academic Services, and University Registrar
6. Vaden Health Center

The division encompasses a broad range of programs and services for undergraduates and graduate students, which are administered by the following offices and centers:

- Asian American Activities Center
- BEAM, Stanford Career Education
- Bechtel International Center
- Black Community Services Center
- Dean of Students
- Diversity and First-Gen Office
- El Centro Chicano y Latino
- Graduate Life Office
- Haas Center for Public Service
- LGBT Community Resources Center
- The Markaz: Resource Center
- Native American Cultural Center
- Office for Military-Affiliated Communities
- Office of Accessible Education
- Office of Alcohol Policy and Education
- Office of Community Standards
- Office of Residential Education
- Office of Student Activities and Leadership
- Student Services Center
- Student Financial Services
- University Registrar
- Vaden Health Center
- Women's Community Center

The Vice Provost for Student Affairs reports directly to the Provost and is responsible for providing leadership, policy direction, and administrative support for budget, personnel, facilities, and development, as well as oversight of the efficiency and effectiveness of each of the division's units. The Vice Provost interacts with the President, the Provost, the Vice Provosts, faculty, schools, department representatives, students, and parents. The Vice Provost is a member of the Stanford University Cabinet, and ex officio member of the Stanford Alumni Association Board of Directors, Stanford Athletic Board, and Haas Center for Public Service National Advisory Board. The Vice Provost also attends the Senate meetings of the Academic Council.

## Bechtel International Center

Office: 584 Capistrano Way

Web Site: <https://bechtel.stanford.edu>

The Bechtel International Center (I-Center) is a meeting place for students and senior research scholars at Stanford from throughout the world and for internationally oriented U.S. students, faculty, and short-term visitors on the campus. Through a variety of social, cultural, and educational

programs, I-Center facilities are used to acquaint students and scholars with the life of the university and the community, and to bring them together in activities of mutual interest.

The Center believes that international educational exchange nurtures a lifelong global perspective, and plays a key role in supporting Stanford's standing as a truly international university in the following ways:

- Provides information about and assistance with obtaining and maintaining legal status in the U.S. to foreign students, scholars, and Stanford departments.
- Advises U.S. students who are pursuing scholarships for study and research abroad.
- Enables foreign students, scholars, and their family members at Stanford to receive maximum academic, cultural, and personal benefit from their stays in the U.S.
- Contributes to international activities at Stanford by helping to create a welcoming and supportive environment that is responsive to the needs of the international community.
- Facilitates professional meetings between visiting international delegations and their Stanford counterparts.
- Provides opportunities for Stanford students, faculty, staff, and members of the local community to broaden their horizons by interacting with people from different cultures through programs to increase international awareness and understanding.

## BEAM, Stanford Career Education

Offices: 563 Salvatierra Walk

Web Site: <https://beam.stanford.edu/>

BEAM (Bridging Education, Ambition and Meaningful Work), Stanford Career Education empowers students to cultivate personalized networks that shape their professional journey through customized support for students based on their interests, academic majors and degrees. BEAM offers many opportunities to engage with employers and alumni via events, mentorships, experiential learning, and much more. Tools and digital resources are also made available through meetups, labs, or individual appointments to help students transform their ambitions into meaningful work.

Support is available to undergraduate and graduate students, and all students are encouraged to login to Handshake, our online platform that connects students and employers, to stay up to date on events and opportunities. Events and appointments are free to students and limited services are available to first-year alumni and student spouses/domestic partners.

The following suggestions may assist students in getting the most out of their journey toward meaningful work:

- Begin building your personalized network early in your Stanford career.
- Register with Handshake to access career events, internships, part-time and full-time jobs, and interview opportunities.
- Discover yourself and gain clarity of your interests and skills through meetups, assessments, and taking advantage of individual career coaching appointments that can be made via Handshake.
- Make exploration a priority by connecting with alumni mentors, planning informational interviews, signing up for a career trek, and meet with an industry consultant.
- Make a plan to pursue opportunities by attending labs, familiarizing yourself with resources, and utilize your connections.

*Visit Career Communities for career coaching in academic departments and student communities:*

Monday–Friday, 9 a.m. to noon, 1 p.m. to 5 p.m.; (650) 725-1789



Visit *Career Ventures* for customized industry connections and employer engagement opportunities:

Monday–Friday, 8:15 a.m. to 4:30 p.m.; (650) 723-9014

## Community Centers

There are seven ethnic and community centers that support students who seek services associated with a particular group or community. Each center has its own site and professional staff who advise and counsel students. In addition, the centers sponsor programs throughout the year that foster intellectual, personal, and cultural growth. Detailed information is available on the following web sites:

- Asian American Activities Center (<https://a3c.stanford.edu>)
- Black Community Services Center (<https://bcsc.stanford.edu>)
- El Centro Chicano y Latino (<https://elcentro.stanford.edu>)
- LGBT Community Resources Center (<https://lgbt.stanford.edu>)
- The Markaz: Resource Center for Engagement with the Cultures and Peoples of the Muslim World (<https://markaz.stanford.edu>)
- Native American Cultural Center (<https://nacc.stanford.edu>)
- Women's Community Center (<https://wcc.stanford.edu>)

The programs offered through the centers are open to all Stanford students.

## Dean of Students

Dean of Student Life: Chris Griffith

Office: Old Union

Phone: (650) 723-2733

Web Site: <https://studentaffairs.stanford.edu/who-we-are/dean-students>

The Dean of Students has responsibility for overseeing the Graduate Life Office, Office of Community Standards, and the Office of Alcohol Policy and Education, as well as responsibility for the Acts of Intolerance Protocol. The Dean reports to the Vice Provost for Student Affairs and is a member of his executive committee.

## Diversity and First-Gen Office

Office: Old Union, 520 Lasuen Mall, Suite 206

Phone: (650) 723-2733

Email: [jrolen@stanford.edu](mailto:jrolen@stanford.edu) (<http://exploreddegrees.stanford.edu/studentaffairs/jrolen@stanford.edu>)

Web Site: <https://diversityandfirstgen.stanford.edu/>

Established in 2010 to serve first-generation and low-income students and help them be successful, the Diversity and First-Gen Office provides:

- a Thrive Guide to publicize the abundance of support available
- contact information for student groups, staff, faculty, and alumni for networking and mentoring
- signature programs and special events to build community
- administrative support and advocacy for diversity programs, especially those highlighting socioeconomic issue

## Graduate Life Office (GLO)

Graduate Life Office: Escondido Village Office, 859 Comstock Circle  
Graduate Life Office, Graduate Community Center: 750 Escondido Road  
Phone: (650) 736-7078

Email: [graduatelife@stanford.edu](mailto:graduatelife@stanford.edu)

Web Site: <https://glo.stanford.edu>

The Graduate Life Office (GLO) works with students on and off campus and with student groups, including Community Associates (student residence staff), the Graduate Student Programming Board, and the Graduate Student Council, to create an inclusive environment through

programs in the residences and campus-wide. The Graduate Community Center (GCC) serves as a focal point for meetings and activities in the graduate community.

The GLO staff also works with individual students who need information and support or who may be experiencing personal difficulties. Staff members are knowledgeable about and have access to support and resources available throughout the university. Staff work closely with student services administrators in academic departments to provide consultation and services to students in need.

## Graduate Student Residence Program

The university's philosophy of graduate student housing is based on the premise that supporting high quality graduate scholarship and research is central to the mission of the university. By providing affordable housing in proximity to academic resources, the university creates an environment conducive to research and intellectual dialogue among students, their peers, and faculty members. The Community Associate (CA) program in the residences serves as a supportive resource for residents and to connect student neighbors through social events and activities to build a sense of community in the residences.

## Haas Center for Public Service

Center Office: 562 Salvatierra Walk

Mail Code: 8620

Phone: (650) 723-0992

Web Site: <https://haas.stanford.edu>

- The Haas Center for Public Service engages Stanford students in local and global public service across diverse pathways: direct service, community engaged learning and research, activism, philanthropy, public policy, and social entrepreneurship. The Haas Center offers:
  - Walk-in advising on public service opportunities and careers.
  - Community engaged learning and research across disciplines.
  - Supported full-time, quarter-long service opportunities in the U.S. and abroad.
  - Tutoring and mentoring programs rooted in enduring partnerships and cutting-edge education research.
  - Leadership training, service trips, and support for more than 125 service-related student organizations.

The Haas Center is the hub for Cardinal Service, a university-wide initiative to elevate service at Stanford in four areas:

- Cardinal Quarter: Students can select from more than 350 supported opportunities to participate full-time in service for a quarter or more. In the next five years, this will grow to 500 local, national and global opportunities.
- Cardinal Courses: Students can participate in more than 70 courses across 25 academic disciplines that integrate a community experience, examine a public issue, and explore civic identities.
- Cardinal Commitments: Students participate in and sustain a significant service experience to explore particular social issues or concerns.
- Cardinal Careers: Students explore multiple public service career options and learn about ways to integrate service into any career.

## Office for Military-Affiliated Communities (OMAC)

Office: Tresidder Memorial Union, 2nd floor

Phone: (650) 721-1563

Web Site: <https://military.stanford.edu>

The Office for Military-Affiliated Communities (OMAC) focuses on the administration and management of VA financial benefits, coordinates and supports educational opportunities for military-affiliated communities, and conducts outreach to faculty regarding engagement and support for faculty grants or other funding specifically identified for military and veteran communities.

## Office of Accessible Education (OAE)

Offices: 563 Salvatierra Walk  
Phone: (650) 723-1066; TDD (650) 723-1067  
Web Site: <https://oae.stanford.edu/>

The Office of Accessible Education (OAE) is the campus office designated to work with students, faculty, and staff to put in place appropriate accommodations for all Stanford students with disabilities, at both the undergraduate and graduate levels (including the professional schools). The OAE provides a wide array of support services, accommodations, and programs to remove barriers to full participation in the life of the university.

In reaching its determinations about appropriate accommodations, the OAE considers factors such as the documentation from professionals specializing in the area of the student's diagnosed disability, the student's functional limitations, and the student's input and accommodation history in regard to particular needs and limitations. The OAE then works with the student and relevant faculty and staff through an interactive process designed to achieve an accommodation that meets the needs of all parties.

## Office of Alcohol Policy and Education (OAPE)

Offices: Rogers House, 581 Capistrano Way  
Phone: (650) 723-5947  
Web Site: <http://studentaffairs.stanford.edu/alcohol>  
<https://alcohol.stanford.edu/>

The Office of Alcohol Policy and Education (OAPE) empowers students to make healthy decisions about drinking behaviors that not only affect them as individuals, but ultimately impact the campus community as a whole. OAPE is focused on reducing the harm of high-risk behaviors while increasing safe, legal, responsible actions. Services offered include individual consultation, educational workshops and seminars, and academic coursework. OAPE also sponsors Cardinal Nights, a program of weekly events that allow students to socialize in an environment free of alcohol.

## Office of Community Standards

Office: Tresidder Memorial Union, 2nd floor  
Mailing Address: 459 Lagunita Drive, Suite 9  
Mail Code: 94305-3010  
Phone: (650) 725-2485  
Fax: (650) 736-0247  
Web Site: <https://communitystandards.stanford.edu/>  
Email: [community\\_standards@stanford.edu](mailto:community_standards@stanford.edu)  
([judicial.affairs@stanford.edu](mailto:judicial.affairs@stanford.edu))

The primary codes of conduct for students are the Fundamental Standard and Honor Code. Cases of alleged violations of the university's Honor Code, Fundamental Standard, and other student conduct or University policies proceed through an established student conduct process (<https://communitystandards.stanford.edu/student-conduct-process>) outlined in the Student Judicial Charter of 1997, which can be found in its entirety at the Office of Community Standards (<https://communitystandards.stanford.edu>) web site. The web site also contains the policies, rules, and interpretations, as well as the university's Student Conduct Penalty Code, applicable to those students found responsible for

violating the Honor Code, the Fundamental Standard, or other university policy or rule.

Allegations of sexual misconduct, sexual harassment, stalking, or dating violence proceed through the Dean's Alternate Misconduct Review Process (<http://studentaffairs.stanford.edu/judicialaffairs/process/alternate-review>).

When a violation of the Fundamental Standard, Honor Code, or other university policy or rule governing student conduct is alleged, or whenever a member of the university community believes such a violation has occurred, he or she should contact the Office of Community Standards.

## Fundamental Standard

Students at Stanford are expected to know, understand, and abide by the Fundamental Standard, which is the university's basic statement on behavioral expectations articulated in 1896 by Stanford's first President, David Starr Jordan, as follows:

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

The Fundamental Standard is an aspirational statement of Stanford's ideal of civic and moral community. Although the spirit of the Fundamental Standard remains unchanged since 1896, these aspirational learning goals for all Stanford students elaborate its basic values today:

- i. Students are expected to respect and uphold the rights and dignity of others regardless of race, color, national or ethnic origin, sex, age, disability, religion, sexual orientation, gender identity, or socioeconomic status.
- ii. Students are expected to uphold the integrity of the university as a community of scholars in which free speech is available to all and intellectual honesty is demanded of all.
- iii. Students are expected to respect university policies as well as state and federal law.
- iv. For the purposes of clarity, students should be aware that they may be subject to discipline at Stanford University for acts of misconduct including:

- Violation of university policy
- Violation of a specific university directive
- Violation of an applicable law
- Physical assault
- Sexual misconduct, sexual assault, sexual harassment, stalking
- Theft of property or services
- Threats
- Hazing
- Hate crimes
- Alcohol- and drug-related violations, including driving under the influence
- Intentional or reckless property damage
- Seeking a university benefit to which a student is not entitled
- Falsifying a document
- Impersonating another
- Computer violations
- Knowingly or recklessly exposing others to significant danger

There is no standard penalty that applies to violations of the Fundamental Standard. Infractions have led to penalties ranging from

formal warning and community service to expulsion. In each case, the nature and seriousness of the offense, the motivation underlying the offense, and precedent in similar cases are considered.

## Honor Code

The Honor Code is the University's statement on academic integrity. It is essentially the application of the Fundamental Standard to academic matters. Provisions of the Honor Code date from 1921, when the honor system was established by the Academic Council of the University Faculty at the request of the student body and with the approval of the President. The Honor Code reads:

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

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

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

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

Examples of conduct that has been found to be in violation of the Honor Code include:

- Copying from another's examination paper or allowing another to copy from one's own paper
- Unpermitted collaboration
- Plagiarism
- Revising and resubmitting a quiz or exam for regrading without the instructor's knowledge and consent
- Representing as one's own work the work of another
- Giving or receiving aid on an academic assignment under circumstances in which a reasonable person should have known that such aid was not permitted

For more information, see the Student Conduct Process (<https://communitystandards.stanford.edu/student-conduct-process>) pages at the Community Standards (<http://communitystandards.stanford.edu>) web site. The standard sanction for a first violation is a one quarter suspension from the University and 40 hours of community service. In addition, many faculty members issue a 'No Pass' for the course in which the violation occurred. Information for teachers is available on the Teaching Commons web site (<https://teachingcommons.stanford.edu/resources/teaching-resources/how-evaluate-students/academic-honesty-and-dishonesty>).

## Office of Residential Education

Office: Tresidder Memorial Union  
Phone: (650) 725-2800  
Web Site: <https://resed.stanford.edu/>

The Office of Residential Education is responsible for developing the policies, programs, and staffing which support the intellectual, educational, and community-building activities in student residences.

The conviction behind the Stanford residence program is that formal teaching, informal learning, and personal support in residences play an important role in a Stanford education.

## Residential Education Program

The Residential Education program provides Stanford undergraduates with a small community experience within a large research university. Residential Education programs extend the classroom into the residences and complement the academic curriculum with activities and experiences that contribute to students' preparation for a life of leadership, intellectual engagement, citizenship, and service. An extensive network of staff, including many who live in the residence halls, supports students during their undergraduate careers.

## Residence Deans

Residence Deans provide assistance to on- and off-campus undergraduate students. They can advise students about personal matters, occasionally intervene directly in behavioral problems or mental health concerns, and assist with personal emergencies. Advice is also available on issues of academic probation or suspension, leaves of absence, special concerns of students, and administrative matters. Residence Deans work closely with the Dean of Student Life and other University offices. They are assigned to specific residences and to off-campus students. For further information, undergraduates should call Residential Education at (650) 725-2800. For assistance, graduate students can consult assistant deans in the Graduate Life Office at (650) 736-7078.

## Office of Student Activities and Leadership (SAL)

Office: Old Union, 520 Lasuen Mall, Suite 206  
Web Site: <https://sal.stanford.edu/>

The Office of Student Activities and Leadership (SAL), located in Old Union, supports student activities, over 600 student organizations and the ASSU through publications, workshops, one-on-one consultation, advising and major event planning support.

## Voluntary Student Organizations

There are over 600 different Voluntary Student Organizations (VSOs) at Stanford. VSOs are organizations

1. in which membership is not mandatory and is nondiscriminatory,
2. in which membership is both open and limited to current Stanford students registered in a degree-granting program,
3. in which students make all organizational decisions, and
4. whose purposes and procedures are consistent with the goals and standards of the University. In order to use University facilities, the Stanford name, or to receive ASSU funding, all voluntary student organizations must register with the University through the Office of Student Activities, Old Union, room 206.

As a condition of registration, each voluntary student organization must file and have approved each of the following:

1. A statement of purpose and organizational constitution.
2. A statement about membership eligibility.
3. Clear procedures for officer elections.
4. Identification of the authorized representatives of the group, who must be a currently registered student, and at least five active members in the organization who are currently registered students.

Each voluntary student organization must renew its registration with the University annually, early in Autumn Quarter, by submitting new registration materials.

If a voluntary student organization that is registered with the University seeks to use University facilities for meetings open to more than its own members and to specifically invited guests, such meetings shall be subject to the policies of the Committee on Public Events. All organization events held in University facilities must receive event approval from the Student Activities and Leadership and Stanford Events.

A voluntary student religious organization may hold open meetings in University facilities only with the approval of the Office of the Dean for Religious Life (as the delegatee of Student Activities and Leadership).

A registered voluntary student organization may advocate publicly a position on a public issue, provided the organization clearly identifies itself, and provided such an organization in any public statement makes clear it does not represent or speak for the University or the Associated Students.

No student group or individual student(s) may use University space or facilities or receive other University support for purposes of supporting candidates for public office. Groups may use White Plaza for tables, speeches, and similar activities and may request to reserve auditoriums and similar space for public events including speeches by political candidates as long as all University guidelines are followed.

## Student Financial Services

Office: Tresidder Memorial Union, 2nd floor  
Phone: (866) 993-7772 (toll-free)  
Web Site: <https://sfs.stanford.edu>

Student Financial Services is responsible for managing billing, payment, and collections of student accounts receivable; and managing student loan receivables and collections. Student Financial Services also manages the refunding of aid to students in collaboration with the financial aid offices and in compliance with Title IV regulations. Furthermore, Student Financial Services provides resources and guidance to University departments to ensure accurate receipting and depositing of monies.

## Student Services Center

Office: Tresidder Memorial Union, 2nd floor  
Contact via HelpSU: <https://remedyweb.stanford.edu/helpsu/helpsu?pcat=StuAcct&dtag=10772> (http)  
Phone: (650) 723-7772 or (866) 993-7772 (toll-free)  
Web Site: <https://studentservicescenter.stanford.edu>

The Student Services Center (SSC) is committed to providing a single point of friendly, professional service for answers to questions concerning administrative and financial issues. The center strives to resolve 90 percent of students' issues upon first contact. The SSC represents Student Financial Services, the Office of the University Registrar, the University Cashier's Office, the Financial Aid Office, and Stanford ID Card Services, and is able to assist students with questions including those related to University billing, financial aid disbursements, refunds, payroll deductions, payment plan, enrollment, Stanford degree policies and procedures, Stanford ID card, and forms pickup and submission.

## Vaden Health Center

Center Office: 866 Campus Drive  
Web Site: <https://vaden.stanford.edu>

The Allene G. Vaden Health Center strictly protects the confidentiality of information obtained in medical care and counseling.

## Medical Services

Medical Services (650-498-2336, ext. 1) is the first stop for diagnosis and treatment of illness, injury, and ongoing conditions, as well as preventive

counseling and education. Services available without additional charge for students who have paid the Campus Health Service fee include:

- Medical appointments in general medicine and sports medicine.
- Medical advice for routine concerns throughout the day. When Medical Services is closed, advice for urgent conditions is available from the on-call physician.
- Referral to specialists, primarily at Stanford Hospital and Clinics and Menlo Medical Clinic.

### Additional services (fees apply):

- Allergy injections, immunizations, travel services, physical exams for employment and scholarships, HIV testing, laboratory, X-rays, drug screening (academic year only).
- Pharmacy (650-498-2336, ext. 3) and physical therapy (650-723-3195) are available on site.

## Counseling and Psychological Services (CAPS)

CAPS (650-723-3785) helps students who experience a wide variety of personal, academic, and relationship concerns. Services available without additional charge for students who have paid the Campus Health Service Fee include:

- Evaluation and brief counseling, including personal, couples and group therapy. Students requesting or requiring longer, ongoing therapy incur fees.
- Workshops and groups that focus on students' social, personal and academic effectiveness.
- Crisis counseling for urgent situations 24 hours a day.
- Consultation and outreach to faculty, staff, and student organizations.

## Confidential Support Team (CST)

Office: Mariposa House, 585 Capistrano Way, 2nd Floor, Rooms 208 and 209  
Phone: 650-736-6933  
Web Site: <http://vaden.stanford.edu/sexual-assault>

The Confidential Support Team (CST) offers emotional support, consultation, and short-term individual counseling to Stanford students impacted by sexual assault and relationship/domestic violence as well as intimate partner abuse, stalking, and sexual harassment. CST is staffed by clinical psychologists and a clinical social worker. At CST, students can receive information and guidance about their rights and reporting options. Confidentiality is strictly maintained. There is no charge for Stanford students.

### Additional Services

- Consultation to faculty, staff and student organizations
- Assistance connecting to other on- and off-campus support resources

### Hours of Service

- To access CST services, call the hotline at 650-725-9955 or stop by the main office at Rogers House (<https://campus-map.stanford.edu/?id=&lat=37.4234371992&lng=-122.171889161&zoom=15&srch=Rogers%20House>) on Monday, Tuesday, Thursday, and Friday from noon-5 pm and Wednesday from 10 am-3:30 pm. Counseling sessions are held at Stanford University Medical Center.
- At all other times, call the hotline at 650-725-9955, which is directed to a CAPS on-call clinician.
- To contact the CST Office when not seeking to access confidential support services, call the general business line at 650-736-6933.

## Health Promotion Services

Health Promotion Services (650-723-0821) educates and supports students to help them make informed, healthy decisions about their lifestyle. Services include:

- Individual preventive counseling and resource referral concerning nutrition, weight management, eating and body image, alcohol, tobacco and other drug use, sexual assault and harassment, relationships, intimacy and gender issues, and sexual health.
- Health education speakers, programs, and events and workshops at student residences, community centers, student organizations, and for new students (such as Real World: Stanford).
- Academic courses and internships.
- Student groups and volunteer opportunities including Peer Health Educators, HIV Peer Anonymous Counseling and Testing (HIV\*PACT), Sexual Health Peer Resource Center (SHPRC), and CPR/First Aid classes.

## Health Insurance

All registered students are required to have health insurance. Call (650) 723-2135 for more information. Cardinal Care (<http://vaden.stanford.edu/insurance>), the University-sponsored plan for students, fulfills this requirement. Insured by Aetna Student Health (medical), and ValueOptions (mental health), Cardinal Care features comprehensive, worldwide coverage, services by referral at Stanford University Medical Center and Menlo Medical Clinic, and lowest costs when one initiates care at Vaden Health Center. Stanford does not sponsor a health insurance plan for dependents; for available options, see the Dependent Health Insurance (<http://vaden.stanford.edu/insurance/dependent-coverage>) web site. Options for voluntary dental insurance are also offered.

Under certain circumstances, students with their own health insurance may waive Cardinal Care coverage. Domestic students who choose not to participate in Cardinal Care only have to waive once each academic year and must waive coverage before the first quarter in which they are enrolled for that academic year. At that time, and that time only, they will be able to waive Cardinal Care for the rest of the year by documenting equivalent health insurance in Axxess (<http://axess.stanford.edu>) by the applicable deadline listed on Vaden's web site ([http://vaden.stanford.edu/insurance/using\\_your\\_own.html#wave](http://vaden.stanford.edu/insurance/using_your_own.html#wave)). International students must have coverage that meets or exceeds minimum standards established by the University in order to opt out of Cardinal Care; for more information see Vaden's web site ([http://vaden.stanford.edu/insurance/using\\_your\\_own.html#international](http://vaden.stanford.edu/insurance/using_your_own.html#international)).

*Vice Provost for Student Affairs:* Susie Brubaker-Cole

*Associate Vice Provost and University Registrar, Student and Academic Services:* Johanna Metzgar (effective May 21, 2018)

*Associate Vice Provost and Dean of Career Education:* Farouk Dey

*Associate Vice Provost and Director of Vaden Health Center:* Jim Jacobs

*Associate Vice Provost and Dean of Students:* Chris Griffith

*Associate Vice Provost and Dean of Residential Education:* Deborah Golder

*Associate Vice Provost for Administration:* Margaret Dyer-Chamberlain

# Accounting (ACCT)

## **ACCT 210. Financial Accounting. 4 Units.**

Financial accounting is the measurement of economic activity for decision-making. Financial statements are a key product of this measurement process and an important component of firms' financial reporting activities. The objective of this course is not to train you to become an accountant but rather to help you develop into an informed user of financial statement information. While financial statement users face a wide variety of decisions, they are often interested in understanding the implications of financial statement information for the future cash flows and earnings potential of a firm. We will focus on understanding the mapping between underlying economic events and financial statements, and on understanding how this mapping affects inferences about future profitability and liquidity. The following learning objectives will be emphasized: (1) familiarity with the transactions businesses engage in, (2) fluency in accounting terminology, (3) understanding the structure that maps transactions into accounting numbers, (4) understanding the rationale for various accounting methods, and (5) awareness of the judgment involved and the discretion allowed in choosing accounting methods, making estimates, and disclosing information in financial statements.

## **ACCT 212. Managerial Accounting: Base. 2 Units.**

This course provides an introduction to the concepts and tools of managerial accounting. The first part of the course covers alternative costing methods and illustrates how the resulting cost information can be used to analyze the profitability of individual products and customers. The second part of the course will examine the role of internal accounting systems in evaluating the performance of individual business segments and divisions of the firm. Included in this part are topics related to the choice of internal pricing methods for transferring goods and services across divisions of the firm and the use of financial metrics for assessing the profitability of these divisions.

## **ACCT 213. Financial Accounting - Accelerated. 4 Units.**

This course develops students' ability to read, understand, and use corporate financial statements. The course is oriented toward the user of financial accounting data (rather than the preparer) and emphasizes the reconstruction and interpretation of economic events from published accounting reports. The course is geared toward students with some familiarity in dealing with financial statement information and allows for deeper coverage and discussion in class.

## **ACCT 219. MSx: Accounting. 3 Units.**

A characteristic of business is the extensive use of accounting data. The financial accounting course has the general objective of developing students' understanding of the nature, scope, and limitations of accounting information. To achieve this objective the course attempts to: (1) develop students' understanding of the conceptual accounting framework, including the objectives of financial reporting, and (2) develop students' ability to understand and critically evaluate the financial disclosures made by corporations. An issue of particular interest will be the managerial incentive aspects of accounting information and disclosures.

## **ACCT 311. Global Financial Reporting. 4 Units.**

This course is designed to enhance students' understanding of current financial reporting issues through a detailed analysis and comparison of U.S. and International Financial Reporting Standards. The course will cover the development of accounting standards, implementation of these standards, and how to interpret output from these standards. The course highlights intermediate and advanced financial reporting topics including fair value accounting, asset securitization, consolidation including special purpose entities, foreign currency translation, derivatives and hedging, leases, revenue recognition, pensions, and equity compensation. The course also focuses on evaluating emerging financial reporting issues such as proposed financial reporting standards put forth by U.S. or international standard setting bodies. This course should help students better understand the environment governing global financial reporting and how firms develop financial statement information within this environment.

## **ACCT 313. Accounting-Based Valuation. 3 Units.**

This course is designed to develop students' ability to interpret and use financial accounting information in an equity valuation context. The perspective taken is that of an outsider relying on publicly available financial information for investment purposes. The course relies heavily upon financial statement analysis tools and the residual income framework for equity valuation. Through lectures, in-depth case studies, and real-time exercises, the first half of the course covers traditional financial statement analysis-based tools for critically analyzing and assessing a firm's current financial performance and economic condition, including ratio analysis, accounting quality analysis and financial distress / bankruptcy prediction models. The second half of the course introduces the accounting-based valuation framework and develops the link between financial statement analysis, forecasting and equity valuation. The capstone to the course is the completion of a comprehensive, real-time valuation of a publicly traded firm (or registered IPO candidate). The course is structured for students to gain a deeper understanding of the economic pressures behind the valuation creation and valuation process, and will be useful to those students who anticipate making investment or credit decisions at least partially based on historical and prospective financial statement information.

## **ACCT 317. Managerial Accounting: Performance Measurement, Compensation, and Governance. 3 Units.**

The course will examine the academic and professional controversies surrounding corporate governance and executive compensation. A basic framework will be developed to integrate the many important dimensions of corporate governance in the U.S. and international settings. The institutional features of corporate governance and executive compensation will be documented using the professional business and legal literatures. In addition, the scientific research in accounting, economics, finance, and organizational behavior will be used to provide insights into the measurement and consequences of observed corporate governance and executive compensation choices. After successfully finishing the course, a student should be able to (i) understand the debates about appropriate choices for corporate governance and executive compensation and (ii) critically evaluate the implications of academic and professional research studies on these controversial issues.

**ACCT 332. Mergers and Acquisitions. 3 Units.**

This course provides a comprehensive overview of strategic, economic, accounting and financial issues related to mergers and acquisitions. Specifically, we review the market for corporate control, discuss strategic and governance issues related to firms' decision to acquire or be acquired, and examine the M&A regulatory environment. We analyze various pricing and deal structure considerations, identify strategies that underlay a successful negotiation, and review the financial reporting and income tax implications of M&A deals. Covering these and other related issues, we will discuss both the theory and practice of mergers and acquisitions. To provide some specific context we will analyze several M&A deals (e.g., Google/Motorola, HP/Compaq, UpJohn/Pharmacia, AOL/Time Warner, Oracle/PeopleSoft, and many more). In discussing these cases, we will examine the situation faced by the company, the issues surrounding the transaction, including the financial reporting implications, and focus on the managerial incentives and the judgment applied. We will also review some of the related literature in accounting, economic, and finance, to gain broader perspectives and insights into the financial issues associated with M&A transactions. Class time comprises mini lectures that introduce some of the more technical concepts, case discussions, and guest speakers who will offer additional perspectives on the subject matters. The course is co-taught by Ron Kasznik (GSB) and Safra Catz (Oracle Corporation). Ms. Catz is the CEO of Oracle Corporation and a member of its Board of Directors. She has led Oracle through more than 100 acquisitions in recent years (including PeopleSoft, Siebel, BEA, Sun Microsystems, and many more). Prior to joining Oracle in 1999, Ms. Catz was Managing Director at Donaldson, Lufkin & Jenrette, a global investment bank (now part of CSFB). Ms. Catz also serves on the board of directors for HSBC Holdings plc.

**ACCT 333. Taxes and Business Strategy. 3 Units.**

Traditional business courses analyze an array of factors affecting business decisions but provide little systematic consideration of the role of taxes. By contrast, tax accounting courses traditionally concentrate on technical legal and administrative issues while ignoring the environment in which taxes enter an individual's or firm's decision. This case-based course intends to bridge this gap by providing a framework for recognizing how taxes affect strategic personal and business decisions and gaining experience analyzing a wide range of tax-related issues. The key themes of the framework - all parties, all taxes and all costs - are applied to decision contexts such as investments, retirement planning, cash and equity compensation, organizational form, tax planning for multiple jurisdictions, and M&A. The goal of this course is to provide an approach to thinking about taxes that will be valuable across jurisdictions even as laws change.

**ACCT 340. Alphanomics: Informational Arbitrage in Equity Markets. 4 Units.**

This is an advanced elective course on the economics of active investing in public equity markets. We will cover a set of foundational skills needed to select, and manage, a portfolio of public stocks. Specifically, the course material is designed to improve student skills in: (1) assessing the relative attractiveness of individual companies, (2) building stock screens to filter and rank firms based on user-specified parameters, (3) buying and shorting individual equity positions, and (4) monitoring and managing portfolio risk. This is a hands-on course with an emphasis on experiential learning. Students will make extensive use of the analytical tools. Some of the classes will be held in the "Real-time Analytics and Investment Lab" (R.A.I.L.) facility in the Bass Center. There is no final exam. However, there will be a number of individual cases and a final group project. 25% of the grade will be based on class participation, and 75% will be based on cases and projects. Because it is an advanced elective, students taking this class are expected to be well versed in core economic, accounting, and finance skills. Material covered in a second Financial Modeling course, as well as in Accounting 312 (Evaluating Financial Statement Information) and Accounting 313 (Accounting-based Valuation) will come in handy. However, none of these courses are required.

**ACCT 354. Analysis and Valuation for Event-Driven Investing. 3 Units.**

This Bass seminar is designed to develop students' ability to interpret and use financial accounting information in credit and equity valuation contexts. The course will focus on valuing the securities of companies undergoing significant changes as a result of litigation, restructuring, regulatory changes, mergers, spin-offs or significant industry shifts. Throughout the course, students will (1) enrich their understanding of how alternative economic, legal, political and regulatory outcomes affect the value of various components of a company's capital structure and (2) develop their ability to apply financial statement analysis to assess the likelihood and valuation implications of the events of interest. Event-driven investing follows the life cycle of companies as they revamp their corporate structures in response to economic and regulatory environments. For example, in rising economic periods companies may undertake acquisitions or spin off divisions to enhance shareholder value. During adverse environments, bankruptcy and reorganizations often reshape the capital structure by offering opportunities to create value through the restructuring process. During economic transitions, debt and equity investors may make significantly different assessments of the quality of a company's earnings, its assets, and its likelihood to meet its debt obligations. To assess the probability of corporate events, investors must make judgments about the quality of a company's earnings and assets and understand how accounting policies may influence management's representations. Investors must also interpret how accounting policies function at various points in a firm's life cycle, influencing the quality of earnings for firms differently in different economic environments. In the first half of the course, we will develop the course framework, and apply it to illustrative cases. Companies featured in past years include Tyco, AIG, CIT, Fannie Mae, Tesla, Pharmasset and Gilead and Commerzbank. Students will interpret information from companies' public financial disclosures to assess the likelihood of different events or outcomes. The course will also feature readings on current accounting standards, articles from the popular press, publicly available financial statement information, and guest speakers with in-depth knowledge of investing strategies vis a vis the case companies. The latter part of the course will be devoted to project work, with students working in teams to develop an event-driven investing strategy. The aim is to allow students to conduct independent research on a company, industry, economic context, or financial reporting environment of particular interest. Students will develop their investment idea, articulate their sense of the possible outcomes for the components of the firm's capital structure, and explain how they have assessed the likelihood and valuation consequences of those outcomes. At the conclusion of the course, students will present their strategies to the class and a panel of expert judges.

**ACCT 516. Analysis and Valuation of Emerging Market Firms. 2 Units.**

This course examines the unique institutional, governance and transparency issues affecting corporate valuations in emerging markets. Through lectures, case discussions and the students' real-time analysis of an emerging market firm, this condensed course is structured for students to gain a deeper understanding of the economic pressures behind the value creation, value destruction and valuation process in emerging economies. The course focuses on critically interpreting financial and non-financial information for purposes of assessing firm fundamentals and corporate governance risk in the presence of weak legal systems, strong political forces, limited investor protections, limited market development, strong macro-economic forces, opacity and resultant business arrangements. The course is beneficial for entrepreneurs, consultants, investors and managers operating in or considering expansion to developing markets.

**ACCT 523. Board Governance. 2 Units.**

This course is focused on helping students understand the role boards and board members play in corporate governance and the lives of businesses large and small. This case-driven course is designed to help students who plan to serve on boards as private-equity or venture investors, entrepreneurs who will need to assemble and manage boards, and executives who realize they will need to interact with and answer to boards. The course is designed to help students understand the issues boards face - both routine and non-routine - through the eyes of the board member. By understanding the roles and responsibilities of board members and the mechanisms through which they exercise these duties, students will come away with an understanding of how boards function effectively (and in too many cases fail to function effectively). The course will include examining boards in a variety of contexts with a focus on three types of situations: public for-profit companies, early-stage private companies, and not-for-profit companies of different sizes.

**ACCT 524. Individual Taxes and Financial Planning. 2 Units.**

The goal of this course is to provide a fundamental understanding of the principles of taxation and tax planning as they relate to personal income taxes and considering an individual's financial position. Traditional business courses analyze an array of factors affecting business decisions but provide little systematic consideration of the role of taxes in individual financial planning decisions. By contrast, tax accounting courses traditionally concentrate on technical legal and administrative issues while ignoring the environment in which taxes enter an individual's decision-making. This case-based course intends to bridge this gap by discussing how taxes affect a variety of personal financial planning decisions.

**ACCT 542. Corporate Taxes and Business Strategy. 2 Units.**

The goal of this course is to provide a fundamental understanding of the principles of business taxation and tax planning, which will be relevant and valuable even as tax laws change - over time, across borders, and by taxpayer type. The role that taxes may play in business decisions are presented within an "all taxes, all parties, all costs" framework, from the tax issues at start-up (e.g., the choice of organizational form for a new venture), multistate and multinational operations, financial accounting implications, and mergers and acquisitions. We will use cases to gain hands' on experience analyzing business tax strategies and refer to financial statement disclosures as appropriate so that you can learn how taxes affect the financial reporting for transactions. A recurring theme will be linking the tax strategies that we learn with concepts from corporate finance, financial accounting, business law, and economics.

**ACCT 609. Financial Reporting and Management Control. 3 Units.**

This course is aimed at doctoral students in accounting and neighboring fields including economics, finance, political economics and operations management. The course seeks to provide an introduction to the role of accounting information in (i) measuring firm performance, (ii) projecting profitability and firm value for external constituents, (iii) and motivating and controlling the firm's management. The main topics covered in this course include: 1. Profitability Measurement and Accrual Accounting. 2. Performance Evaluation and Managerial Incentives. 3. Accounting-based Equity Valuation. 4. The Informational Role of Accounting Numbers 5. Earnings Quality Constructs and Measures. The primary objective of the course is to introduce students to current research paradigms on these topics and to identify promising avenues for future research. The course readings include recent theoretical and empirical papers.

**ACCT 610. Seminar in Empirical Accounting Research. 3 Units.**

Empirical Research on Financial Reporting: This doctoral-level course covers research on the role of accounting information in capital markets. The focus is on introducing students to key themes in empirical accounting and capital markets research, and to key research designs applied to examine information-related questions. Course topics include the informational role of financial reports, accounting measurement attributes, earnings management, earnings quality, and the role of key actors in the financial reporting environment, including management, investors, auditors, analysts and regulators. The course is interdisciplinary in nature. The readings focus on research design, and key theories, themes and approaches from the accounting, finance, economics and psychology literature. Our overall goal is develop your understanding of existing research and its strengths and limitations, and to identify new research opportunities.

**ACCT 611. Applications of Information Economics in Management and Accounting. 3 Units.**

This course develops tools from information economics to study the strategic interactions between agents inside a firm and between firm insiders and market participants. Common to these studies is that agents acquire private information that is valuable to other parties. The range of applications includes: the structure of managerial performance measures, buyer-supplier contracting arrangements, earnings management, voluntary and mandatory disclosure and financial analysts.

**ACCT 612. Financial Reporting Seminar. 3 Units.**

The purpose of this PhD seminar is to facilitate your conception and execution of substantive individual research in financial reporting. It provides a vehicle for supplementing and integrating your knowledge of basic research tools and methods, as well as an exposure to the dimensions of contemporary research in the field of financial reporting. The focus of the research we will discuss in this seminar is on global financial reporting. Such research encompasses studies dealing with contemporary financial reporting issues as well as research addressing issues relating to the globalization of financial reporting. Because these issues are also of concern to financial reporting standard setters, we will discuss whether and how the research we study informs standard setting debates. Prerequisite: Consent of the instructor.

**ACCT 615. Selected Topics in Empirical Accounting Research. 3 Units.**

This course examines selected topics in accounting research. The course features three faculty who will each give a focused look at a given area, introduce students to important questions in that area, key papers in the related literature, and critical aspects of the research designs applied in the area. The aim is to increase student's familiarity with empirical accounting research, their ability to critically evaluate research and research designs, and to prepare students to conduct independent research.

**ACCT 617. Applications of Contract Theory in Accounting Research. 2 Units.**

This course develops tools from information economics to study the strategic interactions between different agents inside a firm. Common to these studies is that agents acquire private information that is valuable to other parties. The range of applications includes: the structure of managerial performance measures, capital budgeting, intra-company pricing, discretionary bonus pools, the role of non-financial performance indicators and earnings management.



**ACCT 618. Market Efficiency and Informational Arbitrage. 3 Units.**

The informational efficiency of stock markets has been a central theme in financial economic research in the past 50 years. Over this period, the focus of academic research has gradually shifted from the general to the more specific. While earlier studies tend to view the matter as a yes/no debate, most recent studies acknowledge the impossibility of fully efficient markets, and focus instead on analyses of factors that materially affect the timely incorporation of information into prices. At the same time, increasing attention is being paid to regulatory and market design issues that either impede or enhance market pricing efficiency. In this course, we will cover recent research on the role of informational arbitrage in asset pricing. Our starting point is the observation that, with costly information, equilibrium prices will invariably reflect some mispricing. The existence of mispricing introduces a role for informational arbitrage, whereby some traders will invest resources to become informed about the mispricing, with hopes of profiting from it. We review recent academic evidence on this process, and reflect on its implications for future market-related research. We will also discuss how academic research might help lower information/arbitrage costs. This is a doctoral level course. Our goal is not only to review existing research, but also to stimulate new work in the area. As such, I expect it will be of primary interest to Ph.D. students majoring in accounting, finance, and economics. Given our focus on returns prediction and the role of information in arbitrage strategies, this course should be of particular interest to those interested exploring the relation between information flows and market pricing dynamics. The course content is interdisciplinary in nature, spanning finance, economics, and accounting. Most of the readings in the earlier readings derive from finance and economics (market efficiency, limits to arbitrage, and behavioral finance); most of the later readings derive from financial accounting (equity valuation, fundamental analysis, earnings management, and analyst behavior).

**ACCT 691. PhD Directed Reading. 1-15 Unit.**

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: FINANCE 691, GSBGEN 691, HRMGT 691, MGTECON 691, MKTG 691, OB 691, OIT 691, POLECON 691, STRAMGT 691

**ACCT 692. PhD Dissertation Research. 1-15 Unit.**

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: FINANCE 692, GSBGEN 692, HRMGT 692, MGTECON 692, MKTG 692, OB 692, OIT 692, POLECON 692, STRAMGT 692

**ACCT 698. Doctoral Practicum in Teaching. 1 Unit.**

Doctoral Practicum in Teaching.

**ACCT 699. Doctoral Practicum in Research. 1 Unit.**

Doctoral Practicum in Research.

**ACCT 802. TGR Dissertation. 0 Units.**

Same as: FINANCE 802, GSBGEN 802, HRMGT 802, MGTECON 802, MKTG 802, OB 802, OIT 802, POLECON 802, STRAMGT 802

## Aeronautics & Astronautics (AA)

**AA 100. Introduction to Aeronautics and Astronautics. 3 Units.**

This class introduces the basics of aeronautics and astronautics through applied physics, hands-on activities, and real world examples. The principles of fluid flow, flight, and propulsion for aircraft will be illustrated, including the creation of lift and drag, aerodynamic performance including takeoff, climb, range, and landing. The principles of orbits, maneuvers, space environment, and propulsion for spacecraft will be illustrated. Students will be exposed to the history and challenges of aeronautics and astronautics.

**AA 108N. Surviving Space. 3 Units.**

Space is dangerous. Anything we put into orbit has to survive the intense forces experienced during launch, extreme temperature changes, impacts by cosmic rays and energetic protons and electrons, as well as hits by human-made orbital debris and meteoroids. If we venture beyond Earth's sphere of influence, we must also then endure the extreme plasma environment without the protection of our magnetic field. With all of these potential hazards, it is remarkable that our space program has experienced so few catastrophic failures. In this seminar, students will learn how engineers design and test spacecraft to ensure survivability in this harsh space environment. We will explore three different space environment scenarios, including a small satellite that must survive in Low Earth Orbit (LEO), a large spacecraft headed to rendezvous with an asteroid, and a human spaceflight mission to Mars.

**AA 109Q. Aerodynamics of Race Cars. 3 Units.**

Almost as soon as cars had been invented, races of various kinds were organized. In all its forms (open-wheel, touring car, sports car, production-car, one-make, stock car, etc.), car racing is today a very popular sport with a huge media coverage and significant commercial sponsorships. More importantly, it is a proving ground for new technologies and a battlefield for the giants of the automotive industry. While race car performance depends on elements such as engine power, chassis design, tire adhesion and of course, the driver, aerodynamics probably plays the most vital role in determining the performance and efficiency of a race car. Front and/or rear wings are visible on many of them. During this seminar, you will learn about many other critical components of a race car including diffusers and add-ons such as vortex generators and spoilers. You will also discover that due to the competitive nature of this sport and its associated short design cycles, engineering decisions about a race car must rely on combined information from track, wind tunnel, and numerical computations. It is clear that airplanes fly on wings. However, when you have completed this seminar, you will be able to understand that cars fly on their tires. You will also be able to appreciate that aerodynamics is important not only for drag reduction, but also for increasing cornering speeds and lateral stability. You will be able to correlate between a race car shape and the aerodynamics effects intended for influencing performance. And if you have been a fan of the Ferrari 458 Italia, you will be able to figure out what that black moustache in the front of the car was for.

**AA 115N. The Global Positioning System: Where on Earth are We, and What Time is It?. 3 Units.**

Preference to freshmen. Why people want to know where they are: answers include cross-Pacific trips of Polynesians, missile guidance, and distraught callers. How people determine where they are: navigation technology from dead-reckoning, sextants, and satellite navigation (GPS). Hands-on experience. How GPS works; when it does not work; possibilities for improving performance.

**AA 116Q. Electric Automobiles and Aircraft. 3 Units.**

Transportation accounts for nearly one-third of American energy use and greenhouse gas emissions and three-quarters of American oil consumption. It has crucial impacts on climate change, air pollution, resource depletion, and national security. Students wishing to address these issues reconsider how we move, finding sustainable transportation solutions. An introduction to the issue, covering the past and present of transportation and its impacts; examining alternative fuel proposals; and digging deeper into the most promising option: battery electric vehicles. Energy requirements of air, ground, and maritime transportation; design of electric motors, power control systems, drive trains, and batteries; and technologies for generating renewable energy. Two opportunities for hands-on experiences with electric cars. Prerequisites: Introduction to calculus and Physics AP or elementary mechanics.

**AA 118N. How to Design a Space Mission: from Concept to Execution. 3 Units.**

Space exploration is truly fascinating. From the space race led by governments as an outgrowth of the Cold War to the new era of space commercialization led by private companies and startups, more than 50 years have passed, characterized by great leaps forward and discoveries. We will learn how space missions are designed, from concept to execution, based on the professional experience of the lecturer and numerous examples of spacecraft, including unique hardware demonstrations by startups of the Silicon Valley. We will study the essentials of systems engineering as applicable to a variety of mission types, for communication, navigation, science, commercial, and military applications. We will explore the various elements of a space mission, including the spacecraft, ground, and launch segments with their functionalities. Special emphasis will be given to the design cycle, to understand how spacecraft are born, from the stakeholders' needs, through analysis, synthesis, all the way to their integration and validation. We will compare the current designs with those employed in the early days of the space age, and show the importance of economics in the development of spacecraft. Finally, we will brainstorm startup ideas and apply the concepts learned to a notional space mission design as a team.

**AA 119N. 3D Printed Aerospace Structures. 3 Units.**

The demand for rapid prototyping of lightweight, complex, and low-cost structures has led the aerospace industry to leverage three-dimensional (3D) printing as a manufacturing technology. For example, the manufacture of aircraft engine components, unmanned aerial vehicle (UAV) wings, CubeSat parts, and satellite sub-systems have recently been realized with 3D printing and other additive manufacturing techniques. In this freshman seminar, a survey of state-of-the-art 3D printing processes will be reviewed and the process-dependent properties of 3D-printed materials and structures will be analyzed in detail. In addition, the advantages and disadvantages of this manufacturing approach will be debated during class! To give students exposure to 3D printing systems in action, tours of actual 3D printing facilities on campus (Stanford's Product Realization Laboratory), as well as in Silicon Valley (e.g., Made in Space) will be conducted.

**AA 120Q. Building Trust in Autonomy. 3 Units.**

Major advances in both hardware and software have accelerated the development of autonomous systems that have the potential to bring significant benefits to society. Google, Tesla, and a host of other companies are building autonomous vehicles that can improve safety and provide flexible mobility options for those who cannot drive themselves. On the aviation side, the past few years have seen the proliferation of unmanned aircraft that have the potential to deliver medicine and monitor agricultural crops autonomously. In the financial domain, a significant portion of stock trades are performed using automated trading algorithms at a frequency not possible by human traders. How do we build these systems that drive our cars, fly our planes, and invest our money? How do we develop trust in these systems? What is the societal impact on increased levels of autonomy?

**AA 121Q. It IS Rocket Science!. 3 Units.**

It's an exciting time for space exploration. Companies like SpaceX and Blue Origin are launching rockets into space and bringing them back for reuse. NASA is developing the world's most powerful rocket. Startups are deploying constellations of hundreds of cubesats for communications, navigation, and earth monitoring. The human race has recently gotten a close look at Pluto, soft landed on a comet, and orbited two asteroids. The upcoming launch of the James Webb Space Telescope will allow astronomers to look closer to the beginning of time than ever before. The workings of space systems remain mysterious to most people, but in this seminar we'll pull back the curtain for a look at the basics of "rocket science." How does a SpaceX rocket get into space? How do Skybox satellites capture images for Google Earth? How did the New Horizons probe find its way to Pluto? How do we communicate with spacecraft that are so distant? We'll explore these topics and a range of others during the quarter. We'll cover just enough physics and math to determine where to look in the sky for a spacecraft, planet, or star. Then we'll check our math by going outside for an evening pizza party observing these objects in the night sky. We'll also visit a spacecraft production facility or Mission Operations Center to see theory put into practice.

**AA 122N. Dawn of the Drones: How Will Unmanned Aerial Systems Change Our World?. 3 Units.**

Unmanned aerial systems (UASs) have exploded on the scene in recent years, igniting a national debate about how to use them, how to regulate them, and how to make them safe. This seminar will dive into the many engineering challenges behind the headlines: in the future, how will we engineer UASs ranging in size from simple RC toys to highly-sophisticated autonomous scientific and military data gathering systems? This seminar will examine the key elements required to conceive, implement, deploy, and operate state-of-the-art of drone systems: What variety of problems can they help us solve? How autonomous are they and how autonomous do they need to be? What are the key technical bottlenecks preventing widespread deployment? How are they different from commercial aircraft? What kinds of companies will serve the market for UAV-related products and services? What business models will be successful and why? We will emphasize aspects of design, autonomy, reliability, navigation, sensing, and perception, as well as coordination/collaboration through a series of case studies drawn from our recent experience. Examples include imaging efforts to map the changing coral reefs in the South Pacific, using and controlling swarms of unmanned systems to perform search and rescue missions over large areas, and package delivery systems over large metropolitan areas. Hands-on experience with Stanford-developed UASs will be part of the seminar.

**AA 190. Directed Research and Writing in Aero/Astro. 3-5 Units.**

For undergraduates. Experimental or theoretical work under faculty direction, and emphasizing development of research and communication skills. Written report(s) and letter grade required; if this is not appropriate, enroll in 199. Consult faculty in area of interest for appropriate topics, involving one of the graduate research groups or other special projects. May be repeated for credit. Prerequisite: consent of student services manager and instructor.

**AA 199. Independent Study in Aero/Astro. 1-5 Unit.**

Directed reading, lab, or theoretical work for undergraduate students. Consult faculty in area of interest for appropriate topics involving one of the graduate research groups or other special projects. May be repeated for credit. Prerequisite: consent of instructor.

**AA 200. Applied Aerodynamics. 3 Units.**

Analytical and numerical techniques for the aerodynamic analysis of aircraft, focusing on airfoil theory, finite wing theory, far-field and Trefftz-plane analysis, two-dimensional laminar and turbulent boundary layers in airfoil analysis, laminar-to-turbulent transition, compressibility effects, and similarity rules. Biweekly assignments require MATLAB or a suitable programming language. Prerequisite: undergraduate courses in basic fluid mechanics and applied aerodynamics, AA 210A.

**AA 201A. Fundamentals of Acoustics. 3 Units.**

Acoustic equations for a stationary homogeneous fluid; wave equation; plane, spherical, and cylindrical waves; harmonic (monochromatic) waves; simple sound radiators; reflection and transmission of sound at interfaces between different media; multipole analysis of sound radiation; Kirchoff integral representation; scattering and diffraction of sound; propagation through ducts (dispersion, attenuation, group velocity); sound in enclosed regions (reverberation, absorption, and dispersion); radiation from moving sources; propagation in the atmosphere and underwater. Prerequisite: first-year graduate standing in engineering, mathematics, sciences; or consent of instructor.

**AA 201B. Topics in Aeroacoustics. 3 Units.**

Acoustic equations for moving medium, simple sources, Kirchoff formula, and multipole representation; radiation from moving sources; acoustic analogy approach to sound generation in compact flows; theories of Lighthill, Powell, and Mohring; acoustic radiation from moving surfaces; theories of Curl, Ffowcs Williams, and Hawkings; application of acoustic theories to the noise from propulsive jets, and airframe and rotor noise; computational methods for acoustics. Prerequisite: 201A or consent of instructor.

**AA 203. Introduction to Optimal Control and Dynamic Optimization. 3 Units.**

Basic solution techniques for optimal control and dynamic optimization problems. Dynamic programming, calculus of variations, and numerical techniques for trajectory optimization. Special cases (chiefly LQR and robotic motion planning); modern solution approaches (such as MPC and MILP); and introduction to stochastic optimal control. Examples in MATLAB and CVX.

**AA 206. Bio-Aerodynamics. 3 Units.**

Topics: flapping flight, low Reynolds number aerodynamics, wing design, flocks, swarms, and dynamic soaring. Readings from current and historical literature dealing with theoretical and observational studies. Applications in aircraft design, and simulation-based problem sets. Prerequisite: course in aerodynamics such as 100, 200A, or 241A.

**AA 208. Aerodynamics of Aircraft Dynamic Response and Stability. 3 Units.**

Companion to 200A for those interested in control and guidance. Typical vehicles and the technical tradeoffs affecting their design. Equations of motion, stressing applications to dynamic performance, stability, and forced response. Forms and sources for the required aerodynamic data. Response to small disturbances and stability derivatives. Static stability and trim. Review of aerodynamic fundamentals, leading to airload predictions for wings, bodies, and complete aircraft. Paneling and other methods for derivative estimation. Natural motions of the aircraft, and the influence on them of various configuration parameters. Vehicle behavior in maneuvers of small and large amplitudes. Prerequisites: 200A, 210A, or equivalents (may be taken concurrently).

**AA 210A. Fundamentals of Compressible Flow. 3 Units.**

Topics: development of the three-dimensional, non-steady, field equations for describing the motion of a viscous, compressible fluid; differential and integral forms of the equations; constitutive equations for a compressible fluid; the entropy equation; compressible boundary layers; area-averaged equations for one-dimensional steady flow; shock waves; channel flow with heat addition and friction; flow in nozzles and inlets; oblique shock waves; Prandtl-Meyer expansion; unsteady one-dimensional flow; the shock tube; small disturbance theory; acoustics in one-dimension; steady flow in two-dimensions; potential flow; linearized potential flow; lift and drag of thin airfoils. Prerequisites: undergraduate background in fluid mechanics and thermodynamics.

**AA 210B. Fundamentals of Compressible Flow. 3 Units.**

Continuation of 210A with emphasis on more general flow geometry. Use of exact solutions to explore the hypersonic limit. Identification of similarity parameters. Solution methods for the linearized potential equation with applications to wings and bodies in steady flow; their relation to physical acoustics and wave motion in nonsteady flow. Nonlinear solutions for nonsteady constant area flow and introduction to Riemann invariants. Elements of the theory of characteristics; nozzle design; extension to nonisentropic flow. Real gas effects in compressible flow. Flows in various gas dynamic testing facilities. Prerequisite: 210A.

**AA 212. Advanced Feedback Control Design. 3 Units.**

Analysis and design techniques for multivariable feedback systems. State-space concepts, observability, controllability, eigenvalues, eigenvectors, stability, and canonical representations. Approaches for robust feedback control design, chiefly H<sub>2</sub>, H-infinity, and mu-synthesis. System identification and adaptive control design. Use of computer-aided design with MATLAB. Prerequisite: ENGR 105, ENGR 205. Recommended: Linear algebra (EE 263 or equivalent).

**AA 214A. Numerical Methods in Engineering and Applied Sciences. 3 Units.**

Scientific computing and numerical analysis for physical sciences and engineering. Advanced version of CME206 that, apart from CME206 material, includes nonlinear PDEs, multidimensional interpolation and integration and an extended discussion of stability for initial boundary value problems. Recommended for students who have some prior numerical analysis experience. Topics include: 1D and multi-D interpolation, numerical integration in 1D and multi-D including adaptive quadrature, numerical solutions of ordinary differential equations (ODEs) including stability, numerical solutions of 1D and multi-D linear and nonlinear partial differential equations (PDEs) including concepts of stability and accuracy. Prerequisites: linear algebra, introductory numerical analysis (CME 108 or equivalent). Same as: CME 207, GEOPHYS 217

**AA 214B. Numerical Methods for Compressible Flows. 3 Units.**

For M.S.-level graduate students. Covers the hierarchy of mathematical models for compressible flows. Introduction to finite difference, finite volume, and finite element methods for their computation. Ideal potential flow; transonic potential flow; Euler equations; Navier-Stokes equations; representative model problems; shocks, expansions, and contact discontinuities; treatment of boundary conditions; time and pseudo-time integration schemes. Prerequisites: basic knowledge of linear algebra and ODEs (CME 206 or equivalent).

**AA 214C. Numerical Computation of Viscous Flow. 3 Units.**

Numerical methods for solving parabolic sets of partial differential equations. Numerical approximation of the equations describing compressible viscous flow with adiabatic, isothermal, slip, and no-slip wall boundary conditions. Applications to the Navier-Stokes equations in two and three dimensions at high Reynolds number. Computational problems are assigned. Prerequisite: 214B.

**AA 215A. Advanced Computational Fluid Dynamics. 3 Units.**

High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent. Same as: CME 215A

**AA 215B. Advanced Computational Fluid Dynamics. 3 Units.**

High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.

Same as: CME 215B

**AA 218. Introduction to Symmetry Analysis. 3 Units.**

Methods of symmetry analysis and their use in the reduction and simplification of physical problems. Topics: dimensional analysis, phase-space analysis of autonomous systems of ordinary differential equations, use of Lie groups to reduce the order of nonlinear ODEs and to generate integrating factors, use of Lie groups to reduce the dimension of partial differential equations and to generate similarity variables, exact solutions of nonlinear PDEs generated from groups. Mathematica-based software developed by the instructor is used for finding invariant groups of ODEs and PDEs.

**AA 222. Engineering Design Optimization. 3-4 Units.**

Design of engineering systems within a formal optimization framework. This course covers the mathematical and algorithmic fundamentals of optimization, including derivative and derivative-free approaches for both linear and non-linear problems, with an emphasis on multidisciplinary design optimization. Topics will also include quantitative methodologies for addressing various challenges, such as accommodating multiple objectives, automating differentiation, handling uncertainty in evaluations, selecting design points for experimentation, and principled methods for optimization when evaluations are expensive. Applications range from the design of aircraft to automated vehicles. Prerequisites: some familiarity with probability, programming, and multivariable calculus.

Same as: CS 361

**AA 228. Decision Making under Uncertainty. 3-4 Units.**

This course is designed to increase awareness and appreciation for why uncertainty matters, particularly for aerospace applications. Introduces decision making under uncertainty from a computational perspective and provides an overview of the necessary tools for building autonomous and decision-support systems. Following an introduction to probabilistic models and decision theory, the course will cover computational methods for solving decision problems with stochastic dynamics, model uncertainty, and imperfect state information. Topics include: Bayesian networks, influence diagrams, dynamic programming, reinforcement learning, and partially observable Markov decision processes. Applications cover: air traffic control, aviation surveillance systems, autonomous vehicles, and robotic planetary exploration. Prerequisites: basic probability and fluency in a high-level programming language.

Same as: CS 238

**AA 229. Advanced Topics in Sequential Decision Making. 3-4 Units.**

Survey of recent research advances in intelligent decision making for dynamic environments from a computational perspective. Efficient algorithms for single and multiagent planning in situations where a model of the environment may or may not be known. Partially observable Markov decision processes, approximate dynamic programming, and reinforcement learning. New approaches for overcoming challenges in generalization from experience, exploration of the environment, and model representation so that these methods can scale to real problems in a variety of domains including aerospace, air traffic control, and robotics. Students are expected to produce an original research paper on a relevant topic. Prerequisites: AA 228/CS 238 or CS 221.

Same as: CS 239

**AA 236A. Spacecraft Design. 3-5 Units.**

The design of unmanned spacecraft and spacecraft subsystems emphasizing identification of design drivers and current design methods. Topics: spacecraft configuration design, mechanical design, structure and thermal subsystem design, attitude control, electric power, command and telemetry, and design integration and operations.

**AA 236B. Spacecraft Design Laboratory. 3-5 Units.**

Continuation of 236A. Emphasis is on practical application of systems engineering to the life cycle program of spacecraft design, testing, launching, and operations. Prerequisite: 236A or consent of instructor.

**AA 236C. Spacecraft Design Laboratory. 3-5 Units.****AA 240A. Analysis of Structures. 3 Units.**

Elements of two-dimensional elasticity theory. Boundary value problems; energy methods; analyses of solid and thin walled section beams, trusses, frames, rings, monocoque and semimonocoque structures. Prerequisite: ENGR 14 or equivalent.

**AA 240B. Analysis of Structures. 3 Units.**

Thin plate analysis. Structural stability. Material behavior: plasticity and fracture. Introduction of finite element analysis; truss, frame, and plate structures. Prerequisite: 240A or consent of instructor.

**AA 241A. Introduction to Aircraft Design, Synthesis, and Analysis. 3 Units.**

New aircraft systems emphasizing commercial aircraft. Economic and technological factors that create new aircraft markets. Determining market demands and system mission performance requirements; optimizing configuration to comply with requirements; the interaction of disciplines including aerodynamics, structures, propulsion, guidance, payload, ground support, and parametric studies. Applied aerodynamic and design concepts for use in configuration analysis. Application to a student-selected aeronautical system; applied structural fundamentals emphasizing fatigue and fail-safe considerations; design load determination; weight estimation; propulsion system performance; engine types; environmental problems; performance estimation. Direct/indirect operating costs prediction and interpretation. Aircraft functional systems; avionics; aircraft reliability and maintainability. Prerequisite: 100 or equivalent.

**AA 241B. Introduction to Aircraft Design, Synthesis, and Analysis. 3 Units.**

New aircraft systems emphasizing commercial aircraft. Economic and technological factors that create new aircraft markets. Determining market demands and system mission performance requirements; optimizing configuration to comply with requirements; the interaction of disciplines including aerodynamics, structures, propulsion, guidance, payload, ground support, and parametric studies. Applied aerodynamic and design concepts for use in configuration analysis. Application to a student-selected aeronautical system; applied structural fundamentals emphasizing fatigue and fail-safe considerations; design load determination; weight estimation; propulsion system performance; engine types; environmental problems; performance estimation. Direct/indirect operating costs prediction and interpretation. Aircraft functional systems; avionics; aircraft reliability and maintainability. Prerequisite: 100 or equivalent.

**AA 241X. Autonomous Aircraft: Design/Build/Fly. 3 Units.**

Students grouped according to their expertise to carry out the multidisciplinary design of a solar-powered autonomous aircraft that must meet a clearly stated set of design requirements. Design and construction of the airframe, integration with existing guidance, navigation, and control systems, and development and operation of the resulting design. Design reviews and reports. Prerequisites: expertise in any of the following disciplines by having satisfied the specified courses or equivalent work elsewhere: conceptual design (241A,B); applied aerodynamics (200A,B); structures (240A); composite manufacturing experience; guidance and control (208/271, ENGR 205).

**AA 242A. Classical Dynamics. 3 Units.**

Accelerating and rotating reference frames. Kinematics of rigid body motion; Euler angles, direction cosines. D'Alembert's principle, equations of motion. Inertia properties of rigid bodies. Dynamics of coupled rigid bodies. Lagrange's equations and their use. Dynamic behavior, stability, and small departures from equilibrium. Prerequisite: ENGR 15 or equivalent.

**AA 242B. Mechanical Vibrations. 3 Units.**

For M.S.-level graduate students. Covers the vibrations of discrete systems and continuous structures. Introduction to the computational dynamics of linear engineering systems. Review of analytical dynamics of discrete systems; undamped and damped vibrations of N-degree-of-freedom systems; continuous systems; approximation of continuous systems by displacement methods; solution methods for the Eigenvalue problem; direct time-integration methods. Prerequisites: AA 242A or equivalent (recommended but not required); basic knowledge of linear algebra and ODEs; no prior knowledge of structural dynamics is assumed.

Same as: ME 242B

**AA 244A. Introduction to Plasma Physics and Engineering. 3 Units.**

Physics and engineering of plasmas, including space and laboratory plasmas. Debye length and distribution functions. Single-particle motion and drifts. Plasmas as fluids and fluid drifts. Waves in plasmas, including electrostatic and electromagnetic. Diffusion and resistivity. Magnetohydrodynamics.

**AA 244B. Advanced Plasma Physics and Engineering. 3 Units.**

Equilibrium and instability. Turbulent flow in plasmas. Kinetic theory and the Vlasov equation. Nonlinear effects and solutions. Radiation in a plasma. Plasma diagnostics in ground- and space-based experiments.

**AA 248E. Aerial Robot Design. 4 Units.**

(Graduate students only enroll in ME 271e or AA 248e) A result-focused introduction to the design of winged aerial robots capable of vertical takeoff and landing for a wide range of applications. Students will learn how to ideate specific aerial robot applications and make an appropriate design from scratch that meets mission requirements. Design skill outcomes include: robot need identification based on mission requirements; system ideation and sizing; making design performance tradeoffs; aerodynamic wing design; CAD assembly; communicating the design and its application. The hands-on lab experience includes prototyping the aerial robot mission, to inform system design, by building and flying quadcopters. Prerequisites: intro level undergraduate fluid mechanics or aerodynamics (e.g. ME 70 or AA 100) or equivalent; Intro level undergraduate electronics or Arduino experience; MATLAB experience.

Same as: ME 171E, ME 271E

**AA 250. Nanomaterials for Aerospace. 3 Units.**

Properties of nanomaterials and current approaches for engineering spacecraft, aircraft, and subsystems with nanotechnology. Manufacturing of nanomaterials; nano-fiber reinforced composites; structural mechanics of nanomaterials; structure-property relationships; and application of nanotechnology for lightweight structures, thermal protection, nanopropellants, and nanoelectronics.

**AA 251. Introduction to the Space Environment. 3 Units.**

The environment through which space probes and vehicles travel and orbit. Survey of physical phenomena in the sun, solar wind, magnetospheres, ionospheres, and upper atmospheres of objects in the solar system. Introduction to the physical processes governing space plasmas, solar-terrestrial interactions, and ionized and neutral media surrounding the Earth and other solar system bodies. Prerequisite: AA 244A.

**AA 252. Techniques of Failure Analysis. 3 Units.**

Introduction to the field of failure analysis, including fire and explosion analysis, large scale catastrophe projects, traffic accident reconstruction, aircraft accident investigation, human factors, biomechanics and accidents, design defect cases, materials failures and metallurgical procedures, and structural failures. Product liability, failure modes and effects analysis, failure prevention, engineering ethics, and the engineer as expert witness.

**AA 256. Mechanics of Composites. 3 Units.**

Fiber reinforced composites. Stress, strain, and strength of composite laminates and honeycomb structures. Failure modes and failure criteria. Environmental effects. Manufacturing processes. Design of composite structures. Individual design project required of each student, resulting in a usable computer software. Prerequisite: ENGR 14 or equivalent.

**AA 257. Design of Multifunctional Composite Structures. 3 Units.**

Hands-on design, analysis, and manufacturing of high-performance composite structures with multifunctional capabilities: structural health monitoring, state sensing and awareness, electrical energy storage, and built-in intelligence. Advanced composite structures will be fabricated and integrated with sensors, actuators, electronic circuits, and batteries to create multifunctional structures and devices for various applications: design of fly-by-wire UAVs and drones, self-powered electrical car frames, maintenance-free self-diagnostic structures, and intelligent structures for various engineering applications. The class will be divided into working teams (design, analysis, software, manufacturing, and testing) to design and build an intelligent structure or multifunctional device to be determined at the beginning of the course. Prerequisite: 256 or consent of instructor.

**AA 260. Sustainable Aviation. 3 Units.**

Quantitative assessment of the impact of aviation on the environment including noise, local, and global emissions, and models used to predict it. Current and future technologies that may allow the air transportation system to meet anticipated growth while reducing or minimizing environmental problems. Atmospheric effects of NO<sub>x</sub>, CO<sub>2</sub>, particulates, unburned hydrocarbons, and water vapor deposition at high altitudes and metrics for assessing global climate effects. Noise sources, measurement, and mitigation strategies. Fundamentals of aircraft and engine performance needed to assess current and future concepts. Major national and international policy implications of existing and future technology choices. Recommended: AA 241B.

**AA 271A. Dynamics and Control of Spacecraft and Aircraft. 3 Units.**

The dynamic behavior of aircraft and spacecraft, and the design of automatic control systems for them. For aircraft: non-linear and linearized longitudinal and lateral dynamics; linearized aerodynamics; natural modes of motion; autopilot design to enhance stability, control the flight path, and perform automatic landings. For spacecraft in orbit: natural longitudinal and lateral dynamic behavior and the design of attitude control systems. Prerequisites: AA242A, ENGR 105.

**AA 272C. Global Positioning Systems. 3 Units.**

The principles of satellite navigation using GPS. Positioning techniques using code tracking, single and dual frequency, carrier aiding, and use of differential GPS for improved accuracy and integrity. Use of differential carrier techniques for attitude determination and precision position determination. Prerequisite: familiarity with matrix algebra and MatLab (or another mathematical programming language).

**AA 272D. Integrated Navigation Systems. 3 Units.**

Navigation satellites (GPS, GLONASS), GPS receivers, principles of inertial navigation for ships, aircraft, and spacecraft. Kalman Filters to integrate GPS and inertial sensors. Radio navigation aids (VOR, DME, LORAN, ILS). Doppler navigation systems. Prerequisites: 272C; ENGR 15, 105. Recommended: ENGR 205.

**AA 273. State Estimation and Filtering for Aerospace Systems. 3 Units.**

Kalman filtering, recursive Bayesian filtering, and nonlinear filter architectures including the extended Kalman filter, particle filter, and unscented Kalman filter. Observer-based state estimation for linear and non-linear systems. Examples from aerospace, including state estimation for fixed-wing aircraft, rotorcraft, spacecraft, and planetary rovers, with applications to control, navigation, and autonomy.

**AA 274. Principles of Robotic Autonomy. 3 Units.**

Basic principles for endowing mobile autonomous robots with perception, planning, and decision-making capabilities. Algorithmic approaches for robot perception, localization, and simultaneous localization and mapping; control of non-linear systems, learning-based control, and robot motion planning; introduction to methodologies for reasoning under uncertainty, e.g., (partially observable) Markov decision processes. Extensive use of the Robot Operating System (ROS) for demonstrations and hands-on activities. Prerequisite: CS 106A or equivalent.

**AA 277. Multi-robot Control, Communication, and Sensing. 3 Units.**

Survey of current research topics in multi-robot systems including multi-agent consensus, formation control, coverage control and sensor deployment, collision avoidance, cooperative mapping, and distributed Bayesian filtering. Students will develop skills in evaluating and critiquing research papers, and will conduct a final research project.

**AA 279A. Space Mechanics. 3 Units.**

Orbits of near-earth satellites and interplanetary probes; relative motion in orbit; transfer and rendezvous; orbit determination; influence of earth's oblateness; sun and moon effects on earth satellites; decay of satellite orbits; invited lectures from industry. Prerequisite: ENGR 15 and familiarity with MatLab.

**AA 279B. Advanced Space Mechanics. 3 Units.**

Restricted 3-body problem. Relative motion, Hill's and Clohessy-Wiltshire equations. Lambert's problem. Satellite constellations and optimization. Communications and link budgets. Space debris. High fidelity simulation. Interplanetary mission planning, launch windows and gravity assists. Basic trajectory optimization. Several guest lectures from practitioners in the field. Individual final project chosen in consultation with instructor. Prerequisites: 279A or equivalent with permission of instructor. Fluency with MATLAB (or another mathematical programming language with 2D and 3D plotting capabilities).

**AA 279C. Spacecraft Attitude Determination and Control. 3 Units.**

Attitude representation and parametrization; unperturbed and perturbed attitude dynamics and stability; attitude sensors and actuators; linear and nonlinear attitude control; optimal attitude maneuvers; dynamics of flexible spacecraft and space tethers; invited lectures from industry. Prerequisites: AA 242A, ENGR 105, AA 279A, and familiarity with MatLab.

**AA 279D. Spacecraft Formation-Flying and Rendezvous. 3 Units.**

Keplerian orbital mechanics and orbital perturbations; the general relative motion problem; linear formation flying dynamics and control; impulsive station-keeping and reconfiguration; high order relative motion equations; formulation of relative motion using orbital elements; perturbation-invariant formations; nonlinear formation control; low-thrust propulsion for formation flying; relative navigation using GNSS and optical navigation; applications: sparse-aperture imaging, remote sensing, on-orbit servicing, rendezvous, and docking. Prerequisite: AA 242A, ENGR 105, AA 279A, and familiarity with MatLab.

**AA 280. Smart Structures. 3 Units.**

Mechanics of smart materials and current approaches for engineering smart structures to monitor health, self heal, and adapt to environment. Definition of smart structures; constitutive models for smart materials; piezoelectric ceramics; electro-active polymers; shape memory alloys; bio-inspired materials and structures; self-healing materials; sensors and sensor networks; structural health monitoring; and energy harvesting. Prerequisite: AA 240A or consent of instructor.

**AA 283. Aircraft and Rocket Propulsion. 3 Units.**

Introduction to the design and performance of airbreathing and rocket engines. Topics: the physical parameters used to characterize propulsion system performance; gas dynamics of nozzles and inlets; cycle analysis of ramjets, turbojets, turbofans, and turboprops; component matching and the compressor map; introduction to liquid and solid propellant rockets; multistage rockets; hybrid rockets; thermodynamics of reacting gases. Prerequisites: undergraduate background in fluid mechanics and thermodynamics.

**AA 284A. Advanced Rocket Propulsion. 3 Units.**

The principles of rocket propulsion system design and analysis. Fundamental aspects of the physics and chemistry of rocket propulsion. Focus is on the design and analysis of chemical propulsion systems including liquids, solids, and hybrids. Nonchemical propulsion concepts such as electric and nuclear rockets. Launch vehicle design and optimization issues including trajectory calculations. Limited enrollment. Prerequisites: 283 or consent of instructor.

**AA 284B. Propulsion System Design Laboratory. 3 Units.**

Propulsion systems engineering through the design and operation of a sounding rocket. Students work in small teams through a full project cycle including requirements definition, performance analysis, system design, fabrication, ground and flight testing, and evaluation. Prerequisite: 284A and consent of instructor.

**AA 284C. Propulsion System Design Laboratory. 3 Units.**

Continuation of 284A,B. Prerequisite: 284B, and consent of instructor.

**AA 289. Robotics and Autonomous Systems Seminar. 1 Unit.**

Seminar talks by researchers and industry professionals on topics related to modern robotics and autonomous systems. Broadly, talks will cover robotic design, perception and navigation, planning and control, and learning for complex robotic systems. May be repeated for credit.

**AA 290. Problems in Aero/Astro. 1-15 Unit.**

(Undergraduates register for 190 or 199.) Experimental, theoretical, or computational investigation. Students may work in any field of special interest. This course is designed to develop students' understanding of what a research problem is and the skills needed to successfully approach and conduct research. Register for section belonging to your research supervisor. May be repeated for credit.

**AA 291. Practical Training. 1-3 Unit.**

Educational opportunities in high-technology research and development labs in aerospace and related industries. Internship integrated into a student's academic program. Research report outlining work activity, problems investigated, key results, and any follow-on projects. Meets the requirements for Curricular Practical Training for students on F-1 visas. Student is responsible for arranging own employment and should see department student services manager before enrolling. May be repeated for credit.

**AA 294. Case Studies in Aircraft Design. 1 Unit.**

Presentations by researchers and industry professionals. Registration for credit optional. May be repeated for credit.

**AA 295. Aerospace Structures and Materials. 1 Unit.**

Presentations by researchers and industry professionals in aerospace structures and materials. May be repeated for credit.

**AA 297. Seminar in Guidance, Navigation, and Control. 1 Unit.**

For graduate students with an interest in automatic control applications in flight mechanics, guidance, navigation, and mechanical design of control systems; others invited. Problems in all branches of vehicle control, guidance, and instrumentation presented by researchers on and off campus. Registration for credit optional. May be repeated for credit.

**AA 300. Engineer Thesis. 1-15 Unit.**

Thesis for degree of Engineer. Students register for section belonging to their thesis adviser.

**AA 301. Ph.D. Dissertation. 1-15 Unit.**

Prerequisite: completion of Ph.D. qualifying exams. Students register for section belonging to their thesis adviser. (Staff).

**AA 47SI. Why Go To Space?. 1 Unit.**

Why do we spend billions of dollars exploring space? What can modern policymakers, entrepreneurs, and industrialists do to help us achieve our goals beyond planet Earth? Whether it is the object of exploration, science, civilization, or conquest, few domains have captured the imagination of a species like space. This course is an introduction to space policy issues, with an emphasis on the modern United States. We will present a historical overview of space programs from all around the world, and then spend the last five weeks discussing present policy issues, through lectures and guest speakers from NASA, the Department of Defense, new and legacy space industry companies, and more. Students will present on one issue that piques their interest, selecting from various domains including commercial concerns, military questions, and geopolitical considerations.

**AA 801. TGR Engineer Thesis. 0 Units.**

Engineer's thesis or non-doctoral work for a TGR student.

**AA 802. TGR Ph.D. Dissertation. 0 Units.**

Doctoral dissertation for a TGR student in PhD program.

**AA 93. Building Trust in Autonomy. 1 Unit.**

Preparatory course for Bing Overseas Studies summer course in Edinburgh. Prerequisite: Requires instructor consent.

## African Studies (AFRICAST)

**AFRICAST 109. Running While Others Walk: African Perspectives on Development. 5 Units.**

Throughout the history of modern Africa, Africans have specified their desired future development, understood broadly, and identified the major obstacles in achieving it. Debates about development have intensified in the post-colonial period, especially as African countries have replaced the leaders installed at independence. Amidst the general critique of the imposition of external values and rules, Africans have differed, sometimes sharply, on priorities, process, and programs. While for some the challenge is to catch up with development elsewhere, for others it is essential to leap ahead, to set the pace, to initiate a radical social, economic, and political transformation. To ground and extend the common approaches to studying development that emphasize economics and that rely largely on external commentators, we will explore African perspectives. Our major task will be a broad overview, sampling the analyses of Africa's intellectuals in several domains. Course participants will review, compare, and analyze major contributions, developing an understanding of contemporary intellectual currents.

Same as: AFRICAST 209

**AFRICAST 111. Education for All? The Global and Local in Public Policy Making in Africa. 3-5 Units.**

Policy making in Africa and the intersection of policy processes and their political and economic dimensions. The failure to implement agreements by international institutions, national governments, and nongovernmental organizations to promote education. Case studies of crowded and poorly equipped schools, overburdened and underprepared teachers, and underfunded education systems.

Same as: AFRICAAM 211, AFRICAST 211

**AFRICAST 112. AIDS, Literacy, and Land: Foreign Aid and Development in Africa. 5 Units.**

Is foreign aid a solution? or a problem? Should there be more aid, less aid, or none at all? How do foreign aid and local initiatives intersect? A clinic in Uganda that addresses AIDS as a family and community problem.

Multiple strategies in Tanzania to increase girls' schooling. These are imaginative and innovative approaches to pressing and contested policy challenges. We will examine several contentious issues in contemporary Africa, exploring their roots and the intense conflicts they engender, with special attention to foreign aid and the aid relationship. As African communities and countries work to shape their future, what are the foreign roles and what are their consequences?

Same as: AFRICAAM 111, AFRICAST 212

**AFRICAST 113V. Freedom in Chains: Black Slavery in the Atlantic, 1400s-1800s. 5 Units.**

This course will focus on the history of slavery in the British, French, Spanish, Portuguese and Dutch Atlantic world(s), from the late 1400s to the 1800s. Its main focus will be on the experiences of enslaved Africans and their descendants. Between the sixteenth and nineteenth centuries, the Europeans forcibly embarked over 10 million Africans to the Americas. Drawing on methodologies used by historians, archaeologists and anthropologists, the course will reconstruct the daily lives and the socio-economic, cultural and political histories of these captives. We will seek to hear their voices by investigating a variety of historical testimonies and recent scholarship. The course will examine slavery in the context of broader trends in Atlantic World studies, a field that has grown considerably in recent years, providing new ways of understanding historical developments across national boundaries. We will seek to identify commonalities and differences across time periods and regions and the reasons for those differences. Covered topics will include slave ship voyages, labor, agency, the creation of new identities (creolization), religion, race, gender, resistance, legacies, and memory.

Same as: AFRICAAM 113V, CSRE 113V, HISTORY 205D

**AFRICAST 114N. Desert Biogeography of Namibia Prefield Seminar. 3 Units.**

Desert environments make up a third of the land areas on Earth, ranging from the hottest to the coldest environments. Aridity leads to the development of unique adaptations among the organisms that inhabit them. Climate change and other processes of desertification as well as increasing human demand for habitable and cultivatable areas have resulting in increasing need to better understand these systems. Namibia is a model system for studying these processes and includes the Sossuvlei (Sand Sea) World Heritable Site. This seminar will prepare students for their overseas field experience in Namibia. The seminar will provide an introduction to desert biogeography and culture, using Namibia as a case study. During the seminar, students will each give two presentations on aspects of desert biogeography and ecology, specific organisms and their adaptations to arid environments, cultural adaptations of indigenous peoples and immigrants, ecological threats and conservation efforts, and/or national and international policy towards deserts. Additional assignments include a comprehensive dossier and a final exam. Students will also carry out background research for the presentations they will be giving during the field seminar where access to the internet and to other scholarly resources will be limited. In addition, we will cover logistics, health and safety, cultural sensitivity, geography, and politics. We will deal with post-field issues such as reverse culture shock, and ways in which participants can consolidate and build up their abroad experiences after they return to campus.

Same as: EARTHSYS 115N

**AFRICAST 119. Novel Perspectives on South Africa. 2-3 Units.**

21st-century South Africa continues its literary effervescence. In this class we'll sample some recent novels and related writings to tease out the issues shaping the country (and to some degree the continent) at present. Is 'South African literature' a meaningful category today? What are the most significant features we can identify in new writings and how do they relate to contemporary social dynamics? The course will appeal to anyone interested in present-day Cape Town or Johannesburg, including students who have spent a term in BOSP-Cape Town or plan to do so in future. Both undergraduate and graduate students are welcome. 2-3 units. Course may be repeated for credit. All students will write short analyses from the prescribed texts. Students taking the course for three units will write an extended essay on a topic agreed with the instructor.

Same as: AFRICAAM 119, AFRICAAM 219, AFRICAST 219, CSRE 119

**AFRICAST 122F. Histories of Race in Science and Medicine at Home and Abroad. 4 Units.**

This course has as its primary objective, the historical study of the intersection of race, science and medicine in the US and abroad with an emphasis on Africa and its Diasporas in the US. By drawing on literature from history, science and technology studies, sociology and other related disciplines, the course will consider the sociological and cultural concept of race and its usefulness as an analytical category. The course will explore how the study of race became its own science in the late-Enlightenment era, the history of eugenics—a science of race aimed at the ostensible betterment of the overall population through the systematic killing or "letting die" of humanity's "undesirable" parts, discuss how the ideology of pseudo-scientific racism underpinned the health policies of the French and British Empires in Africa, explore the fraught relationship between race and medicine in the US, discuss how biological notions of race have quietly slipped back into scientific projects in the 21st century and explore how various social justice advocates and scholars have resisted the scientific racisms of the present and future and/or proposed new paths towards a more equitable and accessible science.

Same as: AFRICAAM 122F, CSRE 122F, HISTORY 248D

**AFRICAST 132. Literature and Society in Africa and the Caribbean. 4 Units.**

This course aims to equip students with an understanding of the cultural, political and literary aspects at play in the literatures of Francophone Africa and the Caribbean. Our primary readings will be Francophone novels and poetry, though we will also read some theoretical texts. The assigned readings will expose students to literature from diverse French-speaking regions of the African/Caribbean world. This course will also serve as a "literary toolbox," with the intention of facilitating an understanding of literary forms, terms and practices. Students can expect to work on their production of written and spoken French (in addition to reading comprehension) both in and outside of class. Special guest: LEILA SLIMANI (Goncourt Prize 2016). Required readings include: Leila Slimani, *Sexe et Mensonges au Maroc*; Albert Memmi, "La Statue de Sel," Kaouthar Adimi, "L'Envers des autres", Maryse Condé, "La Vie sans fards". Movies include "Goodbye Morocco", "Aya de Yopougon", *Les Baies d'Alger*. Taught in French. Prerequisite: FRENLANG 124 or consent of instructor.

Same as: AFRICAAM 133, FRENCH 133, JEWISHST 143

**AFRICAST 133B. Covering Islam: On What We Learn to See, Think and Hear about Islam & Muslims. 3-5 Units.**

In this course, students will think critically about how knowledge about Islam, Muslims, and Muslim Societies is produced and circulated. As a class, we will consider why and how certain kinds of ideas about Islam and Muslims become representative (i.e., authoritative discourse) while others ideas do not. This is an interdisciplinary class; course material will draw on readings from anthropology, literary criticism, history, sociology and media and cultural studies. We will also be engaging with other kinds of material, including news articles, editorials, documentaries, and films.

Same as: ANTHRO 133B, CSRE 133B

**AFRICAST 135. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.**

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 235, EDUC 135, EDUC 335, HRP 235, HUMBIO 26, MED 235

**AFRICAST 138. Conflict and Reconciliation in Africa: International Intervention. 3-5 Units.**

This course will explore recent debates on the causes and structural terms of large-scale violence in Africa in the context of key contemporary models for reconciliation and transitional justice. Discussions will emphasize the broader international legal and political order each presupposes, and specifically whether their underlying reconstitution of rights and subjectivities are compatible with cultural, political or legal diversity. A historical assessment of the predominating Nuremberg paradigm of transitional justice—structured around international military intervention and criminal trials based on international criminal courts—will be contrasted with other regional models that engage with the challenges of the political reconciliation of formerly divided political communities. The necessity of understanding the specificities of both global and local historical and structural contexts will be examined with respect to various proposals for how to balance concerns for both justice and peace. Readings will cover case studies from South Africa, Rwanda, DRC, northern Uganda, Sudan (including Darfur and South Sudan), Libya, Mali, and CAR.

Same as: AFRICAST 238, ANTHRO 138A, ANTHRO 238A

**AFRICAST 141A. Science, Technology, and Medicine in Africa. 4 Units.**

Africa is often depicted as a place simply in need of science, technology, and medicine. This class will introduce students to the culture and politics of science in sub-Saharan Africa: to the diverse and rich traditions, histories and contemporary predicaments of knowledge practices on the continent. We will consider the role of science in the colonial period, covering the expansion of European empires in Africa and the forms of technical knowledge that colonial governments encountered, especially as they relate to health and the environment. We will examine the role of science at African independence and in international development work. Finally, we will discuss the technopolitics of medical training and research, resource extraction, and the internet in contemporary Africa. This course will provide some important background for those with an applied interest in Africa as well as provide an introduction to a growing area of scholarship. Course materials include historical and ethnographic works, as well as primary sources and films emphasizing scientific practice in the context of geopolitical relations of power and inequality.

Same as: ANTHRO 141A



**AFRICAST 142. Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice. 3-5 Units.**

This seminar is part of a broader program on Social Entrepreneurship at CDDRL in partnership with the Haas Center for Public Service. It will use practice to better inform theory. Working with three visiting social entrepreneurs from developing and developed country contexts students will use case studies of successful and failed social change strategies to explore relationships between social entrepreneurship, gender, democracy, development and justice. It interrogates current definitions of democracy and development and explores how they can become more inclusive of marginalized populations. This is a service learning class in which students will learn by working on projects that support the social entrepreneurs' efforts to promote social change. Students should register for either 3 OR 5 units only. Students enrolled in the full 5 units will have a service-learning component along with the course. Students enrolled for 3 units will not complete the service-learning component. Limited enrollment. Attendance at the first class is mandatory in order to participate in service learning.

Same as: AFRICAST 242, INTNLREL 142

**AFRICAST 145B. The African Atlantic. 3-5 Units.**

This course explores the central place Africa holds in prose writing emerging during early and modern periods of globalization across the Atlantic, including the middle passage, exploration and colonialism, black internationalism, decolonization, immigration, and diasporic return. We will begin with Equiano's *Interesting Narrative* (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of self-making or new citizenship, to evoke histories of racial unity or examine psychic and social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Conrad, Condé, Olinto), epic and prose poetry (Césaire, Walcott), theoretical reflection (Gilroy, Glissant, Mudimbe, Benitez-Rojo), and literary autobiography (Barack Obama, Saidiya Hartman). Note: To be eligible for WAYS credit, you must take COMPLIT 145B for a minimum of 3 Units and a Letter Grade.

Same as: AFRICAAM 148, COMPLIT 145B, COMPLIT 345B, CSRE 145B, FRENCH 145B, FRENCH 345B

**AFRICAST 151. AIDS in Africa. 3 Units.**

Medical, social, and political aspects of the HIV epidemic in sub-Saharan Africa including: biology, transmission, diagnosis, and treatment of HIV; mother-to-child transmission and breastfeeding; vaccines; community and activist responses to the HIV epidemic; economics of HIV treatment; governance and health; ethics in research and program implementation.

**AFRICAST 181. Media Representations of Africa. 3-5 Units.**

How has Africa been dominantly represented in the media? How are these representations challenged, complexified and reproduced in the postcolonial context? What is the role of African media in these processes? This class is an introduction to the variety of roles played by the media in representing Africa, with a particular focus on the postcolonial context. The topic is particularly relevant to contemporary Africa as the emerging middle-class, economic and cultural globalization, and the uptake for communication technologies are shaping contested images of the continent. You will: develop a theoretical and empirical understanding of the media as instruments of domination but also of resistance; learn how to critically deconstruct media representations in everyday life; understand the challenges of intercultural communication in an unequal world. Key concepts such as: representation, stereotyping, cultural appropriation, afropessimism, afrocentrism, afro optimism, afropolitanism. Readings drawn from media and cultural studies, anthropology, postcolonial theory and literature. In class-analysis of photographs, news articles and broadcasts, PR campaigns, social media, films and documentaries.

Same as: AFRICAAM 81, AFRICAST 81

**AFRICAST 195. Shifting Frames. 1-2 Unit.**

This is a student driven, dialogue based, and intellectual community focused course. We will explore and challenge the taken-for-granted framing of key African issues and debates. Engagement with discussion leaders drawing on their own research and case studies from across the African continent will guide us across shifting terrain. This course centers the scholarship and voices of African students. Topics include: Afropolitanism, Brain Drain/ Gain, Education, Leadership, Global Health, AI Application in Africa, Economic Development, Industrial Policy, LGBTQI Rights, Gender and Sexuality.

**AFRICAST 199. Independent Study or Directed Reading. 1-5 Unit.**

May be repeated for credit.

**AFRICAST 209. Running While Others Walk: African Perspectives on Development. 5 Units.**

Throughout the history of modern Africa, Africans have specified their desired future development, understood broadly, and identified the major obstacles in achieving it. Debates about development have intensified in the post-colonial period, especially as African countries have replaced the leaders installed at independence. Amidst the general critique of the imposition of external values and rules, Africans have differed, sometimes sharply, on priorities, process, and programs. While for some the challenge is to catch up with development elsewhere, for others it is essential to leap ahead, to set the pace, to initiate a radical social, economic, and political transformation. To ground and extend the common approaches to studying development that emphasize economics and that rely largely on external commentators, we will explore African perspectives. Our major task will be a broad overview, sampling the analyses of Africa's intellectuals in several domains. Course participants will review, compare, and analyze major contributions, developing an understanding of contemporary intellectual currents.

Same as: AFRICAST 109

**AFRICAST 211. Education for All? The Global and Local in Public Policy Making in Africa. 3-5 Units.**

Policy making in Africa and the intersection of policy processes and their political and economic dimensions. The failure to implement agreements by international institutions, national governments, and nongovernmental organizations to promote education. Case studies of crowded and poorly equipped schools, overburdened and underprepared teachers, and underfunded education systems.

Same as: AFRICAAM 211, AFRICAST 111

**AFRICAST 212. AIDS, Literacy, and Land: Foreign Aid and Development in Africa. 5 Units.**

Is foreign aid a solution? or a problem? Should there be more aid, less aid, or none at all? How do foreign aid and local initiatives intersect? A clinic in Uganda that addresses AIDS as a family and community problem. Multiple strategies in Tanzania to increase girls' schooling. These are imaginative and innovative approaches to pressing and contested policy challenges. We will examine several contentious issues in contemporary Africa, exploring their roots and the intense conflicts they engender, with special attention to foreign aid and the aid relationship. As African communities and countries work to shape their future, what are the foreign roles and what are their consequences?

Same as: AFRICAAM 111, AFRICAST 112

**AFRICAST 219. Novel Perspectives on South Africa. 2-3 Units.**

21st-century South Africa continues its literary effervescence. In this class we'll sample some recent novels and related writings to tease out the issues shaping the country (and to some degree the continent) at present. Is 'South African literature' a meaningful category today? What are the most significant features we can identify in new writings and how do they relate to contemporary social dynamics? The course will appeal to anyone interested in present-day Cape Town or Johannesburg, including students who have spent a term in BOSP-Cape Town or plan to do so in future. Both undergraduate and graduate students are welcome. 2-3 units. Course may be repeated for credit. All students will write short analyses from the prescribed texts. Students taking the course for three units will write an extended essay on a topic agreed with the instructor.

Same as: AFRICAAM 119, AFRICAAM 219, AFRICAST 119, CSRE 119

**AFRICAST 224. Memory and Heritage In South Africa Syllabus. 1 Unit.**

The focus of this course is to provide a forum in which students examine the role of memory and heritage in South Africa. The course will include visiting speakers, discussion and other activities. The complex relationship between memory and heritage in South Africa will provide the basis for a series of broad conversations about citizenship, national reconciliation, memorialization, justice, modernity and heritage ethics.

**AFRICAST 229. Literature and Global Health. 3-5 Units.**

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with a call made by the editor-in-chief of *The Lancet* for a literature of global health, namely fiction modeled on the social reform novels of the nineteenth century, understood to have helped readers develop a conscience for public health as the field emerged as a modern medical specialty. We will then spend the quarter understanding how colonial, postcolonial, and world literatures have answered and complicated this call. Readings will include prose fiction by Albert Camus, Joseph Conrad, Tsitsi Dangaremba, Amitav Ghosh, Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese, Paul Farmer. And each literary reading will be paired with medical, philosophical, and policy writings that deeply inform the field of global health. Note: To be eligible for WAYS credit, you must take the course for a Letter Grade.

Same as: AFRICAAM 229, COMPLIT 229, CSRE 129B, FRENCH 229, HUMBIO 175L, MED 234

**AFRICAST 235. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.**

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 135, EDUC 135, EDUC 335, HRP 235, HUMBIO 26, MED 235

**AFRICAST 238. Conflict and Reconciliation in Africa: International Intervention. 3-5 Units.**

This course will explore recent debates on the causes and structural terms of large-scale violence in Africa in the context of key contemporary models for reconciliation and transitional justice. Discussions will emphasize the broader international legal and political order each presupposes, and specifically whether their underlying reconstitution of rights and subjectivities are compatible with cultural, political or legal diversity. A historical assessment of the predominating Nuremberg paradigm of transitional justice, structured around international military intervention and criminal trials based on international criminal courts, will be contrasted with other regional models that engage with the challenges of the political reconciliation of formerly divided political communities. The necessity of understanding the specificities of both global and local historical and structural contexts will be examined with respect to various proposals for how to balance of balance concerns for both justice and peace. Readings will cover case studies from South Africa, Rwanda, DRC, northern Uganda, Sudan (including Darfur and South Sudan), Libya, Mali, and CAR.

Same as: AFRICAST 138, ANTHRO 138A, ANTHRO 238A

**AFRICAST 242. Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice. 3-5 Units.**

This seminar is part of a broader program on Social Entrepreneurship at CDDR in partnership with the Haas Center for Public Service. It will use practice to better inform theory. Working with three visiting social entrepreneurs from developing and developed country contexts students will use case studies of successful and failed social change strategies to explore relationships between social entrepreneurship, gender, democracy, development and justice. It interrogates current definitions of democracy and development and explores how they can become more inclusive of marginalized populations. This is a service learning class in which students will learn by working on projects that support the social entrepreneurs' efforts to promote social change. Students should register for either 3 OR 5 units only. Students enrolled in the full 5 units will have a service-learning component along with the course. Students enrolled for 3 units will not complete the service-learning component. Limited enrollment. Attendance at the first class is mandatory in order to participate in service learning.

Same as: AFRICAST 142, INTNLREL 142

**AFRICAST 246L. Studies in Ethnomusicology: Musics of Africa and the African Diaspora. 3-5 Units.**

An introduction to musics of Africa and the African Diaspora. Topics include: music and nationalism, religion, embodiment, diaspora, migration, resistance, gender, globalization, and race. Musical regions and nations may include: Zimbabwe, South Africa, West Africa, Central Africa, Somalia, Ethiopia, the Caribbean, and the United States. This is a seminar-based course in which students will write short reflective papers and a final, research-based paper. Pre- or co-requisite for WIM credit: Music 22. WIM at 4 or 5 letter-graded units only.

Same as: AFRICAAM 146L, MUSIC 146L, MUSIC 246L

**AFRICAST 249. Bodies, Technologies, and Natures in Africa. 4-5 Units.**

This interdisciplinary course explores how modern African histories, bodies, and natures have been entangled with technological activities. Viewing Africans as experts and innovators, we consider how technologies have mediated, represented, or performed power in African societies. Topics include infrastructure, extraction, medicine, weapons, communications, sanitation, and more. Themes woven through the course include citizenship, mobility, labor, bricolage, in/formal economies, and technopolitical geographies, among others. Readings draw from history, anthropology, geography, and social/cultural theory.

Same as: ANTHRO 348B, HISTORY 349

**AFRICAST 299. Independent Study or Directed Reading. 1-10 Unit.****AFRICAST 300. Contemporary Issues in African Studies. 1 Unit.**

Guest scholars present analyses of major African themes and topics. Brief response papers required. May be repeated for credit.

**AFRICAST 301A. The Dynamics of Change in Africa. 4-5 Units.**

Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.

Same as: HISTORY 246, HISTORY 346, POLISCI 246P, POLISCI 346P

**AFRICAST 302. Research Workshop. 1 Unit.**

Required for African Studies master's students. Student presentations.

**AFRICAST 801. TGR Project. 0 Units.****AFRICAST 81. Media Representations of Africa. 3-5 Units.**

How has Africa been dominantly represented in the media? How are these representations challenged, complexified and reproduced in the postcolonial context? What is the role of African media in these processes? This class is an introduction to the variety of roles played by the media in representing Africa, with a particular focus on the postcolonial context. The topic is particularly relevant to contemporary Africa as the emerging middle-class, economic and cultural globalization, and the uptake for communication technologies are shaping contested images of the continent. You will: develop a theoretical and empirical understanding of the media as instruments of domination but also of resistance; learn how to critically deconstruct media representations in everyday life; understand the challenges of intercultural communication in an unequal world. Key concepts such as: representation, stereotyping, cultural appropriation, afropessimism, afrocentrism, afro optimism, afropolitanism. Readings drawn from media and cultural studies, anthropology, postcolonial theory and literature. In class-analysis of photographs, news articles and broadcasts, PR campaigns, social media, films and documentaries.

Same as: AFRICAAM 81, AFRICAST 181

## Anesthesia (ANES)

**ANES 199. Undergraduate Research. 1-18 Unit.**

Allows for qualified students to undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

**ANES 202. Anesthesiology and Pathophysiologic Implications for the Perioperative Patient. 1 Unit.**

Provides participants a patient-care-related review of organ physiology and an in-depth discussion of the pathophysiologic mechanisms at work in the perioperative period that influence outcome in the surgical patient and their management. Organ systems addressed include cardiovascular, respiratory, renal, hematologic, and cerebral. Subject matter including airway management, ventilatory support, transfusion practices and the acute management of shock provides useful information for all students currently or in the future involved in acute care of the critically ill patient. Additional topics specific to anesthesia, including anesthetic pharmacology. Lecturers are Stanford anesthesia faculty and visiting guest faculty. Prerequisite: completion of first year curriculum is strongly encouraged.

**ANES 204. Medical Education in the New Millennium: Innovation and Digital Disruption. 1-2 Unit.**

Focus is on the unique learning preferences and needs of today's Millennial medical learners (medical students, residents, fellows, practicing physicians, nurses, pharmacists, allied medical professionals) and the role thoughtful learning design and use of technology can play in meeting their unique needs. Grounded in learning theory, colloquium course will provide accessible information for learners at all levels to understand learning design and use of educational technologies in the new Millennium. Features speakers from wide range of medical education-related fields, including experts in instructional design, learning theory and medical education technologies. Students enrolling for 2 units prepare a final paper.

**ANES 205. Engage and Empower Me: Myths and Truths of Designing for Patient Behavior. 2-3 Units.**

Focus is on patient stories and real-life experiences of patient engagement, the neuroscience of behavior change and the principles of patient engagement. Together with patients, students participate in design sessions at Stanford's simulation center to create and test ways to modify behavior through design. Topics include the neuroscience behind motivating individuals into healthy behaviors, including patients in the care design process, how health educators, designers, techies and investors can improve success. Students enrolling for 3 units complete a class project.

**ANES 206. 3D Printing and Biofabrication. 1-2 Unit.**

Focus is on medical possibilities of 3D printing. Additive manufacturing, often termed 3D printing, uses automated techniques to produce physical objects using layer-by-layer construction methods. Biofabrication applies these same techniques to print physical objects from biological cells. Such techniques hold great promise to transform health and medicine to deliver more personalized care solutions for patients. This colloquium course explores the future of 3D printing and its impact on health and medicine. See <http://medicinex.stanford.edu/anes206/>. Students enrolling for 2 units prepare a final paper.

**ANES 207. Medical Acupuncture. 2 Units.**

Acupuncture is part of a comprehensive system of traditional Chinese Medicine developed over the past two millennia. This course reviews the history and theoretical basis of acupuncture for the treatment of various diseases as well as for the alleviation of pain. Issues related to the incorporation of acupuncture into the current health care system and the efficacy of acupuncture in treating various diseases are addressed. Includes practical, hands-on sections.

**ANES 208A. Data Science for Digital Health and Precision Medicine. 1-2 Unit.**

How will digital health, low-cost patient-generated and genomic data enable precision medicine to transform health care? This Everyone Included course from Stanford Medicine X and SHC Clinical Inference will provide an overview of data science principles and showcase real world solutions being created to advance precision medicine through implementation of digital health tools, machine learning and artificial intelligence approaches. This class will feature thought leaders and luminaries who are patients, technologists, providers, researchers and leading innovators from academia and industry. This course is open to undergraduate and graduate students. Lunch will be provided.

**ANES 211SI. Themes in the History of Science and Medicine. 1 Unit.**

What exactly is a diagnosis, and what is the history of that term? Why do Institutional Review Boards exist, and what atrocities in human medical experimentation occurred to prompt their creation? What is the role of narrative, social construction, and storytelling in medicine? This course will shed light on the ways physicians and scholars grapple with these and other important questions through a series of lectures from historians and philosophers of science, as well as bioethicists and scholars of narrative medicine. These perspectives on how scientific knowledge emerges and changes over time offer invaluable insights and frameworks for anyone aspiring to practice medicine or contribute to the collective body of scientific knowledge.

**ANES 212. Machine Learning for Healthcare Quality: Precision Medicine AI Design Lab. 3 Units.**

This course provides a hands-on introduction to building machine learning systems for healthcare quality analysis and improvement. We explore several unconditional topics, including data representation, data manipulation, data analysis and data visualization. Students will be introduced to these topics during lectures. The course also provides students with a significant opportunity to investigate the application of these ideas to real-world clinical quality improvement challenges. Working with clinical mentors from the Stanford University School of Medicine students will be expected to supplement machine learning theory with a quarter-long project targeting representative clinical quality improvement challenges. Students will be encouraged to think creatively about traditionally hard quality problems and requires to perform group research exposing them to designing practical machine learning systems for healthcare.

**ANES 215. Journal Club for Neuroscience, Behavior and Cognition Scholarly Concentration. 1 Unit.**

Review of current literature in both basic and clinical neuroscience in a seminar format consisting of both faculty and student presentations.

**ANES 280. Early Clinical Experience in Anesthesia. 1-2 Unit.**

Provides an observational experience as determined by the instructor and student. Prerequisite: consent of instructor.

**ANES 299. Directed Reading in Anesthesiology. 1-18 Unit.**

Prerequisite: consent of instructor.

**ANES 370. Medical Scholars Research. 4-18 Units.**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

**ANES 399. Graduate Research. 1-18 Unit.**

Students undertake investigations sponsored by individual faculty members. Problems related to metabolism, toxicity, and mechanisms of anesthesia; pharmacologic studies involving pain management; the genetic and molecular basis of hemodynamic insufficiency. Animal studies may be included. Interested students should contact Drs. Trudell, MacIver, Clark, Giffard, Patterson, Angelotti, Drover, Chu, or Angst.

**ANES 70Q. Critical Illness: Patients, Physicians, and Society. 3 Units.**

Examines the various factors involved in shaping the critical care illness experience for three groups of people: the clinicians, the patients, and patients' families. Medical issues, economic forces and cost concerns, cultural biases, and communication errors can all influence one's perception. Helps students understand the arc of critical illness, and how various factors contribute to the interactions between those various groups. Includes an immersion experience (students are expected to round with clinicians in the ICU and to attend Schwartz rounds, a debriefing meeting about difficult emotional situation) and a mentoring experience (with critical care fellows), in addition to routine class work.

**ANES 72Q. The Art of Medical Diagnosis. 3 Units.**

The Art of Medical Diagnosis: Enhancing Observational Skills through the Study of Art is an interactive, multidisciplinary undergraduate course that explores various ways in which studying art increases critical observational skills vital for aspiring health care providers. Students will be introduced to the concept of "Visual Thinking Strategies" through classroom, art creation, and museum based activities. Students will apply these skills to both works of art and medical cases. Significant focus will be on engaging in group discussions where they will collaboratively use visual evidence to generate and defend hypothesis. Drawing and sketching from life will play a critical role in honing observational skills through weekly assignments, workshops, and a final project. The interactive nature of this course pivots students away from a typical lecture based course to a self-directed learning experience.

## Anthropology (ANTHRO)

**ANTHRO 1. Introduction to Cultural and Social Anthropology. 3-5 Units.**

This course introduces basic anthropological concepts and presents the discipline's distinctive perspective on society and culture. The power of this perspective is illustrated by exploring vividly-written ethnographic cases that show how anthropological approaches illuminate contemporary social and political issues in a range of different cultural sites.

Same as: ANTHRO 201

**ANTHRO 100A. India's Forgotten Empire: The Rise and Fall of Indus Civilization. 3 Units.**

How and why cities with public baths, long-distance trade, sophisticated technologies, and writing emerged, maintained themselves, and collapsed in the deserts of present-day Pakistan and India from 2500 to 1900 B.C.

**ANTHRO 100B. Lifeways of the Ancient Maya. 5 Units.**

This course engages with the world of the pre- and post-contact Maya people through scholarship that explores the material culture of daily life. We address how questions about the past are framed through ethnographic and ethnohistoric accounts of daily life, how diverse scientific methods and theoretical perspectives are used to address these questions, and how interpretations of daily life in the ancient Maya world are formulated. We consider how perceptions of the ancient Maya are marshaled in contemporary politics and policies. The course is designed to provide a broad overview of sites and materials in the Maya area, focusing on the dynamic interplay between the material and the social. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 200B

**ANTHRO 100D. Chavin de Huanter Research |Seminar. 3-5 Units.**

Archaeological analytical techniques appropriate for data recovered during archaeological fieldwork in Chavin de Huanter, Peru. Open to all interested students; fieldwork participants are expected to take the course. Students work on data from the previous field season to produce synthetic written reports, focusing on specific methodological issues.

Same as: ARCHLGY 100D

**ANTHRO 101. The Aztecs and Their Ancestors: Introduction to Mesoamerican Archaeology. 3-5 Units.**

The prehispanic cultures of Mesoamerica through archaeology and ethnohistory, from the archaic period to the Spanish conquest in the 16th century.

**ANTHRO 101A. Archaeology as a Profession. 5 Units.**

Academic, contract, government, field, laboratory, museum, and heritage aspects of the profession.

Same as: ARCHLGY 107A

**ANTHRO 101B. Archaeology of Technology. 5 Units.**

The course is an introduction to the social organization of material production and to the theoretical, ethnographic, and historical frameworks used by archaeologists to link the technologies of the past to salient sociocultural information about the people who employed them. Comparison of metallurgical, ceramic, lithic, and textile industries in different cultural and historical settings will inform critical discussions of how and to what extent analyses of artifacts, workshops, and industrial installations can provide insight into past societies.

Same as: ANTHRO 201B, ARCHLGY 100, ARCHLGY 200

**ANTHRO 101S. Introduction to Cultural and Social Anthropology. 3-5 Units.**

This course introduces basic anthropological concepts and presents the discipline's distinctive perspective on society and culture. The power of this perspective is illustrated by exploring vividly-written ethnographic cases that show how anthropological approaches illuminate contemporary social and political issues in a range of different cultural sites.

Same as: ANTHRO 1S

**ANTHRO 102. Urban Ethnography. 5 Units.**

Ethnographic research and writing focuses on the ways our lives are shaped by interacting forces such as history, political economy, and creative cultural practices. In the last fifty years, more and more cultural anthropology has been carried out in urban contexts, due to both urbanization around the world and changes in anthropology as a field. This seminar focuses on careful reading and analysis of book-length ethnographies about urban cultures, people and dynamics to consider what the theory and methodological tools of anthropology have to offer us as we seek to better understand the city. Readings include a variety of approaches to ethnographic research in and/or about cities, with a mix from different eras and about different cities around the world. Same as: URBANST 140

**ANTHRO 102A. Ancient Civilizations: Complexity and Collapse. 3-5 Units.**

How archaeology contributes to understanding prehistoric civilizations. How and why complex social institutions arose, and the conditions and processes behind their collapse. The development of monumental architecture, craft specialization, trade and exchange, and social stratification using examples from the archaeological record. (HEF II, III; DA-B).

Same as: ANTHRO 202A

**ANTHRO 102B. Aztec Language and Culture. 3 Units.**

Introduction to Nahuatl, the language of the Aztecs. Also known as Mexicano, Nahuatl was once used as a lingua franca throughout Mesoamerica, and is today spoken by about 1.5 million people. Emphasis on vocabulary, colonial documents, including Central Mexican codices, and archaeology. Attention also given to modern dialects, the place of Nahuatl in the Uto-Aztecan language phylum, and the relationship between Nahuatl and Aztec culture. Appropriate for students interested in linguistics, anthropology, archaeology, and history, and those desiring to better understand the native linguistic heritage of Mesoamerica and its impact on Spanish.

**ANTHRO 103. The Archaeology of Modern Urbanism. 5 Units.**

Seminar. Urbanism as a defining feature of modern life. The perspective of archaeology on the history and development of urban cultures. Case studies are from around the globe; emphasis is on the San Francisco Bay Area megalopolis. Cities as cultural sites where economic, ethnic, and sexual differences are produced and transformed; spatial, material, and consumption practices; and the archaeology of communities and neighborhoods.

**ANTHRO 103A. Human Osteoarchaeology. 5 Units.**

The course will cover the methodological and theoretical backgrounds to human osteoarchaeology, introduce the student to the chemical and physical characteristics of bone, and to the functional morphology of the human skeleton. Classes will consist of a taught component that outlines how osteoarchaeologists reconstruct individual life-histories based on age, sex etc.; this is combined with hands-on identification of different skeletal elements and the markers used to inform the analytical methods. Additional scientific methodologies are also introduced that increasingly form a major component of human osteoarchaeology.

Same as: ANTHRO 203A

**ANTHRO 105. Ancient Cities in the New World. 3-5 Units.**

Preindustrial urbanism as exemplified by prehispanic New World societies. Case studies: the central and southern highlands of Mesoamerica, and the Maya region. Comparative material from highland S. America.

Same as: ANTHRO 205

**ANTHRO 105A. Archaeological Fieldwork: Critical Analysis and Practical Application. 2-3 Units.**

This introduction to archaeological fieldwork involves both field and seminar components, each component meeting once per week. During the field sessions, we will investigate an archaeological site on campus using methods of survey, mapping, testing, and excavation (digging, recording units/features, profile illustration). In seminar, we will critically examine archaeological fieldwork through reading, writing, and discussion, exploring topics such as history of archaeological excavation, production of archaeological knowledge, disjunction between theory and practice, reflexive methodologies, ethics, collaboration, and specialization. No experience necessary, but students with fieldwork experience are welcome.

Same as: ANTHRO 205A

**ANTHRO 106. Incas and their Ancestors: Peruvian Archaeology. 3-5 Units.**

The development of high civilizations in Andean S. America from hunter-gatherer origins to the powerful, expansive Inca empire. The contrasting ecologies of coast, sierra, and jungle areas of early Peruvian societies from 12,000 to 2,000 B.C.E. The domestication of indigenous plants which provided the economic foundation for monumental cities, ceramics, and textiles. Cultural evolution, and why and how major transformations occurred.

Same as: ANTHRO 206A, ARCHLGY 102B

**ANTHRO 107A. Finding Home Reclaiming History: Advanced Methods in California Indian Studies. 4 Units.**

How do contemporary California Native Americans claim and tell their own stories? Using archival information, government documents, archaeological evidence, interviews and field projects, this course examines the methods contemporary scholars use to work with Native Americans. We emphasize the role of mythmaking, film and popular culture in shaping public perceptions of California Indians. May be repeat for credit.

**ANTHRO 108A. The Formation of Political State in the Peruvian Andes. 3-5 Units.**

This course provides a panorama of the prehistory and history of the political state developed in Peruvian Andes. The Peruvian Andes is a rich cultural area in South America the first generations of Andean state societies developed. Beginning in Formative times with Chavin Culture we have an important development of different forms of state from theocratic to military, and most importantly, the Inca Empire. This richness and diversity of state societies was a consequence of an interesting relationship between societies of different levels of development, economies, and of course, the related diverse ecologies of the region. In 1532, Spanish conquerors came to the Inca Empire and introduced their new vision of politics and economics, and created corresponding new institutions in the Andes. The ensuing colonial age had an interesting development and brought new tensions to this New World. Native ways of work and thought survive in colonial times, creating a distinctive political and ideological scenario including deep ethnic and economic differences. These political tensions established the foundations for revolutionary movements based in indigenous belief as for example Taky Onkoy (dancing sickness) or Neo-Incanism. Finally, with independence from Spain, a new republic is established from Lima but many problems in the native structures conditioned the development of new liberal politics.

**ANTHRO 108B. Gender in the Arab and Middle Eastern City. 5 Units.**

What are the components of gendered experience in the city, and how are these shaped by history and culture? How do meanings attributed to Islam and the Middle East obscure the specificity of women's and men's lives in Muslim-majority cities? This course explores gender norms and gendered experience in the major cities of Arab-majority countries, Iran and Turkey. Assigned historical and sociological readings contextualize feminism in these countries. Established and recent anthropological publications address modernity, mobility, reproduction, consumption, and social movements within urban contexts. Students will engage with some of the key figures shaping debates about gender, class, and Islam in countries of the region typically referenced as North Africa and the Middle East (MENA). They will also evaluate regional media addressing concerns about gender in light of the historical content of the course and related political concepts.

Same as: FEMGEN 108B, URBANST 108B

**ANTHRO 108E. Catalhoyuk and Neolithic Archaeology. 3 Units.**

Catalhoyuk as a case study to understand prehistoric social life during the Neolithic in Anatolia and the Near East. Developments in agriculture, animal domestication, material technology, trade, art, religion, skull cults, architecture, and burial practices. Literature specific to Catalhoyuk and other excavations throughout the Anatolian and Levantine regions to gain a perspective on diversity and variability throughout the Neolithic. The reflexive methodology used to excavate Catalhoyuk, and responsibilities of excavators to engage with larger global audiences of interested persons and stakeholders.

Same as: ARCHLGY 108E

**ANTHRO 109A. Archaeology of the Modern World. 3-5 Units.**

Historical archaeology, also called the archaeology of the modern world, investigates the material culture and spatial history of the past five centuries. As a discipline, historical archaeology has been characterized by (1) a methodological conjunction between history and archaeology; (2) a topical focus on the "three Cs": colonization, captivity, and capitalism; and (3) an epistemological priority to recovering the perspectives of "people without history." Each of these three trends is widely debated yet they continue to profoundly shape the field. This seminar provides an in-depth examination of the emergence and development of this historical archaeology, with a focus on current issues in theory and method. For undergraduates, the prerequisite is Anthro 3 or consent of instructor.

Same as: ANTHRO 209A, ARCHLGY 109A

**ANTHRO 10A. The Archaeology of Home. 3-5 Units.**

Homes evoke powerful emotions about place and also highlight the dynamic and complex nature of people, their relationships, and the broader society they live in. Focus on the ways that material traces from the past shed light on the diversity of domestic life, which includes household organization, economic strategies, diet and status, rituals, and identity. Archaeological case studies to see how archaeologists identify reoccurring patterns in material culture found in homes or domestic dwellings to reconstruct household patterns and social relations.

**ANTHRO 10SC. Evolution and Conservation in Galápagos. 2 Units.**

The tiny remote islands of Galápagos have played a large and central role in the study of evolution. Not surprisingly, they have also been central to the study of conservation. The fascinating adaptations of organisms to the unique ecosystems of the archipelago have left them particularly vulnerable to outside introductions. This seminar explores evolution, conservation, and their connection in the Galapagos. Using case-study material on finches, iguanas, tortoises, cacti, *Scalesia* plants, and more, we will explore current theory and debate about adaptation, sexual selection, speciation, adaptive radiation, and other topics in evolution. Similarly, we will explore the special challenges Galápagos poses today for conservation, owing to both its unusual biota and the increasing human impact on the archipelago. The first week is held on-campus, followed by an intensive eleven-day expedition to Galápagos to observe firsthand evolutionary phenomena and conservation issues. A chartered ship will serve as our floating classroom, dormitory, and dining hall as we work our way around the archipelago to visit as many as ten islands. For this portion of the class, undergraduates will be joined by a group of Stanford alumni and friends in a format called a Stanford "Field Seminar." Students are required to complete all course readings over the summer. Students will be asked to lead discussions and carry out literature research on the evolutionary and conservation biology of particular Galápagos species. The final assignment is a seven- to ten-page paper and class presentation as we travel in Galápagos. Travel to Galápagos will be provided and paid by Sophomore College (except incidentals) and is made possible by the support of the Stanford Alumni Association Travel/Study Program and generous donors. Students will return to campus late afternoon Saturday, September 22.

**ANTHRO 110. Environmental Archaeology. 5 Units.**

This course investigates the field of environmental archaeology. Its goals are twofold: 1) to critically consider the intellectual histories of environmental archaeology, and, 2) to survey the various techniques and methods by which archaeologists assess historical environmental conditions through material proxies. The course will include lab activities.

Same as: ANTHRO 210, ARCHLGY 110

**ANTHRO 110A. Neandertals and Modern Humans: Origin, Evolution, Interactions. 3 Units.**

The expansion out of Africa of our species represents the last spectacular step in the course of Human Evolution. It resulted in the colonization of the whole planet and the replacement of archaic forms of humans in Eurasia. One way to investigate why *Homo sapiens* has been such a successful species is to compare its evolution with that of its closest relative, the Neandertals. Exploring the bio-cultural processes at work in the two lineages leads to examine some of the main issues in Paleoanthropology and the most recent methodological advances in the field.

Same as: ANTHRO 210A

**ANTHRO 110B. Examining Ethnographies. 5 Units.**

Eight or nine important ethnographies, including their construction, their impact, and their faults and virtues.

Same as: ANTHRO 210B

**ANTHRO 111A. Archaeology of the Andes of Argentina. 3-5 Units.**

The aim of this course is to provide a panorama of the archaeology of the andean region of Argentina, along some main topics of past and current researches. North andean Argentina has been considered for a long time as subordinated to the major developments in the central Andes and Puna, as if it were in a marginal position that mirrored their history. More than a hundred years of research in the area have produced different insights, which put that affirmation in relative terms. The course will give an overview of major historical contributions and contemporary trends in the archaeological thinking in relation to themes such as time, the space, people, things and nature. An overview of the conceptions and construction of time. Space seen as cultural area; natural environment and built landscape; archaeological areas as national territory. Historical conceptions of people; bodies; social inequality; the past and present others in the archaeological research. Artefacts, classifications and typologies; material archaeological contexts as cultural units; from artefacts to things; past ontologies. Nature and environment; domestication; ecological approaches; agropastoralism; nature/culture. It is expected that by the end of the course students will gain a panorama of the major problems of the archaeology of andean Argentina with historically and theoretically informed perspectives.

Same as: ANTHRO 211A

**ANTHRO 111B. Muwekma: Landscape Archaeology and the Narratives of California Natives. 3-5 Units.**

This course explores the unique history of San Francisco Bay Area tribes with particular attention to Muwekma Ohlone- the descendent community associated with the landscape surrounding and including Stanford University. The story of Muwekma provides a window into the history of California Indians from prehistory to Spanish exploration and colonization, the role of Missionaries and the controversial legacy of Junipero Serra, Indigenous rebellions throughout California, citizenship and land title during the 19th century, the historical role of anthropology and archaeology in shaping policy and recognition of Muwekma, and the fight for acknowledgement of Muwekma as a federally recognized tribe. We will visit local sites associated with this history and participate in field surveys of the landscape of Muwekma.

Same as: ARCHLGY 111B, NATIVEAM 111B

**ANTHRO 112. Public Archaeology: Market Street Chinatown Archaeology Project. 4-5 Units.**

This internship-style course centers on the practice and theory of historical archaeology research and interpretation through a focused study of San Jose's historic Chinese communities. The course includes classroom lectures, seminar discussion, laboratory analysis of historic artifacts, and participation in public archaeology events. Course themes include immigration, urbanization, material culture, landscape, transnational identities, race and ethnicity, gender, cultural resource management, public history, and heritage politics. The course includes required lab sections, field trips, and public service. Transportation will be provided for off-site activities.

Same as: ANTHRO 212, ASNAMST 112

**ANTHRO 112A. Archaeology of Human Rights. 5 Units.**

This introductory seminar provides a critical vantage point about human rights discourse from an archaeological perspective. The seminar is organized around four main questions: (1) Is cultural heritage a human right? (2) What are archaeologists learning about how the material and temporal dimensions of power and resistance? (3) How is archaeological evidence being used in investigations of human rights violations? (4) Can research about the past shape the politics of the present? Topics to be discussed include archaeological research on mass internment, colonialism, enslavement and coerced labor, ethnic cleansing, homelessness, gender discrimination, indigenous rights, and environmental justice.

Same as: URBANST 147

**ANTHRO 112B. Advanced Study in Public Archaeology. 2-5 Units.**

This service-learning course is offered only to students who have completed Anthro 112a and wish to deepen their scholarship in public archaeology and heritage practice through continued study. Students enrolled in Anthro 112b complete readings, collections management study, public archaeology events, and community-based research oriented towards their specific interests. Prerequisite: Completion of Anthro 112a AND instructor consent.

**ANTHRO 113. Culture and Epigenetics: Towards A Non-Darwinian Synthesis. 4-5 Units.**

The course examines the impact of new research in epigenetics on our understanding of long-term cultural change. The course examines the various attempts that have been made over recent decades to find a synthesis between cultural and biological evolution. These approaches, often termed neo-Darwinian, include memes, dual inheritance theory, theories of cultural selection and transmission, niche construction theory and macro-evolutionary approaches. Research in all these areas will be examined, with particular reference to explanations for the origins of agriculture, but also including other transformations, and critiqued. New research in epigenetics offers an alternative non-Darwinian evolutionary perspective that avoids many of the problems and pitfalls in the neo-Darwinian approaches. Cultural evolution comes to be viewed as cumulative, directional and Lamarckian, since heritable epigenetic variation can underlie evolutionary change. Epigenetics opens the way for human cultural entanglements to become the drivers for evolutionary change, thus allowing the full range of social processes studied in the social and cultural sciences to take their place in the study and analysis of long-term change.

Same as: ANTHRO 213

**ANTHRO 113B. Religious Practices in Archaeological Cultures. 5 Units.**

According to Hawkes (1954), religion or ideology is the most difficult part of social life to access archaeologically. Luckily, not all scholars agree; according to Fogelin (2008) 'religion is not something people think about, but something people do'. Thus, archaeology, an inherently multidisciplinary subject that studies material culture, is well suited to delve into religion and its underpinnings. This course will explore religious practices, as they can be defined and interpreted from archaeological contexts spanning the Paleolithic to historic periods. Definitions of religion differ from author to author but they mostly agree that religion is a fully integrated and thus integral part of human social life. Politics, economics, identity and social class influence religion, and religion influences how these forces play out in society. Thus, the course will also examine the significance of ritual and religion in a variety of social contexts.

Same as: ANTHRO 213B, ARCHLGY 113B

**ANTHRO 114. Prehistoric Stone Tools: Technology and Analysis. 5 Units.**

Archaeologists rely on an understanding of stone tools to trace much of what we know about prehistoric societies. How to make, illustrate, and analyze stone tools, revealing the method and theory intrinsic to these artifacts.

Same as: ANTHRO 214, ARCHLGY 114

**ANTHRO 114A. Introduction to South Asian Archaeology. 5 Units.**

This seminar will survey the archaeology of South Asia, beginning with animal and plant domestication in the early Holocene and ending with the late Medieval Period. Given its chronological breadth and spatial scope, the class will interrogate a variety of social and historical contexts that contribute to a broad range of anthropological research concerns, including the intersections of authority, ritual, alterity and landscape, and at the same time critically consider the epistemological bases for their analyses through archaeological remains.

Same as: ANTHRO 214A, ARCHLGY 114A

**ANTHRO 114B. Landscape Archaeology and Global Information Systematics. 3-5 Units.**

This course is meant to lay groundwork for analysis of archaeological landscapes using the methods of GIS. Throughout, we consider the various understandings of landscape, from the biographical to the biological. The course explores the history of various typologies of landscape, incorporating the cultural, the topographical, the ecological, and the topological; reviews different types of landscape data and analysis, including aerial imagery, stratigraphic excavations, and specialized analyses; addresses how to integrate different sorts of data sets and carry out analytical assessment of interrelated "layers" as dynamic constituents of landscape; considers implications of landscape studies in modern policy and management. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 214B

**ANTHRO 115. The Social life of Human Bones. 3-5 Units.**

Skeletal remains serve a primary function of support and protection for the human body. However, beyond this, they have played a range of social roles once an individual is deceased. The processes associated with excarnation, interment, exhumation and reburial all speak to the place that the body, and its parts, play in our cultural as well as physical landscape. This course builds on introductory courses in human skeletal anatomy by adding the social dynamics that govern the way humans treat other humans once they have died. It draws on anthropological, biological and archaeological research, with case studies spanning a broad chronological and spatial framework to provide students with an overview of social practice as it relates to the human body.

Same as: ANTHRO 215, ARCHLGY 115

**ANTHRO 115B. Peoples and Cultures of Ancient Mesoamerica. 5 Units.**

This course engages with the world of ancient Mesoamerica, focusing on the Mixtec, Aztec, Maya, Zapotec, Chichimec, Olmec, and Teotihuacan peoples. We address how questions about the past are framed through ethnographic and ethnohistoric accounts of daily life, how diverse scientific methods and theoretical perspectives are used to address these questions, how interpretations of daily life in the ancient Mesoamerican world are formulated, and how these interpretations are marshaled in contemporary politics and policies. We explore different scales of Mesoamerican communities, and compare the diverse material culture and lifeways represented in Mesoamerica at different time periods. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 215B

**ANTHRO 116. Data Analysis for Quantitative Research. 5 Units.**

An introduction to numeric methods in Anthropology and related fields employing the Data Desk statistics package to test hypotheses and to explore data. Examples chosen from the instructor's research and other relevant projects. No statistical background is necessary, but a working knowledge of algebra is important. Topics covered include: Frequency Distributions; Measures of Central Tendency, Dispersion, and Variability; Probability and Probability Distributions; Statistical Inference, Comparisons of Sample Means and Standard Deviations; Analysis of Variance; Contingency Tables, Comparisons of Frequencies; Correlation and Regression; Principal Components Analysis; Discriminant Analysis; and Cluster Analysis. Grading based on take-home problem sets.

Same as: ANTHRO 216

**ANTHRO 116B. Anthropology of the Environment. 5 Units.**

This seminar interrogates the history of anthropology's approach to the environment, beginning with early functionalist, structuralist, and Marxist accounts of human-environment relationships. It builds towards more recent developments in the field, focusing on nonhuman and relational ontologies as well as current projects on the intersections of nature, capital, politics, and landscape histories. At the end of this class, students will be familiar with the intellectual histories of environmental anthropology and contemporary debates and tensions around questions of ethics, agency, environment, and historical causality.

Same as: ANTHRO 216B

**ANTHRO 116C. Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America. 5 Units.**

What does it mean to be a Native American in the 21st century? Beyond traditional portrayals of military conquests, cultural collapse, and assimilation, the relationships between Native Americans and American society. Focus is on three themes leading to in-class moot court trials: colonial encounters and colonizing discourses; frontiers and boundaries; and sovereignty of self and nation. Topics include gender in native communities, American Indian law, readings by native authors, and Indians in film and popular culture.

Same as: ANTHRO 16, ARCHLGY 16, NATIVEAM 16

**ANTHRO 117. Thinking Through Animals. 5 Units.**

The human-animal relationship is dynamic, all encompassing and durable. Without exception, all socio-cultural groups have evidenced complex interactions with the animals around them, both domesticated and wild. However, the individual circumstances of these interactions are hugely complicated, and involve much more than direct human-animal contact, going far beyond this to incorporate social, ecological and spiritual contexts. This course delves into this complexity, covering the gamut of social roles played by animals, as well as the methods and approaches to studying these, both traditional and scientific. While the notion of 'animals as social actors' is well acknowledged, their use as proxies for human autecology (the relationship between a species and its environment) is also increasingly recognised as a viable mechanism for understanding our cultural and economic past. The module presents an overview covering a broad timespan from the Pleistocene to the modern day. It will piece together the breadth of human-animal relationships using a wide geographic range of case studies.

Same as: ANTHRO 217

**ANTHRO 117A. Stuff. 5 Units.**

Never before have humans been engulfed by so much stuff. Stuff is needed to survive giving us the basics of food, clothing, and shelter. But stuff does so much more. Smart phones rule our social interactions. Louis Vuitton handbags display status. Air conditioning masters nature. Picassos inspire beauty. Wedding bands promise eternal love. Crosses connect believers to God. Is stuff really who we are? This seminar explores the science of stuff, past, present and future, investigating deeply-held beliefs about the meaning, value, and purpose of objects. Because our stuff has become such a popular obsession, this course embraces the eclectic intersection of popular and academic knowledge. Students will seek to answer the complex whys of our relationship with objects and understand our future human condition made by the material world.

Same as: ANTHRO 217A, ARCHLGY 117A



**ANTHRO 117B. Monuments and Landscapes: An Archaeological Perspective. 3-5 Units.**

The landscape is a result of the action and interaction of human and natural factors. Communities have altered their landscapes for a variety of reasons, including the subsistence practices; as a consequence of economic growth; to express a social ideology, and as a consequence of political and religious drivers. Accordingly, landscapes enable physical and provide psychological sustenance to people, and the human need to relate to our surroundings is part of the way in which identities are created and disputed. Within the humanities, landscape is being conceptualized as a process, a practice and as performance, and monuments within a given landscape have an equally important role, not to mention history. They are often the most durable and well-known evidence of the ancient civilizations, and should be observed jointly with the landscape. How did the landscape predefine the monument and how did the monument complement, emphasize or devalue the landscape? What philosophy channeled the construction of the monuments within the landscapes? Whether ephemeral or permanent, the human agency left traces in the landscape; thus, both monuments and landscapes are the key indicators for understanding the ideology of a particular culture. Archaeology, through its interdisciplinary nature, provides a unique perspective, as well as tools, for examining the formation processes of all man-made elements, within both natural and cultural landscapes. The course will address the multifaceted issues of the ways that people have consciously and unconsciously shaped the land around them through time. It will look into diverse, geographically and periodically influenced concepts of a monument and landscape. The course will be divided into two parts, with the first one covering the theory and methodological approaches and the second part the conceptual characteristics, modifications and changeability in various archaeological and historical periods and cultural frameworks.

Same as: ANTHRO 217B, ARCHLGY 117B

**ANTHRO 118. Heritage, Environment, and Sovereignty in Hawaii. 4 Units.**

This course explores the cultural, political economic, and environmental status of contemporary Hawaiians. What sorts of sustainable economic and environmental systems did Hawaiians use in prehistory? How was colonization of the Hawaiian Islands informed and shaped by American economic interests and the nascent imperialism of the early 20th century? How was sovereignty and Native Hawaiian identity been shaped by these forces? How has tourism and the leisure industry affected the natural environment? This course uses archaeological methods, ethnohistorical sources, and historical analysis in an exploration of contemporary Hawaiian social economic and political life.

Same as: EARTHSYS 118

**ANTHRO 118A. Digital Heritage: Bringing the Past Online with the Chinese American Historical Museum. 5 Units.**

Interpreting the past is no longer just for people like historians and archaeologists, and it's no longer confined to the pages of books. More and more, community-based organizations are gathering stories and perspectives from everyday people, and they're putting them out for the world to see online. With these big changes, what will be the future of thinking about the past? In this course, students will work through the dynamics of digital heritage through readings, discussion, and original research. The course centers around artifacts unearthed at the Market Street Chinatown in San Jose. Each student will analyze and gather stories relating to a single artifact in order to contribute to a multimedia exhibit for the Chinese American Historical Museum in San Jose. Class time will be devoted both to discussion and to work on artifact-based projects, and will also include a fieldtrip to the museum and collaboration time with members of the Chinese Historical and Cultural Project.

Same as: ASNAMST 118A, CSRE 118A

**ANTHRO 118B. Heritage, Environment, and Sovereignty in Hawaii Seminar. 1-2 Unit.**

This course explores the cultural, political economic, and environmental status of contemporary Hawaiians. What sorts of sustainable economic and environmental systems did Hawaiians use in prehistory? How was colonization of the Hawaiian Islands informed and shaped by American economic interests and the nascent imperialism of the early 20th century? How was sovereignty and Native Hawaiian identity been shaped by these forces? How has tourism and the leisure industry affected the natural environment? This course uses archaeological methods, ethnohistorical sources, and historical analysis in an exploration of contemporary Hawaiian social economic and political life. Students participate with field base in Hawaii via Skype and through classroom lectures, readings, and media.

**ANTHRO 119. Zooarchaeology: An Introduction to Faunal Remains. 5 Units.**

As regularly noted, whether historic or pre-historic, animal bones are often the most commonly occurring artefacts on archaeological sites. As bioarchaeological samples, they offer the archaeologist an insight into food culture, provisioning, trade and the social aspects of human-animal interactions. The course will be taught through both practical and lecture sessions: the hands-on component is an essential complement to the lectures. The lectures will offer grounding in the main methodological approaches developed, as well as provide case-studies to illustrate where and how the methods have been applied. The practical session will walk students through the skeletal anatomy of a range of species. It will guide students on the identification of different parts of the animal, how to age / sex individuals, as well as recognize taphonomic indicators and what these mean to reconstructing post-depositional modifications.

Same as: ANTHRO 219, ARCHLGY 119

**ANTHRO 115C. Conservation and Development Dilemmas in the Amazon. 2 Units.**

This course explores the human dimensions of conservation efforts under way in the Amazon Basin of South America. It has two specific goals: (1) to introduce the human ecology of Amazonia; and (2) to assess the prospects for joint efforts at biodiversity conservation and community development. We will draw on case studies to investigate such topics as the causes and consequences of deforestation, the social impact of parks and protected areas, and the potential for "Integrated Conservation and Development Projects" (ICDPs) such as extractive reserves, natural forest management, biodiversity prospecting, and community-based ecotourism. The course views Amazonia as a microcosm of the challenges facing conservation and development efforts today in the Third World. Part of the course is an intensive 11-day expedition to the Peruvian Amazon, at no extra cost, to observe firsthand the conservation and development dilemmas discussed in class. We will visit ecodges in the rainforest, walking miles of trails to learn about local flora, fauna, and conservation efforts. We will also visit Machu Picchu in the upper reaches of the rainforest. For the travel portion of the class, undergraduates will be joined by a group of Stanford alumni and friends. Student contributions and presentations are emphasized throughout the course. Students are expected to come well-prepared to each session, to lead discussions, and to carry out literature research. The final assignment is a 6 to 8 page paper on a case study of your own choosing or an equivalent piece of a longer collaborative paper that offers a critical assessment of one particular conservation and/or development project in or near the region we will visit. Students will present the main findings of their papers in a joint seminar of undergraduates and alumni as we travel in the Peruvian Amazon. Note: Students will arrive on campus and will be housed at Stanford until we leave for the Amazon. Travel to and from Peru organized by the Travel/Study Program of the Stanford Alumni Association is included; costs are defrayed by the Stanford Field Seminar Fund and generous donors.

Same as: HUMBIO 18SC

**ANTHRO 12. Anthropology and Art. 5 Units.**

Modernity. How the concept of art appears timeless and commonsensical in the West, and with what social consequences. Historicizing the emergence of art. Modernist uses of primitive, child art, asylum, and outsider art.

**ANTHRO 120. The Maya. 4-5 Units.**

Lecture course on the ancient and modern Maya. We explore the archaeology, ecology, culture, and language history of the Maya from the earliest times to the Classic Maya Collapse in the 9th-10th Centuries A.D., and examine also the Post-Classic, the Conquest, and Colonial Periods, and the persistence and impact of the Maya in present-day Mexico, Guatemala, Belize, Honduras, El Salvador, and diasporic Maya in the United States. The course acquaints students with the cultural achievements of the Maya in the context of the anthropology and archaeology of civilization, and considers issues of identity over vast periods of time. It includes discussion of the roles of isolation, contact, and geography in Maya history; principles of archaeological excavation and interpretation as applied to the Maya city-states, especially to their rise and fall; Maya hieroglyphic writing and its decipherment; Maya mythology and the Popol Vuh; Maya art in its Mesoamerican context; ethical issues in the management of Maya archaeological sites; principles of ethnographic analysis as applied in modern Maya communities, and Maya rebellions against colonial and modern states. Anthropology concentration: CS, Arch. No prerequisites.

**ANTHRO 120B. Indian Popular Culture. 5 Units.**

This course will explore key topics in contemporary India through an analysis of its popular culture. Bollywood and Kollywood films, Hindi soap operas and reality shows, vernacular music in Bihar, Tamil pulp fiction, matchboxes from Bangalore, clothing styles of Kerala college students, advertising in Mumbai, and cell phones used in Varanasi will all be brought together to help us shape an image of India as complex, contested, and changing. As an anthropology course, we will focus on the consumption of these media and discuss what they do in the world. Looking at both the source material itself and the way in which it is used, we will explore topics such as: nationalism, gender and sexuality, middle class aspiration, globalization, neoliberal consumerism, and the postcolonial condition.

**ANTHRO 120F. Buying Black: Economic Sovereignty, Race, and Entrepreneurship in the USA. 4-5 Units.**

This seminar examines how communities of color have critiqued and transformed capitalism in America through concepts of economic independence, entrepreneurship, and sovereignty. By tracing concepts such as the double-duty dollar, casino/tribal capitalisms, retail boycotts, and buying black, the course traces ethnic entrepreneurialism in America. Students will also consider the international context of such US-based movements, particularly in relation to American imperialism and global supply-chain capitalism.

Same as: AFRICAAM 120F, CSRE 120F

**ANTHRO 121. Language and Prehistory. 4-5 Units.**

Language classification and its implications for human prehistory. The role of linguistic data in analyzing prehistoric populations, cultures, contact, and migrations. Comparison of linguistic and biological classifications. Reconstruction, proto-vocabularies, and culture. Archaeological decipherment and the origins and evolution of writing. Archaeological and genetic evidence for human migrations. (DA-A; HEF II,III).

Same as: ANTHRO 221

**ANTHRO 121A. Hip Hop, Youth Identities, and the Politics of Language. 3-4 Units.**

Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture. Same as: AFRICAAM 121X, AMSTUD 121X, CSRE 121X, EDUC 121, LINGUIST 155

**ANTHRO 122A. Race and Culture in Mexico and Central America. 3-5 Units.**

This course addresses the role of racial ideologies in the historical configuration of multiple hierarchies of inequality that determine the place of everyone in society in Mexico and Central America. Based on readings from the humanities and social sciences, we will discuss the cultural and racial politics of authoritarianism and indigenous insurgency, emphasizing narratives of laziness and vagrancy that have been central to the discipline of labor that shapes local processes of regressive modernization and nation building. We will analyze the hegemony of dictatorship as political necessity, the relationship between local racisms and global Whiteness, and the emergence of new local and transnational contestations to the multiple hierarchies that determine the place of everyone in society.

Same as: ANTHRO 222A

**ANTHRO 122C. Research in Maya Hieroglyphic Writing. 1-2 Unit.**

Workshop. Current issues in the decipherment and analysis of Maya hieroglyphic writing and literacy.

Same as: ANTHRO 222C

**ANTHRO 123A. Debating Repatriation. 5 Units.**

The debates over the return of cultural property have raged for centuries. At stake are key questions about the rights of Indigenous peoples, intellectual freedom, nationalism, globalization, heritage management, the meaning of history, and the purpose of museums in the world.

This seminar examines these vital discussions that intersect law and morality, science and religion, culture and politics. Discussions will be informed by cross-cultural, legal, ethical perspectives, exploring both the philosophical and practical implications of the repatriation debates. This course will provide students with a nuanced historical viewpoint of museum collections, heritage policies, and legal dimensions that underpin contests over cultural property.

Same as: ANTHRO 223A, ARCHLGY 123A

**ANTHRO 124. Maya Mythology and the Popol Vuh. 3-5 Units.**

The mythology and folklore of the ancient Maya, emphasizing the relationship between the 16th-century Quiché Maya mythological epic *Popol Vuh* (Book of the Council) and classic lowland Maya art, architecture, religion, and politics. General Mesoamerican mythology. Anthropological and other theories of mythology. Class participates in the creation of a web project on the *Popol Vuh*.

**ANTHRO 124N. Maya Mythology and the Popol Vuh. 3 Units.**

Shortly after the Spanish conquest of Highland Guatemala, an anonymous Quiché Mayan noble translated a sacred text of his people, Popol Vuh (Council Book), and committed the Mayan to Spanish letters. His book, with its account of creations and destructions of the world by the gods, the descent of the Hero Twins into the Underworld and their ball games with its lords, and a history of the ruling clan of the Quiché state, is a grand apology for the values and world of the Quiché Maya, but it is no drab political treatise. It relates the daily life of the Quiché to their natural world (including the skies) and to the underworld journey that they expected in death, and is a compilation crafted to instruct and entertain at several levels of interpretation, from those of sophisticated scholars to children. In the 1970s, we began to realize that many of the ceramic vessels unearthed from the tombs of the Classic Lowland Maya, originally intended to accompany their owners on their perilous journey through the underworld, actually illustrate scenes described in Popol Vuh. More recently, it has been possible to relate the mythology to texts newly deciphered from Mayan inscriptions as well as vases. The Popol Vuh has thus been shown to be a survival of a much older and more widespread culture. Like most survivals, though, it had been re-crafted in the image of the contemporary Quiché culture. When are mythological similarities sufficient to imply relatedness of the stories through common descent? How can mythical similarities imply universals of mind and culture? How have myths been used as state political instruments? This is an exciting combination of archaeology, linguistics, cultural anthropology, art, and literature. Students will analyze the text critically, examine Mayan art, and help develop a web site. No prerequisites.

**ANTHRO 125. Language and the Environment. 3 Units.**

Lecture course on vocabulary and grammar as keys to peoples' understanding and use of the environment. Ethnobotany, ethnobiology, and ethnosemantics in the analysis of the language of place, plants and animals, the earth, the body, and disease. Terminological gaps and gluts and what they imply. Language as a strategic resource in environmental management. Language contact and conflict in the modern global environment, with particular attention to the vocabularies of capitalism and property. Language extinction and its environmental implications. Anthropology concentration: CS, EE. No prerequisites.

Same as: ANTHRO 225

**ANTHRO 125A. International Criminal Courts and the Question of Global Justice. 3-5 Units.**

What are the cultural, legal and political implications of the global extrapolation of our understanding of the rule of law, in general, and criminal law, in particular? This course will look at the theory and practice of the new international criminal courts, the criminalization and individualization (or humanization) of international law, and the broader system of cosmopolitan order that it presupposes, with special reference to how it differs from earlier projects for international order (international law, war crimes, human rights, and the UN system). Case studies will follow the historical development of the key institutions, individuals and legal precedents that have been determinative for the new international criminal jurisdiction, including Nuremberg and Tokyo, the ad hoc (Yugoslavia, Rwanda) and hybrid tribunals (Liberia, Sierra Leone, Lebanon, Cambodia) and now the International Criminal Court (DRC, northern Uganda, Sudan, Libya and Kenya).

**ANTHRO 125S. International Criminal Courts and the Question of Global Justice. 3 Units.**

What are the cultural, legal and political implications of the globalization of our understanding of the rule of law, in general, and criminal law, in particular? This course will look at the theory and practice of the new international criminal courts, the criminalization and individualization (or humanization) of international law, and the broader system of cosmopolitan order that it presupposes, with special reference to how it differs from earlier projects for international order (international law, war crimes, human rights, and the UN system). Case studies will follow the historical development of the key institutions, individuals and legal precedents that have been determinative for the new international criminal jurisdiction, including Nuremberg and Tokyo, the ad hoc (Yugoslavia, Rwanda) and hybrid tribunals (Liberia, Sierra Leone, Lebanon, Cambodia) and now the International Criminal Court (DRC, northern Uganda, Sudan, Libya and Kenya).

**ANTHRO 126. Urban Culture in Global Perspective. 5 Units.**

Core course for Urban Studies majors. We will study urban space both historically and cross-culturally. Urban Studies, by definition, is an interdisciplinary field, where the methodological approaches draw upon a diverse set of analytic tools. Disciplines that occupy a prominent place in this class are geography, cultural anthropology, sociology, history, media studies, and literature. In this context, we will discuss the importance of cities around the world to the economic, cultural, and political well-being of modern societies and examine how forces such as industrialization, decentralization, and globalization affect the structure and function of cities.

Same as: URBANST 114

**ANTHRO 126A. Politics of the Past. 5 Units.**

The past is never dead, William Faulkner once wrote. It's not even past. This seminar explores the contested meanings of history in the political present. It particularly focuses on how archaeological work and heritage becomes entangled in larger questions of identity, belonging, belief, economics, and the stories we tell about ourselves. Students will gain an expansive and in-depth perspective on why humans so value what has come before us, and why making meaning from the past is a process suffused with power.

Same as: ANTHRO 226A, ARCHLGY 126A

**ANTHRO 128. Visual Studies. 5 Units.**

Drawing on anthropology, art history, cultural studies, and other fields, this course explores how and why one might want to think critically about the politics of visibility, social imagination, the politics of making and consuming images and things, iconophilia and iconophobia, the classification of people and things into artists and art, and cultural production more generally.

**ANTHRO 128A. The Boundaries of Humanity: Humans, Animals and Machines in the Age of Biotechnology. 3-4 Units.**

Advances in research and technology are blurring the boundaries between humans, animals, and machines, challenging conventional notions of human nature. Seminar explores the question of what it now means to be human and the personal, social, and ethical implications of our advancing technologies through the lens of various disciplines, including anthropology, cognitive psychology, neuroscience, genetics, evolutionary biology, biotechnology, and artificial intelligence. Includes guest speakers from fields and industries where important questions are being raised.

**ANTHRO 130B. Introduction to GIS in Anthropology. 5 Units.**

How GIS and spatial tools can be applied in social research. Case studies and student projects address questions of social and cultural relevance using real data sets, including the collection of geospatial data and building of spatial evidence. Analytical approaches and how they can shape a social and cultural interpretation of space and place.

Same as: ANTHRO 230B

**ANTHRO 130D. Spatial Approaches to Social Science. 5 Units.**

This multidisciplinary course combines different approaches to how GIS and spatial tools can be applied in social science research. We take a collaborative, project oriented approach to bring together technical expertise and substantive applications from several social science disciplines. The course aims to integrate tools, methods, and current debates in social science research and will enable students to engage in critical spatial research and a multidisciplinary dialogue around geographic space.

Same as: ANTHRO 230D, POLISCI 241S, URBANST 124

**ANTHRO 131. Genes and Identity. 5 Units.**

In recent decades genes have increasingly become endowed with the cultural power to explain many aspects of human life: physical traits, diseases, behaviors, ancestral histories, and identity. In this course we will explore a deepening societal intrigue with genetic accounts of personal identity and political meaning. Students will engage with varied interdisciplinary sources that range from legal cases to scientific articles, medical ethics guidelines, films, and ethnographies. We will explore several case studies where the use of DNA markers (either as proof of heritage or disease risk) has spawned cultural movements that are biosocial in nature. Examples include legal and political analyses of African ancestry testing as evidence in slavery reparations cases, debates on whether Black Freedman should be allowed into the Cherokee and Seminole Nations, considerations on whether people with genetic links to Jewish groups should have a right of return to Israel, close readings of The U.S. Food and Drug Administration's crackdown on personal genomics testing companies (such as 23andMe), examinations of genetic identity politics in health disparities funding and orphan disease research, inquiries into new social movements organized around gene-based definitions of personhood, and civil liberties concerns about genetic familial searching in forensic databases that disproportionately target specific minority groups as criminal suspects. Students will engage in a short observational pilot ethnographic project that allows them to further explore issues from the course for their final paper.

Same as: AFRICAAM 131, CSRE 131

**ANTHRO 132. Religion and Politics in the Muslim World. 5 Units.**

This course provides an ethnographic examination of religion and politics in the Muslim world. What is the role of Islam in the political life of modern Muslim societies? Conversely, how do modern political powers shape and constrain the terms of religious life? This course takes an anthropological perspective on the study of Islam: our investigations will not focus on the origins of scriptures and doctrines but rather on the use of religious texts and signs in social context and on the political significance of ritual and bodily practices. A major aim of the course is provide students with analytical resources for thinking critically about the history and politics of modern Muslim societies, with a particular focus on issues of religious authority, gender and sexuality, and the politics of secularism.

**ANTHRO 132B. Islam Law in Muslim and Non-Muslim Societies. 3-5 Units.**

In this course, students will engage with scholarly material that demonstrates the multiple and varying ways in which Islam is invoked as a legal discourse in Muslim and Non-Muslim societies. In this course, we look at Islam not merely as being in the domain of legislation and adjudication, but as a cultural object; an important signifier in politics, for the state to enforce itself, as well as a technology for people's strategic use. The point of this course is therefore to consider how Islam operates in legal contexts as a 1) discourse of power and of strategy (at personal and political levels) and 2) as a discourse of identity that concerns issues of ethics, rights, gender, kinship, class and nation.

**ANTHRO 133A. Anthropology of the Middle East. 3-5 Units.**

This course examines social, political, and religious dimensions of various Middle Eastern societies. Key topics include the development of the modern nation-state, the Islamic revival, human rights, and discourses of democracy. Course materials include ethnographic studies, novels, and films, which provide a rich contextualization of social life and cultural politics in the region.

Same as: CSRE 133A

**ANTHRO 133B. Covering Islam: On What We Learn to See, Think and Hear about Islam & Muslims. 3-5 Units.**

In this course, students will think critically about how knowledge about Islam, Muslims, and Muslim Societies is produced and circulated. As a class, we will consider why and how certain kinds of ideas about Islam and Muslims become representative (i.e., authoritative discourse) while others ideas do not. This is an interdisciplinary class; course material will draw on readings from anthropology, literary criticism, history, sociology and media and cultural studies. We will also be engaging with other kinds of material, including news articles, editorials, documentaries, and films.

Same as: AFRICAST 133B, CSRE 133B

**ANTHRO 134. Object Lessons. 5 Units.**

Human-object relations in the processes of world making. Objectification and materiality through ethnography, archaeology, material culture studies, and cultural studies. Interpretive connotations around and beyond the object, the unstable terrain of interrelationships between sociality and materiality, and the cultural constitution of objects. Sources include: works by Marx, Hegel, and Mauss; classic Pacific ethnographies of exchange, circulation, alienability, and fetishism; and material culture studies.

Same as: ANTHRO 234

**ANTHRO 134B. Conflict and Change in the Middle East. 5 Units.**

Following the Arab Spring, the hope for political and social change has been widely raised and celebrated in the Middle East. This hope, however, has been shattered alongside the recent cycles of violence and conflict in different parts of the region, from Syria and Iraq to Egypt. This course examines political violence, change, and boundary making in the modern Middle East. By taking a historical and anthropological look at the political conflict and change, this course will explore how particular political, economic, and social narratives, encounters, and contradictions have accompanied the conflict and change in the region. The course will focus on the cases from Turkey, Iraq, Syria, Iran, Egypt, Morocco, and Israel/Palestine.

**ANTHRO 135. Cultural Studies. 5 Units.**

Identity, community, and culture; their interactions and formation.

Same as: ANTHRO 235

**ANTHRO 135C. Moving Worlds: Anthropology of Mobility and Travel. 5 Units.**

This course looks at human mobility from an anthropological perspective. We will read texts that ethnographically explore the experiences of refugees, labor migrants, tourists and seafarers, among others. In particular, we will look at the intersection of physical mobility and social mobility, as people often move in order to improve their life, to increase safety or economic security, or to gain social capital. However, the mobility perspective has also been criticized for depoliticizing and celebrating movement without critical attention to its socio-political and economic context. While mobility as a term points to the ability to move, human migration is at least as often characterized by restrictions and obstacles to movement, such as borders. We will think critically about the deep inequalities that exist in terms of why and how people move, and who are able to mobilize resources to move.

**ANTHRO 135H. Conversations in CSRE: Case Studies in the Stanford Community. 1-2 Unit.**

Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

Same as: CSRE 135H

**ANTHRO 135I. CSRE House Seminar: Race and Ethnicity at Stanford. 1-2 Unit.**

Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

Same as: CSRE 135I

**ANTHRO 136. The Anthropology of Global Supply Chains. 5 Units.**

This upper-division undergraduate seminar focuses on recent studies by anthropologists and scholars in related disciplines on global supply chains and consumption practices. The goal of the course is to assess concepts and methods for integrating a cultural analysis of transnational production with a cultural analysis of transnational consumption. We will review ethnographic studies of the production and consumption of commodities linked by transnational and global networks. The class will then pursue collaborative research on the global production, distribution, and consumption of a selected commodity. Prerequisite: junior or senior standing and previous coursework in cultural anthropology or permission of instructor.

Same as: ANTHRO 236

**ANTHRO 136B. White Identity Politics. 3-5 Units.**

Pundits proclaim that the 2016 Presidential election marks the rise of white identity politics in the United States. Drawing from the field of whiteness studies and from contemporary writings that push whiteness studies in new directions, this upper-level seminar asks, does white identity politics exist? How is a concept like white identity to be understood in relation to white nationalism, white supremacy, white privilege, and whiteness? We will survey the field of whiteness studies, scholarship on the intersection of race, class, and geography, and writings on whiteness in the United States by contemporary public thinkers, to critically interrogate the terms used to describe whiteness and white identities. Students will consider the perils and possibilities of different political practices, including abolishing whiteness or coming to terms with white identity. What is the future of whiteness? Enrolled students will be contacted regarding the location of the course.

Same as: AFRICAAM 136B, CSRE 136

**ANTHRO 137. The Politics of Humanitarianism. 5 Units.**

What does it mean to want to help, to organize humanitarian aid, in times of crisis? At first glance, the impulse to help issue generis a good one. Helping is surely preferable to indifference and inaction. This does not mean that humanitarian interventions entail no ethical or political stakes or that they are beyond engaged critique. We need to critique precisely that which we value, and to ask some hard questions, among them these: What are the differences among humanitarianism, charity, and philanthropy? What of social obligations and solidarities? How does the neoliberal world order currently create structural inequalities that ensure the reproduction of poverty and violence? How does the current order of things resemble or differ from the colonial world order? This course examines the history of humanitarian sensibilities and the emergence of organized action in the "cause of humanity." In the early years of humanitarian intervention, political neutrality was a key principle; it has now come under ever greater analytical and political scrutiny. We will examine the reasons for the politicization and militarization of aid – be it humanitarian aid in natural disasters or political crises; development programs in the impoverished south (the Third World), or peace-keeping. We will end with a critical exploration of the concept of human rights, humanity, and personhood. The overall methodological aim of the course is to demonstrate what insights an ethnographic approach to the politics, ethics, and aesthetics of humanitarianism can offer.

Same as: ANTHRO 237

**ANTHRO 138. Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise. 5 Units.**

This course will explore historical as well as current market transformations of medical ethics in different global contexts. We will examine various aspects of the research enterprise, its knowledge-generating and life-saving goals, as well as the societal, cultural, and political influences that make medical research a site of brokering in need of oversight and emergent ethics. This seminar will provide students with tools to explore and critically assess the various technical, social, and ethical positions of researchers, as well as the role of the state, the media, and certain publics in shaping scientific research agendas. We will also examine how structural violence, poverty, global standing, and issues of citizenship also influence issues of consent and just science and medicine.

Same as: ANTHRO 238, CSRE 138

**ANTHRO 138A. Conflict and Reconciliation in Africa: International Intervention. 3-5 Units.**

This course will explore recent debates on the causes and structural terms of large-scale violence in Africa in the context of key contemporary models for reconciliation and transitional justice. Discussions will emphasize the broader international legal and political order each presupposes, and specifically whether their underlying reconstitution of rights and subjectivities are compatible with cultural, political or legal diversity. A historical assessment of the predominating Nuremberg paradigm of transitional justice, structured around international military intervention and criminal trials based on international criminal courts, will be contrasted with other regional models that engage with the challenges of the political reconciliation of formerly divided political communities. The necessity of understanding the specificities of both global and local historical and structural contexts will be examined with respect to various proposals for how to balance of balance concerns for both justice and peace. Readings will cover case studies from South Africa, Rwanda, DRC, northern Uganda, Sudan (including Darfur and South Sudan), Libya, Mali, and CAR.

Same as: AFRICAST 138, AFRICAST 238, ANTHRO 238A

**ANTHRO 139. Ethnography of Africa. 5 Units.**

The politics of producing knowledge in and about Africa through the genre of ethnography, from the colonial era to the present. The politics of writing and the ethics of social imagination. Sources include novels juxtaposed to ethnographies.

Same as: ANTHRO 239

**ANTHRO 139C. Anthropology of Global Health. 5 Units.**

Global health has been the contested realm of theoretical debates and praxis in medical anthropology. Rationalities behind global health projects reflected the predominant mode of envisioning health in specific historical moments. In this course, we will first assess the ways in which memories, materiality and institutions of the colonial past persist in the field of global health in Africa. Secondly, we will explore how early medical anthropologists participated in international health projects in order to facilitate implementation of the Western biomedicine in developing countries by investigating cultural barriers under the post-war regime of international development in the efforts of controlling malaria and HIV/AIDS in Latin America. Thirdly, we will examine achievements and limitations of subsequent critical medical anthropologists' shift of the focus of analysis on global health from culture to structure, larger political economic conditions that produced vast health inequalities around the world, including World Bank policies under the Cold War and neoliberal reforms that increased the prevalence of TB and other diseases in post-socialist contexts. Finally, we will question previous anthropological discourses on global health and propose potential insights by understanding moral imaginations of contemporary global health participants such as WHO or Gates Foundation and humanitarian medicine such as MSF, and continuities and discontinuities of colonial and developmental past in current global health movement.

**ANTHRO 13A. Islamic Routes: Archaeology and Heritage of Muslim Societies. 3-5 Units.**

How has archaeology changed our knowledge of the spread of Islam and past Muslim societies? How does archaeology shape heritage debates, conflicts and ideas about Islam today? Topics include the city and urban change, secular and religious life, gender, economy, and globalization. These topics are explored using archaeological and critical heritage approaches. Focus is on examples drawn from Syria-Palestine, Egypt, Iraq, Arabian Peninsula, India, and Africa. Sources include archaeological data and material culture, historical texts in translation, and photography. Same as: ARCHLGY 13, HISTORY 7E, HISTORY 107E

**ANTHRO 13SI. Zombies: Anthropology of the American Undead. 1-2 Unit.**

The zombie apocalypse, affectionately known as the *z*Zombieapocalypse. *z* In this combination class on zombie history, ethnography, biology, and culture, we will explore the origins of zombie legends (or truths?) and how the undead have been represented in American culture for the past 200 years. Classes will include lectures, film clip viewings, literary analysis, medical anthropology components, and disaster survival planning.

**ANTHRO 14. Introduction to Anthropological Genetics. 3 Units.**

For upper division undergraduates. The extent and pattern of variation among human genomes, the origin of these patterns in human evolution, and the social and medical impact of recent discoveries. Topics include: the Human Genome Project; human origins; ancient DNA; genetic, behavioral, linguistic, cultural, and racial diversity; the role of disease in shaping genetic diversity; DNA forensics; genes and reproductive technology.

**ANTHRO 140. Ethnography of Africa. 3 Units.**

This course is an exploration of some central themes and issues in contemporary African society through close readings of a selection of recent ethnographies. It aims to understand Africa as a place where many of the most challenging issues of a modern, globalized world are being thought about in exciting and creative ways, both by ethnographers and by the people about whom they write. Among the key issues that the course seeks to address are: the history and politics of colonial domination; the ways that medicine and government intersect; the increasing use of humanitarian frames of reference in understanding African realities; the changing meanings of HIV/AIDS, sex, and love; and the role of mass media in enabling cultural and imaginative production to take form.

**ANTHRO 140C. Mobilizing Nature. 3 Units.**

From Brazil's Landless Worker's Movement (MST) to Water Wars of Cochabamba to Standing Rock, these moments of protest have turned into movements. This seminar will examine how theoretical framings of movements have shifted from claims about political rights to environmental ones. We will address two overarching questions: How are notions of ethnicity, gender, and class constructed in relation to the environment? And how do people understand these relationships in such a way that motivates them to mobilize? Students will explore what kinds of ecological claims are being made, who is making, how, and who benefits from them. The objective is to ultimately understand how movements not only reflect, but also (re)shape political and social practices around the environment.

**ANTHRO 141A. Science, Technology, and Medicine in Africa. 4 Units.**

Africa is often depicted as a place simply in need of science, technology, and medicine. This class will introduce students to the culture and politics of science in sub-Saharan Africa: to the diverse and rich traditions, histories and contemporary predicaments of knowledge practices on the continent. We will consider the role of science in the colonial period, covering the expansion of European empires in Africa and the forms of technical knowledge that colonial governments encountered, especially as they relate to health and the environment. We will examine the role of science at African independence and in international development work. Finally, we will discuss the politics of medical training and research, resource extraction, and the internet in contemporary Africa. This course will provide some important background for those with an applied interest in Africa as well as provide an introduction to a growing area of scholarship. Course materials include historical and ethnographic works, as well as primary sources and films emphasizing scientific practice in the context of geopolitical relations of power and inequality.

Same as: AFRICAST 141A

**ANTHRO 141B. The Anthropology of Bits and Bytes: Digital Media in the Developing World. 5 Units.**

Recent historical developments, including the widespread adoption of the mobile phone across Africa and Southeast Asia, the *z*Arab Spring, *z* and the rise of technology sectors in cities such as Nairobi, Bangalore, and Accra, have turned digital technology in the *z*global South*z* into a topic of growing popular interest and increasing scholarly concern. This course attempts to make sense of these developments by interrogating diverse theoretical approaches to digital technology and assessing what these approaches reveal and obscure in specific cases of technology adoption in Africa, Asia, and Latin America. Students will be introduced to an overview of scholarly approaches to digital technology from anthropology, science and technology studies (STS), critical theory, geography, and communications studies. We will analyze the relative utility of these explanations through case studies of specific instances of technological production and/or use. These case studies will be drawn from both secondary texts and primary materials such as social media, digital maps, videos, blogs, and news reports. At the same time, we will examine how digital discourses and practices both draw upon and inform broader issues of context-specific political and cultural importance. Major topics to be discussed include *z*development*z* and the State, civil society and the *z*public sphere,*z* youth culture, gender politics, mobility, and globalization. Students will come away from the course with a strong understanding of the major issues at stake in the increasing digitalization of the *z*global South,*z* and the socio-cultural, political, and technical debates that frame them.

**ANTHRO 142A. Youth in the Global South: Beyond Active Subjects and Passive Objects. 5 Units.**

In this course, we will explore the wide variety of ways youth has been culturally constructed (as well as dynamically experienced) across the Global South. Youth is an enduring and powerful concept for understanding competing forms of cultural contestations and political transformations. In the wake of global economic inequality, political instabilities and the emergence of new indigenous movements and social demands, youth is simultaneously associated with discourses over *z*crisis*z* and *z*possibilities.*z*

Same as: CSRE 124A

**ANTHRO 143B. Anthropology and International Development. 3-5 Units.** International development as a set of projects, policies, and controversies has been a major force in shaping the world over the past seventy years. Throughout, the discipline of anthropology has been involved, both as participant and as critical observer. After a brief overview of development theory and history, this course will discuss (1) the ways in which anthropology has contributed to development projects and ideas and (2) how the discipline has critiqued development practice over the past three decades. What has anthropology offered to those who work towards social and economic development, and how has development shaped the discipline itself? Readings will include detailed ethnographic and historical case studies from across the developing world.

**ANTHRO 144A. Practice of Everyday Life in Kazakhstan: From Nomadism to Modernity. 3-5 Units.**

An interdisciplinary introduction to the historically nomadic land of Kazakhstan, its peoples and their lifestyles, and the practice of everyday life. Ranked as the ninth largest country in the world, Kazakhstan is also the world's largest landlocked country; its territory is greater than Western Europe: it stretches from the fringes of Europe to the borders of Mongolia and China. The seminar surveys language and society, traditional economics and customary law, rituals and folk customs, local dwelling, craft and art, the cultural panorama, the historical relationship between sedentary and nomadic peoples as well as new approaches to the study of nomads in modernity. Speaking of the present time, we will follow the changing nomads in a changing world. The instructor is going to base, to the extent possible, on the extremely rich fieldwork data recently discovered in Kazakhstan – the data is yet little known in the West. The seminar will make extensive use of audio-visual materials and films.

Same as: REES 244A

**ANTHRO 144B. The Buddhist Body in East Asia: Charisma, Gender, and the Gift of the Body. 5 Units.**

This course introduces Buddhist practices and texts of embodiment as a subject of the anthropology of the body. We draw on research in social/cultural anthropology, history, and religious studies, and examine a selection of approaches to the Buddhist body: the body of power in Buddhist charisma, the gender of the bodhisattvas and monastic body, the techniques of the body in meditation and martial arts, healing and cultivation, and the gift of the body in bioethics and medical education. We draw on examples in different traditions of Buddhism in a range of societies with a special focus on Chinese Buddhism.

Same as: ANTHRO 244B

**ANTHRO 145. Race and Power. 5 Units.**

This course examines how race is made. We will pay close attention to how people engage with material, economic, scientific, and cultural forces to articulate human group difference as a given, and even natural. In this seminar, we will look at the construction of race as a literally made phenomenon, where historical, colonial, bodily, market, and humanitarian constituent elements both circulate and sediment racial understandings. To focus our readings and discussions we will divide this vast terrain into three units: race and the colonial encounter, race and biopower, and race and capital.

Same as: ANTHRO 245, CSRE 145F

**ANTHRO 145B. Reinventing the Other: Greeks, Romans, Barbarians. 3-5 Units.**

Ancient ethnography was a highly conventionalized tradition stretching from "the father of History," Herodotus, to the last historian of the ancient world, Procopius. We will read selections of these two authors' works as well as of Sallust, Tacitus, and lesser known ones. Within various theoretical frameworks—rhetorical, anthropological, structuralist—we will reconstruct the shifting images of The Other, explore what they tell us about their producers, and reflect on what ancient ethnography contributed to its modern descendant.

**ANTHRO 146B. Global Heritage, World Heritage: History and Intersections in Contemporary Society. 5 Units.**

This Course will provide an overview of global heritage by focusing on the UNESCO World Heritage Program, which is based on an international treaty, the 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage. The first part of the course will provide an historical overview on the development of the international preservation movements, the second part of the course will concentrate on how anthropology can contribute to the study of intergovernmental organizations and cultural bureaucracies, the third part and will discuss specific issues related to heritage by providing case studies from the World Heritage. This course will provide theoretical and empirical interpretations of contemporary issues in heritage and will give students a critical understanding of the complexities related to various uses of past in the present.

Same as: ARCHLGY 146B

**ANTHRO 147. Nature, Culture, Heritage. 5 Units.**

Seminar. Shared histories of natural and cultural heritage and their subsequent trajectories into the present. How thought about archaeological sites and natural landscapes have undergone transformations due to factors including indigenous rights, green politics, and international tourism. The development of key ideas including conservation, wilderness, sustainability, indigenous knowledge, non-renewability and diversity. Case studies draw on cultural and natural sites from Africa, the Americas and Australia.

Same as: ANTHRO 247

**ANTHRO 147A. Folklore, Mythology, and Islam in Central Asia. 3-5 Units.**

Central Asian cults, myths, and beliefs from ancient time to modernity. Life crisis rites, magic ceremonies, songs, tales, narratives, taboos associated with childbirth, marriage, folk medicine, and calendrical transitions. The nature and the place of the shaman in the region. Sources include music from the fieldwork of the instructor and the Kyrgyz epoch *Manas*. The cultural universe of Central Asian peoples as a symbol of their modern outlook.

Same as: REES 247A

**ANTHRO 147B. World Heritage in Global Conflict. 5 Units.**

Heritage is always political, it is typically said. Such a statement might refer to the everyday politics of local stakeholder interests on one end of the spectrum, or the volatile politics of destruction and erasure of heritage during conflict, on the other. If heritage is always political then one might expect that the workings of World Heritage might be especially fraught given the international dimension. In particular, the intergovernmental system of UNESCO World Heritage must navigate the inherent tension between state sovereignty and nationalist interests and the wider concerns of a universal regime. The World Heritage List has over 1000 properties has many such contentious examples, including sites in Iraq, Mali, Syria, Crimea, Palestine and Cambodia. As an organization UNESCO was born of war with an explicit mission to end global conflict and help the world rebuild materially and morally, but has found its own history increasingly entwined with that of international politics and violence.

Same as: ANTHRO 247B, ARCHLGY 147B

**ANTHRO 148. Health, Politics, and Culture of Modern China. 4-5 Units.**

One of the most generative regions for medical anthropology inquiry in recent years has been Asia. This seminar is designed to introduce upper division undergraduates and graduate students to the methodological hurdles, representational challenges, and intellectual rewards of investigating the intersections of health, politics, and culture in contemporary China.

Same as: ANTHRO 248, CHINA 155A, CHINA 255A

**ANTHRO 149. South Asia: History, People, Politics. 5 Units.**

The South Asian subcontinent (comprising of India, Pakistan, Bangladesh, Nepal, Bhutan and Sri Lanka) is one of the most diverse and densely populated regions in the world and increasingly prominent in new global political and cultural economies. South Asia has also provided the inspiration for cutting edge theories about the colonial state, postcolonial studies, democracy, popular culture, and religious conflict. The course will provide an overview of major historical events and social trends in contemporary South Asia and focus on themes such as gender, religion, caste, migration and movement, new technologies, the urban and rural, the state, and new forms of consumption among others. Thus, the course will give students historically and theoretically informed perspectives on contemporary South Asia, as well as how to apply insights learned to larger debates within the political and social sciences.

Same as: ANTHRO 249

**ANTHRO 149A. Cities and Citizens in the Middle East. 4 Units.**

This course will explore historical formation of cities and citizens in the Eastern Mediterranean since the 19th century. We will explore urban development, economy, social classes and local politics with a focus on Egypt and Turkey and in particular two world-historical cities, Cairo and Istanbul. Drawing on history, cultural anthropology, geography and sociology disciplines, we will examine how urban space in Egypt and Turkey have reconfigured through histories of colonialism, nationalism, developmentalism and globalization. Rural to urban immigration, informality, gendered places, consumption, urban regeneration, local politics and branding the city will be the themes of our discussion. We will study these themes in relation to two main questions: How do spatial changes engender new social practices and redefine cultural difference?; How do power struggles at the intersection of local and global interests shape urban change? It will be of interest for urban studies majors and other students at all levels who would like to study urban struggles and change in Turkey, Egypt, the Middle East and the Global South.

Same as: URBANST 144

**ANTHRO 15. Sex and Gender. 3 Units.**

Commonality and diversity of gender roles in crosscultural perspective. Cultural, ecological, and evolutionary explanations for such diversity. Theory of the evolution of sex and gender, changing views about men's and women's roles in human evolution, conditions under which gender roles vary in contemporary societies, and issues surrounding gender equality, power, and politics.

**ANTHRO 150A. Minaret and Mahallah: Women and Islam in Central Asia. 3-5 Units.**

Introduction to women's culture and art in Muslim countries of Central Asia. Women, bearers of family rites and folklore, are the key figures in transmission of traditional culture and guardians of folk Islam. Women helped to keep the continuity of Islamic education in Central Asia during the harsh times of Communist dominance. The whole wealth of women's oral tradition will be demonstrated and examined to the extent possible. The course will make broad use of audio-visual materials.

Same as: FEMGEN 150A, REES 250A

**ANTHRO 151A. Contemporary Chinese Society Through Independent Documentary Film. 3-5 Units.**

An overview of social issues in contemporary China as seen through its emerging independent documentary film movement. Topics covered include representations of history, political power and accountability in the reform era, human rights, urbanization, the environment, homelessness and inequality, sexualities, addiction, and the role of media in society. Each viewing is accompanied by readings in media theory or the anthropological/sociological study of contemporary China. Can be taken with or without research component. Films include English subtitles.

Same as: ANTHRO 251A

**ANTHRO 152. Ritual, Politics, Power. 5 Units.**

Our everyday lives are made up of multiple routines, some consciously staged and imagined and others unconscious and insidious. Anthropologists call these rituals. Rituals shape every aspect of our lives, creating our symbolic universes and governing the most minute of our practices. For early anthropologists and for those interested in religious and symbolic life, rituals and rites were seen as both one of the most universal features of human existence, and, as that which enables us to reflect upon our human existence. A prominent example are that of the *rites de passage* found in every culture, from puberty initiation rites, weddings or funerals, which socially signal the change from one status to another. While initially for anthropologists, rituals marked the difference between the sacred and the profane, soon scholars began to see the ubiquity of ritual and the symbolic in shaping even the most mundane activity such as the structure of a meal and why one is not meant to eat dessert before the main course. The first half of the class examines these different debates surrounding the meaning and effects of rituals and rites. The second half of the class takes these debates to think about the question of power and politics. We return to the question of how our symbolic universes are staged and imagined by us through ritual forms such as the annual Presidential pardoning the turkey at Thanksgiving. The question of power however pushes us even further to ask why it is that we obey particular kinds of authority, consent to particular actions, and find ourselves doing things we haven't consciously decided to do. Many have argued that these kinds of political questions about how we respond and are shaped by power have something to do with our symbolic worlds and ritual, from the most obvious (the monarchy) to the most subtle (listening in a classroom). Throughout the course, these abstract questions will be grounded in cross-cultural examples and analysis.

Same as: SOC 156

**ANTHRO 153A. Population and social trends in Japan. 3-5 Units.**

Anthropological theories and concepts as applied to Japan. Postwar demographic trends. Delayed marriage. Declining nuclear family. Restructuring of education and workplace. Problems for the seniors. Foreign laborers shaking fundamentals of Japan.

Same as: ANTHRO 253A

**ANTHRO 154. Anthropology of Drugs: Experience, Capitalism, Modernity. 5 Units.**

This course examines the significant role *drugs* play in shaping expressions of the self and social life; in the management populations, and in the production of markets and inequality. It engages these themes through cultural representations of drugs and drug use, analyses of scientific discourse, and social theory. Topics include: the social construction of the licit and illicit; the shifting boundaries of deviance, disease and pleasure; and the relationship between local markets and global wars.

Same as: ANTHRO 254B, CSRE 154

**ANTHRO 155. Research Methods in Ecological Anthropology. 5 Units.**

The course prepare students for the methodological and practical aspects of doing ecologically oriented, quantitative anthropological field research. The primary goal is to explore what it means to ask anthropological questions in a systematic way. We will focus on understanding what can constitute an interesting question, how to frame a question in way that facilitates investigation, and how to design methods to begin investigating a question. In turn, the course will provide a format to refine research projects in preparation for doing more extensive fieldwork.

Same as: ANTHRO 255

**ANTHRO 156. Japanese Anthropology. 5 Units.**

This is an advanced reading seminar in the field of Japanese Anthropology. It will explore the historical development of the field and the contemporary issues and topics taken up by scholars of Japanese anthropology. Prior knowledge of Japanese language, history, and, society is required.

Same as: ANTHRO 256



**ANTHRO 156B. Environment, Nature and Race. 3-5 Units.**

Environment, nature and race: Politics of belonging, exclusion, and embodiment. Scientific and popular understandings of race and ethnicity remain deeply entangled with ideas about "nature" and the "environment". This course will introduce students to some of the many ways that nature, environment, and race have been and remain intertwined, for better or for worse. What does it mean to claim race is "natural"? To what extent is race shaped by environment and vice versa? How are the politics of race linked to the politics of environmentalism? The class will begin with a brief treatment of current critical consensus on the biology of race and the cultural politics of race and nature, and move on to a theoretical discussion of how humans and "nature" interact. From there, the course moves into historical and ethnographic examples of the politics of race and the environment: the racialized and racializing character of particular environments; the ways that racial politics shape natural environments; and the politics of exclusion and belonging in environmental movements. Case studies will be both rural and urban and draw from anthropology, geography, history, and biology. The course will end by considering the recent resurgence of the race concept in biology. Same as: CSRE 156J

**ANTHRO 159C. Ecological Humanities. 3 Units.**

What sort of topics, research questions, approaches, theories and concepts lead to an integration of various kinds of knowledges? Ecological Humanities provides a conceptual platform for a merger of humanities and social sciences with earth and life sciences, soil science and forensic sciences. The course will discuss such selected topics as the Anthropocene, geologic/mineral and exhumed subjects/personae, bio- and geosocial collectives, symbiotic life-forms, non-human agencies, and foreign landscapes as examples of this merger. Same as: ANTHRO 259C, DLCL 259C, REES 259C

**ANTHRO 16. Native Americans in the 21st Century: Encounters, Identity, and Sovereignty in Contemporary America. 5 Units.**

What does it mean to be a Native American in the 21st century? Beyond traditional portrayals of military conquests, cultural collapse, and assimilation, the relationships between Native Americans and American society. Focus is on three themes leading to in-class moot court trials: colonial encounters and colonizing discourses; frontiers and boundaries; and sovereignty of self and nation. Topics include gender in native communities, American Indian law, readings by native authors, and Indians in film and popular culture. Same as: ANTHRO 116C, ARCHLGY 16, NATIVEAM 16

**ANTHRO 160. Social and Environmental Sustainability: The Costa Rican Case. 3-5 Units.**

Seminar focused on issues of tropical sustainability with a particular emphasis on the Osa Peninsula of Costa Rica. Offered in conjunction with the Osa Initiative in the Wood's Institute for the Environment, the course highlights issues of human development in the tropics, through such means as agricultural development, ecotourism, conservation efforts, private and indigenous reserves, and mining. The course will draw from diverse disciplines including anthropology, rural sociology, conservation biology, geosciences, history, political science, and journalism. In addition to weekly discussions, students will develop a research paper throughout the term which will be presented to a panel of selected Wood's Faculty during the final week of the term. Same as: ANTHRO 260

**ANTHRO 160A. Tragedy of the Commons: Human Ecology of Communal Resources. 5 Units.**

The tragedy of the commons is a classic social dilemma a situation in which individual interests conflict with collective ones and key to understanding past, present and future environmental degradation. This course surveys a variety of scientific perspectives on the essence of the tragedy: common property resources will ultimately be destroyed by overexploitation. Major themes include the effects of human population density and social organization on the health and management of commons, self-interest versus collective action, and potential solutions to commons problems. Modern and prehistoric case studies are examined from ecological and evolutionary perspectives. Same as: ANTHRO 260A

**ANTHRO 161A. Human Ecology: Adaptations to Climate and Climate Change. 5 Units.**

Humans face essentially the same adaptive challenges as all organisms but are unique for having successfully adapted to virtually every environment on Earth. The resulting diversity of phenotypes and cultures past and present is key to understanding how interactions with environments shape the economic, social, and cultural lives of hunter-gatherers, pastoralists and agriculturalists. This course surveys the range of human adaptations from an ecological and evolutionary perspective to understand human adaptive capacity and vulnerability to climate change. Same as: ANTHRO 261A

**ANTHRO 162. Indigenous Peoples and Environmental Problems. 3-5 Units.**

The social and cultural consequences of contemporary environmental problems. The impact of market economies, development efforts, and conservation projects on indigenous peoples, emphasizing Latin America. The role of indigenous grass roots organizations in combating environmental destruction and degradation of homeland areas. Same as: ANTHRO 262

**ANTHRO 163. Conservation and Evolutionary Ecology. 5 Units.**

Environmental degradation resulting from human behavior, and what can be done about it. Patterns of interaction between people and environments, and why they vary over time and space. Topics include adaptation and behavior, resource acquisition and utilization, conflicts of interest, collective action problems, conspicuous consumption, waste, land management, and public policy. Same as: ANTHRO 263

**ANTHRO 163A. Endangered Languages and Language Revitalization. 3-4 Units.**

Languages around the world are dying at such a rapid rate that the next century could see half of the world's 6800 languages and cultures become extinct unless action is taken now. This course looks at how and why languages die, and what is lost from a culture when that occurs. We will investigate how this trend can be reversed by methods of language documentation and description, the use of innovative technologies, multimodal fieldwork, writing dictionaries and grammars for different audiences, language planning, and data creation, annotation, preservation, and dissemination. We will focus on a number of current programs around the world to revitalize languages. Finally, the course will examine ethical modes of fieldwork within endangered language communities, and the possibilities of successful collaborations and capacity building, focusing especially on Northern California Indian peoples and their languages. Same as: ANTHRO 263A, LINGUIST 163A, LINGUIST 263, NATIVEAM 163

**ANTHRO 164. Natural Resource Extraction: Use and Development: Assessing Policies, Practices and Outcomes. 3-5 Units.**

This interdisciplinary course explores natural resource extraction from multiple conceptual perspectives. Logging and non-timber resource harvesting practices are examined through ecological dynamics of species and community life histories, natural and anthropogenic disturbance regimes and resilience and recovery to diverse perturbations through alternative stable states. Using a political ecology lens, we then examine historical and current policies and practices aimed to manage terrestrial resource use and extraction: maximum sustained yield, community-based forest management, certification systems, payment for ecosystem services and Reducing Emissions from Deforestation and Degradation (REDD). Through problem sets and lab/field exercises, we employ quantitative ecological measurements and experiments coupled with quantitative and qualitative methods and analyses used to assess socio-economic drivers and ecological impacts. Diverse benefits/costs imparted throughout the supply chain - from extraction to consumer - are explored across temporal and spatial scales with local to global agents. No Prerequisites: course or foundation in Ecology, Community Ecology, and/or Ecosystem Ecology strongly suggested.

Same as: ANTHRO 264

**ANTHRO 165. Parks and Peoples: The Benefits and Costs of Protected Area Conservation. 5 Units.**

Seminar. Emphasis is on the social impact of parks and reserves. Integrated conservation and development projects (ICDPs) based on protected areas; alternative ways to derive local social benefits from them. Cases include Yellowstone, Manu, Galápagos, Ngorongoro, and Guanacaste.

**ANTHRO 166. Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness. 3-5 Units.**

Seminar. The state, private sector, development agencies, and NGOs in development and conservation of tropical land use. Focus is on the socioeconomic and political drivers of resource extraction and agricultural production. Case studies used to examine the local-to-global context from many disciplines. Are maps and analyses used for gain, visibility, accountability, or contested terrain? How are power dynamics, land use history, state-private sector collusion, and neoliberal policies valued? What are the local and extra-local responses?.

Same as: ANTHRO 266

**ANTHRO 167A. A Wilderness Empire: The Political Ecology of California. 5 Units.**

This course traverses the historical and geographic space of California to explore the intersection of nature, economy and politics in the making of the contemporary American West. The course links popular historical accounts of the state to related core theoretical literature from anthropology, preparing students to use the analytic tools of anthropology to pursue questions about the people, processes and landscapes that are part of our taken for granted lived experience in California. The class draws theoretically from cultural anthropology, ecological anthropology, cultural and economic geography, and literature to develop a holistic understanding of the historical and social co-production of nature and economy in California and the American West.

**ANTHRO 167B. Networks in Anthropology. 5 Units.**

¿Social network¿ may now be a household term but network concepts long predate the internet age. In fact, networks are an important part of some of the earliest (and most enduring) theoretical ideas in anthropology and sociology. Starting from the premise that relationships between individuals provide the raw material for the emergence of social structure, this course focuses on how network analysis can be used to examine and explain both system-level patterning and outcomes for individuals. In addition to the theoretical foundations of social network analysis, students will learn basic techniques for collecting, analyzing, and visualizing network data, through workshops in class and hands-on assignments. We will also explore contemporary applications of network analysis in economic anthropology, kinship studies, human evolutionary studies, and epidemiology, among other topics. Prerequisite: None. Students will be expected to learn some mathematical concepts.

**ANTHRO 168. Everest: Extreme Anthropology. 3-5 Units.**

Using Mt. Everest as a touch point, this class will examine the anthropology of nature, specifically focusing on exploration and adventure travel.

**ANTHRO 168A. Risky Environments: The Nature of Disaster. 5 Units.**

This seminar explores topics including environmental movements and countercultures, human agency and geoengineering ecotourism, and indigenous perspectives of changing climates to query how humans view `nature¿ in terms of stability, instability, risk and disaster in the 21st century. Case studies draw upon a broad range of geographical regions including the Arctic, Iceland, Australia, and the Americas. Discussions will draw upon film portrayals and interviews with researchers in addition to readings.

Same as: ANTHRO 268A

**ANTHRO 169. The Ecology of Cuisine: Food, Nutrition, and the Evolution of the Human Diet. 3-5 Units.**

This course is an interdisciplinary approach to understanding human food consumption and nutrition, incorporating biological, evolutionary, ecological and social perspectives. Topics include a broad survey of primate diets and their physiological and behavioral correlates; fossil and archaeological evidence for early human diets; adaptations to dietary shifts since the Neolithic; infant and early child feeding practices and their role in shaping human social arrangements, metabolic syndrome, food security, food taboos; the origins of spices; cultural diversity in the social uses and meanings of food and the sharing of food; gathering, hunting and locavorism as high hipster cuisine. Emphasis is on understanding the diversity of human foodways through time and space: how biology, culture, and ecology interact to shape the food we eat, and how the food we eat shapes us.

Same as: ANTHRO 269

**ANTHRO 169A. New Citizenship: Grassroots Movements for Social Justice in the U.S.. 5 Units.**

Focus is on the contributions of immigrants and communities of color to the meaning of citizenship in the U.S. Citizenship, more than only a legal status, is a dynamic cultural field in which people claim equal rights while demanding respect for differences. Academic studies of citizenship examined in dialogue with the theory and practice of activists and movements. Engagement with immigrant organizing and community-based research is a central emphasis.

Same as: CHILATST 168, CSRE 168, FEMGEN 140H

**ANTHRO 170. Australian Ecosystems: Human Dimensions and Environmental Dynamics. 3 Units.**

This cross-disciplinary course surveys the history and prehistory of human ecological dynamics in Australia, drawing on geology, climatology, archaeology, geography, ecology and anthropology to understand the mutual dynamic relationships between the continent and its inhabitants. Topics include anthropogenic fire and fire ecology, animal extinctions, aridity and climate variability, colonization and spread of *Homo sapiens*, invasive species interactions, changes in human subsistence and mobility throughout the Pleistocene and Holocene as read through the archaeological record, the totemic geography and social organization of Aboriginal people at the time of European contact, the ecological and geographical aspects of the "Dreamtime", and contemporary issues of policy relative to Aboriginal land tenure and management.

Same as: ANTHRO 270, EARTHSYS 172

**ANTHRO 170A. Multispecies Ethnography: Human, Animal, Plant, Mineral, and Microbe. 5 Units.**

This course explores new modes of writing and researching in anthropology. Multispecies ethnography considers nonhuman life as objects of analysis—animals, plants, fungi, bacteria, and viruses—as having political lives and import. By studying how these nonhuman entities, including metals, interact with and shape human existence, multispecies ethnographers who study "life" from the human down to the microbe, must engage in multiple worlds: from the jungle to the laboratory, from the field to the desk. This course will incorporate readings on "zoe" and "bios", the making of species categories, relationships between the human and nonhuman, current debates on breaking with the species concept and "the rights of mother earth." We will read the conceptual works in conjunction with current multispecies ethnographies to give grounding to the theory.

Same as: ANTHRO 270A

**ANTHRO 171. The Biology and Evolution of Language. 4-5 Units.**

Lecture course surveying the biology, linguistic functions, and evolution of the organs of speech and speech centers in the brain, language in animals and humans, the evolution of language itself, and the roles of innateness vs. culture in language. Suitable both for general education and as preparation for further studies in anthropology, biology, linguistics, medicine, psychology, and speech & language therapy. Anthropology concentration: CS, EE. No prerequisites.

Same as: ANTHRO 271, HUMBIO 145L

**ANTHRO 171A. Linguistic Field Methods. 5 Units.**

Workshop applying methods for gathering and analyzing linguistic data in the field, i.e., from consultants who are native speakers of a language essentially unknown to the investigator. Principles of language documentation. Students will do local field projects and work on these both in and out of class. Format involves lectures, discussion, working with native speakers, and student presentations. Topics include: choosing a language; planning the project; computerized collection, storage, and analysis of linguistic data; field recording equipment; interviews and elicitation; diagnostic vocabulary lists and grammatical schedules; field study of everyday communication and discourse; area surveys and the ethnography of communication; ethics, reflexivity, and bias; working with human subjects and governments. Prerequisite: a course in linguistics or in anthropological field methods.

**ANTHRO 172. Seminar on Cultural Evolution and Coevolution. 3-5 Units.**

Upper division/graduate seminar on recent approaches to the study of cultural evolution and coevolution. Critical evaluation of Darwinian and non-Darwinian theories, with special attention to the interplay of culture, genes, environment and society. Students will undertake projects of their own design to review, test, or improve current theoretical formulations. Prerequisite: a university-level course in evolution, ecology, or human behavioral biology.

Same as: ANTHRO 272

**ANTHRO 172B. Anthropology of Gender/Sexuality: Eco-Feminist Perspectives. 5 Units.**

This course takes an eco-feminist approach to anthropology, investigating the different meanings of "eco" in eco-nomy and eco-logy. The term, "eco", from the Greek, *oikos*, means "household," "house," or "family", laying the foundation for examining women's roles in changing forms of kinship, beyond and within the concept of the human.

Same as: ANTHRO 272B

**ANTHRO 174. Beginnings of Social Complexity. 5 Units.**

Models and examples of the social evolution of stratification and political centralization in prehistoric human societies. Inferences from the archaeological record concerning the forces and mechanisms behind the rise and fall of complex societies, particularly in S. America. (HEF II; DA-B).

Same as: ANTHRO 274

**ANTHRO 175. Human Skeletal Anatomy. 5 Units.**

Study of the human skeleton (a. k. a. human osteology), as it bears on other disciplines, including medicine, forensics, archaeology, and paleoanthropology (human evolution). Basic bone biology, anatomy, and development, emphasizing hands-on examination and identification of human skeletal parts, their implications for determining an individual's age, sex, geographic origin, and health status, and for the evolutionary history of our species. Three hours of lecture and at least three hours of supervised and independent study in the lab each week.

Same as: ANTHRO 275, BIO 174, BIO 274, HUMBIO 180

**ANTHRO 176. Cultures, Minds, and Medicine. 1 Unit.**

This workshop aims to bring together scholars from the social sciences, humanities, medicine and bio-science and technology to explore the ways that health and illness are made through complex social forces. We aim for informal, interactive sessions, full of debate and good will. Dates of meetings will be listed in the notes section in the time schedule.

Same as: ANTHRO 276

**ANTHRO 177. Environmental Change and Emerging Infectious Diseases. 4-5 Units.**

The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV.

Same as: ANTHRO 277, EARTHSYS 114, EARTHSYS 214, HUMBIO 114

**ANTHRO 178. Evolution and Conservation in Galapagos. 5 Units.**

The contribution of research in the Galapagos Islands to our current understanding of evolution and conservation. Writings from Darwin to Dawkins, as they reveal patterns and processes of evolution including selection, adaptation, speciation, and coevolution. Current conservation strategies in the archipelago, and urgent measures needed today before unique species and adaptations are lost.

Same as: ANTHRO 278

**ANTHRO 178A. Culture, Narrative, and Medicine. 5 Units.**

This course examines the ways in which medicine is practiced in diverse cultural contexts with narrative skills of recognizing, interpreting and being moved by the stories of illness. It is an examination of the human experience of illness and healing through narratives as presented in literature, film, and storytelling. We explore how cultural resources enable and empower healing and how narrative medicine can guide the practice of culturally competent medical care.

**ANTHRO 179. Cultures of Disease: Cancer and HIV/AIDS. 5 Units.**

History, politics, science, and anthropology of cancer; political and economic issues of disease and health care in the U.S., including the ethics and economics of health care provision, the pharmaceutical industry, carcinogen production, and research priorities.

Same as: ENGLISH 179

**ANTHRO 179A. Health, Illness, and Healing in South Asia. 5 Units.**

This course has three related goals pertinent to medicine and healing in South Asia. The first is to understand the experiences of illness, and therapy in ordinary South Asian communities. How do social and economic inequality, religious commitments, available healing traditions, and community and family contexts shape the experience of illness and healing? The second goal is to think about South Asian medical systems using a broad historical perspective. How had biomedicine been used during the colonial period to manage the health of native populations? What is the legacy of this colonial history on current practices? What happens when South Asian medical traditions (such as Ayurveda) become global? Third, we will explore crucial health problems in South Asia from the perspective of medical anthropology. Possible topics for the third portion of the course include: child birth and maternal health, sex-selection technologies, malnutrition, metabolic diseases, the selling of organs, medical tourism, tuberculosis, HIV, suicide, and schizophrenia. Same as: ANTHRO 279A

**ANTHRO 179B. Culture of Disease: The Social History of Vaccines. 5 Units.**

This course will detail the history and develop of vaccines, specifically examining critical issues such as personal choice v. public health, the use of experimental subjects, population-wide medical trials, and the use of animal tissues in vaccine development.

**ANTHRO 18. Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years. 3-5 Units.**

Fossil, genetic and archaeological evidence suggest that modern humans began to disperse out of Africa about 50,000 years ago. Subsequently, humans have colonized every major landmass on earth. This class introduces students to the data and issues regarding human dispersal, migration and colonization of continents and islands around the world. We explore problems related to the timing and cause of colonizing events, and investigate questions about changing patterns of land use, demography and consumption. Students are introduced to critical relationships between prehistoric population changes and our contemporary environmental crisis.

Same as: ARCHLGY 12, EARTHSYS 21, HUMBIO 182

**ANTHRO 180. Science, Technology, and Gender. 3-5 Units.**

Why is engineering often seen as a masculine profession? What have women's experiences been in entering fields of science and technology? How has gender been defined by scientists? Issues: the struggles of women in science to negotiate misogyny and cultural expectation (marriage, children), reproductive issues (surrogate motherhood, visual representations of the fetus, fetal surgery, breast feeding, childbirth practices), how the household became a site of consumerism and technology, and the cultural issues at stake as women join the ranks of scientists.

**ANTHRO 180A. Sex and Power. 5 Units.**

From hook-up culture to pornography and sex work and even Beyoncé's latest album, "Lemonade," our struggles with consent, betrayal, and violence evince collective confusions about the relationship between sex and power in our societies. A quick Google search for news articles on the topic reveals that we must communally brace ourselves, usually through a Public Service Announcement pun, Let's Talk About Sex, and then a warning, Talking about sex can be hard. Cultural and social analyses can help us un-brace ourselves and get closer to meaningfully, and respectfully, talking about how cultural difference and social hierarchies fuel, and our fueled by, ideologies about sex and sexuality. This course examines sex as a nexus of socio-cultural, economic, and political relations of power for individuals and groups across local and global and national and transnational boundaries. And because a lot of the difficulties in talking about sex entail difficulties about seeing sex, this class relies on visual culture and documentary filmmaking alongside ethnographies and theoretical scholarship.

Same as: FEMGEN 180A

**ANTHRO 181A. Gender in the Middle East: Iran, Turkey, and Egypt. 4 Units.**

This course explores the construction of gender in the Middle East. Drawing on the historical, sociological and anthropological research in the region, the course aims to question the stereotypes about the subordination of Muslim women and to offer students a systematic reading and analytical discussion of the political, economic and cultural structures that inform gender relations and practices in the region. The course starts with an examination of early Islam and religious sources with regard to women's status, then moves on to nationalist and modernization movements in the 19th and 20th centuries, and finally explores women's and men's lives in contemporary Egypt, Turkey and Iran. In this framework, we will pay special attention to Islamist mobilizations, family and sexual relations, as well as women's changing livelihoods and labor.

Same as: FEMGEN 181A

**ANTHRO 182. An Anthropology of Annihilation: Tobacco at the Turn of the Millennium. 3-5 Units.**

The cigarette as the world's greatest weapon of mass destruction: 100 million dead worldwide from cigarettes during the 20th century, one billion expected to die in the 21st century. How to understand this toll, its production, management, politicization, and depoliticization? What can anthropological and allied perspectives disclose? How does the catastrophe challenge key precepts within anthropology and other branches of the academy?.

**ANTHRO 182A. Down and Out: Marginal Lives and Institutional Technologies. 5 Units.**

This course examines the neglect and management of socially marginalized persons including the mentally ill, youth runaways, child wards of the state, drug addicts and prisoners. In this course, we will approach the concept of marginality by investigating the spaces and institutions of decay, neglect and rehabilitation to which unwanted and indigent individuals are relegated. Readings are focused on qualitative research conducted within institutions of health, welfare, and reform. There will be two comparative public mental health sections in this course: one focused on South Asia and the second on Africa. This course is relevant for students interested in medical anthropology, applied anthropology, public health policy, or clinical careers in medicine, psychology, or social work.

Same as: ANTHRO 282A

**ANTHRO 182N. Smoke and Mirrors in Global Health. 3 Units.**

A few years ago, health experts began calling out tobacco as engendering a global health crisis, categorizing the cigarette as the world's greatest weapon of mass destruction. A "global health crisis"? What merits that title if not tobacco use? A hundred million people were killed by tobacco in the 20th century, and ten times that number a billion people are predicted to die prematurely from exposure to cigarette smoke over the next hundred years. How has tobacco come to be labeled a global health crisis over the last decade and what has been the political response? From whence does activism and ongoing complacency regarding tobacco arise? How are they created in different cultural contexts? This course aims to provide students conceptual tools to tackle two specific thought projects: (1) to understand how institutional actors compete to define a situation in the world today as a problem of global health, and (2) to understand the sociocultural means by which something highly dangerous to health such as the cigarette is made both politically contentious and inert. On both fronts, special attention will be given to the ways global health activism and complacency unfold in the U.S. and China.

**ANTHRO 183B. Human Mobility and Adaptability. 5 Units.**

Mobility, whether in the form of seasonal or permanent migration, is an ancient practice necessary for many subsistence strategies, including hunting-and-gathering and pastoralism. Many new forms of mobility have emerged and now it is nearly impossible to consider a patch of human society that is not engaged in or directly impacted by habitual, patterned geographic mobility. Today, almost everywhere in the world, people can get farther, faster; urbanization, environmental degradation, and civil unrest are driving groups of people who do not have a cultural tradition of nomadic migration to adopt a mobile lifestyle; sometimes permanently, sometimes temporarily, in search of new economic or resource opportunities. In this seminar course, we will explore modern patterns of human mobility and migration as adaptive strategies for predictably and unpredictably changing environments. Using a framework of biological and cultural adaptation, we will discuss the major types of current human mobility (e.g. nomadism, immigration, migrant labor, displacement) and how they influence and are influenced by social systems, resource access, and health.

Same as: ANTHRO 283B

**ANTHRO 184. Spirituality and Healing. 3-5 Units.**

The puzzle of symbolic healing. How have societies without the resources of modern medicine approached healing? Why do these rituals have common features around the world? Shamanism, spirit possession, prayer, and the role of placebos in modern biomedicine. Students do ethnographic work and practical explorations along with more traditional scholarly approaches to learning.

**ANTHRO 185. Medical Anthropology of Contemporary Africa. 5 Units.**

In this course we will examine the place of Africa in global health discourses while reading in-depth histories and ethnographies of the varied causes and consequences of some of the most difficult problems facing African countries today. We will study the effects of colonialism and conflict on health, explore the military and humanitarian connections in the fight against HIV/AIDS, weigh the risks and benefits of population genetic studies on African populations, examine biomedical interventions on, and erasures of, local health problems, and query the role of violence, memory, insecurity, and power in daily life on the continent.

Same as: ANTHRO 285

**ANTHRO 185A. Race and Biomedicine. 3-5 Units.**

Race, identity, culture, biology, and political power in biomedicine. Biological theories of racial ordering, sexuality and the medicalization of group difference. Sources include ethnography, film, and biomedical literature. Topics include colonial history and medicine, the politics of racial categorization in biomedical research, the protection of human subjects and research ethics, immigration health and citizenship, race-based models in health disparities research and policy, and recent developments in human genetic variation research.

Same as: ASNAMST 185A

**ANTHRO 186. Culture and Madness: Anthropological and Psychiatric Approaches to Mental Illness. 3-5 Units.**

Unusual mental phenomena have existed throughout history and across cultures. Taught by an anthropologist and psychiatrist, this course explores how different societies construct the notions of "madness": What are the boundaries between "normal" and "abnormal", reason and unreason, mind and body, diversity and disease? Optional: The course will be taught in conjunction with an optional two-unit discussion section or engaged learning component.

Same as: ANTHRO 286, HUMBIO 146, PSYC 286

**ANTHRO 186N. The Most Rational People in the World. 4 Units.**

Humans, broadly construed, emerged as bipedal apes in the African mixed savanna-woodlands approximately two million years ago. From humble beginnings, humans have gone on to become the ecologically dominant species in most biomes and grown to a global population in excess of seven billion. This dominance arises from a combination of features of the human organism including its extreme degree of behavioral flexibility and flexible social organization. The prima facie evidence of human evolutionary and ecological success raises a paradox with respect to recent work in economics and psychology which increasingly argues for pervasive irrationality in human decision-making in a wide array of behavioral contexts. How is it possible for an organism with such seemingly flawed software supporting decision-making to become the globally dominant species? We will use this contradiction as the launching point for understanding what rationality means in a broad ecological and cross-cultural context. What do we mean by "rationality"? How do different disciplines conceive of rationality in different ways? Is there such a thing as a rationality that transcends cultural differences or is the very idea of rationality a cultural construction that is used to justify imperialism and other modes of paternalism? Are there systematic factors that promote or impede rational decision-making? The seminar will provide a gentle introduction to the formal approaches of decision theory which we will apply to an unusual array of topics centered on the subsistence and reproductive decisions of hunter-gatherers, horticulturalists, pastoralists, and agrarian peasants, in short, people living in face-to-face, subsistence societies. In addition to doing reading from a broad array of social and natural science disciplines around the topic of rationality, students will regularly engage in exercises to assess their own approaches to decision-making.

**ANTHRO 187. Nuclear Cultures. 5 Units.**

This course examines the new cultural forms that arose out of the use of nuclear technology. Subjects covered will include: The Manhattan Project, nuclear activism, nuclear experimentation in medicine, pre-nuclear history, nuclear energy, and nuclear waste and trade.

**ANTHRO 187A. The Anthropology of Race, Nature, and Animality. 5 Units.**

As recently as the 40s, the S. Africa government labeled indigenous San people part of the animal landscape. Using the San example as a starting point, course examines socially, culturally, and politically constructed ideas about race, animality, and nature in the cultural and geographic settings of N. America, Australia, and Africa. How connections between race and nature have served as terrains of power through which people and governments have claimed territories and justified violence. Classic texts by nature writers and philosophers and current social science works that focus on race and ethnicity. Concepts such as gender, sex, and nature; environmental tourism; natural resource development; and indigeneity and animality. How ideas about race and nature have come together around concepts such as the myth of wilderness and the violence of considering certain people to be less-than-human. Issues of environmental politics and activism.

Same as: CSRE 187A

**ANTHRO 193. Anthropology Capstone: Contemporary Debates in Anthropology. 5 Units.**

Do you know what an anthropological perspective is? Can you describe some of the key assumptions and questions within the discipline? A major in Anthropology is composed of many specialized courses in different tracks, different emphases and seemingly a never-ending multiplication of perspectives and ethnographies. However, Anthropology is also an ongoing intellectual conversation with foundational questions, some of longstanding and some new. These foundational questions have stimulated different responses and answers and thus have also led to constant renewal of the discipline in the midst of profound disagreement. In this Anthropology Capstone course students across tracks and emphases will address some of the critical debates that have been central to the discipline as it has developed. We will feature three debate questions in the class. Preparation for each debate will be through class discussion of critical readings as well as extra-mural reading and preparation with one's debating partners.

**ANTHRO 199. Senior and Master's Paper Writing Workshop. 1-2 Unit.**

Techniques of interpreting data, organizing bibliographic materials, writing, editing and revising. Preparation of papers for conferences and publications in anthropology. Seniors register for 199; master's students register for 299.

Same as: ANTHRO 299

**ANTHRO 19Q. Hauntings, Visions, and Prophecy. 1-3 Unit.**

Preference to sophomores. Why do people see ghosts? Why do people believe that stars foretell the future? When do people see demons and angels? Focus is on the conditions under which people experience themselves as having sensory evidence of supernatural phenomena and the role of training and expectation in the process. Intellectual exploration of what is known from the ethnographic, historical, and psychological record. Practical experimental projects involve attempting to induce positive supernatural experience. Prerequisite: consent of instructor.

**ANTHRO 1S. Introduction to Cultural and Social Anthropology. 3-5 Units.**

This course introduces basic anthropological concepts and presents the discipline's distinctive perspective on society and culture. The power of this perspective is illustrated by exploring vividly-written ethnographic cases that show how anthropological approaches illuminate contemporary social and political issues in a range of different cultural sites.

Same as: ANTHRO 101S

**ANTHRO 200B. Lifeways of the Ancient Maya. 5 Units.**

This course engages with the world of the pre- and post-contact Maya people through scholarship that explores the material culture of daily life. We address how questions about the past are framed through ethnographic and ethnohistoric accounts of daily life, how diverse scientific methods and theoretical perspectives are used to address these questions, and how interpretations of daily life in the ancient Maya world are formulated. We consider how perceptions of the ancient Maya are marshaled in contemporary politics and policies. The course is designed to provide a broad overview of sites and materials in the Maya area, focusing on the dynamic interplay between the material and the social. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 100B

**ANTHRO 201. Introduction to Cultural and Social Anthropology. 3-5 Units.**

This course introduces basic anthropological concepts and presents the discipline's distinctive perspective on society and culture. The power of this perspective is illustrated by exploring vividly-written ethnographic cases that show how anthropological approaches illuminate contemporary social and political issues in a range of different cultural sites.

Same as: ANTHRO 1

**ANTHRO 201B. Archaeology of Technology. 5 Units.**

The course is an introduction to the social organization of material production and to the theoretical, ethnographic, and historical frameworks used by archaeologists to link the technologies of the past to salient sociocultural information about the people who employed them. Comparison of metallurgical, ceramic, lithic, and textile industries in different cultural and historical settings will inform critical discussions of how and to what extent analyses of artifacts, workshops, and industrial installations can provide insight into past societies.

Same as: ANTHRO 101B, ARCHLGY 100, ARCHLGY 200

**ANTHRO 202A. Ancient Civilizations: Complexity and Collapse. 3-5 Units.**

How archaeology contributes to understanding prehistoric civilizations. How and why complex social institutions arose, and the conditions and processes behind their collapse. The development of monumental architecture, craft specialization, trade and exchange, and social stratification using examples from the archaeological record. (HEF II, III; DA-B).

Same as: ANTHRO 102A

**ANTHRO 203A. Human Osteoarchaeology. 5 Units.**

The course will cover the methodological and theoretical backgrounds to human osteoarchaeology, introduce the student to the chemical and physical characteristics of bone, and to the functional morphology of the human skeleton. Classes will consist of a taught component that outlines how osteoarchaeologists reconstruct individual life-histories based on age, sex etc.; this is combined with hands-on identification of different skeletal elements and the markers used to inform the analytical methods. Additional scientific methodologies are also introduced that increasingly form a major component of human osteoarchaeology.

Same as: ANTHRO 103A

**ANTHRO 204. Language and Culture. 4-5 Units.**

Comparative approach, using examples from many languages. Emphasis is on generally non-Western speech communities. Topics include: the structure of language; the theory of signs; vocabulary and culture; grammar, cognition, and culture (linguistic relativism and determinism); encodability of cultural information in language; language adaptiveness to social function; the ethnography of speaking; registers; discourse (conversation, narrative, verbal art); language and power; language survival and extinction; and linguistic ideology (beliefs about language).

Same as: ANTHRO 4

**ANTHRO 205. Ancient Cities in the New World. 3-5 Units.**

Preindustrial urbanism as exemplified by prehispanic New World societies. Case studies: the central and southern highlands of Mesoamerica, and the Maya region. Comparative material from highland S. America.

Same as: ANTHRO 105

**ANTHRO 205A. Archaeological Fieldwork: Critical Analysis and Practical Application. 2-3 Units.**

This introduction to archaeological fieldwork involves both field and seminar components, each component meeting once per week. During the field sessions, we will investigate an archaeological site on campus using methods of survey, mapping, testing, and excavation (digging, recording units/features, profile illustration). In seminar, we will critically examine archaeological fieldwork through reading, writing, and discussion, exploring topics such as history of archaeological excavation, production of archaeological knowledge, disjunction between theory and practice, reflexive methodologies, ethics, collaboration, and specialization. No experience necessary, but students with fieldwork experience are welcome.

Same as: ANTHRO 105A

**ANTHRO 206. Human Origins. 5 Units.**

The human fossil record from the first non-human primates in the late Cretaceous or early Paleocene, 80-65 million years ago, to the anatomically modern people in the late Pleistocene, between 100,000 to 50,000 B.C.E. Emphasis is on broad evolutionary trends and the natural selective forces behind them.

Same as: ANTHRO 6, HUMBIO 6

**ANTHRO 206A. Incas and their Ancestors: Peruvian Archaeology. 3-5 Units.**

The development of high civilizations in Andean S. America from hunter-gatherer origins to the powerful, expansive Inca empire. The contrasting ecologies of coast, sierra, and jungle areas of early Peruvian societies from 12,000 to 2,000 B.C.E. The domestication of indigenous plants which provided the economic foundation for monumental cities, ceramics, and textiles. Cultural evolution, and why and how major transformations occurred.

Same as: ANTHRO 106, ARCHLGY 102B

**ANTHRO 209A. Archaeology of the Modern World. 3-5 Units.**

Historical archaeology, also called the archaeology of the modern world, investigates the material culture and spatial history of the past five centuries. As a discipline, historical archaeology has been characterized by (1) a methodological conjunction between history and archaeology; (2) a topical focus on the  $\zeta$ three Cs $\zeta$ : colonization, captivity, and capitalism  $\zeta$  forces which arguably are constitutive of the modern world; and (3) an epistemological priority to recovering the perspectives of  $\zeta$ people without history. $\zeta$  Each of these three trends is widely debated yet they continue to profoundly shape the field. This seminar provides an in-depth examination of the emergence and development of this historical archaeology, with a focus on current issues in theory and method. For undergraduates, the prerequisite is Anthro 3 or consent of instructor.

Same as: ANTHRO 109A, ARCHLGY 109A

**ANTHRO 210. Environmental Archaeology. 5 Units.**

This course investigates the field of environmental archaeology. Its goals are twofold: 1) to critically consider the intellectual histories of environmental archaeology, and, 2) to survey the various techniques and methods by which archaeologists assess historical environmental conditions through material proxies. The course will include lab activities.

Same as: ANTHRO 110, ARCHLGY 110

**ANTHRO 210A. Neandertals and Modern Humans: Origin, Evolution, Interactions. 3 Units.**

The expansion out of Africa of our species represents the last spectacular step in the course of Human Evolution. It resulted in the colonization of the whole planet and the replacement of archaic forms of humans in Eurasia. One way to investigate why *Homo sapiens* has been such a successful species is to compare its evolution with that of its closest relative, the Neandertals. Exploring the bio-cultural processes at work in the two lineages leads to examine some of the main issues in Paleanthropology and the most recent methodological advances in the field.

Same as: ANTHRO 110A

**ANTHRO 210B. Examining Ethnographies. 5 Units.**

Eight or nine important ethnographies, including their construction, their impact, and their faults and virtues.

Same as: ANTHRO 110B

**ANTHRO 211A. Archaeology of the Andes of Argentina. 3-5 Units.**

The aim of this course is to provide a panorama of the archaeology of the andean region of Argentina, along some main topics of past and current researches. North andean Argentina has been considered for a long time as subordinated to the major developments in the central Andes and Puna, as if it were in a marginal position that mirrored their history. More than a hundred years of research in the area have produced different insights, which put that affirmation in relative terms. The course will give an overview of major historical contributions and contemporary trends in the archaeological thinking in relation to themes such as time, the space, people, things and nature. An overview of the conceptions and construction of time. Space seen as cultural area; natural environment and built landscape; archaeological areas as national territory. Historical conceptions of people; bodies; social inequality; the past and present others in the archaeological research. Artefacts, classifications and typologies; material archaeological contexts as cultural units; from artefacts to things; past ontologies. Nature and environment; domestication; ecological approaches; agropastoralism; nature/culture. It is expected that by the end of the course students will gain a panorama of the major problems of the archaeology of andean Argentina with historically and theoretically informed perspectives.

Same as: ANTHRO 111A

**ANTHRO 212. Public Archaeology: Market Street Chinatown Archaeology Project. 4-5 Units.**

This internship-style course centers on the practice and theory of historical archaeology research and interpretation through a focused study of San Jose's historic Chinese communities. The course includes classroom lectures, seminar discussion, laboratory analysis of historic artifacts, and participation in public archaeology events. Course themes include immigration, urbanization, material culture, landscape, transnational identities, race and ethnicity, gender, cultural resource management, public history, and heritage politics. The course includes required lab sections, field trips, and public service. Transportation will be provided for off-site activities.

Same as: ANTHRO 112, ASNAMST 112

**ANTHRO 213. Culture and Epigenetics: Towards A Non-Darwinian Synthesis. 4-5 Units.**

The course examines the impact of new research in epigenetics on our understanding of long-term cultural change. The course examines the various attempts that have been made over recent decades to find a synthesis between cultural and biological evolution. These approaches, often termed neo-Darwinian, include memes, dual inheritance theory, theories of cultural selection and transmission, niche construction theory and macro-evolutionary approaches. Research in all these areas will be examined, with particular reference to explanations for the origins of agriculture, but also including other transformations, and critiqued. New research in epigenetics offers an alternative non-Darwinian evolutionary perspective that avoids many of the problems and pitfalls in the neo-Darwinian approaches. Cultural evolution comes to be viewed as cumulative, directional and Lamarckian, since heritable epigenetic variation can underlie evolutionary change. Epigenetics opens the way for human cultural entanglements to become the drivers for evolutionary change, thus allowing the full range of social processes studied in the social and cultural sciences to take their place in the study and analysis of long-term change.

Same as: ANTHRO 113

**ANTHRO 213B. Religious Practices in Archaeological Cultures. 5 Units.**

According to Hawkes (1954), religion or ideology is the most difficult part of social life to access archaeologically. Luckily, not all scholars agree; according to Fogelin (2008) "religion is not something people think about, but something people do." Thus, archaeology, an inherently multidisciplinary subject that studies material culture, is well suited to delve into religion and its underpinnings. This course will explore religious practices, as they can be defined and interpreted from archaeological contexts spanning the Paleolithic to historic periods. Definitions of religion differ from author to author but they mostly agree that religion is a fully integrated and thus integral part of human social life. Politics, economics, identity and social class influence religion, and religion influences how these forces play out in society. Thus, the course will also examine the significance of ritual and religion in a variety of social contexts.

Same as: ANTHRO 113B, ARCHLGY 113B

**ANTHRO 214. Prehistoric Stone Tools: Technology and Analysis. 5 Units.**

Archaeologists rely on an understanding of stone tools to trace much of what we know about prehistoric societies. How to make, illustrate, and analyze stone tools, revealing the method and theory intrinsic to these artifacts.

Same as: ANTHRO 114, ARCHLGY 114

**ANTHRO 214A. Introduction to South Asian Archaeology. 5 Units.**

This seminar will survey the archaeology of South Asia, beginning with animal and plant domestication in the early Holocene and ending with the late Medieval Period. Given its chronological breadth and spatial scope, the class will interrogate a variety of social and historical contexts that contribute to a broad range of anthropological research concerns, including the intersections of authority, ritual, alterity and landscape, and at the same time critically consider the epistemological bases for their analyses through archaeological remains.

Same as: ANTHRO 114A, ARCHLGY 114A

**ANTHRO 214B. Landscape Archaeology and Global Information Systematics. 3-5 Units.**

This course is meant to lay groundwork for analysis of archaeological landscapes using the methods of GIS. Throughout, we consider the various understandings of landscape, from the biographical to the biological. The course explores the history of various typologies of landscape, incorporating the cultural, the topographical, the ecological, and the topological; reviews different types of landscape data and analysis, including aerial imagery, stratigraphic excavations, and specialized analyses; addresses how to integrate different sorts of data sets and carry out analytical assessment of interrelated "layers" as dynamic constituents of landscape; considers implications of landscape studies in modern policy and management. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 114B

**ANTHRO 215. The Social life of Human Bones. 3-5 Units.**

Skeletal remains serve a primary function of support and protection for the human body. However, beyond this, they have played a range of social roles once an individual is deceased. The processes associated with exhumation, interment, exhumation and reburial all speak to the place that the body, and its parts, play in our cultural as well as physical landscape. This course builds on introductory courses in human skeletal anatomy by adding the social dynamics that govern the way humans treat other humans once they have died. It draws on anthropological, biological and archaeological research, with case studies spanning a broad chronological and spatial framework to provide students with an overview of social practice as it relates to the human body.

Same as: ANTHRO 115, ARCHLGY 115

**ANTHRO 215B. Peoples and Cultures of Ancient Mesoamerica. 5 Units.**

This course engages with the world of ancient Mesoamerica, focusing on the Mixtec, Aztec, Maya, Zapotec, Chichimec, Olmec, and Teotihuacan peoples. We address how questions about the past are framed through ethnographic and ethnohistoric accounts of daily life, how diverse scientific methods and theoretical perspectives are used to address these questions, how interpretations of daily life in the ancient Mesoamerican world are formulated, and how these interpretations are marshaled in contemporary politics and policies. We explore different scales of Mesoamerican communities, and compare the diverse material culture and lifeways represented in Mesoamerica at different time periods. Students will create interpretive frameworks for a public audience as a component of the final project.

Same as: ANTHRO 115B

**ANTHRO 216. Data Analysis for Quantitative Research. 5 Units.**

An introduction to numeric methods in Anthropology and related fields employing the Data Desk statistics package to test hypotheses and to explore data. Examples chosen from the instructor's research and other relevant projects. No statistical background is necessary, but a working knowledge of algebra is important. Topics covered include: Frequency Distributions; Measures of Central Tendency, Dispersion, and Variability; Probability and Probability Distributions; Statistical Inference, Comparisons of Sample Means and Standard Deviations; Analysis of Variance; Contingency Tables, Comparisons of Frequencies; Correlation and Regression; Principal Components Analysis; Discriminant Analysis; and Cluster Analysis. Grading based on take-home problem sets.

Same as: ANTHRO 116

**ANTHRO 216B. Anthropology of the Environment. 5 Units.**

This seminar interrogates the history of anthropology's approach to the environment, beginning with early functionalist, structuralist, and Marxist accounts of human-environment relationships. It builds towards more recent developments in the field, focusing on nonhuman and relational ontologies as well as current projects on the intersections of nature, capital, politics, and landscape histories. At the end of this class, students will be familiar with the intellectual histories of environmental anthropology and contemporary debates and tensions around questions of ethics, agency, environment, and historical causality.

Same as: ANTHRO 116B

**ANTHRO 217. Thinking Through Animals. 5 Units.**

The human-animal relationship is dynamic, all encompassing and durable. Without exception, all socio-cultural groups have evidenced complex interactions with the animals around them, both domesticated and wild. However, the individual circumstances of these interactions are hugely complicated, and involve much more than direct human-animal contact, going far beyond this to incorporate social, ecological and spiritual contexts. This course delves into this complexity, covering the gamut of social roles played by animals, as well as the methods and approaches to studying these, both traditional and scientific. While the notion of "animals as social actors" is well acknowledged, their use as proxies for human autecology (the relationship between a species and its environment) is also increasingly recognised as a viable mechanism for understanding our cultural and economic past. The module presents an overview covering a broad timespan from the Pleistocene to the modern day. It will piece together the breadth of human-animal relationships using a wide geographic range of case studies.

Same as: ANTHRO 117



**ANTHRO 217A. Stuff. 5 Units.**

Never before have humans been engulfed by so much stuff. Stuff is needed to survive giving us the basics of food, clothing, and shelter. But stuff does so much more. Smart phones rule our social interactions. Louis Vuitton handbags display status. Air conditioning masters nature. Picassos inspire beauty. Wedding bands promise eternal love. Crosses connect believers to God. Is stuff really who we are? This seminar explores the science of stuff, past, present and future, investigating deeply-held beliefs about the meaning, value, and purpose of objects. Because our stuff has become such a popular obsession, this course embraces the eclectic intersection of popular and academic knowledge. Students will seek to answer the complex whys of our relationship with objects and understand our future human condition made by the material world.

Same as: ANTHRO 117A, ARCHLGY 117A

**ANTHRO 217B. Monuments and Landscapes: An Archaeological Perspective. 3-5 Units.**

The landscape is a result of the action and interaction of human and natural factors. Communities have altered their landscapes for a variety of reasons, including the subsistence practices; as a consequence of economic growth; to express a social ideology, and as a consequence of political and religious drivers. Accordingly, landscapes enable physical and provide psychological sustenance to people, and the human need to relate to our surroundings is part of the way in which identities are created and disputed. Within the humanities, landscape is being conceptualized as a process, a practice and as performance, and monuments within a given landscape have an equally important role, not to mention history. They are often the most durable and well-known evidence of the ancient civilizations, and should be observed jointly with the landscape. How did the landscape predefine the monument and how did the monument complement, emphasize or devalue the landscape? What philosophy channeled the construction of the monuments within the landscapes? Whether ephemeral or permanent, the human agency left traces in the landscape; thus, both monuments and landscapes are the key indicators for understanding the ideology of a particular culture. Archaeology, through its interdisciplinary nature, provides a unique perspective, as well as tools, for examining the formation processes of all man-made elements, within both natural and cultural landscapes. The course will address the multifaceted issues of the ways that people have consciously and unconsciously shaped the land around them through time. It will look into diverse, geographically and periodically influenced concepts of a monument and landscape. The course will be divided into two parts, with the first one covering the theory and methodological approaches and the second part the conceptual characteristics, modifications and changeability in various archaeological and historical periods and cultural frameworks.

Same as: ANTHRO 117B, ARCHLGY 117B

**ANTHRO 219. Zooarchaeology: An Introduction to Faunal Remains. 5 Units.**

As regularly noted, whether historic or pre-historic, animal bones are often the most commonly occurring artefacts on archaeological sites. As bioarchaeological samples, they offer the archaeologist an insight into food culture, provisioning, trade and the social aspects of human-animal interactions. The course will be taught through both practical and lecture sessions: the hands-on component is an essential complement to the lectures. The lectures will offer grounding in the main methodological approaches developed, as well as provide case-studies to illustrate where and how the methods have been applied. The practical session will walk students through the skeletal anatomy of a range of species. It will guide students on the identification of different parts of the animal, how to age / sex individuals, as well as recognize taphonomic indicators and what these mean to reconstructing post-depositional modifications.

Same as: ANTHRO 119, ARCHLGY 119

**ANTHRO 21N. The Anthropology of Globalization. 4 Units.**

Preference to freshmen. Anthropological approach to how cultural change, economic restructuring, and political mobilization are bound up together in the process of globalization.

**ANTHRO 22. Archaeology of North America. 3-5 Units.**

Why and how people of N. America developed. Issues and processes that dominate or shape developments during particular periods considering the effects of history and interactions with physical and social environment. Topics include the peopling of the New World, explaining subsequent diversity in substance and settlement adaptations, the development of social complexity, and the impact of European contact.

**ANTHRO 221. Language and Prehistory. 4-5 Units.**

Language classification and its implications for human prehistory. The role of linguistic data in analyzing prehistoric populations, cultures, contact, and migrations. Comparison of linguistic and biological classifications. Reconstruction, proto-vocabularies, and culture. Archaeological decipherment and the origins and evolution of writing. Archaeological and genetic evidence for human migrations. (DA-A; HEF II,III).

Same as: ANTHRO 121

**ANTHRO 222A. Race and Culture in Mexico and Central America. 3-5 Units.**

This course addresses the role of racial ideologies in the historical configuration of multiple hierarchies of inequality that determine the place of everyone in society in Mexico and Central America. Based on readings from the humanities and social sciences, we will discuss the cultural and racial politics of authoritarianism and indigenous insurgency, emphasizing narratives of laziness and vagrancy that have been central to the discipline of labor that shapes local processes of regressive modernization and nation building. We will analyze the hegemony of dictatorship as political necessity, the relationship between local racisms and global Whiteness, and the emergence of new local and transnational contestations to the multiple hierarchies that determine the place of everyone in society.

Same as: ANTHRO 122A

**ANTHRO 222C. Research in Maya Hieroglyphic Writing. 1-2 Unit.**

Workshop. Current issues in the decipherment and analysis of Maya hieroglyphic writing and literacy.

Same as: ANTHRO 122C

**ANTHRO 223A. Debating Repatriation. 5 Units.**

The debates over the return of cultural property have raged for centuries. At stake are key questions about the rights of Indigenous peoples, intellectual freedom, nationalism, globalization, heritage management, the meaning of history, and the purpose of museums in the world. This seminar examines these vital discussions that intersect law and morality, science and religion, culture and politics. Discussions will be informed by cross-cultural, legal, ethical perspectives, exploring both the philosophical and practical implications of the repatriation debates. This course will provide students with a nuanced historical viewpoint of museum collections, heritage policies, and legal dimensions that underpin contests over cultural property.

Same as: ANTHRO 123A, ARCHLGY 123A

**ANTHRO 225. Language and the Environment. 3 Units.**

Lecture course on vocabulary and grammar as keys to peoples' understanding and use of the environment. Ethnobotany, ethnobiology, and ethnosemantics in the analysis of the language of place, plants and animals, the earth, the body, and disease. Terminological gaps and gluts and what they imply. Language as a strategic resource in environmental management. Language contact and conflict in the modern global environment, with particular attention to the vocabularies of capitalism and property. Language extinction and its environmental implications. Anthropology concentration: CS, EE. No prerequisites.

Same as: ANTHRO 125

**ANTHRO 226A. Politics of the Past. 5 Units.**

The past is never dead, William Faulkner once wrote. It's not even past. This seminar explores the contested meanings of history in the political present. It particularly focuses on how archaeological work and heritage becomes entangled in larger questions of identity, belonging, belief, economics, and the stories we tell about ourselves. Students will gain an expansive and in-depth perspective on why humans so value what has come before us, and why making meaning from the past is a process suffused with power.

Same as: ANTHRO 126A, ARCHLGY 126A

**ANTHRO 22N. Ethnographies of North America: An Introduction to Cultural and Social Anthropology. 3-4 Units.**

Preference to freshmen. Ethnographic look at human behavior, including cultural transmission, social organization, sex and gender, culture change, and related topics in N. America. Films.

**ANTHRO 230B. Introduction to GIS in Anthropology. 5 Units.**

How GIS and spatial tools can be applied in social research. Case studies and student projects address questions of social and cultural relevance using real data sets, including the collection of geospatial data and building of spatial evidence. Analytical approaches and how they can shape a social and cultural interpretation of space and place.

Same as: ANTHRO 130B

**ANTHRO 230D. Spatial Approaches to Social Science. 5 Units.**

This multidisciplinary course combines different approaches to how GIS and spatial tools can be applied in social science research. We take a collaborative, project oriented approach to bring together technical expertise and substantive applications from several social science disciplines. The course aims to integrate tools, methods, and current debates in social science research and will enable students to engage in critical spatial research and a multidisciplinary dialogue around geographic space.

Same as: ANTHRO 130D, POLISCI 241S, URBANST 124

**ANTHRO 234. Object Lessons. 5 Units.**

Human-object relations in the processes of world making. Objectification and materiality through ethnography, archaeology, material culture studies, and cultural studies. Interpretive connotations around and beyond the object, the unstable terrain of interrelationships between sociality and materiality, and the cultural constitution of objects. Sources include: works by Marx, Hegel, and Mauss; classic Pacific ethnographies of exchange, circulation, alienability, and fetishism; and material culture studies.

Same as: ANTHRO 134

**ANTHRO 235. Cultural Studies. 5 Units.**

Identity, community, and culture; their interactions and formation.

Same as: ANTHRO 135

**ANTHRO 236. The Anthropology of Global Supply Chains. 5 Units.**

This upper-division undergraduate seminar focuses on recent studies by anthropologists and scholars in related disciplines on global supply chains and consumption practices. The goal of the course is to assess concepts and methods for integrating a cultural analysis of transnational production with a cultural analysis of transnational consumption. We will review ethnographic studies of the production and consumption of commodities linked by transnational and global networks. The class will then pursue collaborative research on the global production, distribution, and consumption of a selected commodity. Prerequisite: junior or senior standing and previous coursework in cultural anthropology or permission of instructor.

Same as: ANTHRO 136

**ANTHRO 237. The Politics of Humanitarianism. 5 Units.**

What does it mean to want to help, to organize humanitarian aid, in times of crisis? At first glance, the impulse to help issue generis a good one. Helping is surely preferable to indifference and inaction. This does not mean that humanitarian interventions entail no ethical or political stakes or that they are beyond engaged critique. We need to critique precisely that which we value, and to ask some hard questions, among them these: What are the differences among humanitarianism, charity, and philanthropy? What of social obligations and solidarities? How does the neoliberal world order currently create structural inequalities that ensure the reproduction of poverty and violence? How does the current order of things resemble or differ from the colonial world order? This course examines the history of humanitarian sensibilities and the emergence of organized action in the "cause of humanity". In the early years of humanitarian intervention, political neutrality was a key principle; it has now come under ever greater analytical and political scrutiny. We will examine the reasons for the politicization and militarization of aid – be it humanitarian aid in natural disasters or political crises; development programs in the impoverished south ("the Third World"), or peace-keeping. We will end with a critical exploration of the concept of human rights, humanity, and personhood. The overall methodological aim of the course is to demonstrate what insights an ethnographic approach to the politics, ethics, and aesthetics of humanitarianism can offer.

Same as: ANTHRO 137

**ANTHRO 238. Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise. 5 Units.**

This course will explore historical as well as current market transformations of medical ethics in different global contexts. We will examine various aspects of the research enterprise, its knowledge-generating and life-saving goals, as well as the societal, cultural, and political influences that make medical research a site of brokering in need of oversight and emergent ethics. This seminar will provide students with tools to explore and critically assess the various technical, social, and ethical positions of researchers, as well as the role of the state, the media, and certain publics in shaping scientific research agendas. We will also examine how structural violence, poverty, global standing, and issues of citizenship also influence issues of consent and just science and medicine.

Same as: ANTHRO 138, CSRE 138

**ANTHRO 238A. Conflict and Reconciliation in Africa: International Intervention. 3-5 Units.**

This course will explore recent debates on the causes and structural terms of large-scale violence in Africa in the context of key contemporary models for reconciliation and transitional justice. Discussions will emphasize the broader international legal and political order each presupposes, and specifically whether their underlying reconstitution of rights and subjectivities are compatible with cultural, political or legal diversity. A historical assessment of the predominating Nuremberg paradigm of transitional justice structured around international military intervention and criminal trials based on international criminal courts will be contrasted with other regional models that engage with the challenges of the political reconciliation of formerly divided political communities. The necessity of understanding the specificities of both global and local historical and structural contexts will be examined with respect to various proposals for how to balance concerns for both justice and peace. Readings will cover case studies from South Africa, Rwanda, DRC, northern Uganda, Sudan (including Darfur and South Sudan), Libya, Mali, and CAR.

Same as: AFRICAST 138, AFRICAST 238, ANTHRO 138A

**ANTHRO 239. Ethnography of Africa. 5 Units.**

The politics of producing knowledge in and about Africa through the genre of ethnography, from the colonial era to the present. The politics of writing and the ethics of social imagination. Sources include novels juxtaposed to ethnographies.

Same as: ANTHRO 139

**ANTHRO 244B. The Buddhist Body in East Asia: Charisma, Gender, and the Gift of the Body. 5 Units.**

This course introduces Buddhist practices and texts of embodiment as a subject of the anthropology of the body. We draw on research in social/cultural anthropology, history, and religious studies, and examine a selection of approaches to the Buddhist body: the body of power in Buddhist charisma, the gender of the bodhisattvas and monastic body, the techniques of the body in meditation and martial arts, healing and cultivation, and the gift of the body in bioethics and medical education. We draw on examples in different traditions of Buddhism in a range of societies with a special focus on Chinese Buddhism.

Same as: ANTHRO 144B

**ANTHRO 245. Race and Power. 5 Units.**

This course examines how race is made. We will pay close attention to how people engage with material, economic, scientific, and cultural forces to articulate human group difference as a given, and even natural. In this seminar, we will look at the construction of race as a literally made phenomenon, where historical, colonial, bodily, market, and humanitarian constituent elements both circulate and sediment racial understandings. To focus our readings and discussions we will divide this vast terrain into three units: race and the colonial encounter, race and biopower, and race and capital.

Same as: ANTHRO 145, CSRE 145F

**ANTHRO 247. Nature, Culture, Heritage. 5 Units.**

Seminar. Shared histories of natural and cultural heritage and their subsequent trajectories into the present. How thought about archaeological sites and natural landscapes have undergone transformations due to factors including indigenous rights, green politics, and international tourism. The development of key ideas including conservation, wilderness, sustainability, indigenous knowledge, non-renewability and diversity. Case studies draw on cultural and natural sites from Africa, the Americas and Australia.

Same as: ANTHRO 147

**ANTHRO 247B. World Heritage in Global Conflict. 5 Units.**

Heritage is always political, it is typically said. Such a statement might refer to the everyday politics of local stakeholder interests on one end of the spectrum, or the volatile politics of destruction and erasure of heritage during conflict, on the other. If heritage is always political then one might expect that the workings of World Heritage might be especially fraught given the international dimension. In particular, the intergovernmental system of UNESCO World Heritage must navigate the inherent tension between state sovereignty and nationalist interests and the wider concerns of a universal regime. The World Heritage List has over 1000 properties has many such contentious examples, including sites in Iraq, Mali, Syria, Crimea, Palestine and Cambodia. As an organization UNESCO was born of war with an explicit mission to end global conflict and help the world rebuild materially and morally, but has found its own history increasingly entwined with that of international politics and violence.

Same as: ANTHRO 147B, ARCHLGY 147B

**ANTHRO 248. Health, Politics, and Culture of Modern China. 4-5 Units.**

One of the most generative regions for medical anthropology inquiry in recent years has been Asia. This seminar is designed to introduce upper division undergraduates and graduate students to the methodological hurdles, representational challenges, and intellectual rewards of investigating the intersections of health, politics, and culture in contemporary China.

Same as: ANTHRO 148, CHINA 155A, CHINA 255A

**ANTHRO 249. South Asia: History, People, Politics. 5 Units.**

The South Asian subcontinent (comprising of India, Pakistan, Bangladesh, Nepal, Bhutan and Sri Lanka) is one of the most diverse and densely populated regions in the world and increasingly prominent in new global political and cultural economies. South Asia has also provided the inspiration for cutting edge theories about the colonial state, postcolonial studies, democracy, popular culture, and religious conflict. The course will provide an overview of major historical events and social trends in contemporary South Asia and focus on themes such as gender, religion, caste, migration and movement, new technologies, the urban and rural, the state, and new forms of consumption among others. Thus, the course will give students historically and theoretically informed perspectives on contemporary South Asia, as well as how to apply insights learned to larger debates within the political and social sciences.

Same as: ANTHRO 149

**ANTHRO 251A. Contemporary Chinese Society Through Independent Documentary Film. 3-5 Units.**

An overview of social issues in contemporary China as seen through its emerging independent documentary film movement. Topics covered include representations of history, political power and accountability in the reform era, human rights, urbanization, the environment, homelessness and inequality, sexualities, addiction, and the role of media in society. Each viewing is accompanied by readings in media theory or the anthropological/sociological study of contemporary China. Can be taken with or without research component. Films include English subtitles.

Same as: ANTHRO 151A

**ANTHRO 253A. Population and social trends in Japan. 3-5 Units.**

Anthropological theories and concepts as applied to Japan. Postwar demographic trends. Delayed marriage. Declining nuclear family. Restructuring of education and workplace. Problems for the seniors. Foreign laborers shaking fundamentals of Japan.

Same as: ANTHRO 153A

**ANTHRO 254B. Anthropology of Drugs: Experience, Capitalism, Modernity. 5 Units.**

This course examines the significant role drugs play in shaping expressions of the self and social life; in the management populations, and in the production of markets and inequality. It engages these themes through cultural representations of drugs and drug use, analyses of scientific discourse, and social theory. Topics include: the social construction of the licit and illicit; the shifting boundaries of deviance, disease and pleasure; and the relationship between local markets and global wars.

Same as: ANTHRO 154, CSRE 154

**ANTHRO 255. Research Methods in Ecological Anthropology. 5 Units.**

The course prepare students for the methodological and practical aspects of doing ecologically oriented, quantitative anthropological field research. The primary goal is to explore what it means to ask anthropological questions in a systematic way. We will focus on understanding what can constitute an interesting question, how to frame a question in way that facilitates investigation, and how to design methods to begin investigating a question. In turn, the course will provide a format to refine research projects in preparation for doing more extensive fieldwork.

Same as: ANTHRO 155

**ANTHRO 256. Japanese Anthropology. 5 Units.**

This is an advanced reading seminar in the field of Japanese Anthropology. It will explore the historical development of the field and the contemporary issues and topics taken up by scholars of Japanese anthropology. Prior knowledge of Japanese language, history, and society is required.

Same as: ANTHRO 156

**ANTHRO 259C. Ecological Humanities. 3 Units.**

What sort of topics, research questions, approaches, theories and concepts lead to an integration of various kinds of knowledges? Ecological Humanities provides a conceptual platform for a merger of humanities and social sciences with earth and life sciences, soil science and forensic sciences. The course will discuss such selected topics as the Anthropocene, geologic/mineral and exhumed subjects/personae, bio- and geosocial collectives, symbiotic life-forms, non-human agencies, and forensic landscapes as examples of this merger.  
Same as: ANTHRO 159C, DLCL 259C, REES 259C

**ANTHRO 260. Social and Environmental Sustainability: The Costa Rican Case. 3-5 Units.**

Seminar focused on issues of tropical sustainability with a particular emphasis on the Osa Peninsula of Costa Rica. Offered in conjunction with the Osa Initiative in the Wood¿s Institute for the Environment, the course highlights issues of human development in the tropics, through such means as agricultural development, ecotourism, conservation efforts, private and indigenous reserves, and mining. The course will draw from diverse disciplines including anthropology, rural sociology, conservation biology, geosciences, history, political science, and journalism. In addition to weekly discussions, students will develop a research paper throughout the term which will be presented to a panel of selected Wood¿s Faculty during the final week of the term.  
Same as: ANTHRO 160

**ANTHRO 260A. Tragedy of the Commons: Human Ecology of Communal Resources. 5 Units.**

The ¿tragedy of the commons¿ is a classic social dilemma ¿ a situation in which individual interests conflict with collective ones ¿ and key to understanding past, present and future environmental degradation. This course surveys a variety of scientific perspectives on the essence of the tragedy: common property resources will ultimately be destroyed by overexploitation. Major themes include the effects of human population density and social organization on the health and management of commons, self-interest versus collective action, and potential solutions to commons problems. Modern and prehistoric case studies are examined from ecological and evolutionary perspectives.  
Same as: ANTHRO 160A

**ANTHRO 261A. Human Ecology: Adaptations to Climate and Climate Change. 5 Units.**

Humans face essentially the same adaptive challenges as all organisms but are unique for having successfully adapted to virtually every environment on Earth. The resulting diversity of phenotypes and cultures¿past and present¿is key to understanding how interactions with environments shape the economic, social, and cultural lives of hunter-gatherers, pastoralists and agriculturalists. This course surveys the range of human adaptations from an ecological and evolutionary perspective to understand human adaptive capacity and vulnerability to climate change.  
Same as: ANTHRO 161A

**ANTHRO 262. Indigenous Peoples and Environmental Problems. 3-5 Units.**

The social and cultural consequences of contemporary environmental problems. The impact of market economies, development efforts, and conservation projects on indigenous peoples, emphasizing Latin America. The role of indigenous grass roots organizations in combating environmental destruction and degradation of homeland areas.  
Same as: ANTHRO 162

**ANTHRO 263. Conservation and Evolutionary Ecology. 5 Units.**

Environmental degradation resulting from human behavior, and what can be done about it. Patterns of interaction between people and environments, and why they vary over time and space. Topics include adaptation and behavior, resource acquisition and utilization, conflicts of interest, collective action problems, conspicuous consumption, waste, land management, and public policy.  
Same as: ANTHRO 163

**ANTHRO 263A. Endangered Languages and Language Revitalization. 3-4 Units.**

Languages around the world are dying at such a rapid rate that the next century could see half of the world's 6800 languages and cultures become extinct unless action is taken now. This course looks at how and why languages die, and what is lost from a culture when that occurs. We will investigate how this trend can be reversed by methods of language documentation and description, the use of innovative technologies, multimodal fieldwork, writing dictionaries and grammars for different audiences, language planning, and data creation, annotation, preservation, and dissemination. We will focus on a number of current programs around the world to revitalize languages. Finally, the course will examine ethical modes of fieldwork within endangered language communities, and the possibilities of successful collaborations and capacity building, focusing especially on Northern California Indian peoples and their languages.  
Same as: ANTHRO 163A, LINGUIST 163A, LINGUIST 263, NATIVEAM 163

**ANTHRO 264. Natural Resource Extraction: Use and Development: Assessing Policies, Practices and Outcomes. 3-5 Units.**

This interdisciplinary course explores natural resource extraction from multiple conceptual perspectives. Logging and non-timber resource harvesting practices are examined through ecological dynamics of species and community life histories, natural and anthropogenic disturbance regimes and resilience and recovery to diverse perturbations through alternative stable states. Using a political ecology lens, we then examine historical and current policies and practices aimed to manage terrestrial resource use and extraction: maximum sustained yield, community-based forest management, certification systems, payment for ecosystem services and Reducing Emissions from Deforestation and Degradation (REDD). Through problem sets and lab/field exercises, we employ quantitative ecological measurements and experiments coupled with quantitative and qualitative methods and analyses used to assess socio-economic drivers and ecological impacts. Diverse benefits/costs imparted throughout the supply chain - from extraction to consumer ¿ are explored across temporal and spatial scales with local to global agents. No Prerequisites: course or foundation in Ecology, Community Ecology, and/or Ecosystem Ecology strongly suggested.  
Same as: ANTHRO 164

**ANTHRO 266. Political Ecology of Tropical Land Use: Conservation, Natural Resource Extraction, and Agribusiness. 3-5 Units.**

Seminar. The state, private sector, development agencies, and NGOs in development and conservation of tropical land use. Focus is on the socioeconomic and political drivers of resource extraction and agricultural production. Case studies used to examine the local-to-global context from many disciplines. Are maps and analyses used for gain, visibility, accountability, or contested terrain? How are power dynamics, land use history, state-private sector collusion, and neoliberal policies valued? What are the local and extra-local responses?  
Same as: ANTHRO 166

**ANTHRO 268A. Risky Environments: The Nature of Disaster. 5 Units.**

This seminar explores topics including environmental movements and countercultures, human agency and geoenvironmental ecotourism, and indigenous perspectives of changing climates to query how humans view `nature¿ in terms of stability, instability, risk and disaster in the 21st century. Case studies draw upon a broad range of geographical regions including the Arctic, Iceland, Australia, and the Americas. Discussions will draw upon film portrayals and interviews with researchers in addition to readings.  
Same as: ANTHRO 168A

**ANTHRO 269. The Ecology of Cuisine: Food, Nutrition, and the Evolution of the Human Diet. 3-5 Units.**

This course is an interdisciplinary approach to understanding human food consumption and nutrition, incorporating biological, evolutionary, ecological and social perspectives. Topics include a broad survey of primate diets and their physiological and behavioral correlates; fossil and archaeological evidence for early human diets; adaptations to dietary shifts since the Neolithic; infant and early child feeding practices and their role in shaping human social arrangements, metabolic syndrome, food security, food taboos; the origins of spices; cultural diversity in the social uses and meanings of food and the sharing of food; gathering, hunting and locavorism as high hipster cuisine. Emphasis is on understanding the diversity of human foodways through time and space: how biology, culture, and ecology interact to shape the food we eat, and how the food we eat shapes us.

Same as: ANTHRO 169

**ANTHRO 26N. God and the Supernatural. 3-5 Units.**

This course explores the conditions under which people have experiences that they identify as "supernatural": experiences of something that is not physically present. We will explore the cultural and psychological dimensions of this very real phenomenon. We will not, however, make ontological judgments about whether something which is experienced as externally present is in fact externally present: in other words, this is a class about culture and psychology, not about metaphysics. We will do experimental work, using our selves and fellow classmates, as subjects, to understand who, when and how people have experiences that they deem "supernatural."

**ANTHRO 270. Australian Ecosystems: Human Dimensions and Environmental Dynamics. 3 Units.**

This cross-disciplinary course surveys the history and prehistory of human ecological dynamics in Australia, drawing on geology, climatology, archaeology, geography, ecology and anthropology to understand the mutual dynamic relationships between the continent and its inhabitants. Topics include anthropogenic fire and fire ecology, animal extinctions, aridity and climate variability, colonization and spread of *Homo sapiens*, invasive species interactions, changes in human subsistence and mobility throughout the Pleistocene and Holocene as read through the archaeological record, the totemic geography and social organization of Aboriginal people at the time of European contact, the ecological and geographical aspects of the "Dreamtime", and contemporary issues of policy relative to Aboriginal land tenure and management.

Same as: ANTHRO 170, EARTHSYS 172

**ANTHRO 270A. Multispecies Ethnography: Human, Animal, Plant, Mineral, and Microbe. 5 Units.**

This course explores new modes of writing and researching in anthropology. Multispecies ethnography considers nonhuman life as objects of analysis—animals, plants, fungi, bacteria, and viruses—as having political lives and import. By studying how these nonhuman entities, including metals, interact with and shape human existence, multispecies ethnographers who study life from the human down to the microbe, must engage in multiple worlds: from the jungle to the laboratory, from the field to the desk. This course will incorporate readings on zoe and bios, the making of species categories, relationships between the human and nonhuman, current debates on breaking with the species concept and the rights of mother earth. We will read the conceptual works in conjunction with current multispecies ethnographies to give grounding to the theory.

Same as: ANTHRO 170A

**ANTHRO 271. The Biology and Evolution of Language. 4-5 Units.**

Lecture course surveying the biology, linguistic functions, and evolution of the organs of speech and speech centers in the brain, language in animals and humans, the evolution of language itself, and the roles of innateness vs. culture in language. Suitable both for general education and as preparation for further studies in anthropology, biology, linguistics, medicine, psychology, and speech & language therapy. Anthropology concentration: CS, EE. No prerequisites.

Same as: ANTHRO 171, HUMBIO 145L

**ANTHRO 272. Seminar on Cultural Evolution and Coevolution. 3-5 Units.**

Upper division/graduate seminar on recent approaches to the study of cultural evolution and coevolution. Critical evaluation of Darwinian and non-Darwinian theories, with special attention to the interplay of culture, genes, environment and society. Students will undertake projects of their own design to review, test, or improve current theoretical formulations. Prerequisite: a university-level course in evolution, ecology, or human behavioral biology.

Same as: ANTHRO 172

**ANTHRO 272B. Anthropology of Gender/Sexuality: Eco-Feminist Perspectives. 5 Units.**

This course takes an eco-feminist approach to anthropology, investigating the different meanings of eco in eco-nomy and eco-logy. The term, *oikos*, from the Greek, *oikos*, means household, house, or family, laying the foundation for examining women's roles in changing forms of kinship, beyond and within the concept of the human.

Same as: ANTHRO 172B

**ANTHRO 274. Beginnings of Social Complexity. 5 Units.**

Models and examples of the social evolution of stratification and political centralization in prehistoric human societies. Inferences from the archaeological record concerning the forces and mechanisms behind the rise and fall of complex societies, particularly in S. America. (HEF II; DA-B).

Same as: ANTHRO 174

**ANTHRO 275. Human Skeletal Anatomy. 5 Units.**

Study of the human skeleton (a. k. a. human osteology), as it bears on other disciplines, including medicine, forensics, archaeology, and paleoanthropology (human evolution). Basic bone biology, anatomy, and development, emphasizing hands-on examination and identification of human skeletal parts, their implications for determining an individual's age, sex, geographic origin, and health status, and for the evolutionary history of our species. Three hours of lecture and at least three hours of supervised and independent study in the lab each week.

Same as: ANTHRO 175, BIO 174, BIO 274, HUMBIO 180

**ANTHRO 276. Cultures, Minds, and Medicine. 1 Unit.**

This workshop aims to bring together scholars from the social sciences, humanities, medicine and bio-science and technology to explore the ways that health and illness are made through complex social forces. We aim for informal, interactive sessions, full of debate and good will. Dates of meetings will be listed in the notes section in the time schedule.

Same as: ANTHRO 176

**ANTHRO 277. Environmental Change and Emerging Infectious Diseases. 4-5 Units.**

The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV.

Same as: ANTHRO 177, EARTHSYS 114, EARTHSYS 214, HUMBIO 114

**ANTHRO 278. Evolution and Conservation in Galapagos. 5 Units.**

The contribution of research in the Galapagos Islands to our current understanding of evolution and conservation. Writings from Darwin to Dawkins, as they reveal patterns and processes of evolution including selection, adaptation, speciation, and coevolution. Current conservation strategies in the archipelago, and urgent measures needed today before unique species and adaptations are lost.

Same as: ANTHRO 178

**ANTHRO 279A. Health, Illness, and Healing in South Asia. 5 Units.**

This course has three related goals pertinent to medicine and healing in South Asia. The first is to understand the experiences of illness, and therapy in ordinary South Asian communities. How do social and economic inequality, religious commitments, available healing traditions, and community and family contexts shape the experience of illness and healing? The second goal is to think about South Asian medical systems using a broad historical perspective. How had biomedicine been used during the colonial period to manage the health of native populations? What is the legacy of this colonial history on current practices? What happens when South Asian medical traditions (such as Ayurveda) become global? Third, we will explore crucial health problems in South Asia from the perspective of medical anthropology. Possible topics for the third portion of the course include: child birth and maternal health, sex-selection technologies, malnutrition, metabolic diseases, the selling of organs, medical tourism, tuberculosis, HIV, suicide, and schizophrenia. Same as: ANTHRO 179A

**ANTHRO 27N. Ethnicity and Violence: Anthropological Perspectives. 3-5 Units.**

Ethnicity is one of the most compelling and most modern ways in which people - in the midst of considerable global and local uncertainty - all across the world imagine and narrate themselves. This seminar will take an anthropological look at both the modernity and the compulsions of ethnic allegiance, and, why struggles over ethnic identity are so frequently violent. Our questions will be both historical ¿ how, why and when did people come to think of themselves as possessing different ethnic identities - and contemporary ¿ how are these identities lived, understood, narrated, and transformed and what is the consequence of such ethnicisation. We follow this through anthropological perspectives which ask persistently how people themselves locally narrate and act upon their experiences and histories. Through this we will approach some of the really big and yet everyday questions that many of us around the world face: how do we relate to ourselves and to those we define as others; and how do we live through and after profound violence? The seminar will take these larger questions through a global perspective focusing on cases from Rwanda and Burundi, India, Sri Lanka, Northern Ireland, Guatemala, and the countries of Former Yugoslavia among others. These cases cover a broad canvas of issues from questions of historicity, racial purity, cultural holism, and relations to the state, to contests over religious community, indigeneity, minority identities, globalization, gender, and generation.

**ANTHRO 282. Medical Anthropology. 4 Units.**

Emphasis is on how health, illness, and healing are understood, experienced, and constructed in social, cultural, and historical contexts. Topics: biopower and body politics, gender and reproductive technologies, illness experiences, medical diversity and social suffering, and the interface between medicine and science.

Same as: ANTHRO 82, HUMBIO 176A

**ANTHRO 282A. Down and Out: Marginal Lives and Institutional Technologies. 5 Units.**

This course examines the neglect and management of socially marginalized persons including the mentally ill, youth runaways, child wards of the state, drug addicts and prisoners. In this course, we will approach the concept of marginality by investigating the spaces and institutions of decay, neglect and rehabilitation to which unwanted and indigent individuals are relegated. Readings are focused on qualitative research conducted within institutions of health, welfare, and reform. There will be two comparative public mental health sections in this course: one focused on South Asia and the second on Africa. This course is relevant for students interested in medical anthropology, applied anthropology, public health policy, or clinical careers in medicine, psychology, or social work.

Same as: ANTHRO 182A

**ANTHRO 283. Ecology, Evolution, and Human Health. 3-5 Units.**

Human ecology, human environments, adaptation and plasticity, and their relationship to health and well-being. Comparative context. Topics include human population history, subsistence ecology, demography, reproductive decision making, migration, infectious disease, risk management, and social inequalities. Particular attention will be paid to small-scale subsistence populations. Small-scale societies demonstrate an enormous range of variation in both environmental challenges faced and adaptations thereto. The process of human adaptation cannot be understood in the absence of a grounding in this range of challenge and adaptation.

**ANTHRO 283B. Human Mobility and Adaptability. 5 Units.**

Mobility, whether in the form of seasonal or permanent migration, is an ancient practice necessary for many subsistence strategies, including hunting-and-gathering and pastoralism. Many new forms of mobility have emerged and now it is nearly impossible to consider a patch of human society that is not engaged in or directly impacted by habitual, patterned geographic mobility. Today, almost everywhere in the world, people can get farther, faster; urbanization, environmental degradation, and civil unrest are driving groups of people who do not have a cultural tradition of nomadic migration to adopt a mobile lifestyle; sometimes permanently, sometimes temporarily; in search of new economic or resource opportunities. In this seminar course, we will explore modern patterns of human mobility and migration as adaptive strategies for predictably and unpredictably changing environments. Using a framework of biological and cultural adaptation, we will discuss the major types of current human mobility (e.g. nomadism, immigration, migrant labor, displacement) and how they influence and are influenced by social systems, resource access, and health.

Same as: ANTHRO 183B

**ANTHRO 285. Medical Anthropology of Contemporary Africa. 5 Units.**

In this course we will examine the place of Africa in global health discourses while reading in-depth histories and ethnographies of the varied causes and consequences of some of the most difficult problems facing African countries today. We will study the effects of colonialism and conflict on health, explore the military and humanitarian connections in the fight against HIV/AIDS, weigh the risks and benefits of population genetic studies on African populations, examine biomedical interventions on, and erasures of, local health problems, and query the role of violence, memory, insecurity, and power in daily life on the continent.

Same as: ANTHRO 185

**ANTHRO 286. Culture and Madness: Anthropological and Psychiatric Approaches to Mental Illness. 3-5 Units.**

Unusual mental phenomena have existed throughout history and across cultures. Taught by an anthropologist and psychiatrist, this course explores how different societies construct the notions of "madness": What are the boundaries between "normal" and "abnormal", reason and unreason, mind and body, diversity and disease? Optional: The course will be taught in conjunction with an optional two-unit discussion section or engaged learning component.

Same as: ANTHRO 186, HUMBIO 146, PSYC 286

**ANTHRO 28N. Secularism and its Critics. 3-5 Units.**

Secularism is often taken to be a necessary prerequisite for democracy in the modern world. The separation of religion and politics is often written into constitutions as a fundamental priority. Yet around the world, growing numbers of religious movements have sought to dispute the legitimacy of secularism. Social scientists, including anthropologists, are beginning to research the forms of domination and political violence that have been justified in the name of secularism. This course seeks to make sense of this global debate about secularism. It does so by taking up an anthropological perspective: much as anthropologists might study culture, religion, or kinship, we will interrogate secularism as a comparative social artifact, constituted by historically specific repertoires of signs, identities, everyday practices, and institutional powers. The course focuses on case studies in the United States, Western Europe, the Middle East, and South Asia.

**ANTHRO 298B. Digital Methods in Archaeology. 3-5 Units.**

This is a course on digital technologies in archaeology used for documentation, visualization, and analysis of archaeological spaces and objects. Emphasizes hands-on approaches to image manipulation, virtual reality, GIS, CAD, and photogrammetry modeling methods. Same as: ANTHRO 98B, ARCHLGY 98B

**ANTHRO 298C. Digital Methods in Anthropology. 3-5 Units.**

The course provides an introduction to a broad range of digital tools and techniques for anthropological research. It is geared towards those interested in exploring such methodologies for their research and wanting to add hands-on experience with state-of-the-art digital tools to their skill set. Students will learn to work with some of the most common tools used to collect and manage digital data, and to perform various types of analysis and visualization. Undergraduate students register for 5 Units, Graduate students can register for 5 or 3 units. Same as: ANTHRO 98C

**ANTHRO 299. Senior and Master's Paper Writing Workshop. 1-2 Unit.**

Techniques of interpreting data, organizing bibliographic materials, writing, editing and revising. Preparation of papers for conferences and publications in anthropology. Seniors register for 199; master's students register for 299. Same as: ANTHRO 199

**ANTHRO 3. Introduction to Archaeology. 3-5 Units.**

Aims, methods, and data in the study of human society's development from early hunters through late prehistoric civilizations. Archaeological sites and remains characteristic of the stages of cultural development for selected geographic areas, emphasizing methods of data collection and analysis appropriate to each. Same as: ARCHLGY 1

**ANTHRO 300. Reading Theory Through Ethnography. 5 Units.**

Required of and restricted to first-year ANTHRO Ph.D. students. Focus is on contemporary ethnography and related cultural and social theories generated by texts. Topics include agency, resistance, and identity formation, and discourse analysis. Prerequisite: consent of instructor.

**ANTHRO 301. History of Anthropological Theory, Culture and Society. 5 Units.**

Required of Anthropology Ph.D. students. The history of cultural and social anthropology in relation to historical and national contexts and key theoretical and methodological issues as these inform contemporary theory and practices of the discipline. Enrollment limited to 15. Prerequisite: consent of instructor.

**ANTHRO 301A. Foundations of Social Theory. 5 Units.**

The purpose of this course is to introduce key themes in social theory - the social, the modern subject, reason, autonomy, civility, interests, exchange, morality, life, the senses - through a reading of classic texts from Descartes up to psychoanalysis and phenomenology. Each section has original texts, commentaries, and background readings that place these texts in their deeper historical setting. Many of these commentaries trace how practical theories of 'lower' or minor selves - the subject people of the colonies, slaves, and other - were integral to the very development of ideas of the modern, autonomous and reasonable self in the western world. Prerequisite, by instructor consent.

**ANTHRO 302. History of Anthropological Theory, Ecology and Environment. 5 Units.**

Evolutionary and ecological theory from the 19th century to present. Theory and concepts from evolution and ecology, emphasizing anthropological applications. Evolutionary theories of human behavior, culture, and societies. Ecological theory behind carrying capacity, sustainable yield, and population growth. Emphasis is on tools of analysis and formulating research questions in anthropology today. Upper division undergrads require consent of instructor.

**ANTHRO 303. Introduction to Archaeological Theory. 5 Units.**

The history of archaeological thought emphasizing recent debates. Evolutionary theories, behavioral archaeology, processual and cognitive archaeology, and approaches termed feminist and post-processual archaeology in the context of wider debate in adjacent disciplines. The application and integration of theory on archaeological problems and issues. Prerequisite: consent of instructor.

**ANTHRO 304. Data Analysis for Quantitative Research. 5 Units.**

Univariate, multivariate, and graphical methods used for analyzing quantitative data in anthropological research. Archaeological and paleobiological examples. Recommended: algebra. Prerequisite: consent of instructor.

**ANTHRO 305. Research Methods in Ecological Anthropology. 5 Units.**

The course prepare students for the methodological and practical aspects of doing ecologically oriented, quantitative anthropological field research. The primary goal is to explore what it means to ask anthropological questions in a systematic way. We will focus on understanding what can constitute an interesting question, how to frame a question in way that facilitates investigation, and how to design methods to begin investigating a question. In turn, the course will provide a format to refine research projects in preparation for doing more extensive fieldwork.

**ANTHRO 306. Anthropological Research Methods. 5 Units.**

Required of ANTHRO Ph.D. students; open to all graduate students. Research methods and modes of evidence building in ethnographic research. Prerequisite: consent of instructor.

**ANTHRO 307. Archaeological Methods. 5 Units.**

Methodological aspects of field and laboratory practice from traditional archaeological methods to the latest interdisciplinary analytical techniques. The nature of archaeological data and inference; interpretive potential of these techniques. Prerequisite: consent of instructor.

**ANTHRO 308. Proposal Writing Seminar in Cultural and Social Anthropology. 5 Units.**

Required of second-year Ph.D. students in the culture and society track. The conceptualization of dissertation research problems, the theories behind them, and the methods for exploring them. Participants draft a research prospectus suitable for a dissertation proposal and research grant applications. Limited enrollment. Prerequisite: consent of instructor.

**ANTHRO 308A. Proposal Writing Seminar in Archaeology. 5 Units.**

Required of second-year Ph.D. students in the archaeology track. The conceptualization of dissertation research problems, the theories behind them, and the methods for exploring them. Participants draft a research prospectus suitable for a dissertation proposal and research grant applications. Limited enrollment. Prerequisite: consent of instructor.

**ANTHRO 308B. Interdisciplinary Research Proposals: Effective Presentation, Skills, and Styles. 5 Units.**

This seminar examines the diverse skills, methods, and styles required for the development and production of interdisciplinary dissertation and grant proposals. Topical focus centers primarily on proposals with both social science and natural science elements. Proposals may include a diverse suite of methods and analyses. Throughout this course, we critique examples, assess writing styles and presentation, evaluate budgets, assess data management plans, examine tables and figures, and discuss reviews and evaluations of research proposals. Students are expected to be either in the early stages of writing their dissertation proposal or preparing applications for grants and fellowships. Prerequisite: consent of instructor.

**ANTHRO 30Q. The Big Shift. 4 Units.**

Is the middle class shrinking? How do people who live at the extremes of American society- the super rich, the working poor and those who live on the margins, imagine and experience "the good life"? How do we understand phenomena such as gang cultures, addiction and the realignment of white consciousness? This class uses the methods and modes of ethnographic study in an examination of American culture. Ethnographic materials range from an examination of the new American wealth boom of the last 20 years (Richistan by Robert Frank) to the extreme and deadly world of the invisible underclass of homeless addicts on the streets of San Francisco (Righteous Dopefiend by Phillippe Bourgois and Jeff Schonberg). The experiences of Hispanic immigrants and the struggle to escape gang life in Los Angeles are highlighted in the story of Homeboy Industries a job creation program initiated by a priest working in LA's most deadly neighborhoods (G-Dog and the Homeboys by Celeste Fremon). Finally in Searching for Whitopia: an improbable journey into the heart of White America, Rich Benjamin explores the creation on ethnic enclaves (whitopias) as fear over immigration and the shrinking white majority redefine race consciousness in the 21st century. Each of these narratives provides a window into the various ways in which Americans approach the subjects of wealth and the good life, poverty and the underclass, and then construction of class, race, and gender in American society. Students will not be required to have any previous knowledge, just curiosity and an open mind. Same as: CSRE 30Q

**ANTHRO 31. Ecology, Evolution, and Human Health. 3-5 Units.**

Ecology, Evolution, and Human Health Human ecology, environments, adaptation and plasticity, and their relationship to health and well-being considered in the broad comparative context. Topics include human population history, subsistence ecology, demography, reproductive decision making, urbanization, migration, infectious disease, the physiology of stress and the inflammatory response, social capital and social networks, nutrition, nutritional deficiencies, growth, and social inequalities. No prior course work in ecological or medical anthropology required.

**ANTHRO 310C. Intersections. 5 Units.**

Themes of materiality and visibility, aesthetic and other forms of cultural production, and the meanings of creativity and convention. Ethnographic and archaeological material and case studies from worldwide cultural contexts. Prerequisite: consent of instructor.

**ANTHRO 310G. Introduction to Graduate Studies. 2 Units.**

Required graduate seminar. The history of anthropological theory and key theoretical and methodological issues of the discipline. Prerequisite: consent of instructor.

**ANTHRO 311. Ethnographic Writing. 3-5 Units.**

For graduate students writing or planning to write a dissertation using ethnographic methods. The choices made by the authors of ethnographies in constructing an argument, using data and speaking to an audience of readers. Readings include chapters written by class members currently writing dissertations. Prerequisite: consent of instructor.

**ANTHRO 311G. Introduction to Culture and Society Graduate Studies in Anthropology. 2 Units.**

Required graduate seminar for CS track. The history of anthropological theory and key theoretical and methodological issues in cultural anthropology. Prerequisites: this course is open only to Ph.D. students in anthropology or by permission of the instructor.

**ANTHRO 313. Anthropology of Neoliberalism. 5 Units.**

How is the recent worldwide restructuring under the name neoliberalism understood as a social, cultural, and economic phenomenon? Focus is on interrogation of analytic categories, and ethnographic explorations of social and political processes. Prerequisite: graduate standing or consent of instructor.

**ANTHRO 316. Politics of the Mass Subject. 5 Units.**

Harbinger of democracy or arbiter of tyrannous rule? Source of collective agency or threat to political order? Over the past century, notions of the masses, the multitudes, and the people have served as volatile focal points for political theory and for institutions of governance. Drawing on historical, ethnographic, and theoretical readings, this course explores how tensions haunting these concepts continue to animate, as much as beleaguer, contemporary discussions of democratic citizenship and political modernity.

**ANTHRO 317. Colonial Archives and Archaeology: Models and Methods of Analysis. 5 Units.**

This course details the methodological challenges associated with using primary historical documents, ethnographic methods and sources and archaeological data. How do archaeologists deal with multiple sources of data, primary texts (translated and original) and ethnographic materials? This course examines archaeological monographs as models for individual student projects leading to dissertation research and publishing beyond the dissertation. Students will be required to present materials, research questions and primary source materials to the class in order to expand our understanding of the challenges and insights provided by archival and archaeological studies.

**ANTHRO 318. Democracy and Political Authority. 5 Units.**

Democracy is commonly defined in formalist terms as a form of government (involving the consent of the governed) and a procedure of governance (involving the rule of law). In place of a formalist definition, this course examines democracy as a historical and discursive form. In what ways have the rights of citizenship for some been premised on the domination of others (workers, women, the colonized, etc.)? What forms of violence are not only tolerated as practical necessity in the contemporary order of democratic states but sanctioned as morally just? What mechanisms of political authority operate by defining the boundaries between the tolerable and the intolerable, between citizenly belonging and terrorism? In short, between democracy and its others (e.g., an arbitrary despot, a feudal economy, a religious fundamentalism)? These questions require urgent interrogation in the present day: the past thirty years have witnessed a virtual explosion of new constitutions proclaiming democratic sovereignty across the world. What forms of global power and institutional domination are constitutive of the contemporary era of liberty, freedom, and equality? Readings are drawn from a variety of disciplines, including anthropology, political theory, and political philosophy. Prerequisite: consent of instructor.



**ANTHRO 32. Theories in Race and Ethnicity: A Comparative Perspective. 5 Units.**

This undergraduate course employs an anthropological and historical perspective to introduce students to ideas and concepts of race and ethnicity that emerged primarily in Europe and the United States in the eighteenth and nineteenth centuries and that continue to shape contemporary racial attitudes, interactions, and inequalities. Ideas about race and ethnicity forged outside the U.S. and case studies from other nations are presented to broaden students' understanding and to overcome the limitations of an exclusive focus on the U.S. This course is geared to sophomores and juniors who have already taken at least one course on race and ethnicity, anthropology, African American Studies, Asian American Studies, Chicana/o Studies, Jewish Studies or Native American Studies.

Same as: CSRE 32

**ANTHRO 320A. Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations. 3-5 Units.**

Language, as a cultural resource for shaping our identities, is central to the concepts of race and ethnicity. This seminar explores the linguistic construction of race and ethnicity across a wide variety of contexts and communities. We begin with an examination of the concepts of race and ethnicity and what it means to be "doing race," both as scholarship and as part of our everyday lives. Throughout the course, we will take a comparative perspective and highlight how different racial/ethnic formations (Asian, Black, Latino, Native American, White, etc.) participate in similar, yet different, ways of drawing racial and ethnic distinctions. The seminar will draw heavily on scholarship in (linguistic) anthropology, sociolinguistics and education. We will explore how we talk and don't talk about race, how we both position ourselves and are positioned by others, how the way we talk can have real consequences on the trajectory of our lives, and how, despite this, we all participate in maintaining racial and ethnic hierarchies and inequality more generally, particularly in schools. Same as: CSRE 389A, EDUC 389A, LINGUIST 253

**ANTHRO 321. Reading Marx, Reading Weber. 5 Units.**

This advanced graduate seminar is devoted to a critical reading of selected writings by two nineteenth century social theorists who continue to shape anthropology and social analysis more broadly. Prerequisites: Graduate standing in Anthropology or permission of the instructor. Previous graduate level coursework in cultural or social anthropology, social theory or cultural studies is required. No auditing is permitted. Maximum enrollment 12.

**ANTHRO 321A. Anthropology and Literature: Problems of Representation, Power, and Textuality. 5 Units.**

How are literary and social scientific forms of cultural description, evocation, and interpretation related? The seminar reads classic texts as well as recent experiments, addressing issues of genre, rhetoric, epistemology, translation, authority, and collaboration. The emphasis is on writing as a situated practice—embodied, relational, and historically circumscribed. Authors may include Malinowski, Mead, Benedict, Lévi-Strauss, Geertz, Taussig, Leiris, Conrad, Achebe, Said, Barthes, Kroeber, Le Guin, and selected contemporary ethnographies. Examples from film, visual culture, and performance art may also be included.

**ANTHRO 321B. From Marx TO Piketty: Toward An Anthropology Of Wealth, Inequality and Power. 5 Units.**

This seminar will explore the ways in which theorists and researchers from Karl Marx to Thomas Piketty have conceptualized, studied, and analyzed inequality in capitalist societies. In considering the ways in which Marx, Piketty and other scholars approach profit, accumulation, wealth, inequality, class and power, we will be especially interested in how these are shaped by their ideas and assumptions about kinship, sentiment, gender, and subjectivity. We will work toward developing an anthropological framework and ethnographic research projects that build on our critical understanding of Marx and Piketty. The course is limited to graduate students and anthropology majors who have taken Anthropology 90b.

**ANTHRO 322. From Biopolitics to Necropolitics and Beyond. 5 Units.**

Scholarship produced and informed by Michel Foucault. Focus is on the final period of Foucault's life; how his discussions of biopolitics, subjectification, governmentality, and death have served as touchstones for recent empirical research. Key interventions initially made under these rubrics; how anthropologists and others have applied, challenged, and extended them. Prerequisite: consent of instructor.

**ANTHRO 323. Graduate Seminar in Economic Anthropology. 5 Units.**

Classical and contemporary anthropological perspectives on topics such as money, markets and exchange; capitalist and non-capitalist modes of production; class and socio-economic differentiation; globalization and neoliberalism; and the social and cultural construction of the object, "the economy". Prerequisite: consent of instructor.

**ANTHRO 324. Political Anthropology. 5 Units.**

An anthropological approach to politics through bringing anthropological ways of thinking and modes of analysis to bear on key presuppositions of modern Western political thought. Ideas of rights, the individual, society, liberty, democracy, equality, and solidarity; ethnographic accounts used to identify the limits of conventional analytical approaches and to document the forms of politics that such approaches either ignore or misunderstand. Prerequisite: consent of instructor.

**ANTHRO 326. Postcolonial and Indigenous Archaeologies. 5 Units.**

The role of postcolonial and Indigenous archaeologies as emergent disciplinary activities within contemporary society. Community based archaeologies; the roles of oral history, landscape, and memory; archaeology as political action; and history in archaeological projects. The emergence of Indigenous archaeology within N. America in relation to limitations imposed by processual or new archaeology; and NAGPRA, Kennewick, essentialism, and terminal narratives within this context. Prerequisite: consent of instructor.

**ANTHRO 327. Language and Political Economy. 5 Units.**

Theories of language: Saussure, Jakobson, Hymes, Marx, Foucault, Butler, and Derrida. The theorization of language in its linkages to power, social relations, and history. Prerequisites: Linguistics or Anthropology course work. Prerequisite: consent of instructor.

**ANTHRO 328. Making. 5 Units.**

The politics of visibility, social imagination, and the ethics of visual production and consumption in the current moment. Sources include anthropology, art history, and philosophy. Prerequisite: consent of instructor.

**ANTHRO 331. The Anthropology of Technology. 5 Units.**

Iconic discipline-building works of the last three decades; readings that lay out and intervene in contemporary debates. Prerequisite: consent of instructor.

**ANTHRO 332. Anthropology of Ethics. 5 Units.**

Recent decades have witnessed what some scholars have termed an ethical turn in anthropology. This course explores the emergence of this field of study, asking the following questions: What has motivated a renewed anthropological interest in the subject of ethics? How has a focus on ethics enabled the development of new theoretical currents in the discipline? To what extent have anthropological studies of ethics provided new understandings of traditional topics, concerning social hierarchy, power relations, embodiment, and subject-formation?.

**ANTHRO 332A. The Anthropology of Heritage: Concepts, Contexts and Critique. 3-5 Units.**

This seminar will explore foundational concepts currently employed within heritage practice and debates. Readings will examine the historically formative context of colonial-era and nationalist discourses on stewardship and culture, as well as postcolonial reformulations of such concepts as cultural property, cultural recognition and public history. The seminar will engage the question of the relationship between foundational concepts and the current cosmopolitan and internationalist vision for heritage, probing the enduring dynamics of North-South divides in heritage development and archaeological practice. Same as: ARCHLGY 132, ARCHLGY 232, ARCHLGY 332

**ANTHRO 333. Anthropologies of Evidence. 5 Units.**

Drawing on literature in Anthropology and Science and Technology Studies, this course will examine what kinds of artifacts and arguments count as evidence in intellectual and scientific debate.

**ANTHRO 333A. The Cultural Politics of Ambiguity. 5 Units.**

Contemporary conceptual approaches to understanding the politics and production of certainty, ambiguity, and doubt. The seemingly ambiguous nature of the science of industrial pollution and contamination exonerate corporate and government polluters from rising rates of cancer, while the science of liberal economic models seems to create no alternative to massive economic subsidies of the financial sector. How culpability, exoneration, transformative action, institutional stasis, and political rely on the production of certainty, ambiguity, and doubt. Prerequisite: consent of instructor.

**ANTHRO 334. Trauma and Healing. 5 Units.**

This course considers class and recent work on culture and psychiatry with an emphasis on trauma. We consider work on the main diagnostic categories like depression and schizophrenia, but also the work on dissociation, war combat, PTSD, and psychosis.

**ANTHRO 335A. Animism and Alter-Native Modernities. 5 Units.**

For many years indigenous knowledges were treated as a field of research for anthropologists and as "mistaken epistemologies," i. e., unscientific and irrational folklore and childish worldviews. This old view of animism was a product of the evolutionist and anthropocentric worldview of the Enlightenment. However within the framework of ecological humanities, current interest in posthumanism, postsecularism and discussions on building altermodernity (Michael Hardt and Antonio Negri), indigenous thought is used to critique modern epistemology and develop an alternative to the Western worldview. Treating native thought as an equivalent to Western knowledge is presented as a decolonizing and liberating practice. The term alter-native modernities as response to the challenges of Euromodernity and suggests modernities that might emerge out of indigenous ways of being in the world. Comparison between literature on indigenous cultures from Latin America and from Russia (animism in Amazonia and Siberia). Following recent works by anthropologists and archaeologists such as Nurit Bird-Rose, Philippe Descola, Graham Harvey, Tim Ingold and Viveiros de Castro, new animism is treated as an alternative (relational) ontology that allows rethinking the problem of matter and agency, goes beyond human exceptionalism and embraces non-humans. Topics include: alternative and alter-native modernities; Jean Piaget's theory of childhood animism; problem of anthropomorphism and personification; indigenous knowledge and the problem of epistemic violence; vitalist materialism (Jane Bennett, Rosi Braidotti); connectedness as the principle of life (relational epistemologies and ontologies); non-human agency (Bruno Latour). Same as: FRENCH 335A, REES 335A

**ANTHRO 337. The Politics of Humanitarianism. 5 Units.**

What does it mean to want to help, to organize humanitarian aid, in times of crisis? At first glance, the impulse to help issues a good one. Helping is surely preferable to indifference and inaction. This does not mean that humanitarian interventions entail no ethical or political stakes or that they are beyond engaged critique. We need to critique precisely that which we value, and to ask some hard questions, among them these: What are the differences among humanitarianism, charity, and philanthropy? What of social obligations and solidarities? How does the neoliberal world order currently create structural inequalities that ensure the reproduction of poverty and violence? How does the current order of things resemble or differ from the colonial world order? This course examines the history of humanitarian sensibilities and the emergence of organized action in the cause of humanity. In the early years of humanitarian intervention, political neutrality was a key principle; it has now come under ever greater analytical and political scrutiny. We will examine the reasons for the politicization and militarization of aid -- be it humanitarian aid in natural disasters or political crises; development programs in the impoverished south (the Third World), or peace-keeping. We will end with a critical exploration of the concept of human rights, humanity, and personhood. The overall methodological aim of the course is to demonstrate what insights an ethnographic approach to the politics, ethics, and aesthetics of humanitarianism can offer. Prerequisite, by instructor consent.

**ANTHRO 337B. Anthropological Approaches to Health Issues in Contemporary Latin America. 5 Units.**

The purpose of this course is to examine the anthropological and ethnographic research on emerging health issues and sufferings in Latin America. In particular, the class explores how anthropologists understand and ponder social, economic, political, environmental, spatial processes that shape patterns of health, suffering and death, and the strategies to address them. By analyzing paradigmatic case studies, we will discuss theoretical concepts and social perspectives, as well as ethnographic dilemmas and methods. Taking a critical perspective, this class will not only explore the standard topics on Latin American health (hunger, infectious disease, mental health, etc.). We will also focus on emerging sufferings (drug use, epidemics, environmental discomforts and sufferings, etc.). Both standard and emerging topics are examined with respect to the changes in political economy, medical institutions and policy approaches, models of care and caregiving, gender violence, circulation and appropriation of expert knowledge, contamination, migration, spatial segregation, violence, marginalization, abandonment, justice and human rights. Interdisciplinary investigation is conducted into most of these health issues, not only in the global health field. They are addressed by the South American Social Medicine and Collective Health approaches. This class will include a description and critical analysis of their theoretical frameworks and core concepts, as well as their relationships to international and local medical anthropological theory and research.

**ANTHRO 338B. History and Memory. 5 Units.**

How are history and memory important in the making of collective and public memory? This seminar draws together an interdisciplinary collection of readings with an aim to provide a foundation for seminar participants' projects, both historical and contemporary projects. We will explore critiques of the practice of gathering material, i.e., archival and oral histories as well as delve into experimental forms that combine improvisational approaches to history and critique in an effort to develop a methodological tool kit that allows for a push beyond established projects.

**ANTHRO 339. Anthropology of Religion. 5 Units.**

This course presents classic and contemporary work on the anthropology of religion: Durkheim *Elementary Forms of the Religious Life*; Levy-Bruhl; *Primitive Mentality*; Douglas *Purity and Danger*; Evans Pritchard *Nuer Religion*; and recent ethnographies/scholarly work by Robbins, Keane, Keller, Boyer, Barrett, and others.

**ANTHRO 339A. Technologies of Extinctions: Ecocides and Genocides. 5 Units.**

This course will explore the relationship between history, ecological evolution and mass killing in the age of humanly caused species extinction. It will explore the universalization of the notion of the Jewish Holocaust, its use to integrate into genocide studies the Native American "spiritual" holocaust, the Japanese nuclear holocaust and the Rwandan genocide, and the ethical dilemmas posed by the ideas of biotic, animal and ecological holocausts. Anthropology and history of genocides and extinctions as well as posthumanist, multispecies theories will provide theoretical frames for the course.

Same as: FRENCH 339A

**ANTHRO 34. Animals and Us. 5 Units.**

The human-animal relationship is dynamic, all encompassing and durable. Without exception, all socio-cultural groups have evidenced complex interactions with the animals around them, both domesticated and wild. However, the individual circumstances of these interactions are hugely complicated, and involve much more than direct human-animal contact, going far beyond this to incorporate social, ecological and spiritual contexts. This course delves into this complexity, covering the gamut of social roles played by animals, as well as the methods and approaches to studying these, both traditional and scientific. While the notion of "animals as social actors" is well acknowledged, their use as proxies for human autecology (the relationship between a species and its environment) is also increasingly recognized as a viable mechanism for understanding our cultural and economic past. It will piece together the breadth of human-animal relationships using a wide geographic range of case studies.

Same as: ARCHLGY 34

**ANTHRO 340A. Post-secular Humanities: Religion and Spirituality in the Contemporary World. 5 Units.**

The term "postsecularism" refers to various theories and approaches regarding the revival of religion in the present, as well as current reevaluations of the relationship between faith and reason in knowledge building. When thinking about a postsecular humanities, the course would follow scholars that are usually associated with this trend (like Agamben, Badiou, Derrida, Habermas), on the one hand, and discuss Braidotti's ideas of a new vitalism, Chakrabarty's postcolonial postsecularism, and Harvey's new animism, on the other. The course will examine the way interactions and collisions among various worldviews can provoke the rethinking of key ideas of our times: what it means to be secular, religious, a citizen, a hybrid, an indigenous, a non-human.

Same as: FRENCH 341A, REES 340A

**ANTHRO 341. The Archaeology of Religious Crusading in Medieval Europe. 5 Units.**

This course will present a chronologically framed outline of the three main regions that witnessed the greatest impact of the crusading period. Commencing with the initial capture of Jerusalem and the subsequent establishment of a crusader kingdom in the Middle East in AD1099, till its eventual end in 1291, this will be followed by the "pagan conversions" of the Northern Baltic. Centred on Poland (Prussia) and Latvia (Livonia) from the 13th to 15th c., this example will also be compared with neighbouring Lithuania, which never fell under the political hegemony of the Monastic Orders. Finally, the course covers the Iberian case, where the Reconquista or "reconquest" of lands from Muslim groups concluded with the fall of Granada and the unification of Spain in 1492. Through archaeological and historical evidence, the materials, technologies and ideas of the crusading groups will be compared and contrasted, with a particularly emphasis on bioarchaeological datasets. Ultimately, the course deals with the economic, social and practical mechanisms used by the religious orders to "colonise", once the initial conquest had been achieved.

Prerequisite: graduate standing or consent of instructor.

**ANTHRO 343. Culture as Commodity. 5 Units.**

Focus is on theories of commodification, interests in tourism, national cultures as marketable objects, and how identities are constituted through production and consumption. The formation of global style and taste. Prerequisite: consent of instructor. Co-term students and above may sign up for this course.

**ANTHRO 344. Graphic Medicine. 5 Units.**

In this course students will study medical cultures through visual communication ranging from x-rays and PET scans to graphic novels. Course will also include literature on visual theory.

**ANTHRO 345. New Visions in Medical Anthropology. 5 Units.**

Recent experimental histories of the field. Emphasis is on how, working within anthropology's classic format, the ethnographic monograph, authors have innovatively responded to the challenges of representing amorphous, unspoken, and often violent relationships between the body and social change. The authors' expository techniques, and how they engage and extend theoretical debate. How to assess works within medical anthropology and its allied fields. Prerequisite: consent of instructor.

**ANTHRO 345A. Race and Power: The Making of Human Difference in History, Biology and Capital. 5 Units.**

This course examines how race is made. We will pay close attention to how people engage with material, economic, scientific, and cultural forces to articulate human group difference as a given, and even natural. In this seminar, we will look at the reality of race as a literally constructed phenomenon, where historical, colonial, bodily, market, penal, and humanitarian constituent elements both circulate and sediment racial understandings. To focus our readings and discussions we will divide this vast terrain into three units: race and the colonial encounter, race and biopower, and race in systems of capital accumulation.

**ANTHRO 346. The Social Imagination. 5 Units.**

The imagination as such has not been an accustomed object of ethnographic fieldwork or theoretical debate in anthropology. This seminar consists of a cluster of thematic explorations including: the spatial imagination of states; the imagination of race, colonialism, and domination; the social imagination of evil and of the good; and conceptualizations of the creative imagination.

**ANTHRO 346A. Sexuality Studies in Anthropology. 5 Units.**

Current research on sexuality from perspectives including paleoanthropology, archaeology, ethnography, and linguistic anthropology. Readings paired with case studies that explore theoretical and methodological issues. Prerequisite: consent of instructor.

**ANTHRO 347. Religion and Modernity. 5 Units.**

What role has the category of religion played in the development of the modern state, both colonial and national? How have central concepts of liberal political thought, such as freedom, progress, and history, depended on certain normative ideas of religion? Through various genealogical, historical, and ethnographic inquiries, this course examines how the category of religion has both subtended and disturbed formations of colonial and post-colonial modernity.

Same as: RELIGST 332X

**ANTHRO 348. Representing Medicine. 5 Units.**

The seminar will offer the opportunity to discuss the recent work of a series of 9 scholars known for their innovation in writing and research. The seminar will offer professional networking as well as the opportunity to engage authors in questions of writing, approaches to fieldwork, strategies for career advancement, and brainstorming on how to structure relevant arguments. Prerequisite: graduate standing or consent of instructor.

**ANTHRO 348A. Health, Politics, and Culture of Modern China. 5 Units.**

One of the most generative regions for medical anthropology inquiry in recent years has been Asia. This seminar is designed to introduce upper division undergraduates and graduate students to the methodological hurdles, representational challenges, and intellectual rewards of investigating the intersections of health, politics, and culture in contemporary China.

**ANTHRO 348B. Bodies, Technologies, and Natures in Africa. 4-5 Units.**

This interdisciplinary course explores how modern African histories, bodies, and natures have been entangled with technological activities. Viewing Africans as experts and innovators, we consider how technologies have mediated, represented, or performed power in African societies. Topics include infrastructure, extraction, medicine, weapons, communications, sanitation, and more. Themes woven through the course include citizenship, mobility, labor, bricolage, in/formal economies, and technopolitical geographies, among others. Readings draw from history, anthropology, geography, and social/cultural theory. Same as: AFRICAST 249, HISTORY 349

**ANTHRO 349. Anthropology of Capitalism. 5 Units.**

This advanced graduate seminar explores capitalism as an historically-situated and culturally-mediated articulation of practices rather than as an economic system or social structure governed by an internal logic. It draws on poststructural theories of culture, society and subjectivity to investigate the processes through which diverse capitalist practices are produced. Prerequisite: Graduate standing in Anthropology or permission of the instructor. Previous graduate level coursework in cultural anthropology, social theory or cultural studies is required. No auditing is permitted. Enrollment limited to 12.

**ANTHRO 349A. Advanced Archaeological Field Methods: A Practical Approach to Working With and Within Communities. 5 Units.**

This is a graduate level course (open to undergraduates with permission) in archaeological field methods at several archaeological and cultural sites in the San Francisco Bay area. This is a practical course designed to help students identify potential archaeological sites (using GIS) historical maps, historical archives and extant site reports. Students will gain hands-on experience with mapping, field survey and strategies and methods of field excavation. Study of local artifact types and lab techniques for artifact cleaning and identification and written analysis. The course emphasizes a community based model of archaeology, working with members of local indigenous cultures. The seminar will begin with readings and classroom instruction and proceed to the field. Students will be required to hike to field sites and conduct experiments using a variety of equipment, recording devices and strategies. Prerequisite, by instructor consent.

**ANTHRO 350. Topics in Linguistic Anthropology. 5 Units.**

Reading seminar; restricted to Anthropology graduate students. The anthropology of language and semiotics. Focus is on the limits of textualism, and alternative semiotic and epistemic bases for theorizing language and representation. No linguistic anthropology course work required. Prerequisite, by instructor consent.

**ANTHRO 351. The Ordinary: The History of a Concept. 5 Units.**

The ordinary has today acquired something like a cultic status in contemporary culture. 'Ordinary' citizens are the touchstone and essence of political democracy; the holy grail of effective marketing, the byword for earthy ethical judgment. In social science, the ordinary has blended in with the 'normal' and the statistical mean. In Anthropology, ordinary life has all but replaced 'cultural practice' as the epistemic gold standard of evidence. But this was not always so, and the ordinary has many, varied and contradictory meanings across the world. This course will (a) trace the historical emergence of the ordinary as a central ideological and metaphysical concept in modern thought and practice; (b) trace how the ordinary and the everyday have acquired unprecedented authority in anthropology; (3) trace the various meanings and connotations of 'the ordinary' in different socio-historical contexts from Asia, Africa and Euro-America. The literature will consist of ethnographies, and works of philosophical and historical scholarship.

**ANTHRO 353. Landscape. 5 Units.**

This seminar offers an interdisciplinary approach to the study of landscape, noting the various processes and projects that have help create them. Readings draw together a broad range of theoretical approaches that are attentive to human-non-human interactions and the overlapping and divergent spatial and temporal questions of the exchanges between landscapes and humans. The readings will also draw attention to representational and non-representational ways that material and symbolic aspects of landscapes help constitute the making of place. The aim of the seminar is to explore the various methodologies for what they offer for the study of place.

**ANTHRO 355. Cities in Global Perspective. 5 Units.**

Interdisciplinary approach to examining global cities. The concept of the global city, and the interdependent processes that help produce urban spaces. Situating the transformation of urban spaces within globalization and its differential effects; current explanatory frameworks that pay attention to multiple scales of spatial and economic articulation. Prerequisite: graduate standing. Prerequisite: consent of instructor.

**ANTHRO 357. Other Minds: Puzzles in Psychiatric and Psychological Anthropology. 5 Units.**

Problems in the way anthropologists explore other minds anthropologically and the ways in which anthropologists seek to understand the models of other minds held by the people observed. Topics include theory of mind, witchcraft, belief, empathy, psychosis, trauma, Freud, Vygotsky, and cognitive dissonance. Prerequisite: consent of instructor. Under grads cannot take this class without permission of the instructor.

**ANTHRO 358. Anthropology and the Limit of Experience. 5 Units.**

In this course, we will examine the concept of the 'limit' in relation to questions of experience. Taking an interdisciplinary perspective, we will explore how the limit (as border, threshold, other, transgression, liminality, etc.) frames and disrupts discourses of experience in ethnography, philosophy and literature.

**ANTHRO 359. Copies, Collections, and Commodities. 5 Units.**

In this class we will grapple with multiple questions that arise with reproduction. On the one hand, reproducibility is good: we want generic drugs to work as well as the originals, we want trial subjects to adequately stand in for the people likely to be having a treatment, and we want a cartographic map to describe the landscape that unfolds before us. On the other hand, the copy threatens the value the object it is meant to imitate or represent, and to take on a life of its own. A series of classic and new ethnographies will be organized around these issues.

**ANTHRO 360. Social Structure and Social Networks. 5 Units.**

In this course, we will explore social network analysis, a set of methods and theories used in the analysis of social structure. The fundamental conceit underlying social network analysis is that social structure emerges from relationships between individuals. We will therefore concentrate in particular on the measurement of relationships, emphasizing especially practical methodology for anthropological fieldwork. This is a somewhat unusual course because of its focus on social network research coming out of anthropological and ethological traditions. While most current practitioners of social network analysis are (probably) sociologists, many of both the methodological antecedents and theoretical justifications for the field can be found in these two traditions. A major goal of this course is to understand how the methods and perspectives of social network analysis can be usefully incorporated into contemporary approaches to ethnography and other anthropological modes of investigation. Prerequisite: graduate standing or consent of instructor.

Same as: ESS 360

**ANTHRO 360A. Archival Research for Social Science: A Practicum. 5 Units.**

Since the 1980s, the necessity of historicizing cultural and social formations has become established as integral to anthropological research. Every ethnography and dissertation has historical sections, derived primarily from secondary sources, commentaries within other ethnographies and published historical work. Most students attempt to conduct archival research in local or national archives alongside ethnographic fieldwork, most often in an ad hoc manner, collecting and analyzing archival material on a trial and error basis. This class is conceived as a practicum that addresses students who need to and want to do archival research as part of their anthropological and sociological fieldwork, but find themselves at a loss for how to think about, begin, and, do archival work. The base layer of the class is methodological and practical: students will be engaged in the practical activities of becoming acquainted with archives, developing archival research questions, learning techniques of recording, coding, and thinking historically. The second layer will be conceptual. Students will be reading and discussing concepts of the archive, reading and analyzing different styles of historical ethnographies, and thinking about how to organize and conceptualize cultural categories historically. Students will be asked to conduct archival research at the archives available at Stanford Libraries and the Hoover Institution archives and write a research paper based on this archival work. We will have weekly meetings divided into two sessions. The first half will discuss set readings and intellectual concern. In the second half, we will discuss methodological concerns, problems encountered in the archives and bounce ideas off each other. We will also have regular guest speakers who will give talks and answer questions, intellectual and methodological about archival research.

**ANTHRO 361. Life and Death in Contemporary Latin America: An Anthropological Inquiry. 5 Units.**

This seminar explores life and death in contemporary Latin America. We will address anthropological understanding of the role of colonialism, migration, violence, urbanization, democratic transition and neoliberalism as they configure the experience of, and threshold between, vital and deadly processes. This is not a standard survey course, covering the region as a whole however. Instead, we will critically engage several recent ethnographies that explore, for example: the politics and practices of memory; border thinking and living; the political economy of death and desire; state violence and social movements; the relationship between the laboring city and body. We will supplement ethnographies with contemporary Latin American critical theory, film, and literary texts. Prerequisite: consent of instructor.

**ANTHRO 362. Human Spatial Dynamics: Seminar in Communicating Contemporary Science. 5 Units.**

This seminar is designed to bring together all students and faculty currently working on issues related to human use of land and spatially defined resources. The focus is to provide a forum for reporting on recent results and question development, providing students with vital skills in designing and communicating the results of research. Under grads by permission of instructor.

**ANTHRO 362A. Introduction to Human Evolution, Ecology, Genetics, and Culture. 5 Units.**

Themes and topics of lasting heuristic value in the anthropological sciences. Combines the lecture content of 2A and 2B with a discussion section for graduate students. Must be taken in the Autumn Quarter of a student's first year in the graduate program.

**ANTHRO 363A. Anthropology of Environmental Conservation. 5 Units.**

Graduate seminar focused on key works by anthropologists on environmental conservation. We will discuss both classics (ie, works by Ostrom, Lansing, Bray) as well recent debates regarding communities, neoliberalism and conservation. Students will present on topics of particular interest or relevance to their research.

**ANTHRO 364. EcoGroup: Current Topics in Ecological, Evolutionary, and Environmental Anthropology. 2-5 Units.**

Seminar; restricted to graduate students. Topics vary with instructor. How to ask appropriate questions, how to derive research hypotheses from theory, how to design methodologies for testing hypotheses, and how to present results by reading and critiquing key contemporary papers in the field. Ph.D. students enrolling in this course to fulfill the department review course requirement must enroll in 5 units. Graduate students enrolling in this course to participate in a topical forum may enroll in 2 units. Course may be repeated for 2 units. Prerequisites: by consent of instructor.

**ANTHRO 364A. EcoGroup: Problems in Ecological and Evolutionary Anthropology. 2-5 Units.**

Seminar; restricted to graduate students. Topics vary with instructor. How to ask appropriate questions, how to derive research hypotheses from theory, how to design methodologies for testing hypotheses, and how to present results by reading and critiquing key contemporary papers in the field. Ph.D. students enrolling in this course to fulfill the department review course requirement must enroll in 5 units. Graduate students enrolling in this course to participate in a topical forum may enroll in 2 units. Course may be repeated for 2 units. Prerequisites: by consent of instructor.

**ANTHRO 365. The Theory of the Modern Subject. 5 Units.**

This course traces the emergence of a coherent theory of the modern subject through readings of philosophical works and social theory from 18th century to the 20th century. Prerequisite: graduate standing or consent of instructor.

**ANTHRO 366. Material Semiotics. 5 Units.**

This seminar will focus on the emerging body of literature on the materiality of the production, circulation, and mediation of paperwork as constitutive of modern forms of governance. We will discuss specific genres of paperworks; notes, memos, files, documents, as well as archives and other mnemonic technologies; both as cultural practices and reflexive objects, and examine how they produce modern social epistemologies of accountability, evidence, the fact, and truth in the fields of law, business, and public administration, as well as in civil society generally. Readings will include works by Max Weber, Bruno Latour, Jacques Derrida, Michel Foucault, Cornelia Vismann, Ann Stoler, and others. Prerequisite: graduate standing or consent of instructor.

**ANTHRO 367. The Anthropology of Science: Global Politics and Laboratory Life. 5 Units.**

Science and technology are important cultural products that often dramatically reorganize various aspects of human life. In this course we will explore how recent innovations in the life sciences and biomedicine may reconfigure crucial elements of social institutions, lend new structures to identity politics, and often change the way we interact with and conceive of nature. We will examine these issues in various global settings to explore how everyday politics shape politics of life in different locales.

**ANTHRO 367B. The Intellectual and Political Career of Stuart Hall and British Cultural Studies from 1960 to 2014. 5 Units.**

The seminar traces the trajectory of Stuart Hall and British Cultural Studies, beginning with the first New Left in 1960; then the Birmingham Centre period, Thatcherism and Gramscian analysis; race, gender, and identity politics; global and diasporic approaches; New Times, neo-liberalism, and the problem of historicizing the present conjuncture. Case studies from other parts of the world will put cultural studies tools to the test.

**ANTHRO 368. Dynamics of Coupled Human-Natural Systems. 5 Units.**

This is a graduate research seminar on the interdisciplinary approach to the study of the dynamics of what is known as  $\zeta$ coupled human-natural systems.  $\zeta$  We will take a critical perspective on such systems, asking to what extent the idea of coupling of discrete subsystems is intellectually profitable and what defines a  $\zeta$ human $\zeta$  vs. a  $\zeta$ natural $\zeta$  system? We will explore concepts such as coupling, nonlinearity, threshold behavior, feedback, complexity, resilience, and catastrophes. Case studies will be drawn from the literature on human ecology, population dynamics, disease ecology, and social dynamics. Emphasis will be on developing a working knowledge of mathematical and computational models of coupled systems embedded within a rigorous empirical framework of biosocial data collection.

**ANTHRO 369. Advanced Topics in Human Behavioral. 2-5 Units.**

Course covers a variety of advanced topics which rotate annually, such as: ownership and egalitarianism, the integration of landscape and behavioral ecology, conservation and indigenous subsistence, or fertility and demography. Course may be repeated for credit when topics change.

**ANTHRO 370. Advanced Theory and Method in Historical Archaeology. 5 Units.**

Current debates about theory and method. Prerequisite: consent of instructor.

**ANTHRO 371. Living and Dying in the Contemporary World. 5 Units.**

This seminar explores how biological, political and social conditions transform and conjoin experiences of living and dying in the world today. Engaging contemporary ethnographies and social theory, we will examine how life and death, the natural and the social, the individual and the collective, are braided together in ways that challenge conclusions about what constitutes care, community, health, rights, and violence, among other issues. We will also reflect on whether and how the braiding together of these domains leaves room for the recognition of their singularity. Thus, an abiding question for this seminar is the relation of history to the present. Prerequisite: consent of instructor.

**ANTHRO 371B. New Methodologies in the Humanities and Social Sciences. 3-5 Units.**

The course will discuss how social virtues are converted into methods of research (hope, friendship, sincerity, trust, utopia), and how they affect processes of knowledge building within the humanities and social sciences in terms of revival of futurity. The concepts will be critically examined in their positive as well as negative potential for practicing prefigurative politics the creation of desirable modes of social relationships of conviviality and co-existence in the world. Same as: DLCL 371, REES 371B

**ANTHRO 372. Urban Ecologies. 5 Units.**

At the intersections of urbanism and environmental studies, political ecology, postcolonial theory and the new materialism, new fields are in formation. This seminar explores scholarship that connects cities with countryside rough questions of resources and infrastructures. We will consider questions of inequality access and community as well as unexpected urban ecologies.

**ANTHRO 372A. Materiality. 5 Units.**

The relationships between people and things. The world of objects plays a major role in materialism and the anthropology of material culture. Approaches that break down subject-object opposition. New social and psychological approaches that explore the mutual constitution of people and things, and object and subject. Approaches in which objects are seen to have agency, and people are seen as entangled in object worlds. Authors include Hegel, Marx, Benjamin, Miller, Gell, and Latour. Prerequisite, by instructor consent.

**ANTHRO 373. Things: An Archaeology of the Relationships Between Humans and Things. 5 Units.**

This course examines a variety of approaches that claim to explore the relationships between humans and things. Some of the approaches include Marx and material culture studies; Heidegger; cognitive and phenomenological; Actor Network Theory. But there is a need also to examine behavioral and ecological and Darwinian approaches. Many of these approaches do not adequately deal with the physicality of things as objects and there is a need to seek a way to incorporate such aspects of things into social theory. Prerequisite: graduate standing or consent of instructor.

**ANTHRO 374. Archaeology of Colonialism/Postcolonialisms. 5 Units.**

Advanced graduate seminar focused on the archaeology of colonial and postcolonial contexts, both prehistoric and historic. Emphasis on intersections between archaeological research and and subaltern, postcolonial, and transnational feminist/queer theory. Prerequisite: consent of instructor.

**ANTHRO 376. Archaeology: The Emergence of a Discipline. 5 Units.**

This course explores the key thinkers and practitioners who have founded the discipline of archaeology. Reaching back into the nineteenth century, the course examines in depth the key figures, their preoccupations and projects that shaped the way that archaeology grew through the 20th and into the 21st century. Global in scope, the emphasis will be on field projects and practical problems that stimulated the intellectual development of archaeology as an independent discipline closely tied to geology, history, anthropology, and the natural sciences. Prerequisite: consent of instructor.

**ANTHRO 377. Authority: Anthropological Perspectives. 5 Units.**

Why do people obey others in the absence of explicit coercion? Why do people accept some leaders but not others? What does it mean to say something or someone has authority? Is authority personal or institutional? Why do people believe in the Pope? Why do people believe some objects have power and others not? Is charisma only a perfume? Can institutions wield charismatic power? These are questions that from Max Weber onwards classical and contemporary anthropologists and sociologists continue to ask. In returning to (Weberian) questions of authority and legitimacy this course takes a question posed by Bourdieu  $\zeta$  what is the mystery of ministry? We will apply the question of authority broadly, not just in the explicitly political realm but also to understand, for example, how (culturally specific) charismatic and sacral authority can be fashioned through persons and through objects (eg. relics). The course will thus move between interrelated religious, moral, and political notions to try to generate some critical questions for how a contemporary anthropology that explicitly (rather than implicitly) re-addresses authority might look.

**ANTHRO 378B. Culture, Mind and Emotion : Anthropological and Psychological Approaches. 3-5 Units.**

How does culture shape the experience of thinking and feeling, the way humans relate to the world and to others? This graduate level course, taught by a psychologist who studies emotion (Jeanne Tsai) and an anthropologist who studies mind (Tanya Marie Luhmann), explores the way that living in social worlds deeply shapes what seem to be basic processes. We explore what we know about the cultural variations in emotional experience, and about the effect of different representations of minds. We also what can be learned about the way culture shapes experience through different methods.

**ANTHRO 379. Empathy Lab. 5 Units.**

This lab-based class examines the ways in which various disciplines and art forms conceive of, and tell stories about, the experiences and stories of others. With permission of instructor. Same as: TAPS 284

**ANTHRO 379A. Empathy Lab II: The Potential of Anthropology for the 21st Century. 1-5 Unit.**

This interdisciplinary arts/anthropology lab class will study and practice methods from performing arts to expand our understandings of cultural contact and develop methods of thinking more expansively about the creative elements and possibilities for ethnographic fieldwork and critical cultural studies. Prerequisite, by instructor consent.  
Same as: TAPS 379A

**ANTHRO 379B. Empathy Lab II: The Potential of Anthropology for the 21st Century. 1 Unit.**

This interdisciplinary arts/anthropology lab class will study and practice methods from performing arts to expand our understandings of cultural contact and develop methods of thinking more expansively about the creative elements and possibilities for ethnographic fieldwork and critical cultural studies.

**ANTHRO 380. Practice and Performance: Bourdieu, Butler, Giddens, de Certeau. 5 Units.**

Poststructuralist theories of iteration and mimesis used by social scientists to negotiate the tension between social structure and social practice: Giddens's structuration theory; Bourdieu's practice theory; Butler's theories of gender performativity; and de Certeau's analysis of tactics and strategies. Ethnographic and archaeological case studies that employ methodologies inspired by these approaches. Intersections and contradictions between these theorists' work; their use in anthropological practice. Issues of gender, sexuality, and ethnicity. Prerequisite: consent of instructor.

**ANTHRO 381. Archaeology of Violence. 5 Units.**

This advanced graduate seminar reflects on archaeological research on violence in relation to readings in philosophy, political anthropology, cultural studies, and gender and ethnic studies. While some forensic approaches are discussed, the emphasis is more on structural and collective violence and the role of violence in the formation of the archaeological record.

**ANTHRO 382. Advanced Topics in Medical Anthropology. 5 Units.**

Graduate seminar. The history and theories of medical anthropology. Focus is on medical anthropology's transformations in the 20th century: how medical anthropology has emerged as a field of inquiry, grown in dialogue with other areas of scholarship, and come to offer a unique array of theoretical positions and modes of ethnographic engagement. Emphasis is on debates within interpretive and critical medical anthropology, and how an understanding of these debates may be used to assess contemporary works within the field. Prerequisite: consent of instructor.

**ANTHRO 384. Sacrifice, Ethics and Modern Convictions. 5 Units.**

This course is an investigation of how notions of sacrifice, of ethics and conviction are embedded in both ordinary and extraordinary practices in our contemporary world. The key question is how the modern global condition has transformed the way in which it is possible to hold convictions, and to frame forms of ethical conduct, be they religious or secular. We will ask if convictions based on choice or moral outrage differ from convictions based on inhabiting and reversing stigmatized racial and social identities. Rather than maintaining a categorical distinction between "the religious" and "the secular," we will focus on how groups and individuals have attached themselves passionately to ideas, abstractions, ritual communities or ethical frames. When do certain attachments appear necessary and compelling, almost beyond choice? How does one forge a sense of ethics and ethical conduct through social media rather than face-to-face contact?  
Students will acquire a grounded and guided understanding of philosophical and anthropological theories of ideas of ethics, sacrifice, and political conviction as well as explore these ideas through contemporary ethnographic contexts.  
Readings will be philosophical, historical and ethnographic drawing on original texts and ethnographic accounts from Europe, Asia and Africa.

**ANTHRO 386. Epidemics, Chronics, and Contagion. 5 Units.**

The seminar will take as its focal point the question: how do institutional and personal responses to disease result from judgements about threat level? Through a series of contemporary monographs on obesity, HIV/AIDS, avian flu, vaccination, cancer, and other health issues, this class will examine ways of understanding broader ideologies of health in the United States.

**ANTHRO 387. Strangers and Intimate: Exploring Civility. 5 Units.**

How do we encounter and read each other in public and private spaces? How are these very spaces historically constituted around such distinctions and manners of reading? What do these questions look like in dense heterogeneous cities with differentiated class, caste and ethnic communities? How might we consider the differentiation between private and public in different ethnographic contexts? What kinds of sociality might emerge from these kinds of encounters? This course will explore these questions through social theory and ethnographies. There are two major sets of concepts that will be explored and interrogated. The first is that deriving from the essays of the Georg Simmel such as "The Face" and "The Stranger" which explore the new forms of sociality enabled by seemingly anonymous city life, which in turn have been interpreted very differently by Zygmunt Bauman and James Siegel to understand the place of continually excluded outsiders and the high stakes of reading each other. The other is the strand of work on the emergence of the public sphere such as the work of Jurgen Habermas, Richard Sennet, Michael Warner, Nancy Fraser etc. While much of the social theory on the public, the stranger and civility emerge from studies of Euro-American politics and city spaces, in this course we will move some of these discussion into considering these questions in the global south and the kinds of sociality (including their historicity) that make up the dense fabric of ordinary life. How does this work out in contexts where we take into account intense social differentiation by class, race, and communitarian divisions? This could be asked of the historical and social context addressed in these theories as well as from the postcolonial world. The course will attempt to understand whether such theorizations can indeed be re-rooted and re-imagined or whether ethnographic and historical difference re-route them instead. In doing so we will also bring theories of the private and the intimate to bear on questions of the public and the stranger.

**ANTHRO 388. Anthropology of the Extraordinary: Ontologies and Phenomenologies. 5 Units.**

In the last few years anthropology has taken what has come to be called an "ontological turn" in which the ways an object or experience is felt to be real is explored from different perspectives. Often this involves exploring phenomena (like ghosts, talking trees and humans who become jaguars) which could be called "extraordinary" and which challenge secular, western expectations of what is real. There has also been a "phenomenological turn" in which anthropologists have become interested in classifying and categorizing human experience in particular detail. The class will explore the scholarship in this area. Readings will include an introduction to classic philosophical writing (William James, Karl Jaspers, Martin Heidegger) and more recent work such as David Hufford, *The Terror that Comes in the Night*; Eduardo Kohn *How Forests Think*; Morton Pederson *Not Quite Shamans*; Ann Taves *Religious Experience Reconsidered*; Annemarie Mol, *The Body Multiple*; Roger Lohmann *Dream Travelers*, and others.

**ANTHRO 389. Ethnographic Writing and Beyond. 3-5 Units.**

In this class we analyze anthropological writing that has examined and pushed the bounds of the discipline. We will focus on how writing itself is a practice in anthropology, and how styles of writing impact argument, affect, and ultimately, the discipline itself. Students will also work in different genres of writing to better understand writing as a craft, a discipline, and a means of communication.

**ANTHRO 39. Sense of Place. 3 Units.**

This course examines the life of places as shaped by environmental events and projects aimed towards rural or urban development. Drawing methodological insights from anthropology, cultural geography and environmental studies, we examine the forces that generate place problems for humans and nonhumans. Each encounter with place and displacement sets up a particular issue for us to grapple with: How would we address issues created by natural disasters, the seizure of land through legal means that fall under eminent domain or gentrification projects? Through a critical dialogue with interdisciplinary fields that inform the readings, the seminar aims to bring theoretical and methodological insights to inform our practical suggestions for how to address placeness and displaceness at different scales.

**ANTHRO 390. Psychological Anthropology. 5 Units.**

Introduction to psychological anthropology as a subfield. We read through ethnographies on the anthropology of childhood, of emotion, of human relationship and of cognition, drawing analytic tools not only from anthropology but also from psychoanalysis, developmental psychology, and cognitive science. We will read some earlier classic work but focus on more contemporary theory. Prerequisite, by instructor consent.

**ANTHRO 391. Subjectivity. 5 Units.**

This seminar considers subjectivity as a central category of social, cultural, psychological, historical and political analysis. Through a critical and collaborative examination of ethnographic works and psychoanalytic theory, we will identify the processes by which subjectivities are produced, explore subjectivity as a locus of social change, and examine how emerging subjectivities remake social worlds. Some of the questions this seminar will pose include: what is the relation between subjectivity and subjection? How to account for the effects of the social in terms of subject formation without succumbing to social determinism? What else is the subject other than the outcome of a complex constellation of discursive, material, institutional, and historical factors?

**ANTHRO 398B. Race, Ethnicity, and Language: Writing Race, Ethnicity, and Language in Ethnography. 3-4 Units.**

This methods seminar focuses on developing ethnographic strategies for representing race, ethnicity, and language in writing without reproducing the stereotypes surrounding these categories and practices. In addition to reading various ethnographies, students conduct their own ethnographic research to test out the authors' contrasting approaches to data collection, analysis, and representation. The goal is for students to develop a rich ethnographic toolkit that will allow them to effectively represent the (re)production and (trans)formation of racial, ethnic, and linguistic phenomena.

Same as: EDUC 389B, LINGUIST 254

**ANTHRO 4. Language and Culture. 4-5 Units.**

Comparative approach, using examples from many languages. Emphasis is on generally non-Western speech communities. Topics include: the structure of language; the theory of signs; vocabulary and culture; grammar, cognition, and culture (linguistic relativism and determinism); encodability of cultural information in language; language adaptiveness to social function; the ethnography of speaking; registers; discourse (conversation, narrative, verbal art); language and power; language survival and extinction; and linguistic ideology (beliefs about language). Same as: ANTHRO 204

**ANTHRO 400. Cultural and Social Dissertation Writers Seminar. 1-3 Unit.**

Required of fifth-year Ph.D. students returning from dissertation field research and in the process of writing dissertations and preparing for professional employment. Prerequisite: consent of instructor.

**ANTHRO 401A. Qualifying Examination: Topic. 2-5 Units.**

Required of second- and third-year Ph.D. students writing the qualifying paper or the qualifying written examination. May be repeated for credit.

**ANTHRO 401B. Qualifying Examination: Area. 2-5 Units.**

Required of second- and third-year Ph.D. students writing the qualifying paper or the qualifying written examination. May be repeated for credit one time.

**ANTHRO 41. Genes and Identity. 3 Units.**

In recent decades genes have increasingly become endowed with the cultural power to explain many aspects of human life: physical traits, diseases, behaviors, ancestral histories, and identity. In this course we will explore a deepening societal intrigue with genetic accounts of personal identity and political meaning. Students will engage with varied interdisciplinary sources that range from legal cases to scientific articles, medical ethics guidelines, films, and anthropological works (ethnographies). We will explore several case studies where the use of DNA markers (as proof of heritage, disease risk, or legal standing) has spawned cultural movements that are biosocial in nature. Throughout we will look at how new social movements are organized around gene-based definitions of personhood, health, and legal truth. Several examples include political analyses of citizenship and belonging. On this count we will discuss issues of African ancestry testing as evidence in slavery reparations cases, revisit debates on whether Black Freedman should be allowed into the Cherokee and Seminole Nations, and hear arguments on whether people with genetic links to Jewish groups should have a right of return to Israel. We will also examine the ways genetic knowledge may shape different health politics at the individual and societal level. On this count we will do close readings of how personal genomics testing companies operate, we will investigate how health disparities funding as well as orphan disease research take on new valences when re-framed in genetic terms, and we will see how new articulations of global health priorities are emerging through genetic research in places like Africa. Finally we will explore social implications of forensic uses of DNA. Here we will examine civil liberties concerns about genetic familial searching in forensic databases that disproportionately target specific minority groups as criminal suspects, and inquire into the use of DNA to generate digital mugshots of suspects that re-introduce genetic concepts of race. Same as: AFRICAAM 41, CSRE 41A

**ANTHRO 42. Megacities. 5 Units.**

In this course we will examine the meaning, processes, and challenges of urbanization. Through a series of targeted readings across history and geography and through the study of varied means of representation (anthropology, literature, cartography, film, etc), the class will analyze the ways in which urban forms have come into being and created, met, and/or ignored challenges such as disease, water, transport, religious and class conflict, colonialism, labor, and trade. Students will read anthropology in conjunction with other disciplines (literature, urban planning, public health, architecture, and economics) to learn the ways in which ethnographies of immigration, urban poverty, class disparity, economic development and indicators, noise, and transportation substantively augment our understandings of how people live within globalization.

Same as: ARTHIST 242B

**ANTHRO 440. Teaching Assistantship. 3-5 Units.**

Supervised experience as assistant in one undergraduate course.

**ANTHRO 441. Master's Research Thesis. 1-15 Unit.**

Supervised work for terminal and coterminal master's students writing the master's project in the final quarter of the degree program.

**ANTHRO 442. Reading Group. 2-3 Units.**

Graduate student reading group on a thematic topic of interest. Intended for first or second-year cohort PhD students. Sections: Liisa Malkki, Sylvia Yanagisako, Thomas Hansen, Paulla Ebron, and Miyako Inoue.

**ANTHRO 444. Anthropology Colloquium. 1 Unit.**

Department Colloquia Lecture Series. Lectures presented on a variety of anthropological topics. Colloquium is intended for the Department of Anthropology's under graduate majors and graduate students. May be repeated for credit.

**ANTHRO 445. Anthropology Brown Bag Series. 1 Unit.**

Current topics and trends in cultural/social anthropology, archaeology, and environmental and ecological anthropology. Enrollment in this noon-time series is restricted to the Department of Anthropology Master's students and First and Second-year PhD students.



**ANTHRO 450. Research Apprenticeship. 1-15 Unit.**

Supervised work on a research project with an individual faculty member. May be repeated for credit.

**ANTHRO 451. Directed Individual Study. 1-15 Unit.**

Supervised work for a qualifying paper, examination, or project with an individual faculty member.

**ANTHRO 452. Graduate Internship. 3-5 Units.**

Provides graduate students with the opportunity to pursue their area of specialization in an institutional setting such as a laboratory, clinic, research institute, or government agency.

**ANTHRO 49. Violence and Belonging in the Middle East. 5 Units.**

This course examines politics in the Middle East from an anthropological perspective. We will explore the symbolic expression of political identities, the effects of religious revival on political institutions, and the tumultuous culture of protest in the region. Readings discuss the historical development of rights and citizenship, Islamic politics, sectarian tensions, and imaginings of revolution. Course materials are drawn from ethnographic studies and films, which provide a rich contextualization of social life and cultural politics in the region.

**ANTHRO 54A. Central Asia Through Films: A Weekly 3-Hour Seminar. 3-5 Units.**

Through films this course explores major issues of contemporary peoples of Central Asia while learning fundamental concepts in cultural anthropology. In this seminar we will consider a wide range of examples, including first of all the new feature films, which will be used as a window into the modern reality and therefore could be served in a certain sense as anthropological fieldwork data. Films are prearranged by the instructor according to certain thematic subjects for in-class discussions.

Same as: REES 54A

**ANTHRO 6. Human Origins. 5 Units.**

The human fossil record from the first non-human primates in the late Cretaceous or early Paleocene, 80-65 million years ago, to the anatomically modern people in the late Pleistocene, between 100,000 to 50,000 B.C.E. Emphasis is on broad evolutionary trends and the natural selective forces behind them.

Same as: ANTHRO 206, HUMBIO 6

**ANTHRO 64Q. These languages were here first: A look at the indigenous languages of California. 3 Units.**

Stanford was built on land originally inhabited by the Muwekma Ohlone tribe, and Native American students have always held an important place in the university community from the writer and journalist John Milton Oskison (Cherokee) who graduated in 1894 to current enrolments of over three hundred students who represent over fifty tribes. Two hundred years ago, the Muwekma language was one of a hundred languages that made California one of the most linguistically-diverse places on earth. Today, less than half of these languages survive but many California Indian communities are working hard to maintain and revitalize them. This is a familiar pattern globally: languages around the world are dying at such a rapid rate that the next century could see half of the world's 6800 languages and cultures become extinct unless action is taken now. Focusing especially on California, this course seeks to find out how and why languages die; what is lost from a culture when that occurs; and how "sleeping" languages might be revitalized. We will take a field trip to a Native American community in northern California to witness first-hand how one community is bringing back its traditional language, songs, dances, and story-telling. We will learn from visiting indigenous leaders and linguistic experts who will share their life, language, and culture with the class. Through weekly readings and discussion, we will investigate how languages can be maintained and revitalized by methods of community- and identity-building, language documentation and description, the use of innovative technologies, writing dictionaries and grammars for different audiences, language planning, and data creation, annotation, preservation, and dissemination. Finally, the course will examine ethical modes of fieldwork within endangered-language communities.

Same as: LINGUIST 64Q, NATIVEAM 64Q

**ANTHRO 801. TGR Project. 0 Units.**

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**ANTHRO 802. TGR Dissertation. 0 Units.**

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**ANTHRO 82. Medical Anthropology. 4 Units.**

Emphasis is on how health, illness, and healing are understood, experienced, and constructed in social, cultural, and historical contexts. Topics: biopower and body politics, gender and reproductive technologies, illness experiences, medical diversity and social suffering, and the interface between medicine and science.

Same as: ANTHRO 282, HUMBIO 176A

**ANTHRO 82P. The Literature of Psychosis. 3-5 Units.**

One of the great gifts of literature is its ability to give us insight into the internal worlds of others. This is particularly true of that state clinicians call "psychosis." But psychosis is a complex concept. It can be terrifying and devastating for patients and families, and yet shares characteristics with other, less pathological states, such as mysticism and creativity. How then can we begin to make sense of it? In this course, we will examine the first-hand experience of psychosis. We will approach it from multiple perspectives, including clinical descriptions, works of art, and texts by writers ranging from Shakespeare, to the science fiction writer Philip K. Dick, to patients attempting to describe their experience. This class is not only for students thinking of careers in medicine, psychology or anthropology, but also readers and writers interested exploring extraordinary texts. There are no prerequisites necessary; all that is needed is a love of language and a curiosity about the secrets of other minds.

Same as: HUMBIO 162L, PSYC 82, PSYC 282

**ANTHRO 90B. Theory of Cultural and Social Anthropology. 5 Units.**

Preference to Anthropology majors. Anthropological interpretations of other societies contain assumptions about Western societies. How underlying assumptions and implicit categories have influenced the presentation of data in major anthropological monographs. Emphasis is on Karl Marx, Emile Durkheim, Max Weber, and anthropological analyses of non-Western societies.

**ANTHRO 90C. Theory of Ecological and Environmental Anthropology. 5 Units.**

Dynamics of culturally inherited human behavior and its relationship to social and physical environments. Topics include a history of ecological approaches in anthropology, subsistence ecology, sharing, risk management, territoriality, warfare, and resource conservation and management. Case studies from Australia, Melanesia, Africa, and S. America.

Same as: HUMBIO 118

**ANTHRO 91. Method and Evidence in Anthropology. 5 Units.**

This course provides a broad introduction to various ways of designing anthropological questions and associated methods for collecting evidence and supporting arguments. We review the inherent links between how a question is framed, the types of evidence that can address the question, and way that data are collected. Research activities such as interviewing, participant observation, quantitative observation, archival investigation, ecological survey, linguistic methodology, tracking extended cases, and demographic methods are reviewed. Various faculty and specialists will be brought in to discuss how they use different types of evidence and methods for supporting arguments in anthropology.

**ANTHRO 91A. Archaeological Methods. 5 Units.**

Methodological issues related to the investigation of archaeological sites and objects. Aims and techniques of archaeologists including: location and excavation of sites; dating of places and objects; analysis of artifacts and technology and the study of ancient people, plants, and animals. How these methods are employed to answer the discipline's larger research questions.

Same as: ARCHLGY 102

**ANTHRO 92A. Undergraduate Research Proposal Writing Workshop. 2-3 Units.**

Practicum. Students develop independent research projects and write research proposals. How to formulate a research question; how to integrate theory and field site; and step-by-step proposal writing.

**ANTHRO 92B. Undergraduate Research Proposal Writing Workshop. 2-3 Units.**

Practicum. Students develop independent research projects and write research proposals. How to formulate a research question; how to integrate theory and field site; and step-by-step proposal writing.

**ANTHRO 93. Prefield Research Seminar. 5 Units.**

For Anthropology majors only; non-majors register for 93B. Preparation for anthropological field research in other societies and the U.S. Data collection techniques include participant observation, interviewing, surveys, sampling procedures, life histories, ethnohistory, and the use of documentary materials. Strategies of successful entry into the community, research ethics, interpersonal dynamics, and the reflexive aspects of fieldwork. Prerequisites: two ANTHRO courses or consent of instructor.

**ANTHRO 93B. Prefield Research Seminar: Non-Majors. 5 Units.**

Preparation for anthropological field research in other societies and the U.S. Data collection techniques include participant observation, interviewing, surveys, sampling procedures, life histories, ethnohistory, and the use of documentary materials. Strategies for successful entry into the community, research ethics, interpersonal dynamics, and the reflexive aspects of fieldwork. Service Learning Course (certified by Haas Center).

**ANTHRO 94. Postfield Research Seminar. 5 Units.**

Goal is to produce an ethnographic report based on original field research gathered during summer fieldwork, emphasizing writing and revising as steps in analysis and composition. Students critique classmates' work and revise their own writing in light of others' comments. Ethical issues in fieldwork and ethnographic writing, setting research write-up concerns within broader contexts.

**ANTHRO 95. Research in Anthropology. 1-10 Unit.**

Independent research conducted under faculty supervision, normally taken junior or senior year in pursuit of a senior paper or an honors project. May be repeated for credit.

**ANTHRO 95B. Directed Study in Honors and Senior Papers. 1-10 Unit.**

Taken in the final quarter before graduation. Independent study and work on senior paper for students admitted to the program. Prerequisite: consent of program adviser and instructor.

**ANTHRO 96. Directed Individual Study. 1-10 Unit.**

Prerequisite: consent of instructor.

**ANTHRO 97. Internship in Anthropology. 1-10 Unit.**

Opportunity for students to pursue their specialization in an institutional setting such as a laboratory, clinic, research institute, or government agency. May be repeated for credit. Service Learning Course (certified by Haas Center).

**ANTHRO 98B. Digital Methods in Archaeology. 3-5 Units.**

This is a course on digital technologies in archaeology used for documentation, visualization, and analysis of archaeological spaces and objects. Emphasizes hands-on approaches to image manipulation, virtual reality, GIS, CAD, and photogrammetry modeling methods.

Same as: ANTHRO 298B, ARCHLGY 98B

**ANTHRO 98C. Digital Methods in Anthropology. 3-5 Units.**

The course provides an introduction to a broad range of digital tools and techniques for anthropological research. It is geared towards those interested in exploring such methodologies for their research and wanting to add hands-on experience with state-of-the-art digital tools to their skill set. Students will learn to work with some of the most common tools used to collect and manage digital data, and to perform various types of analysis and visualization. Undergraduate students register for 5 Units, Graduate students can register for 5 or 3 units.

Same as: ANTHRO 298C

**ANTHRO 98E. Catalhoyuk and Neolithic Archaeology. 1-3 Unit.**

Catalhoyuk as a case study to understand prehistoric social life during the Neolithic in Anatolia and the Near East. Developments in agriculture, animal domestication, material technology, trade, art, religion, skull cults, architecture, and burial practices. Literature specific to Catalhoyuk and other excavations throughout the Anatolian and Levantine regions to gain a perspective on diversity and variability throughout the Neolithic. The reflexive methodology used to excavate Catalhoyuk, and responsibilities of excavators to engage with larger global audiences of interested persons and stakeholders.

**ANTHRO 98F. Field School Training Workshop. 1-3 Unit.**

Provides students important preparatory orientation to anthropology as well as the methods, ethics, and logistics of the specific field school each student will be attending in the summer.

## Athletics, Phys Ed, Recreation (ATHLETIC)

**ATHLETIC 1. Thriving in Athletics: Health and Wellness Concepts. 2 Units.**

Develops the understanding, self-awareness, confidence, and skills necessary for students to serve as a resource for their peers in the areas of building resilience, promoting wellbeing, and supporting emotional balance. Examines personal values, identity, signature strengths, self-care and stress management practices, signs and symptoms of common mental health concerns, and barriers for care-seeking in the student population. Develops skills for enhancing personal well-being, communication, connecting students with existing resources, and promoting a culture of support, health and wellness.





**ATHLETIC 47. VARSITY - Water Polo. 1-2 Unit.**

Designed for the Varsity Athlete; conditioning; practice; game preparation; and weight training. Limit 2 credits per quarter with a maximum of 8 activity units may be applied towards graduation. Prerequisite: Must be a Varsity Athlete in the specific sport; Permission of appropriate sport administrator. May repeat for credit. Same as: Men

**ATHLETIC 48. VARSITY - Water Polo. 1-2 Unit.**

Designed for the Varsity Athlete; conditioning; practice; game preparation; and weight training. Limit 2 credits per quarter with a maximum of 8 activity units may be applied towards graduation. Prerequisite: Must be a Varsity Athlete in the specific sport; Permission of appropriate sport administrator. May repeat for credit. Same as: Women

**ATHLETIC 49. VARSITY - Wrestling. 1-2 Unit.**

Designed for the Varsity Athlete; conditioning; practice; game preparation; and weight training. Limit 2 credits per quarter with a maximum of 8 activity units may be applied towards graduation. Prerequisite: Must be a Varsity Athlete in the specific sport; Permission of appropriate sport administrator. May repeat for credit.

**ATHLETIC 60. CLUB - Sport Experience. 1 Unit.**

This course is offered to club sport athletes who participate on credit approved Club Sports teams. Teams who are eligible to receive credit, are required to have a coach and/or administrator to supervise their class. All teams and athletes on the team must complete 30 hours of participation during the quarter. To be eligible for credit, teams must practice 2x a week for a maximum total of 4 hours and participate in 1-3 competitions in the quarter. Prerequisite: Permission of club sport administrator. May repeat for credit. A maximum of 8 activity units may be applied towards graduation.

**ATHLETIC 61. CLUB - Martial Arts Experience. 1 Unit.**

This course is offered to Martial Arts athletes who participate on credit approved Martial Arts teams. All teams and athletes on the team must complete 30 hours of participation during the quarter. To be eligible for credit, teams must practice 2x a week for a maximum total of 4 hours and participate in 1-3 competitions in the quarter. Prerequisite: Permission of martial arts administrator. May repeat for credit. A maximum of 8 activity units may be applied towards graduation.

**ATHLETIC 62. CLUB - Band. 1 Unit.**

This course is offered to club members who participate on credit approved Club Sports teams. All members must complete 30 hours of participation during the quarter. To be eligible for credit, the club must practice 2x a week for a maximum total of 4 hours and participate in 1-3 events in the quarter. Prerequisite: Permission of club sport administrator. May repeat for credit. A maximum of 8 activity units may be applied towards graduation. Same as: MUSIC 62

**ATHLETIC 63. CLUB - Climbing. 1 Unit.**

This course is offered to club sport athletes who participate on credit approved Club Sports teams. All teams and athletes on the team must complete 30 hours of participation during the quarter. To be eligible for credit, teams must practice 2x a week for a maximum total of 4 hours and participate in 1-3 competitions in the quarter. Prerequisite: Permission of club sport administrator. May repeat for credit. A maximum of 8 activity units may be applied towards graduation.

**ATHLETIC 64. CLUB - Equestrian. 1 Unit.**

This course is offered to club sport athletes who participate on credit approved Club Sports teams. All teams and athletes on the team must complete 30 hours of participation during the quarter. To be eligible for credit, teams must practice 2x a week for a maximum total of 4 hours and participate in 1-3 competitions in the quarter. Prerequisite: Permission of club sport administrator. May repeat for credit. A maximum of 8 activity units may be applied towards graduation.

**ATHLETIC 65. CLUB - Rugby. 1 Unit.**

This course is offered to club sport athletes who participate on credit approved Club Sports teams. All teams and athletes on the team must complete 30 hours of participation during the quarter. To be eligible for credit, teams must practice 2x a week for a maximum total of 4 hours and participate in 1-3 competitions in the quarter. Prerequisite: Permission of club sport administrator. May repeat for credit. A maximum of 8 activity units may be applied towards graduation. Same as: Men

**ATHLETIC 66. CLUB - Rugby. 1 Unit.**

This course is offered to club sport athletes who participate on credit approved Club Sports teams. All teams and athletes on the team must complete 30 hours of participation during the quarter. To be eligible for credit, teams must practice 2x a week for a maximum total of 4 hours and participate in 1-3 competitions in the quarter. Prerequisite: Permission of club sport administrator. May repeat for credit. A maximum of 8 activity units may be applied towards graduation. Same as: Women

**ATHLETIC 67. CLUB - Squash. 1 Unit.**

This course is offered to club sport athletes who participate on credit approved Club Sports teams. All teams and athletes on the team must complete 30 hours of participation during the quarter. To be eligible for credit, teams must practice 2x a week for a maximum total of 4 hours and participate in 1-3 competitions in the quarter. Prerequisite: Permission of club sport administrator. May repeat for credit. A maximum of 8 activity units may be applied towards graduation. Same as: Men

## Bio Hopkins Marine (BIOHOPK)

**BIOHOPK 14. Bio-logging and Bio-telemetry. 3 Units.**

Bio-logging is a rapidly growing discipline that includes diverse fields such as consumer electronics, medicine, and marine biology. The use of animal-attached digital tags is a powerful approach to study the movement and ecology of individuals over a wide range of temporal and spatial scales. This course is an introduction to bio-logging methods and analysis. Using whales as a model system, students will learn how use multi-sensor tags to study behavioral biomechanics.

**BIOHOPK 150H. Ecological Mechanics. 3 Units.**

(Graduate students register for 250H.) The principles of life's physical interactions. We will explore basic physics: fluid mechanics, thermal dynamics, and materials science to see how the principles of these fields can be used to investigate ecology at levels from the individual to the community. Topics include: diffusion, boundary layers, fluid-dynamic forces, locomotion, heat-budget models, fracture mechanics, adhesion, beam theory, the statistics of extremes, and the theory of self-organization. Open to students from all backgrounds. Some familiarity with basic physics and calculus advantageous but not necessary. Same as: BIOHOPK 250H

**BIOHOPK 152H. Physiology of Global Change. 2 Units.**

(Graduate students register for 252H.) Global change is leading to significant alterations in several environmental factors, including temperature, ocean acidity and oxygen availability. This course focuses on: (i) how these environmental changes lead to physiological stress and (ii) how, and to what extent, are organisms able to adapt through short-term acclimatization and evolutionary adaptation to cope with these stresses. A major focus of the class is to link changes in species' distribution patterns with underlying physiological mechanics that establish environmental optima and tolerance limits.

Same as: BIOHOPK 252H

**BIOHOPK 153H. Current Topics and Concepts in Quantitative Fish Dynamics and Fisheries Management. 1 Unit.**

(Graduate students register for 253H) The course will focus on extensive reading of seminal and reference papers published in the literature in the last decade on modeling population biology, community dynamics and fishery management in the marine environment. Basic knowledge of population dynamics is welcome. The goal is to develop an appreciation on both traditional and cutting-edge modeling approaches to study the dynamics and management of marine populations subjected to natural or anthropogenic shocks and pressures.

Same as: BIOHOPK 253H

**BIOHOPK 154H. Animal Diversity: An Introduction to Evolution of Animal Form and Function from Larvae to Adults. 7 Units.**

Survey of invertebrate diversity, emphasizing form and function of both adult and larval life history stages. Focuses on how morphology, life histories, and development contribute to current views of the evolutionary diversification of multicellular animals. Labs are a hands-on exploration of animal diversity using local marine species as examples, as well as techniques of obtaining, handling, and maintaining larvae from early development through settlement. Lectures, labs, plus field trips. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructors.

Same as: BIOHOPK 254H

**BIOHOPK 155H. Developmental Biology and Evolution. 4 Units.**

(Graduate students register for 255) This course focusses on how animals form their basic body plans; from the formation of their germ layers; ectoderm, endoderm and mesoderm, to how they are organized along the main developmental axes; the anteroposterior and dorsoventral axes. The course will focus in part on the molecular mechanisms that underlie these developmental decisions from work carried out in established developmental model species. However, we will also explore the current understanding of how these mechanisms evolved from new insights from emerging models representing a broad range of animal phyla. The setting at Hopkins Marine Station will allow us to carry out experiments from animals collected in the field, and the course will involve a substantial lab component to complement concepts and approaches presented in lecture. nPre-requisites : Biocore or by permission of instructor.

Same as: BIOHOPK 255H

**BIOHOPK 156H. Hands-On Neurobiology: Structure, Function and Development. 6 Units.**

This laboratory course will examine neural and neuromuscular systems at a cellular level in selected vertebrate and invertebrate taxa using anatomical, physiological and molecular approaches. Intracellular dye injections and confocal microscopy will be used to visualize neuronal structure. Ca-imaging will permit functional analysis of living neurons. Electrical recording methods will be used to explore principles of excitability, synaptic transmission, sensory pathways and neural integration. Development of neural systems will be studied using molecular visualization methods. Work in the lab will be supplemented with informal lectures and discussions, and results of the labs will be reviewed weekly. Two 4-hour afternoon lab sessions per week.

Same as: BIOHOPK 256H

**BIOHOPK 160H. Developmental Biology in the Ocean: Diverse Embryonic & Larval Strategies of marine invertebrates. 5-8 Units.**

(Graduate students register for 261H). Lab course is designed to introduce students to the diversity in the early developmental strategies of marine invertebrates and how an understanding of these microscopic life histories is key to understanding the evolutionary diversification of phyla and the distribution of their more familiar adults. Emphasis is on hands-on collection, spawning, observation and manipulation of embryos and their larvae.

Same as: BIOHOPK 260H

**BIOHOPK 161H. Invertebrate Zoology. 5 Units.**

(Graduate students register for 261H.) Survey of invertebrate diversity emphasizing form and function in a phylogenetic framework. Morphological diversity, life histories, physiology, and ecology of the major invertebrate groups, concentrating on local marine forms as examples. Current views on the phylogenetic relationships and evolution of the invertebrates. Lectures, lab, plus field trips. Satisfies Central Menu Area 3 for Bio majors.

Same as: BIOHOPK 261H

**BIOHOPK 162H. Comparative Animal Physiology. 5 Units.**

(Graduate students register for 262H.) How animals work. Topics: physiology of respiration, circulation, energy metabolism, thermal regulation, osmotic regulation, muscle physiology, and locomotion. Evolutionary and ecological physiology. Lectures, lab, and field research. An option to combine the course work with a more intensive research focus, with more units, is available. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Consent of instructor.

Same as: BIOHOPK 262H

**BIOHOPK 163H. Oceanic Biology. 4 Units.**

(Graduate students register for 263H.) How the physics and chemistry of the oceanic environment affect marine plants and animals. Topics: seawater and ocean circulation, separation of light and nutrients in the two-layered ocean, oceanic food webs and trophic interactions, oceanic environments, biogeography, and global change. Lectures, discussion, and field trips. Satisfies Central Menu Area 4 for Bio majors. Recommended: PHYSICS 21 or 51, CHEM 31, or consent of instructor.

Same as: BIOHOPK 263H

**BIOHOPK 165H. The Extreme Life of the Sea. 3 Units.**

(Graduate students register for 265H). Lecture course that explores the way marine species live in extreme ocean habitats. We will cover the deepest, hottest, coldest, and shallowest habitats and the biggest, fastest, most fecund, oldest and smallest species. We will focus on the molecular, physiological and ecological adaptations that allow species to thrive in these unusual environments.

Same as: BIOHOPK 265H

**BIOHOPK 166H. Molecular Ecology. 5 Units.**

(Graduate students register for 266H.) How modern technologies in gene sequencing, detection of nuclear nucleotide polymorphisms, and other approaches are used to gather data on genetic variation that allow measurement of population structure, infer demographic histories, inform conservation efforts, and advance understanding of the ecology of diverse types of organisms.

Same as: BIOHOPK 266H

**BIOHOPK 167H. Nerve, Muscle, and Synapse. 5 Units.**

(Graduate students register for 267H.) Fundamental aspects of membrane excitability, nerve conduction, synaptic transmission, and excitation-contraction coupling. Emphasis is on biophysical, molecular, and cellular level analyses of these processes in vertebrate and invertebrate systems. Labs on intra- and extracellular recording and patch clamp techniques. Lectures, discussions, and labs. Satisfies Central Menu Area 3 for Bio majors Prerequisites: PHYSICS 23, 28, 43, or equivalent; CHEM 31, calculus; or consent of instructor.

Same as: BIOHOPK 267H

**BIOHOPK 168H. Disease Ecology: from parasites evolution to the socio-economic impacts of pathogens on nations. 3 Units.**

(Graduate students register for 268H.) Course will lead participants on a journey through the dynamics of infectious diseases that will start at the smallest level from within-host parasite dynamics and will progressively scale up to parasite evolution, disease ecology, public health policies, disease driven poverty traps and the socio-economic impact of infectious diseases on nations. The course will be organized around case studies, including among the others, schistosomiasis, malaria, cholera and sleeping sickness. Participants will have the opportunity to develop a capstone project.

Same as: BIOHOPK 268H

**BIOHOPK 172H. Marine Ecology: From Organisms to Ecosystems. 5 Units.**

(Graduate students register for 272H.) This course incorporates the approaches of experimental ecology, biomechanics (ecomechanics), and physiology to develop an integrated perspective on the factors that govern the structures of marine ecosystems and how environment change, including anthropogenic influences, affects ecosystems' species composition and health. Focus is on rocky intertidal, kelp forest, estuarine, and midwater ecosystems of Monterey Bay. Experimental projects done in the field offer experience in a variety of ecological techniques and in analysis of ecological data. Students will engage in presentation and debates of current topics in marine ecology and conservation. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: consent of instructor. Fulfills WIM in Biology. Same as: BIOHOPK 272H

**BIOHOPK 173H. Marine Conservation Biology. 4 Units.**

(Graduate students register for 273H.) Introduction to the key concepts of ecology and policy relevant to marine conservation issues at the population to ecosystems level. Focus is on the origin and maintenance of biodiversity and conservation applications from both the biology and policy perspectives (for example, endangered species, captive breeding, reserve design, habitat fragmentation, ecosystem restoration/rehabilitation). Also includes emerging approaches such as ecosystem based management, ocean planning, and coupled social-ecological systems. The course will include lectures, readings and discussions of primary literature, and attendance at seminars with visiting scholars. Prerequisite: introductory biology; suggested: a policy and/or introductory ecology course. Same as: BIOHOPK 273H

**BIOHOPK 174H. Experimental Design and Probability. 3 Units.**

(Graduate students register for 274H.) Variability is an integral part of biology. Introduction to probability and its use in designing experiments to address biological problems. Focus is on analysis of variance, when and how to use it, why it works, and how to interpret the results. Design of complex, but practical, asymmetrical experiments and environmental impact studies, and regression and analysis of covariance. Computer-based data analysis. Prerequisite: Biology core or consent of instructor. Same as: BIOHOPK 274H

**BIOHOPK 177H. Dynamics and Management of Marine Populations. 4 Units.**

(Graduate students register for 277H.) Course examines the ecological factors and processes that control natural and harvested marine populations. Course emphasizes mathematical models as tools to assess the dynamics of populations and to derive projections of their demographic fate under different management scenarios. Course objectives will be met by a combination of theoretical lectures, assigned readings and class discussions, case study analysis and interactive computer sessions. Same as: BIOHOPK 277H

**BIOHOPK 179H. Physiological Ecology of Marine Megafauna. 3 Units.**

(Graduate students register for 279H.) The ocean is home to the largest animals of all-time. How, when, and why did gigantism evolve in different taxa? What are the consequences of large body size? This course will focus on how biological processes scale with body size, with an emphasis on oceanic megafauna including marine mammals, birds, fishes, and reptiles. In particular, the course will explore the functional mechanisms that generate the scaling relationships for physiological and ecological traits, such as metabolism, ecosystem function and body size evolution. Students will also be introduced to state-of-the-art technologies used to student marine megafauna in some of the most logistically challenging habitats on earth. Same as: BIOHOPK 279H

**BIOHOPK 180H. Air and Water. 3 Units.**

(Graduate students register for 280H.) Introduction to environmental physics. The physical properties of life's fluids compared and contrasted. How and why life has evolved differently on land than in water. Topics: density, viscosity, diffusion, thermal properties, sound, light, evaporation, and surface tension. Recommended: PHYSICS 21, 23, or 51, 53; calculus; Biology core; or consent of instructor. Same as: BIOHOPK 280H

**BIOHOPK 181H. Physiology of Global Change. 2 Units.**

(Graduate students register for 281H.) Global change is leading to significant alterations in several environmental factors, including temperature, ocean acidity and oxygen availability. This course focuses on: (i) how these environmental changes lead to physiological stress and (ii) how, and to what extent, are organisms able to adapt through short-term acclimatization and evolutionary adaptation to cope with these stresses. A major focus of the class is to link changes in species' distribution patterns with underlying physiological mechanics that establish environmental optima and tolerance limits. Same as: BIOHOPK 281H

**BIOHOPK 182H. Stanford at Sea. 16 Units.**

(Graduate students register for 323H.) Five weeks of marine science including oceanography, marine physiology, policy, maritime studies, conservation, and nautical science at Hopkins Marine Station, followed by five weeks at sea aboard a sailing research vessel in the Pacific Ocean. Shore component comprised of three multidisciplinary courses meeting daily and continuing aboard ship. Students develop an independent research project plan while ashore, and carry out the research at sea. In collaboration with the Sea Education Association of Woods Hole, MA. Only 6 units may count towards the Biology major. Same as: BIOHOPK 323H, EARTHSYS 323, ESS 323

**BIOHOPK 184H. Holistic Biology. 16 Units.**

(Graduate students register for 284H.) For majors and non-majors. Complexity in natural systems is examined from complementary points of view, including scientific, historical, philosophical and literary. Lectures and discussions will focus on the writings of Ed Ricketts and John Steinbeck, poetry of Robinson Jeffers and on historical and contemporary works concerning marine and fresh-water systems, resource management and climate change. A group project with individual contributions will be carried out and presented at a symposium. This course will involve a significant amount of creative writing, and it satisfies the Writing in Major requirement for Biology. It is open to all majors and classes. Only 6 units may count towards the Biology major. Same as: BIOHOPK 284H

**BIOHOPK 185H. Ecology and Conservation of Kelp Forest Communities. 5 Units.**

(Graduate students register for 285H.) Five week course. Daily lectures, labs, and scuba dives focused on kelp forest biology. Topics include identification and natural history of resident organisms, ecological processes that maintain biodiversity and community organization, field methods, data analysis, and research diving techniques. Class projects contribute to ongoing studies associated with Hopkins Marine Life Observatory. It is recommended that students complete one of Stanford's Scientific Diver Training sessions, offered during spring break and the week before the course starts, although this is not a requirement. Prerequisites: consent of instructor; advanced scuba certification and scuba equipment. Same as: BIOHOPK 285H

**BIOHOPK 187H. Sensory Ecology. 4 Units.**

(Graduate students register for 287H.) Topics: the ways animals receive, filter, and process information gleaned from the environment, sensory receptor mechanisms, neural processing, specialization to life underwater, communication within and between species, importance of behavior to ecosystem structure and dynamics, impact of acoustic and light pollution on marine animals. Emphasis is on the current scientific literature. The laboratory portion of the class explores sensory mechanisms using neurobiological methods and methods of experimental animal behavior.

Same as: BIOHOPK 287H

**BIOHOPK 189H. Sustainability and Marine Ecosystems. 3 Units.**

(Graduate students register for 289H.) The health of marine ecosystems is in decline due to overfishing, pollution, habitat damage, invasive species, and climate change. Because human communities are tightly coupled to coastal marine resources, understanding pathways to sustainability require understanding as much about humans as about the ocean. In this course, we explore factors that contribute to the sustainability and resilience of marine ecosystems and the human communities that depend upon them. This course is based on readings in the primary literature, discussions, and student projects.

Same as: BIOHOPK 289H

**BIOHOPK 198H. Directed Instruction or Reading. 1-15 Unit.**

May be taken as a prelude to research and may also involve participation in a lab or research group seminar and/or library research. Credit for work arranged with out-of-department instructors restricted to Biology majors and requires department approval. May be repeated for credit. (Staff).

**BIOHOPK 199H. Undergraduate Research. 1-15 Unit.**

Qualified undergraduates undertake individual work in the fields listed under 300H. Arrangements must be made by consultation or correspondence.

**BIOHOPK 234H. Topics in Comparative and Environmental Physiology. 1 Unit.**

Seminar and discussion focused on current topics and research at the interface of physiology and ecology.

**BIOHOPK 250H. Ecological Mechanics. 3 Units.**

(Graduate students register for 250H.) The principles of life's physical interactions. We will explore basic physics. fluid mechanics, thermal dynamics, and materials science to see how the principles of these fields can be used to investigate ecology at levels from the individual to the community. Topics include: diffusion, boundary layers, fluid-dynamic forces, locomotion, heat-budget models, fracture mechanics, adhesion, beam theory, the statistics of extremes, and the theory of self-organization. Open to students from all backgrounds. Some familiarity with basic physics and calculus advantageous but not necessary.

Same as: BIOHOPK 150H

**BIOHOPK 252H. Physiology of Global Change. 2 Units.**

(Graduate students register for 252H.) Global change is leading to significant alterations in several environmental factors, including temperature, ocean acidity and oxygen availability. This course focuses on: (i) how these environmental changes lead to physiological stress and (ii) how, and to what extent, are organisms able to adapt through short-term acclimatization and evolutionary adaptation to cope with these stresses. A major focus of the class is to link changes in species' distribution patterns with underlying physiological mechanics that establish environmental optima and tolerance limits.

Same as: BIOHOPK 152H

**BIOHOPK 253H. Current Topics and Concepts in Quantitative Fish Dynamics and Fisheries Management. 1 Unit.**

(Graduate students register for 253H) The course will focus on extensive reading of seminal and reference papers published in the literature in the last decade on modeling population biology, community dynamics and fishery management in the marine environment. Basic knowledge of population dynamics is welcome. The goal is to develop an appreciation on both traditional and cutting-edge modeling approaches to study the dynamics and management of marine populations subjected to natural or anthropogenic shocks and pressures.

Same as: BIOHOPK 153H

**BIOHOPK 254H. Animal Diversity: An Introduction to Evolution of Animal Form and Function from Larvae to Adults. 7 Units.**

Survey of invertebrate diversity, emphasizing form and function of both adult and larval life history stages. Focuses on how morphology, life histories, and development contribute to current views of the evolutionary diversification of multicellular animals. Labs are a hands-on exploration of animal diversity using local marine species as examples, as well as techniques of obtaining, handling, and maintaining larvae from early development through settlement. Lectures, labs, plus field trips. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Biology core or consent of instructors.

Same as: BIOHOPK 154H

**BIOHOPK 255H. Developmental Biology and Evolution. 4 Units.**

(Graduate students register for 255) This course focusses on how animals form their basic body plans; from the formation of their germ layers; ectoderm, endoderm and mesoderm, to how they are organized along the main developmental axes; the anteroposterior and dorsoventral axes. The course will focus in part on the molecular mechanisms that underlie these developmental decisions from work carried out in established developmental model species. However, we will also explore the current understanding of how these mechanisms evolved from new insights from emerging models representing a broad range of animal phyla. The setting at Hopkins Marine Station will allow us to carry out experiments from animals collected in the field, and the course will involve a substantial lab component to complement concepts and approaches presented in lecture. nPre-requisites : Biocore or by permission of instructor.

Same as: BIOHOPK 155H

**BIOHOPK 256H. Hands-On Neurobiology: Structure, Function and Development. 6 Units.**

This laboratory course will examine neural and neuromuscular systems at a cellular level in selected vertebrate and invertebrate taxa using anatomical, physiological and molecular approaches. Intracellular dye injections and confocal microscopy will be used to visualize neuronal structure. Ca-imaging will permit functional analysis of living neurons. Electrical recording methods will be used to explore principles of excitability, synaptic transmission, sensory pathways and neural integration. Development of neural systems will be studied using molecular visualization methods. Work in the lab will be supplemented with informal lectures and discussions, and results of the labs will be reviewed weekly. Two 4-hour afternoon lab sessions per week.

Same as: BIOHOPK 156H

**BIOHOPK 260H. Developmental Biology in the Ocean: Diverse Embryonic & Larval Strategies of marine invertebrates. 5-8 Units.**

(Graduate students register for 261H). Lab course is designed to introduce students to the diversity in the early developmental strategies of marine invertebrates and how an understanding of these microscopic life histories is key to understanding the evolutionary diversification of phyla and the distribution of their more familiar adults. Emphasis is on hands-on collection, spawning, observation and manipulation of embryos and their larvae.

Same as: BIOHOPK 160H



**BIOHOPK 261H. Invertebrate Zoology. 5 Units.**

(Graduate students register for 261H.) Survey of invertebrate diversity emphasizing form and function in a phylogenetic framework. Morphological diversity, life histories, physiology, and ecology of the major invertebrate groups, concentrating on local marine forms as examples. Current views on the phylogenetic relationships and evolution of the invertebrates. Lectures, lab, plus field trips. Satisfies Central Menu Area 3 for Bio majors.

Same as: BIOHOPK 161H

**BIOHOPK 262H. Comparative Animal Physiology. 5 Units.**

(Graduate students register for 262H.) How animals work. Topics: physiology of respiration, circulation, energy metabolism, thermal regulation, osmotic regulation, muscle physiology, and locomotion. Evolutionary and ecological physiology. Lectures, lab, and field research. An option to combine the course work with a more intensive research focus, with more units, is available. Satisfies Central Menu Area 3 for Bio majors. Prerequisite: Consent of instructor.

Same as: BIOHOPK 162H

**BIOHOPK 263H. Oceanic Biology. 4 Units.**

(Graduate students register for 263H.) How the physics and chemistry of the oceanic environment affect marine plants and animals. Topics: seawater and ocean circulation, separation of light and nutrients in the two-layered ocean, oceanic food webs and trophic interactions, oceanic environments, biogeography, and global change. Lectures, discussion, and field trips. Satisfies Central Menu Area 4 for Bio majors. Recommended: PHYSICS 21 or 51, CHEM 31, or consent of instructor.

Same as: BIOHOPK 163H

**BIOHOPK 264H. POPULATION GENOMICS. 1-2 Unit.**

Introduces students to the analysis of single nucleotide polymorphism data from next generation sequencing projects. Computer analysis, hypothesis testing, and projects based on existing data sets will be pursued.

**BIOHOPK 265H. The Extreme Life of the Sea. 3 Units.**

(Graduate students register for 265H.) Lecture course that explores the way marine species live in extreme ocean habitats. We will cover the deepest, hottest, coldest, and shallowest habitats and the biggest, fastest, most fecund, oldest and smallest species. We will focus on the molecular, physiological and ecological adaptations that allow species to thrive in these unusual environments.

Same as: BIOHOPK 165H

**BIOHOPK 266H. Molecular Ecology. 5 Units.**

(Graduate students register for 266H.) How modern technologies in gene sequencing, detection of nuclear nucleotide polymorphisms, and other approaches are used to gather data on genetic variation that allow measurement of population structure, infer demographic histories, inform conservation efforts, and advance understanding of the ecology of diverse types of organisms.

Same as: BIOHOPK 166H

**BIOHOPK 267H. Nerve, Muscle, and Synapse. 5 Units.**

(Graduate students register for 267H.) Fundamental aspects of membrane excitability, nerve conduction, synaptic transmission, and excitation-contraction coupling. Emphasis is on biophysical, molecular, and cellular level analyses of these processes in vertebrate and invertebrate systems. Labs on intra- and extracellular recording and patch clamp techniques. Lectures, discussions, and labs. Satisfies Central Menu Area 3 for Bio majors Prerequisites: PHYSICS 23, 28, 43, or equivalent; CHEM 31, calculus; or consent of instructor.

Same as: BIOHOPK 167H

**BIOHOPK 268H. Disease Ecology: from parasites evolution to the socio-economic impacts of pathogens on nations. 3 Units.**

(Graduate students register for 268H.) Course will lead participants on a journey through the dynamics of infectious diseases that will start at the smallest level from within-host parasite dynamics and will progressively scale up to parasite evolution, disease ecology, public health policies, disease driven poverty traps and the socio-economic impact of infectious diseases on nations. The course will be organized around case studies, including among the others, schistosomiasis, malaria, cholera and sleeping sickness. Participants will have the opportunity to develop a capstone project.

Same as: BIOHOPK 168H

**BIOHOPK 272H. Marine Ecology: From Organisms to Ecosystems. 5 Units.**

(Graduate students register for 272H.) This course incorporates the approaches of experimental ecology, biomechanics (ecomechanics), and physiology to develop an integrated perspective on the factors that govern the structures of marine ecosystems and how environment change, including anthropogenic influences, affects ecosystems' species composition and health. Focus is on rocky intertidal, kelp forest, estuarine, and midwater ecosystems of Monterey Bay. Experimental projects done in the field offer experience in a variety of ecological techniques and in analysis of ecological data. Students will engage in presentation and debates of current topics in marine ecology and conservation. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: consent of instructor. Fulfills WIM in Biology.

Same as: BIOHOPK 172H

**BIOHOPK 273H. Marine Conservation Biology. 4 Units.**

(Graduate students register for 273H.) Introduction to the key concepts of ecology and policy relevant to marine conservation issues at the population to ecosystems level. Focus on the origin and maintenance of biodiversity and conservation applications from both the biology and policy perspectives (for example, endangered species, captive breeding, reserve design, habitat fragmentation, ecosystem restoration/rehabilitation). Also includes emerging approaches such as ecosystem based management, ocean planning, and coupled social-ecological systems. The course will include lectures, readings and discussions of primary literature, and attendance at seminars with visiting scholars. Prerequisite: introductory biology; suggested: a policy and/or introductory ecology course.

Same as: BIOHOPK 173H

**BIOHOPK 274. Hopkins Microbiology Course. 3-12 Units.**

(Formerly GES 274S.) Four-week, intensive. The interplay between molecular, physiological, ecological, evolutionary, and geochemical processes that constitute, cause, and maintain microbial diversity. How to isolate key microorganisms driving marine biological and geochemical diversity, interpret culture-independent molecular characterization of microbial species, and predict causes and consequences. Laboratory component: what constitutes physiological and metabolic microbial diversity; how evolutionary and ecological processes diversify individual cells into physiologically heterogeneous populations; and the principles of interactions between individuals, their population, and other biological entities in a dynamically changing microbial ecosystem. Prerequisites: CEE 274A and CEE 274B, or equivalents.

Same as: BIO 274S, CEE 274S, ESS 253S

**BIOHOPK 274H. Experimental Design and Probability. 3 Units.**

(Graduate students register for 274H.) Variability is an integral part of biology. Introduction to probability and its use in designing experiments to address biological problems. Focus is on analysis of variance, when and how to use it, why it works, and how to interpret the results. Design of complex, but practical, asymmetrical experiments and environmental impact studies, and regression and analysis of covariance. Computer-based data analysis. Prerequisite: Biology core or consent of instructor.

Same as: BIOHOPK 174H

**BIOHOPK 275H. Synthesis in Ecology. 2 Units.**

Introduction to frameworks and approaches to synthesizing large data sets, including meta-analysis and permutational multivariate analysis of variance. Hands-on data analysis sessions. May be repeated for credit.

**BIOHOPK 276H. Estimates and Errors: The Theory of Scientific Measurement. 3 Units.**

Measurement plays a fundamental role in science, but many biologists have no formal training in what it means to measure something. Errors are inevitable in any measurement. Which are inherent, and which can be controlled? How do errors propagate? How can you decide which data to reject? When are uncertainties normal? In this course we will work our way into the theory of measurement, covering some topics that overlap with inferential statistics (but from a new and perhaps more intuitive perspective), and extending beyond those basics to include spectral analysis and the dangers of measurement in the digital realm.

**BIOHOPK 277H. Dynamics and Management of Marine Populations. 4 Units.**

(Graduate students register for 277H.) Course examines the ecological factors and processes that control natural and harvested marine populations. Course emphasizes mathematical models as tools to assess the dynamics of populations and to derive projections of their demographic fate under different management scenarios. Course objectives will be met by a combination of theoretical lectures, assigned readings and class discussions, case study analysis and interactive computer sessions.

Same as: BIOHOPK 177H

**BIOHOPK 279H. Physiological Ecology of Marine Megafauna. 3 Units.**

(Graduate students register for 279H.) The ocean is home to the largest animals of all-time. How, when, and why did gigantism evolve in different taxa? What are the consequences of large body size? This course will focus on how biological processes scale with body size, with an emphasis on oceanic megafauna including marine mammals, birds, fishes, and reptiles. In particular, the course will explore the functional mechanisms that generate the scaling relationships for physiological and ecological traits, such as metabolism, ecosystem function and body size evolution. Students will also be introduced to state-of-the-art technologies used to study marine megafauna in some of the most logistically challenging habitats on earth.

Same as: BIOHOPK 179H

**BIOHOPK 280. Short Course on Ocean Policy. 3 Units.**

The course will introduce graduate students in the natural and social sciences to ocean policy and governance in the US at national, regional, state, and local levels. Together with leaders in ocean science and policy, students will examine pressing issues in ocean sustainability from natural science, social science, and legal and policy perspectives, with an emphasis on the role of science in the policy and governance processes. Students will learn and apply practical skills in communication, leadership and interdisciplinary problem-solving through participation in a group project, interactive discussions and simulations, and field trips. Prerequisite: consent of instructor and by application due in winter.

**BIOHOPK 280H. Air and Water. 3 Units.**

(Graduate students register for 280H.) Introduction to environmental physics. The physical properties of life's fluids compared and contrasted. How and why life has evolved differently on land than in water. Topics: density, viscosity, diffusion, thermal properties, sound, light, evaporation, and surface tension. Recommended: PHYSICS 21, 23, or 51, 53; calculus; Biology core; or consent of instructor.

Same as: BIOHOPK 180H

**BIOHOPK 281H. Physiology of Global Change. 2 Units.**

(Graduate students register for 281H.) Global change is leading to significant alterations in several environmental factors, including temperature, ocean acidity and oxygen availability. This course focuses on: (i) how these environmental changes lead to physiological stress and (ii) how, and to what extent, are organisms able to adapt through short-term acclimatization and evolutionary adaptation to cope with these stresses. A major focus of the class is to link changes in species' distribution patterns with underlying physiological mechanics that establish environmental optima and tolerance limits.

Same as: BIOHOPK 181H

**BIOHOPK 284H. Holistic Biology. 16 Units.**

(Graduate students register for 284H.) For majors and non-majors. Complexity in natural systems is examined from complementary points of view, including scientific, historical, philosophical and literary. Lectures and discussions will focus on the writings of Ed Ricketts and John Steinbeck, poetry of Robinson Jeffers and on historical and contemporary works concerning marine and fresh-water systems, resource management and climate change. A group project with individual contributions will be carried out and presented at a symposium. This course will involve a significant amount of creative writing, and it satisfies the Writing in Major requirement for Biology. It is open to all majors and classes. Only 6 units may count towards the Biology major.

Same as: BIOHOPK 184H

**BIOHOPK 285H. Ecology and Conservation of Kelp Forest Communities. 5 Units.**

(Graduate students register for 285H.) Five week course. Daily lectures, labs, and scuba dives focused on kelp forest biology. Topics include identification and natural history of resident organisms, ecological processes that maintain biodiversity and community organization, field methods, data analysis, and research diving techniques. Class projects contribute to ongoing studies associated with Hopkins Marine Life Observatory. It is recommended that students complete one of Stanford's Scientific Diver Training sessions, offered during spring break and the week before the course starts, although this is not a requirement. Prerequisites: consent of instructor; advanced scuba certification and scuba equipment.

Same as: BIOHOPK 185H

**BIOHOPK 287H. Sensory Ecology. 4 Units.**

(Graduate students register for 287H.) Topics: the ways animals receive, filter, and process information gleaned from the environment, sensory receptor mechanisms, neural processing, specialization to life underwater, communication within and between species, importance of behavior to ecosystem structure and dynamics, impact of acoustic and light pollution on marine animals. Emphasis is on the current scientific literature. The laboratory portion of the class explores sensory mechanisms using neurobiological methods and methods of experimental animal behavior.

Same as: BIOHOPK 187H

**BIOHOPK 289H. Sustainability and Marine Ecosystems. 3 Units.**

(Graduate students register for 289H.) The health of marine ecosystems is in decline due to overfishing, pollution, habitat damage, invasive species, and climate change. Because human communities are tightly coupled to coastal marine resources, understanding pathways to sustainability require understanding as much about humans as about the ocean. In this course, we explore factors that contribute to the sustainability and resilience of marine ecosystems and the human communities that depend upon them. This course is based on readings in the primary literature, discussions, and student projects.

Same as: BIOHOPK 189H

**BIOHOPK 290H. Teaching of Biological Science. 1-15 Unit.**

Open to upper-division undergraduates and graduate students. Practical experience in teaching lab biology or serving as an assistant in a lecture course. Prerequisite: consent of instructor.nn (Staff).

**BIOHOPK 299H. Advanced Topics in Marine Conservation. 2 Units.**

Graduate students only. Topics will change from year to year but will include such topics as sustainable fisheries, protected areas, ocean planning, social-ecological systems, dynamic management, sustainable seafood, and impacts of climate change.

**BIOHOPK 300H. Research. 1-15 Unit.**

Graduate study involving original work undertaken with staff in the fields indicated. B. Block: Comparative Vertebrate Physiology (biomechanics, metabolic physiology and phylogeny of pelagic fishes, evolution of endothermy); L. Crowder: Marine ecology, fisheries, bycatch, integrating science and policy, marine conservation; G. De Leo: Population dynamics and management, wildlife diseases, environmental policies and sustainable development; M. Denny: Biomechanics (the mechanical properties of biological materials and their consequences for animal size, shape, and performance); W. Gilly: Neurobiology (analysis of giant axon systems in marine invertebrates from molecular to behavioral levels); J. Goldbogen: Physiological and Behavioral Ecology (functional morphology and biomechanics of marine organisms); C. Lowe: Evolution of Development (origin of chordates, early evolution of body plans); F. Micheli: Marine Ecology (species interactions and community ecology, scale-dependent aspects of community organization, marine conservation and design of multi-species marine protected areas, behavioral ecology); S. Palumbi: Molecular Evolution (mechanisms of speciation, genetic differentiations of populations, use of molecular tools in conservation biology, design of marine protected areas); S. Thompson: Neurobiology (neuronal control of behavior and mechanisms of ion permeation, signal transduction, calcium homeostasis, and neurotransmission); J. Watanabe: Marine Ecology (kelp forest ecology and invertebrate zoology).

**BIOHOPK 315H. Career Development for Graduate Students. 2 Units.**

The course will cover multiple skills required to succeed in graduate school and beyond, including fund raising, publishing, selecting career options, job application and negotiation, and teaching, through lectures, group discussions, and practical exercises.

**BIOHOPK 320H. Physical Biology. 3 Units.**

Physics, mathematics, and biology are often studied as separate subjects. In this two-week intensive course we will attempt to bring them together in a dynamic combination of lectures and hands on projects. We will draw on the diverse flora and fauna of Monterey Bay for our experimental organisms, and will take advantage of the facilities at Hopkins Marine Station to explore questions at levels ranging from molecules to ecological communities.

**BIOHOPK 323H. Stanford at Sea. 16 Units.**

(Graduate students register for 323H.) Five weeks of marine science including oceanography, marine physiology, policy, maritime studies, conservation, and nautical science at Hopkins Marine Station, followed by five weeks at sea aboard a sailing research vessel in the Pacific Ocean. Shore component comprised of three multidisciplinary courses meeting daily and continuing aboard ship. Students develop an independent research project plan while ashore, and carry out the research at sea. In collaboration with the Sea Education Association of Woods Hole, MA. Only 6 units may count towards the Biology major. Same as: BIOHOPK 182H, EARTHYSYS 323, ESS 323

**BIOHOPK 330H. Scientific Writing. 2 Units.**

This writer's seminar will workshop the elements of good scientific writing by focusing on a paper's Introduction. We will chart the elements of an effective Introduction, designed for different audiences and types of scientific journals. The course will provide participants with the chance to craft an Introduction to a current paper or proposal and have it evaluated in light of the ideal structure we define.

**BIOHOPK 43. Plant Biology, Evolution, and Ecology. 5 Units.**

Introduction to biology in a marine context. Principles of plant biology: physiology, structure, diversity. Principles of evolution: macro and microevolution, population genetics. Ecology: the principles governing the distribution and abundance of organisms; population, community, and ecosystem ecology. Equivalent to BIO 43. Corequisite: BIOHOPK 47.

**BIOHOPK 47. Introduction to Research in Ecology and Ecological Physiology. 5 Units.**

This course is a field-based inquiry into rocky intertidal shores that introduces students to ecology and environmental physiology and the research methods used to study them. Students will learn how to detect patterns quantitatively in nature through appropriate sampling methods & statistical analysis. Following exploration of appropriate background material in class and through exploration of the scientific literature, students will learn how to formulate testable hypotheses regarding the underlying causes of the patterns they discern. A variety of different aspects of ecology and physiology will be investigated cooperatively by the students during the quarter, culminating in development of an individual final paper in the form of a research proposal based on data collected during the course. The course will provide a broad conceptual introduction to the underlying biological principles that influence adaptation to the planet's dynamic habitats, as well as inquiry-based experience in how to explore and understand complex systems in nature. This course fulfills the same laboratory requirement as BIO 47. Satisfies WIM in Biology.

**BIOHOPK 801H. TGR Project. 0 Units.****BIOHOPK 802H. TGR Dissertation. 0 Units.****BIOHOPK 81. Introduction to Ecology. 4 Units.**

The course is designed to provide background on key concepts in ecology, familiarize students with key ecological processes and ecosystems, and the methods used in ecological studies. The course will further build students' skills in critical scientific thinking, reading the literature, and scientific communication. A major goal of the course is to train students to ask questions in ecology, and to design, conduct and report studies addressing these questions. Thus, emphasis is also placed, in addition to general ecological concepts, on field observations, experimental design, and the analysis, interpretation and presentation of ecological data (through computer laboratories, written assignments and presentations). Written assignments, presentations and discussions are designed to provide experience in organizing and presenting information and to expose students to multiple perspectives on ecological processes and their applications. This course fulfills the same requirement as BIO 81.

**BIOHOPK 84. Physiology. 4 Units.**

This course will examine basic physiological systems of vertebrate and invertebrate animals, including nerve and muscle, heart and circulation, kidney and osmoregulation, metabolism, and thermoregulation. This course fulfills the same requirement as BIO 84.

**BIOHOPK 85. Evolution. 4 Units.**

Principles of micro- and macro-evolution from molecular genetics to the development of biological diversity. Adaptation, divergence and natural selection in the past and in contemporary ecological settings. Evolution of humans and human-caused evolution. Emphasis on major body plans in the sea and ocean examples of major evolutionary processes. This course fulfills the same requirements as BIO 85.

## Biology (BIO)

### **BIO 104. Advanced Molecular Biology. 5 Units.**

Molecular mechanisms that govern the replication, recombination, and expression of eukaryotic genomes. Topics: DNA replication, DNA recombination, gene transcription, RNA splicing, regulation of gene expression, protein synthesis, and protein folding. Satisfies Central Menu Area 1. Prerequisite: Biology core. Same as: BIO 200

### **BIO 105A. Ecology and Natural History of Jasper Ridge Biological Preserve. 4 Units.**

Formerly 96A - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology, land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRBP community after the course. Same as: EARTHSYS 105A

### **BIO 105B. Ecology and Natural History of Jasper Ridge Biological Preserve. 4 Units.**

Formerly 96B - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology, land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRBP community after the course. Same as: EARTHSYS 105B

### **BIO 107. Human Physiology Laboratory. 4 Units.**

This laboratory course is active and inquiry based. Aspects of exercise and temperature are explored; however, the specific questions the class tackles differ each quarter. Samples of past questions: Does lactic acid accumulation correlate with exercise fatigue at different exercise and body temperatures? Does palm cooling during exercise mitigate the effect of body temperature on fatigue with or without evaporative cooling? Students participate both as experimenters and as subjects of the experiments in two-person teams. Participants must be in good physical condition, though not necessarily athletes, and must be willing to participate in strenuous exercise routines under adverse environmental conditions. Varsity athletes concurrently participating in a spring sport must consult the instructor before applying. Discussion sessions include student presentations of journal articles, data analyses, and feedback on individual WIM research proposals. By application only, see [sites.stanford.edu/bio107humbio136](https://sites.stanford.edu/bio107humbio136) for the application form. Prerequisite: Bio 42 or HumBio 4A. Satisfies WIM for Biology. Same as: HUMBIO 136

### **BIO 108. Essential Statistics for Human Biology. 4 Units.**

Introduction to statistical concepts and methods that are essential to the study of questions in biology, environment, health and related areas. The course will teach and use the computer language R and Python (you learn both, choose one). Topics include distributions, probabilities, likelihood, linear models; illustrations will be based on recent research. Same as: HUMBIO 85A

### **BIO 109A. The Human Genome and Disease. 3 Units.**

The variability of the human genome and the role of genomic information in research, drug discovery, and human health. Concepts and interpretations of genomic markers in medical research and real life applications. Human genomes in diverse populations. Original contributions from thought leaders in academia and industry and interaction between students and guest lecturers. Students with a major, minor or coterm in Biology: 109A/209A or 109B/209B may count toward degree program but not both. Same as: BIOC 109A, BIOC 209A, HUMBIO 158

### **BIO 109B. The Human Genome and Disease: Genetic Diversity and Personalized Medicine. 3 Units.**

Continuation of 109A/209A. Genetic drift: the path of human predecessors out of Africa to Europe and then either through Asia to Australia or through northern Russia to Alaska down to the W. Coast of the Americas. Support for this idea through the histocompatibility genes and genetic sequences that predispose people to diseases. Guest lectures from academia and pharmaceutical companies. Prerequisite: Biology or Human Biology core. Students with a major, minor or coterm in Biology: 109A/209A or 109B/209B may count toward degree program but not both. Same as: BIOC 109B

### **BIO 10AX. Conservation Photography. 2 Units.**

Account of the genre of conservation photography and strategic use of visual communication in the environmental arena. Introduction to use of digital SLR cameras and digital image processing. Case studies of conservation issues accompanied by multimedia platforms including images, video, and audio. Theory and application of photographic techniques. Lectures, tutorials, demonstrations, and field trips. Individual and group projects.

**BIO 10SC. Natural History, Marine Biology, and Research. 2 Units.**

Monterey Bay is home to the nation's largest marine sanctuary and also home to Stanford's Hopkins Marine Station. This course, based at Hopkins, explores the spectacular biology of Monterey Bay and the artistic and political history of the region. We will conduct investigations across all of these contexts toward an inclusive understanding of place, ultimately to lead us to explore our own lives in relation to the natural world, historical and cultural milieu, and the direction of our individual life path. The location at the entry point to the Big Sur Coast of California provides a unique outdoor laboratory in which to study the biology of the bay and the adjacent coastal lands. It is also an area with a deep cultural, literary and artistic history. We will meet marine biologists, experts in the literary history of Cannery Row and the writings of John Steinbeck, local artists and photographers, experts in the neuroscience of creativity, as well as people who are very much involved in the forces and fluxes that steer modern culture. This rich and immersive approach provides students a rare opportunity to reflect on their relationships to nature, culture, and their own individual goals. The course emphasizes interactions and discussions. We will be together all of the time, either at our base at the Belden House in Pacific Grove, hiking and camping in Big Sur's pristine Big Creek Reserve on the rocky coast, and traveling to the Tassajara Mountain Zen Center in the Ventana wilderness for several days. This is not an ordinary academic experience, instead it is an adventure of a personal, intellectual, spiritual and physical kind. We welcome people with wide interests; artists, poets, writers, engineers, scientists and musicians. Mostly we invite people with an open mind and a sense of adventure. Students are expected to have read the several books provided as introductory material before the course begins, and each is also expected to become our local expert in an area such as plant identification, bird identification, poetry, weather prediction, photography, history, ethnography, etc. The course requires an individual research project of your choice on a topic related to the general theme. Final reports will be presented at the last meeting of the group and may involve any medium, including written, oral, and performance media. Note: This course will be held at the Hopkins Marine Station in the Monterey region, and housing will be provided nearby. Transportation from campus to the housing site will be provided once students arrive to campus on Monday, September 4 (Labor Day). Transportation to campus from the Belden House in Pacific Grove will be provided on Saturday, September 23.

**BIO 110. Chromatin Regulation of the Genome. 3 Units.**

Maintenance of the genome is a prerequisite for life. In eukaryotes, all DNA-templated processes are tightly connected to chromatin structure and function. This course will explore epigenetic and chromatin regulation of cellular processes related to aging, cancer, stem cell pluripotency, metabolic homeostasis, and development. Course material integrates current literature with a foundational review of histone modifications and nucleosome composition in epigenetic inheritance, transcription, replication, cell division and DNA damage responses. Prerequisite: BIO 41 or consent of instructor. Same as: BIO 210

**BIO 112. Human Physiology. 4 Units.**

Human physiology will be examined by organ systems: cardiovascular, respiratory, renal, gastrointestinal and endocrine. Molecular and cell biology and signaling principles that underlie organ development, pathophysiology and opportunities for regenerative medicine are discussed, as well as integrative control mechanisms and fetal development. Prerequisite: Human Biology core, Biology core, or equivalent, or consent of instructor. Same as: HUMBIO 133

**BIO 113. Fundamentals of Molecular Evolution. 4 Units.**

The inference of key molecular evolutionary processes from DNA and protein sequences. Topics include random genetic drift, coalescent models, effects and tests of natural selection, combined effects of linkage and natural selection, codon bias and genome evolution. Satisfies Central Menu Areas 1 or 4. Prerequisites: Biology core or graduate standing in any department, and consent of instructor. Same as: BIO 244

**BIO 115. The Hidden Kingdom - Evolution, Ecology and Diversity of Fungi. 4 Units.**

Fungi are critical, yet often hidden, components of the biosphere. They regulate decomposition, are primary partners in plant symbiosis and strongly impact agriculture and economics. Students will explore the fascinating world of fungal biology, ecology and evolution via lecture, lab, field exercises and Saturday field trips that will provide traditional and molecular experiences in the collection, analysis and industrial use of diverse fungi. Students will choose an environmental niche, collect and identify resident fungi, and hypothesize about their community relationship. Prerequisite: Bio 43 recommended. Same as: BIO 239

**BIO 116. Ecology of the Hawaiian Islands. 4 Units.**

Terrestrial and marine ecology and conservation biology of the Hawaiian Archipelago. Taught in the field in Hawaii as part of quarter-long sequence of courses including Earth Sciences and Anthropology. Topics include ecological succession, plant-soil interactions, conservation biology, biological invasions and ecosystem consequences, and coral reef ecology. Restricted to students accepted into the Earth Systems of Hawaii Program. Same as: EARTHSYS 116

**BIO 117. Biology and Global Change. 4 Units.**

The biological causes and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial and freshwater ecosystems. Topics: glacial cycles and marine circulation, greenhouse gases and climate change, tropical deforestation and species extinctions, and human population growth and resource use. Prerequisite: Biology or Human Biology core or graduate standing. Same as: EARTHSYS 111, ESS 111

**BIO 118. Genetic Analysis of Biological Processes. 4 Units.**

Focus is on using mutations and genetic analysis to study biological and medical questions. The first portion of the course covers how the identification and analysis of mutations can be used in model systems to investigate biological processes such as development and metabolism. In the second portion of the course, we focus on the use of existing genetic variation in humans and other species to identify disease-associated genes as well as to investigate variation in morphological traits such as body size and shape. This course will be offered for a final time in Winter 2017-18 and then discontinued. Students who have taken BIO 82 may not enroll in BIO 118.

**BIO 119. Evolution of Marine Ecosystems. 3-4 Units.**

Life originally evolved in the ocean. When, why, and how did the major transitions occur in the history of marine life? What triggered the rapid evolution and diversification of animals in the Cambrian, after more than 3.5 billion years of Earth's history? What caused Earth's major mass extinction events? How do ancient extinction events compare to current threats to marine ecosystems? How has the evolution of primary producers impacted animals, and how has animal evolution impacted primary producers? In this course, we will review the latest evidence regarding these major questions in the history of marine ecosystems. We will develop familiarity with the most common groups of marine animal fossils. We will also conduct original analyses of paleontological data, developing skills both in the framing and testing of scientific hypotheses and in data analysis and presentation. Same as: EARTHSYS 122, GS 123, GS 223B

**BIO 120. Bacteria in Health and Disease. 3 Units.**

Enrollment limited to junior and senior undergraduates, graduate students and medical students. Introduces students to the bacteria that live in and on humans and, in some cases, can cause disease and sometimes death. Topics include the biology of the interaction of the simple microbe with complex human biology and the factors that determine whether or not we coexist relatively peacefully, suffer from overt disease, or succumb to the bacterial onslaught.

Same as: MI 120

**BIO 124. Topics in Cancer Biology. 3 Units.**

This discussion-based course will explore the scientific tools used to study the molecular and genetic basis of cancer and to develop treatments for this disease. Topics covered may include cancer models, traditional and targeted cancer therapies, and the development of resistance to treatment. Students will develop skills in critical reading of primary research articles and will also complete a final project. Prerequisites: Biology/Human Biology core or equivalent or consent of instructor.

**BIO 125. Ecophysiology and Land Surface Processes. 4 Units.**

Ecological and physical processes of ecosystem function, spanning from the micrometer scale of plant physiological processes to the ecosystem and global scale. Emphasizes interactions between ecological processes and the physical world at the land surface and in the atmosphere.

Same as: ESS 123, ESS 223

**BIO 126. Introduction to Biophysics. 3-4 Units.**

Core course appropriate for advanced undergraduate students and graduate students with prior knowledge of calculus and a college physics course. Introduction to how physical principles offer insights into modern biology, with regard to the structural, dynamical, and functional organization of biological systems. Topics include the roles of free energy, diffusion, electromotive forces, non-equilibrium dynamics, and information in fundamental biological processes.

Same as: APPPHYS 205, BIO 226

**BIO 12N. Sensory Ecology of Marine Animals. 3 Units.**

Animals living in the oceans experience a highly varied range of environmental stimuli. An aquatic lifestyle requires an equally rich range of sensory adaptations, including some that are totally foreign to us. In this course we will examine sensory system in marine animals from both an environmental and behavioral perspective and from the point of view of neuroscience and information systems engineering.

**BIO 131. Complex Systems Lab. 1 Unit.**

Applications of complex systems will be explored in this seminar through lectures, discussions, and a class project. Lecture topics include a discussion of chaos in weather modeling and aircraft turbulence, application of network science to understand Ebola and the ALS ice bucket challenge, and self-organized processes such as crowd dynamics and Wikipedia. The first half of the course will emphasize complex systems applications. Students will apply complex systems analysis techniques to their personal research, a current event, or repeat a classic complex systems experiment. Projects can include topics such as calculating the fractal dimension of a forest, simulating crowd dynamics, studying the degree distribution of social networks, or making a Van der Pol oscillator. Graduate student led seminar. Can be repeated for credit.

**BIO 132. Advanced Imaging Lab in Biophysics. 4 Units.**

Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, microendoscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor.

Same as: APPPHYS 232, BIO 232, BIOPHYS 232, GENE 232

**BIO 133. Network analysis for community ecology and conservation research. 2 Units.**

Graduate student led seminar. Plant-pollinator, predator-prey, and parasite-host are all examples of species interactions that can be analyzed using species interaction networks. Network analysis is an incredible tool to understand how ecological communities are impacted by environmental stressors like human development and climate change. In this class, we will review and discuss relevant scientific literature and learn how to manipulate, visualize, and interpret species interaction network data. Students will develop grant-writing skills by producing a culminating research proposal and we will take a field trip to practice species interaction sampling techniques. Prerequisites: BIO 43 or BIO 81 or BIO 85.

**BIO 137. Plant Genetics. 3-4 Units.**

Gene analysis, mutagenesis, transposable elements; developmental genetics of flowering and embryo development; biochemical genetics of plant metabolism; scientific and societal lessons from transgenic plants. Satisfies Central Menu Area 2. Prerequisite: Biology core or consent of instructor. Satisfies WIM in Biology.

**BIO 138. Ecosystem Services: Frontiers in the Science of Valuing Nature. 3 Units.**

This advanced course explores the science of valuing nature, beginning with its historical origins, and then its recent development in natural (especially ecological), economic, psychological, and other social sciences. We will use the ecosystem services framework (characterizing benefits from ecosystems to people) to define the state of knowledge, core methods of analysis, and research frontiers, such as at the interface with biodiversity, resilience, human health, and human development. Intended for diverse students, with a focus on research and real-world cases. To apply, please email the instructor (gdaily@stanford.edu) with a brief description of your background and research interests.

Same as: BIO 238, EARTHSYS 139, EARTHSYS 239

**BIO 141. Biostatistics. 3-5 Units.**

Introductory statistical methods for biological data: describing data (numerical and graphical summaries); introduction to probability; and statistical inference (hypothesis tests and confidence intervals). Intermediate statistical methods: comparing groups (analysis of variance); analyzing associations (linear and logistic regression); and methods for categorical data (contingency tables and odds ratio). Course content integrated with statistical computing in R.

Same as: STATS 141

**BIO 142. Molecular Geomicrobiology Laboratory. 4 Units.**

In this course, students will be studying the biosynthesis of cyclic lipid biomarkers, molecules that are produced by modern microbes that can be preserved in rocks that are over a billion years old and which geologists use as molecular fossils. Students will be tasked with identifying potential biomarker lipid synthesis genes in environmental genomic databases, expressing those genes in a model bacterial expression system in the lab, and then analyzing the lipid products that are produced. The overall goal is for students to experience the scientific research process including generating hypotheses, testing these hypotheses in laboratory experiments, and communicating their results through a publication style paper. Prerequisites: BIO83 and CHEM35 or permission of the instructor.

Same as: EARTHSYS 143, ESS 143, ESS 243

**BIO 144. Conservation Biology: A Latin American Perspective. 3 Units.**

Principles and application of the science of preserving biological diversity. Conceptually, this course is designed to explore 4 major components relevant to the conservation of biodiversity, as exemplified by the Latin American region. The conceptual frameworks and principles, however, should be generally applicable, and provide insights for all regions of the world, including those of lesser biodiversity. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: BIO 101, or BIO 43 or HUMBIO 2A with consent of instructor. Graduate level students will be expected to conduct a literature research exercise leading to a written paper, addressing a topic of their choosing, derived from any of the themes discussed in class.

Same as: BIO 234, HUMBIO 112

**BIO 145. Ecology and Evolution of Animal Behavior. 3 Units.**

Ecological and evolutionary perspectives on animal behavior, with an emphasis on social and collective behavior. This is a project-based course in a lecture/seminar format. Seminars will be based on discussion of journal articles. Independent research projects on the behavior of animals on campus. Prerequisites: Biology or Human Biology core, Biology/ES 30. Recommended: statistics.

Same as: BIO 245

**BIO 146. Population Studies. 1 Unit.**

Series of talks by distinguished speakers introducing approaches to population and resource studies.

**BIO 149. The Neurobiology of Sleep. 4 Units.**

Preference to seniors and graduate students. The neurochemistry and neurophysiology of changes in brain activity and conscious awareness associated with changes in the sleep/wake state. Behavioral and neurobiological phenomena including sleep regulation, sleep homeostasis, circadian rhythms, sleep disorders, sleep function, and the molecular biology of sleep. Enrollment limited to 16.

Same as: BIO 249, HUMBIO 161

**BIO 150. Human Behavioral Biology. 5 Units.**

Multidisciplinary. How to approach complex normal and abnormal behaviors through biology. How to integrate disciplines including sociobiology, ethology, neuroscience, and endocrinology to examine behaviors such as aggression, sexual behavior, language use, and mental illness.

Same as: HUMBIO 160

**BIO 151. Mechanisms of Neuron Death. 3 Units.**

For Biology majors with background in neuroscience. Cell and molecular biology of neuron death during neurological disease. Topics: the amyloid diseases (Alzheimer's), prion diseases (kuru and Creutzfeldt-Jakob), oxygen radical diseases (Parkinson's and ALS), triplet repeat diseases (Huntington's), and AIDS-related dementia. Student presentations. Enrollment limited to 15; application required.

**BIO 152. Imaging: Biological Light Microscopy. 3 Units.**

This intensive laboratory and discussion course will provide participants with the theoretical and practical knowledge to utilize emerging imaging technologies based on light microscopy. Topics include microscope optics, resolution limits, Köhler illumination, confocal microscopy, fluorescence, two-photon, TIRF, FRET, photobleaching, super-resolution (SIM, STED, STORM/PALM), and live-cell imaging. Applications include using fluorescent probes to analyze subcellular localization and live cell-translocation dynamics. We will be using a flipped classroom for the course in that students will watch iBiology lectures before class, and class time will be used for engaging in extensive discussion. Lab portion involves extensive in-class use of microscopes in the Stanford Cell Sciences Imaging Facility (CSIF) and Neuroscience Microscopy Core (NMS) microscopy facilities. Monday/Wednesday 1:30-2:50PM, Friday 1:30-4:30PM for 6 weeks (Apr. 2 - May 9), 3 units.

Same as: CSB 222, MCP 222

**BIO 153. Cellular Neuroscience: Cell Signaling and Behavior. 4 Units.**

Neural interactions underlying behavior. Prerequisites: PSYCH 1 or basic biology.

Same as: PSYCH 120

**BIO 154. Molecular and Cellular Neurobiology. 4 Units.**

For advanced undergraduate students. Cellular and molecular mechanisms in the organization and functions of the nervous system. Topics: wiring of the neuronal circuit, synapse structure and synaptic transmission, signal transduction in the nervous system, sensory systems, molecular basis of behavior including learning and memory, molecular pathogenesis of neurological diseases. Satisfies Central Menu Areas 2 or 3 for Bio majors. Prerequisite for undergraduates: Biology core or equivalent, or consent of instructors.

**BIO 156. Epigenetics. 2 Units.**

Epigenetics is the process by which phenotypes not determined by the DNA sequence are stably inherited in successive cell divisions. Course will cover the molecular mechanisms governing epigenetics, ranging from the discovery of epigenetic phenomena to present-day studies on the role of chromatin, DNA methylation, and RNA in regulating epigenetics processes. Topics include: position effect gene expression, genome regulation, gene silencing & heterochromatin, histone code, DNA methylation & imprinting, epigenetics & disease, and epigenetic-based therapeutics. Prerequisite: BIO41 and BIO42 or consent of instructor, advanced biology course such as Bio104.

Same as: BIO 256

**BIO 157. Biochemistry and Molecular Biology of Plants. 3-4 Units.**

Biochemical and molecular basis of plant growth and adaptation. Topics include: hormone signal transduction; photoreceptor chemistry and signaling; metabolite sensing and transport; dynamics of photosynthesis; plant innate immunity and symbiosis. Lectures and readings will emphasize research methods. Prerequisite: Biology core or equivalent, or consent of instructor.

Same as: BIO 257

**BIO 158. Developmental Neurobiology. 4 Units.**

For advanced undergraduates and coterminal students. The principles of nervous system development from the molecular control of patterning, cell-cell interactions, and trophic factors to the level of neural systems and the role of experience in influencing brain structure and function. Topics: neural induction and patterning cell lineage, neurogenesis, neuronal migration, axonal pathfinding, synapse elimination, the role of activity, critical periods, and the development of behavior. Satisfies Central Menu Areas 2 or 3. Prerequisite: BIO 42 or equivalent.

Same as: BIO 258

**BIO 16. Conservation Storytelling: Pre-course for BOSP South Africa. 1 Unit.**

Limited to students admitted to the BOSP South Africa overseas seminar. Through 4 workshop meetings, students will develop and pitch story ideas, form teams in which a writer and a photographer agree to collaborate on a story, and conduct background research prior to departing for South Africa.

**BIO 160. Developmental Biology. 4 Units.**

This course will cover the molecular mechanisms underlying the generation of diverse cell types and tissues during embryonic and post-embryonic animal development. Topics include the role of cell-cell communication in controlling developmental decisions, the organization and patterning of large groups of cells via morphogen signaling, the specification of individual cell types, and the role of stem cells in development. The course emphasizes the experimental logic and methods of research in developmental biology and includes discussions of research papers.

**BIO 165. Molecular and Cellular Mechanisms of Neurological Disease. 1 Unit.**

Current topics in research and investigative therapies of neurological disorders, including epilepsy, OCD, Alzheimer's disease, stroke and multiple sclerosis. Analysis and discussion of primary research papers as well as sources directed at general public. Emphasis on critical thinking, experimental design, therapeutic approaches. Guest lecturers include Dr. Lawrence Steinman and Dr. Gary Steinberg."

**BIO 167. Insulin and carbohydrate metabolism in health and disease a history of advances 1850 to current. 3 Units.**

The quest to understand how the body uses sugar and the overlapping quest for a diabetes cure have resulted in discoveries in every branch of biology. Topics include insulin production, structure, and evolution; transduction of the insulin signal; transport of sugar into cells; sugar storage and release; how the brain transports and uses sugar; growth control; pancreas development; genetic and environmental causes of diabetes; engineering solutions to diabetes (artificial pancreas, stem cells), glucose homeostasis (modeling insulin action). Prerequisites: BIO 41, 42.

**BIO 168. Explorations in Stem Cell Biology. 3 Units.**

A discussion-based course for advanced undergraduates. The purpose of this course is to introduce students to key topics in stem cell biology and foster the development of strong scientific writing skills. We will review and discuss some landmark and current primary literature in the stem cell field. Topics will include embryonic and adult stem cells, cellular reprogramming and stem cells in disease and regenerative medicine. Students will present a current research paper in their preferred stem cell topic area and compose a novel research proposal. Prerequisites: Biology or Human Biology core. Satisfies WIM in Biology.

**BIO 171. Principles of Cell Cycle Control. 3 Units.**

Genetic analysis of the key regulatory circuits governing the control of cell division. Illustration of key principles that can be generalized to other synthetic and natural biological circuits. Focus on tractable model organisms; growth control; irreversible biochemical switches; chromosome duplication; mitosis; DNA damage checkpoints; MAPK pathway-cell cycle interface; oncogenesis. Analysis of classic and current primary literature. Satisfies Central Menu Area 2. Same as: BIO 271, CSB 271

**BIO 173. Chemical Biology. 3 Units.**

Chemical biology is an integrative discipline that seeks to apply chemical tools and approaches to understand biology. This course will introduce students to various methods and approaches used in this field, with an emphasis on the use of natural products and synthetic small molecules as probes of biological function. Specific examples will be used to illustrate the ramifications of chemical biology with molecular, cell and developmental biology. The interaction between disease and drug discovery will be considered in detail. Prerequisites: Completion of BioCore (BIO 41, 42, 43).

**BIO 174. Human Skeletal Anatomy. 5 Units.**

Study of the human skeleton (a. k. a. human osteology), as it bears on other disciplines, including medicine, forensics, archaeology, and paleoanthropology (human evolution). Basic bone biology, anatomy, and development, emphasizing hands-on examination and identification of human skeletal parts, their implications for determining an individual's age, sex, geographic origin, and health status, and for the evolutionary history of our species. Three hours of lecture and at least three hours of supervised and independent study in the lab each week. Same as: ANTHRO 175, ANTHRO 275, BIO 274, HUMBIO 180

**BIO 175. Collective Behavior and Distributed Intelligence. 3 Units.**

This course will explore possibilities for student research projects based on presentations of faculty research. We will cover a broad range of topics within the general area of collective behavior, both natural and artificial. Students will build on faculty presentations to develop proposals for future projects. Same as: SYMSYS 275

**BIO 177. Plant Microbe Interaction. 3 Units.**

Molecular basis of plant symbiosis and pathogenesis. Topics include mechanisms of recognition and signaling between microbes and plant hosts, with examples such as the role of small molecules, secreted peptides, and signal transduction pathways in symbiotic or pathogenic interactions. Readings include landmark papers together with readings in the contemporary literature. Prerequisites: Biology core and two or more upper division courses in genetics, molecular biology, or biochemistry. Recommended: plant genetics or plant biochemistry. Same as: BIO 277

**BIO 178. Microbiology Literature. 3 Units.**

For advanced undergraduates and first-year graduate students. Critical reading of the research literature in prokaryotic genetics and molecular biology, with particular applications to the study of major human pathogens. Classic and foundational papers in pathogenesis, genetics, and molecular biology; recent literature on bacterial pathogens such as *Salmonella*, *Vibrio*, and/or *Yersinia*. Diverse experimental approaches: biochemistry, genomics, pathogenesis, and cell biology. Prerequisites: Biology Core and two upper-division courses in genetics, molecular biology, or biochemistry. Same as: BIO 278

**BIO 180. Microbial Physiology. 3 Units.**

Introduction to the physiology of microbes including cellular structure, transcription and translation, growth and metabolism, mechanisms for stress resistance and the formation of microbial communities. These topics will be covered in relation to the evolution of early life on Earth, ancient ecosystems, and the interpretation of the rock record. Recommended: introductory biology and chemistry. Same as: EARTHSYS 255, ESS 255, GS 233A

**BIO 182. Modeling Cultural Evolution. 3 Units.**

Seminar. Quantitative models for the evolution of socially transmitted traits. Rates of change of learned traits in populations and patterns of cultural diversity as a function of innovation and cultural transmission. Learning in constant and changing environments. Possible avenues for gene-culture coevolution. Same as: BIO 282

**BIO 183. Theoretical Population Genetics. 3 Units.**

Models in population genetics and evolution. Selection, random drift, gene linkage, migration, and inbreeding, and their influence on the evolution of gene frequencies and chromosome structure. Models are related to DNA sequence evolution. Prerequisites: calculus and linear algebra, or consent of instructor. Same as: BIO 283



**BIO 196A. Biology Senior Reflection. 3 Units.**

Capstone course series for seniors. Creative, self-reflective and scientifically relevant projects conceived, produced and exhibited over the course of three quarters. Explore scientific content of personal interest through creative forms including but not limited to writing, music, fine arts, performing arts, photography, film or new media. A written essay on the creative process and scientific significance of the selected topic will accompany the creative work. Completed projects may be included in a creative portfolio. Required enrollment in 196A,B,C. Satisfies WIM in Biology.

**BIO 196B. Biology Senior Reflection. 3 Units.**

Capstone course series for seniors. Creative, self-reflective and scientifically relevant projects conceived, produced and exhibited over the course of three quarters. Explore scientific content of personal interest through creative forms including but not limited to writing, music, fine arts, performing arts, photography, film or new media. A written essay on the creative process and scientific significance of the selected topic will accompany the creative work. Completed projects may be included in a creative portfolio. Required enrollment in 196A,B,C.

**BIO 196C. Biology Senior Reflection. 3 Units.**

Capstone course series for seniors. Creative, self-reflective and scientifically relevant projects conceived, produced and exhibited over the course of three quarters. Explore scientific content of personal interest through creative forms including but not limited to writing, music, fine arts, performing arts, photography, film or new media. A written essay on the creative process and scientific significance of the selected topic will accompany the creative work. Completed projects may be included in a creative portfolio. Required enrollment in 196A,B,C.

**BIO 197WA. Senior Writing Project: The Personal Essay in Biology. 3 Units.**

Seminar focused on writing. Compose, workshop and revise scientifically relevant and personal essays in biology directed at a mainstream audience, interweaving research, interview, memoir, and other elements of nonfiction craft. Satisfies WIM in Biology.

**BIO 198. Directed Reading in Biology. 1-15 Unit.**

Individually arranged under the supervision of members of the faculty.

**BIO 198X. Out-of-Department Directed Reading. 1-15 Unit.**

Individually arranged under the supervision of members of the faculty. Credit for work arranged with out-of-department faculty is restricted to Biology majors and requires department approval. See <https://biology.stanford.edu/academics/undergraduate-research/directed-reading> for information and petitions. May be repeated for credit.

**BIO 199. Advanced Research Laboratory in Experimental Biology. 1-15 Unit.**

Individual research taken by arrangement with in-department instructors. See <http://biohonors.stanford.edu> for information on research sponsors, units, and credit for summer research. May be repeated for credit.

**BIO 199W. Senior Honors Thesis: How to Effectively Write About Scientific Research. 3 Units.**

Workshop. For seniors pursuing an honors thesis in a biology-focused major or program. Focus on improving scientific writing and synthesizing in the context of students' individual research projects. Complete literature review which will form the basis for the thesis introduction. Develop methods section of the thesis. Small seminar-style discussion sections with research-based discussions, student led PowerPoint presentations, and writing workshops. Co-requisite: Concurrent enrollment in 199 or 199X or equivalent. Satisfies WIM in Biology.

**BIO 199X. Out-of-Department Advanced Research Laboratory in Experimental Biology. 1-15 Unit.**

Individual research by arrangement with out-of-department instructors. Credit for 199X is restricted to declared Biology majors and requires department approval. See <https://biology.stanford.edu/academics/undergraduate-research/research> for information on research sponsors, units, petitions, deadlines, credit for summer research, and out-of-Stanford research. May be repeated for credit.

**BIO 200. Advanced Molecular Biology. 5 Units.**

Molecular mechanisms that govern the replication, recombination, and expression of eukaryotic genomes. Topics: DNA replication, DNA recombination, gene transcription, RNA splicing, regulation of gene expression, protein synthesis, and protein folding. Satisfies Central Menu Area 1. Prerequisite: Biology core. Same as: BIO 104

**BIO 202. Ecological Statistics. 3 Units.**

Intended for graduate students (and advanced undergraduates in special circumstances with consent of instructors) in biology and related environmental sciences, this course is an introduction to statistical methods for ecological data analysis, using the programming language R. The course will have lectures, discussions, and independent research projects using the students' own data or simulated or publicly available data.

**BIO 204. Neuroplasticity: From Synapses to Behavior. 3 Units.**

This course will focus on neuroplasticity from a broad perspective, from molecular cellular mechanism to its involvement in behavior and diseases. Emphasis will be on: a) molecular and cellular mechanisms underlying various forms of neuroplasticity; b) the neuroplasticity during brain development; c) the neuroplasticity in adult brain with respect to learning and memory; and d) maladaptive neuroplasticity in neurodegenerative disease and drug addiction. This course is designed for Ph.D. students from both the Biology and Neuroscience programs. Open to advanced undergraduates by consent of instructor.

**BIO 208. Spanish in Science/Science in Spanish. 2 Units.**

For graduate and undergraduate students interested in the natural sciences and the Spanish language. Students will acquire the ability to communicate in Spanish using scientific language and will enhance their ability to read scientific literature written in Spanish. Emphasis on the development of science in Spanish-speaking countries or regions. Course is conducted in Spanish and intended for students pursuing degrees in the sciences, particularly disciplines such as ecology, environmental science, sustainability, resource management, anthropology, and archeology. Same as: EARTHSYS 207

**BIO 21. The Science of the Extreme Life of the Sea. 3 Units.**

Based on the book *Extreme Life of the Sea*, this course will explore the new science about how marine species thrive in some of the world's most difficult environments. Species that live in the hottest, coldest, deepest and shallowest habitats will be described along with the genetic, biochemical, physiological and behavioral adaptations that allow them to persist. A major outcome is a blending of divergent ways of thinking, the narrative of science, and training about how to craft written narratives that bring science alive to people from all backgrounds. New science demands creativity and expression demands knowledge. This course blends the two ways of thinking by establishing two parallel tracks of lecture material - the science of ocean life, and the tools of the new field of creative non-fiction.

**BIO 210. Chromatin Regulation of the Genome. 3 Units.**

Maintenance of the genome is a prerequisite for life. In eukaryotes, all DNA-templated processes are tightly connected to chromatin structure and function. This course will explore epigenetic and chromatin regulation of cellular processes related to aging, cancer, stem cell pluripotency, metabolic homeostasis, and development. Course material integrates current literature with a foundational review of histone modifications and nucleosome composition in epigenetic inheritance, transcription, replication, cell division and DNA damage responses. Prerequisite: BIO 41 or consent of instructor. Same as: BIO 110

**BIO 214. Advanced Cell Biology. 4 Units.**

For Ph.D. students. Current research on cell structure, function, and dynamics. Topics include complex cell phenomena such as cell division, apoptosis, compartmentalization, transport and trafficking, motility and adhesion, and differentiation. Weekly reading of current papers from the primary literature. Preparation of an original research proposal. Prerequisite for advanced undergraduates: BIO 129A,B, and consent of instructor. Same as: BIOC 224, MCP 221

**BIO 222. Exploring Neural Circuits. 3 Units.**

Seminar. The logic of how neural circuits control behavior; how neural circuits are assembled during development and modified by experience. Emphasis is on primary literature. Topics include: neurons as information processing units; simple and complex circuits underlying sensory information processing and motor control; and development and plasticity of neural circuits. Advanced undergraduates and graduate students with background in physical science, engineering, and biology may apply to enroll. Enrollment is by application only. Recommended: background in neuroscience.

**BIO 223. Stochastic and Nonlinear Dynamics. 3 Units.**

Theoretical analysis of dynamical processes: dynamical systems, stochastic processes, and spatiotemporal dynamics. Motivations and applications from biology and physics. Emphasis is on methods including qualitative approaches, asymptotics, and multiple scale analysis. Prerequisites: ordinary and partial differential equations, complex analysis, and probability or statistical physics. Same as: APPPHYS 223, BIOE 213

**BIO 226. Introduction to Biophysics. 3-4 Units.**

Core course appropriate for advanced undergraduate students and graduate students with prior knowledge of calculus and a college physics course. Introduction to how physical principles offer insights into modern biology, with regard to the structural, dynamical, and functional organization of biological systems. Topics include the roles of free energy, diffusion, electromotive forces, non-equilibrium dynamics, and information in fundamental biological processes. Same as: APPPHYS 205, BIO 126

**BIO 227. Foundations of Community Ecology. 2 Units.**

Discussion of classic papers in community ecology (Forbes, Clements, Gleason, Grinnell, Lindeman, Preston, Elton, Hutchinson, May, MacArthur, Odum, Connell, Paine, Tilman, etc.) and contemporary papers on related topics, to develop historical perspectives to understand current issues and identify future directions. Prerequisite for undergraduates: consent of instructor.

**BIO 230. Molecular and Cellular Immunology. 4 Units.**

Components of the immune system and their functions in immune responses in health and disease: development of the immune system; innate and adaptive immunity; structure and function of antibodies; molecular biology and biochemistry of antigen receptors and signaling pathways; cellular basis of immune responses and their regulation; genetic control of immune responses and disease susceptibility. Lectures and discussion in class and in sections. Satisfies Central Menu Areas 1 or 2. For upper class undergraduates and graduate students who have not previously taken an introductory immunology course. Prerequisite for undergraduates: Biology or Human Biology core, or consent of instructor.

**BIO 230A. Molecular and Cellular Immunology Literature Review. 1 Unit.**

Special discussion section for graduate students. Supplement to 230. Corequisite: 230.

**BIO 232. Advanced Imaging Lab in Biophysics. 4 Units.**

Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, microendoscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor. Same as: APPPHYS 232, BIO 132, BIOPHYS 232, GENE 232

**BIO 234. Conservation Biology: A Latin American Perspective. 3 Units.**

Principles and application of the science of preserving biological diversity. Conceptually, this course is designed to explore 4 major components relevant to the conservation of biodiversity, as exemplified by the Latin American region. The conceptual frameworks and principles, however, should be generally applicable, and provide insights for all regions of the world, including those of lesser biodiversity. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: BIO 101, or BIO 43 or HUMBIO 2A with consent of instructor. Graduate level students will be expected to conduct a literature research exercise leading to a written paper, addressing a topic of their choosing, derived from any of the themes discussed in class. Same as: BIO 144, HUMBIO 112

**BIO 238. Ecosystem Services: Frontiers in the Science of Valuing Nature. 3 Units.**

This advanced course explores the science of valuing nature, beginning with its historical origins, and then its recent development in natural (especially ecological), economic, psychological, and other social sciences. We will use the ecosystem services framework (characterizing benefits from ecosystems to people) to define the state of knowledge, core methods of analysis, and research frontiers, such as at the interface with biodiversity, resilience, human health, and human development. Intended for diverse students, with a focus on research and real-world cases. To apply, please email the instructor (gdaily@stanford.edu) with a brief description of your background and research interests. Same as: BIO 138, EARTHSYS 139, EARTHSYS 239

**BIO 239. The Hidden Kingdom - Evolution, Ecology and Diversity of Fungi. 4 Units.**

Fungi are critical, yet often hidden, components of the biosphere. They regulate decomposition, are primary partners in plant symbiosis and strongly impact agriculture and economics. Students will explore the fascinating world of fungal biology, ecology and evolution via lecture, lab, field exercises and Saturday field trips that will provide traditional and molecular experiences in the collection, analysis and industrial use of diverse fungi. Students will choose an environmental niche, collect and identify resident fungi, and hypothesize about their community relationship. Prerequisite: Bio 43 recommended. Same as: BIO 115

**BIO 244. Fundamentals of Molecular Evolution. 4 Units.**

The inference of key molecular evolutionary processes from DNA and protein sequences. Topics include random genetic drift, coalescent models, effects and tests of natural selection, combined effects of linkage and natural selection, codon bias and genome evolution. Satisfies Central Menu Areas 1 or 4. Prerequisites: Biology core or graduate standing in any department, and consent of instructor. Same as: BIO 113

**BIO 245. Ecology and Evolution of Animal Behavior. 3 Units.**

Ecological and evolutionary perspectives on animal behavior, with an emphasis on social and collective behavior. This is a project-based course in a lecture/seminar format. Seminars will be based on discussion of journal articles. Independent research projects on the behavior of animals on campus. Prerequisites: Biology or Human Biology core, Biology/ES 30. Recommended: statistics.  
Same as: BIO 145

**BIO 249. The Neurobiology of Sleep. 4 Units.**

Preference to seniors and graduate students. The neurochemistry and neurophysiology of changes in brain activity and conscious awareness associated with changes in the sleep/wake state. Behavioral and neurobiological phenomena including sleep regulation, sleep homeostasis, circadian rhythms, sleep disorders, sleep function, and the molecular biology of sleep. Enrollment limited to 16.  
Same as: BIO 149, HUMBIO 161

**BIO 24N. Visions of Paradise: Garden Design. 3 Units.**

Through literature readings and field trips to local gardens learn the principles and esthetics of classic garden designs: Italian Renaissance, botanical teaching, Japanese, English cottage, and others. Design a personal vision of paradise with details of species, visual and scent impact, water features, and hardscape. Open your eyes to a new appreciation of the world of plants and learn some physiology and genetics that explains the specific properties of individual species.

**BIO 254. Molecular and Cellular Neurobiology. 3-5 Units.**

For graduate students. Includes lectures for BIO 154. Cellular and molecular mechanisms in the organization and functions of the nervous system. Topics: wiring of the neuronal circuit, synapse structure and synaptic transmission, signal transduction in the nervous system, sensory systems, molecular basis of behavior including learning and memory, molecular pathogenesis of neurological diseases.  
Same as: NBIO 254

**BIO 256. Epigenetics. 2 Units.**

Epigenetics is the process by which phenotypes not determined by the DNA sequence are stably inherited in successive cell divisions. Course will cover the molecular mechanisms governing epigenetics, ranging from the discovery of epigenetic phenomena to present-day studies on the role of chromatin, DNA methylation, and RNA in regulating epigenetics processes. Topics include: position effect gene expression, genome regulation, gene silencing & heterochromatin, histone code, DNA methylation & imprinting, epigenetics & disease, and epigenetic-based therapeutics. Prerequisite: BIO41 and BIO42 or consent of instructor, advanced biology course such as Bio104.  
Same as: BIO 156

**BIO 257. Biochemistry and Molecular Biology of Plants. 3-4 Units.**

Biochemical and molecular basis of plant growth and adaptation. Topics include: hormone signal transduction; photoreceptor chemistry and signaling; metabolite sensing and transport; dynamics of photosynthesis; plant innate immunity and symbiosis. Lectures and readings will emphasize research methods. Prerequisite: Biology core or equivalent, or consent of instructor.  
Same as: BIO 157

**BIO 258. Developmental Neurobiology. 4 Units.**

For advanced undergraduates and coterminal students. The principles of nervous system development from the molecular control of patterning, cell-cell interactions, and trophic factors to the level of neural systems and the role of experience in influencing brain structure and function. Topics: neural induction and patterning cell lineage, neurogenesis, neuronal migration, axonal pathfinding, synapse elimination, the role of activity, critical periods, and the development of behavior. Satisfies Central Menu Areas 2 or 3. Prerequisite: BIO 42 or equivalent.  
Same as: BIO 158

**BIO 25Q. Cystic fibrosis: from medical conundrum to precision medicine success story. 3 Units.**

Preference to sophomores. The class will explore cystic fibrosis (CF), the most prevalent fatal genetic disease in the US, as a scientific and medical whodunit. Through reading and discussion of medical and scientific literature, we will tackle questions that include: how was life expectancy with CF increased from weeks to decades without understanding the disease mechanism? Why is the disease so prevalent? Is there an advantage to being a carrier? Is CF a single disease or a continuum of physiological variation or what is a disease? How did research into CF lead to discovery of the underlying cause of most other genetic diseases as well? Through critical reading of the scientific and medical literature, class discussion, field trips and meetings with genetic counselors, caregivers, patients, physicians and researchers, we will work to build a deep understanding of this disease, from the biochemical basis to the current controversies over pathogenic mechanisms, treatment strategies and the ethics and economics of genetic testing and astronomical drug costs.

**BIO 263. Neural Systems and Behavior. 4 Units.**

The field of neuroethology and its vertebrate and invertebrate model systems. Research-oriented. Readings include reviews and original papers. How animal brains compare; how neural circuits are adapted to species-typical behavior; and how the sensory worlds of different species represent the world. Lectures and required discussions. Satisfies Central Menu Area 3 for Bio majors. Prerequisites: BIO 42, HUMBIO 4A.  
Same as: HUMBIO 163

**BIO 267. Molecular Mechanisms of Neurodegenerative Disease. 4 Units.**

The epidemic of neurodegenerative disorders such as Alzheimer's and Parkinson's disease occasioned by an aging human population. Genetic, molecular, and cellular mechanisms. Clinical aspects through case presentations. This class is open to both graduate and undergraduate students, but requires sufficient backgrounds in college level genetics, cell biology and biochemistry. Undergraduates who are interested are required to contact the course director first.  
Same as: GENE 267, NENS 267

**BIO 268. Statistical and Machine Learning Methods for Genomics. 3 Units.**

Introduction to statistical and computational methods for genomics. Sample topics include: expectation maximization, hidden Markov model, Markov chain Monte Carlo, ensemble learning, probabilistic graphical models, kernel methods and other modern machine learning paradigms. Rationales and techniques illustrated with existing implementations used in population genetics, disease association, and functional regulatory genomics studies. Instruction includes lectures and discussion of readings from primary literature. Homework and projects require implementing some of the algorithms and using existing toolkits for analysis of genomic datasets.  
Same as: BIOMEDIN 245, CS 373, GENE 245, STATS 345

**BIO 26S. Maintenance of the Genome. 3 Units.**

The precious blueprint for life is entrusted to genome maintenance proteins found in all living cells. This seminar introduces the remarkable systems that scan cellular DNA for alterations and make repairs to ensure genomic stability. We further explore how deficiencies in these systems can lead to developmental defects, premature aging, and predisposition to cancer. Course includes background reading from primary articles, introductory lectures, student presentations, and a short term paper. Prerequisites: High school Biology. Preference to Stanford students.

**BIO 271. Principles of Cell Cycle Control. 3 Units.**

Genetic analysis of the key regulatory circuits governing the control of cell division. Illustration of key principles that can be generalized to other synthetic and natural biological circuits. Focus on tractable model organisms; growth control; irreversible biochemical switches; chromosome duplication; mitosis; DNA damage checkpoints; MAPK pathway-cell cycle interface; oncogenesis. Analysis of classic and current primary literature. Satisfies Central Menu Area 2.

Same as: BIO 171, CSB 271

**BIO 274. Human Skeletal Anatomy. 5 Units.**

Study of the human skeleton (a. k. a. human osteology), as it bears on other disciplines, including medicine, forensics, archaeology, and paleoanthropology (human evolution). Basic bone biology, anatomy, and development, emphasizing hands-on examination and identification of human skeletal parts, their implications for determining an individual's age, sex, geographic origin, and health status, and for the evolutionary history of our species. Three hours of lecture and at least three hours of supervised and independent study in the lab each week.

Same as: ANTHRO 175, ANTHRO 275, BIO 174, HUMBIO 180

**BIO 274S. Hopkins Microbiology Course. 3-12 Units.**

(Formerly GES 274S.) Four-week, intensive. The interplay between molecular, physiological, ecological, evolutionary, and geochemical processes that constitute, cause, and maintain microbial diversity. How to isolate key microorganisms driving marine biological and geochemical diversity, interpret culture-independent molecular characterization of microbial species, and predict causes and consequences. Laboratory component: what constitutes physiological and metabolic microbial diversity; how evolutionary and ecological processes diversify individual cells into physiologically heterogeneous populations; and the principles of interactions between individuals, their population, and other biological entities in a dynamically changing microbial ecosystem. Prerequisites: CEE 274A and CEE 274B, or equivalents.

Same as: BIOHOPK 274, CEE 274S, ESS 253S

**BIO 277. Plant Microbe Interaction. 3 Units.**

Molecular basis of plant symbiosis and pathogenesis. Topics include mechanisms of recognition and signaling between microbes and plant hosts, with examples such as the role of small molecules, secreted peptides, and signal transduction pathways in symbiotic or pathogenic interactions. Readings include landmark papers together with readings in the contemporary literature. Prerequisites: Biology core and two or more upper division courses in genetics, molecular biology, or biochemistry. Recommended: plant genetics or plant biochemistry.

Same as: BIO 177

**BIO 278. Microbiology Literature. 3 Units.**

For advanced undergraduates and first-year graduate students. Critical reading of the research literature in prokaryotic genetics and molecular biology, with particular applications to the study of major human pathogens. Classic and foundational papers in pathogenesis, genetics, and molecular biology; recent literature on bacterial pathogens such as *Salmonella*, *Vibrio*, and/or *Yersinia*. Diverse experimental approaches: biochemistry, genomics, pathogenesis, and cell biology. Prerequisites: Biology Core and two upper-division courses in genetics, molecular biology, or biochemistry.

Same as: BIO 178

**BIO 27S. Evolution: From DNA to Dinosaurs. 3 Units.**

This course centers on the fundamental idea of evolution, which impacts fields as disparate as genetics to paleontology. You will learn about the history of evolutionary thought, including Darwin's idea of evolution by natural selection, and explore evolutionary timescales both small and large. Topics include population genetics, genomics, molecular evolution, evolutionary forces, formation of new species, evolutionary divergences in the history of life, and evidence of evolution, including patterns from DNA and the fossil record.

**BIO 282. Modeling Cultural Evolution. 3 Units.**

Seminar. Quantitative models for the evolution of socially transmitted traits. Rates of change of learned traits in populations and patterns of cultural diversity as a function of innovation and cultural transmission. Learning in constant and changing environments. Possible avenues for gene-culture coevolution.

Same as: BIO 182

**BIO 283. Theoretical Population Genetics. 3 Units.**

Models in population genetics and evolution. Selection, random drift, gene linkage, migration, and inbreeding, and their influence on the evolution of gene frequencies and chromosome structure. Models are related to DNA sequence evolution. Prerequisites: calculus and linear algebra, or consent of instructor.

Same as: BIO 183

**BIO 286. Natural History of the Vertebrates. 4 Units.**

Broad survey of the diversity of vertebrate life. Discussion of the major branches of the vertebrate evolutionary tree, with emphasis on evolutionary relationships and key adaptations as revealed by the fossil record and modern phylogenetics. Modern orders introduced through an emphasis on natural history, physiology, behavioral ecology, community ecology, and conservation. Lab sessions focused on comparative skeletal morphology through hands-on work with skeletal specimens. Discussion of field methods and experience with our local vertebrate communities through field trips to several of California's distinct biomes. Prerequisite: Biology core.

**BIO 287. Advanced Topics in Mathematical Evolutionary Biology. 3 Units.**

Focused examination of specific topics in mathematical evolutionary biology and population genetics. Course themes may include: mathematical properties of statistics used in human population genetics, mathematics of evolutionary trees, population genetics and biological race, and statistical inference of human migrations.

**BIO 28S. Molecular Genetics and Biotechnology. 3 Units.**

This course covers the fundamentals of molecular genetics, including principles of how genes work, how gene expression is regulated in both prokaryotes and eukaryotes, and how signals are passed from cells to cells that are far away. We will also explore key advances in biotechnology, including cloning, sequencing, and next-generation sequencing, and discuss case studies involving cancer, Huntington's Disease, and more.

**BIO 290. Teaching of Biology. 1-5 Unit.**

Open to upper-division undergraduates and graduate students. Practical experience in teaching lab biology or serving as an assistant in a lecture course. May be repeated for credit. Prerequisite: consent of instructor.

**BIO 291. Development and Teaching of Core Experimental Laboratories. 1-2 Unit.**

Preparation for teaching the core experimental courses (44X and 44Y). Emphasis is on lab, speaking, and writing skills. Focus is on updating the lab to meet the changing technical needs of the students. Taken prior to teaching either of the above courses. May be repeated for credit. Prerequisite: selection by instructor.

**BIO 292. Curricular Practical Training. 1-3 Unit.**

CPT course required for international students completing degree requirements.

**BIO 294. Cellular Biophysics. 3 Units.**

Physical biology of dynamical and mechanical processes in cells. Emphasis is on qualitative understanding of biological functions through quantitative analysis and simple mathematical models. Sensory transduction, signaling, adaptation, switches, molecular motors, actin and microtubules, motility, and circadian clocks. Prerequisites: differential equations and introductory statistical mechanics.

Same as: APPPHYS 294, BIOPHYS 294

**BIO 296. TA Training in Biology. 1 Unit.**

Workshop to provide teaching assistants in the Department of Biology with basic training, support, and professional development in their teaching roles. Should be taken concurrently with the first TA position.

**BIO 299. Biology PhD Lab Rotation. 1-10 Unit.**

Limited to first year Biology PhD students. Lab rotations with Biosciences faculty.

**BIO 2N. Ecology and Evolution of Infectious Disease in a Changing World. 3 Units.**

This seminar will explore the ways in which anthropogenic change, climate change, habitat destruction, land use change, and species invasions effects the ecology and evolution of infectious diseases. Topics will include infectious diseases of humans, wildlife, livestock, and crops, effects of disease on threatened species, disease spillover, emerging diseases, and the role of disease in natural systems. Course will be taught through a combination of popular and scientific readings, discussion, and lecture. .

**BIO 3. Frontiers in Marine Biology. 1 Unit.**

An introduction to contemporary research in marine biology, including ecology, conservation biology, environmental toxicology, behavior, biomechanics, evolution, neurobiology, and molecular biology. Emphasis is on new discoveries and the technologies used to make them. Weekly lectures by faculty from the Hopkins Marine Station.

**BIO 30. Ecology for Everyone. 4 Units.**

Everything is connected, but how? Ecology is the science of interactions and the changes they generate. This project-based course links individual behavior, population growth, species interactions, and ecosystem function. Introduction to measurement, observation, experimental design and hypothesis testing in field projects, mostly done in groups. The goal is to learn to think analytically about everyday ecological processes involving bacteria, fungi, plants, animals and humans. The course uses basic statistics to analyze data; there are no math prerequisites except arithmetic. Open to everyone, including those who may be headed for more advanced courses in ecology and environmental science.

**BIO 300. Graduate Research. 1-10 Unit.**

For graduate students only. Individual research by arrangement with in-department instructors.

**BIO 300X. Out-of-Department Graduate Research. 1-10 Unit.**

Individual research by arrangement with out-of-department instructors. Master's students: credit for work arranged with out-of-department instructors is restricted to Biology students and requires approved department petition. See <http://biohonors.stanford.edu> for more information. May be repeated for credit.

**BIO 301. Frontiers in Biology. 1-3 Unit.**

Limited to and required of first-year Ph.D. students in molecular, cellular, and developmental biology. Current research in molecular, cellular, and developmental biology emphasizing primary research literature. Held in conjunction with the department's Monday seminar series. Students and faculty meet weekly before the seminar for a student presentation and discussion of upcoming papers.

**BIO 302. Current Topics and Concepts in Population Biology, Ecology, and Evolution. 1 Unit.**

Required of first-year PhD students in population biology, and ecology and evolution. Major conceptual issues and developing topics. This course is nonopen only to Biology PhD students and is not open to auditors."

**BIO 303. Current Topics and Concepts in Population Biology, Ecology, and Evolution. 1 Unit.**

Required of first-year PhD students in population biology, and ecology and evolution. Major conceptual issues and developing topics. This course is nonopen only to Biology PhD students and is not open to auditors."

**BIO 304. Current Topics and Concepts in Population Biology, Ecology, and Evolution. 1 Unit.**

Required of first-year PhD students in population biology, and ecology and evolution. Major conceptual issues and developing topics. This course is nonopen only to Biology PhD students and is not open to auditors.

**BIO 312. Ethical Issues in Ecology and Evolutionary Biology. 1 Unit.**

Focus is on ethical issues addressed in Donald Kennedy's *Academic Duty* and others of importance to academics and scientists in the fields of ecology, behavior, and evolutionary biology. Discussions led by faculty and outside guests. Satisfies ethics course requirement for ecology and evolutionary biology. Prerequisite: PhD student in the ecology and evolutionary biology or marine program, or consent of instructor.

**BIO 327. Research Frontiers in Biodiversity and Ecosystem Services. 3 Units.**

This advanced seminar explores research frontiers in the science of biodiversity and ecosystem services. We will begin with foundational work and then shift to key frontiers now opening up  $\zeta$  including DNA barcoding, food web structure and ecosystem processes; remote sensing and modeling biodiversity change and ecosystem services; relating big data on natural capital and human well-being; and nature experience and human mental health. Students will lead discussions and make research presentations. To apply, please email the instructor ([gdaily@stanford.edu](mailto:gdaily@stanford.edu)).

**BIO 329. Matrix Methods for Dynamic Models and Data Analysis. 1 Unit.**

Types of matrices in dynamic & stochastic models, covariances, rectangular data, networks. Spectral theorem, asymptotics, stability theory, Nonnegative matrices, ergodicity, Markov chains. Hermitian, covariance, SVD. Perturbation theory. Random matrix products, Lyapunov exponents. Open to Ph.D. students in Biology. Prerequisites: Calculus (AP level) required. Some knowledge of linear algebra, R, preferred.

**BIO 32Q. Neuroethology: The Neural Control of Behavior. 3 Units.**

Preference to sophomores. Animal behavior offers insights about evolutionary adaptations and this seminar will discuss the origins of the study of animal behavior and its development to the present. How does the nervous system control behavior and how is it changed by behavior? We will analyze and discuss original research papers about the neural basis of behavior. The use and misuse of parallels between animal and human behavior. Possible field trip to observe animals in their natural habitat.  
Same as: HUMBIO 91Q

**BIO 330. Stochastic Methods for Simulation, Dynamics and Data Analysis. 1 Unit.**

Markov chains: ergodicity, CLT, passage times, absorption. Simulation: random numbers, chains. Poisson processes: applications and simulation. Time series models. MCMC essentials. Open to Ph.D. students in Biology. Prerequisites: Calculus (AP level) and basic linear algebra required. Facility with linear algebra, R, preferred.

**BIO 332. Evolutionary Genomics. 2 Units.**

We will read classic and modern papers relevant to evolutionary genomics, and discuss. We will cover a broad range of topics, methods, and species.

**BIO 33N. Conservation Science and Practice. 3 Units.**

Preference to freshmen. This course will explore the potential for harmonizing people and nature, for achieving improved outcomes in the well-being of both as a result of conservation investments and interventions. We will consider biophysical, economic, social, and psychological perspectives, examining an array of conservation goals, from protecting endangered species to securing ecosystem services (such as flood control and climate stability) to alleviating poverty and improving mental well-being. We will also study the design and implementation of real conservation and human development efforts worldwide, among the many farmers, ranchers, fishing people, and others managing Earth's lands and waters. Highlights include a field trip to Jasper Ridge Biological Preserve, Stanford's very own nature reserve, and guest visits of some impressive conservation leaders internationally.

**BIO 340. The History of Evolution. 4-5 Units.**

This course examines the history of evolutionary biology from its emergence around the middle of the eighteenth century. We will consider the continual engagement of evolutionary theories of life with a larger, transforming context: philosophical, political, social, economic, institutional, aesthetic, artistic, literary. Our goal will be to achieve a historical rich and nuanced understanding of how evolutionary thinking about life has developed to its current form.

Same as: HISTORY 240, HISTORY 340

**BIO 342. Plant Biology Seminar. 1-3 Unit.**

Topics in plant biology presented at a weekly seminar. Topics announced at the beginning of each quarter. Current literature. May be repeated for credit. See <https://dpb.carnegiescience.edu/events>.

**BIO 346. Advanced Seminar on Prokaryotic Molecular Biology. 1 Unit.**

Enrollment limited to PhD students associated with departmental research groups in genetics or molecular biology.

Same as: CSB 346, GENE 346

**BIO 34N. Hunger. 3 Units.**

The biology of hunger and satiety, disease states that disrupt normal responses to hunger and satiety, starvation responses and adaptations to starvation in a variety of organisms, food production and distribution mechanisms, historic famines and their causes, the challenges of providing adequate food and energy for the Earth's growing population, local and global efforts to alleviate hunger, and hunger in fiction.

**BIO 35N. Climate change ecology: Is it too late?. 3 Units.**

This Introductory Seminar will explore the consequences of climate change on ecological communities, focusing on two emerging concepts: "disequilibrium," which emphasizes that it can take long time for communities to respond to climate change because of species interactions, and "historical contingency," which proposes that the order in which species invade and disappear as communities re-assemble in response to climate change will determine which species will persist. The seminar will involve lecture, discussion, writing, and visit to Jasper Ridge Biological Preserve.

**BIO 375. Field Ecology & Conservation. 4 Units.**

This course is based on question-driven research in the field, addressing both conceptual frameworks and methodological aspects of evolutionary ecology and conservation biology. It consists of faculty-led research projects and student independent projects. The field part takes place in a tropical rain forest research station in Mexico September 5-15, 2014. The field component is followed by sessions on campus, where the research data are analyzed, discussed and prepared as scientific papers. The training includes presentations of the papers in a mini-symposium organized as a professional meeting.

**BIO 383. Seminar in Population Genetics. 1-3 Unit.**

Literature review, research, and current problems in the theory and practice of population genetics and molecular evolution. May be repeated for credit. Prerequisite: consent of instructor.

**BIO 390. Topics in Biology. 1 Unit.**

Seminar. Topics in biology ranging from neurobiology to ecology.

**BIO 3N. Views of a Changing Sea: Literature & Science. 3 Units.**

The state of a changing world ocean, particularly in the eastern Pacific, will be examined through historical and contemporary fiction, non-fiction and scientific publications. Issues will include harvest and mariculture fisheries, land-sea interactions and oceanic climate change in both surface and deep waters.

**BIO 45. Introduction to Laboratory Research in Cell and Molecular Biology. 4 Units.**

Investigate yeast strains that are engineered to express the human tumor suppressor protein, p53, and use modern molecular methods to identify the functional consequences of p53 mutations isolated from tumor cells. Learn about the protein's role as Guardian of the Genome through lectures and by reading and discussing journal articles. Use molecular visualization programs to examine the structure of normal and mutant p53 proteins. Assay the ability of mutant p53 to direct expression of several reporter genes. During guided reflection, investigate further and identify what could be wrong with the p53 mutants you have been studying. Conduct lab experiments to test hypotheses, analyze data, and present your findings through a team oral presentation, as well as a scientific poster. There are no pre-requisites for this course. However, having taken CHEM 31X, or 31A and B, and 33 and being concurrently enrolled or past enrollment in Biology or Human Biology core will help. Note: This class has a \$25 course fee.

**BIO 459. Frontiers in Interdisciplinary Biosciences. 1 Unit.**

Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

Same as: BIOC 459, BIOE 459, CHEM 459, CHEMENG 459, PSYCH 459

**BIO 46. Introduction to Research in Ecology and Evolutionary Biology. 4 Units.**

The goal of this course is to develop an understanding of how to conduct biological research, using a topic in Ecology, Evolutionary Biology, and Plant Biology as a practical example. This includes the complete scientific process: assessing background literature, generating testable hypotheses, learning techniques for field- and lab-based data collection, analyzing data using appropriate statistical methods, and writing and sharing results. To build these skills, this course focuses on the microorganisms associated with lichen epiphytes. Students, working in teams, develop novel research hypotheses and execute the necessary experiments and measurements to test these hypotheses. In addition, students will learn how to manipulate, visualize and analyze data in R. The capstone of the course is an oral defense of students' findings, as well as a research paper in the style of a peer-reviewed journal article. Labs are completed both on campus and at Jasper Ridge. Lab fee. Information about this class is available at <http://bio44.stanford.edu>. Satisfies WIM in Biology.

**BIO 47. Introduction to Research in Ecology and Evolutionary Biology. 4 Units.**

The goal of this course is to develop an understanding of how to conduct biological research, using a topic in Ecology, Evolutionary Biology, and Plant Biology as a practical example. This includes the complete scientific process: assessing background literature, generating testable hypotheses, learning techniques for field- and lab-based data collection, analyzing data using appropriate statistical methods, and finally writing and sharing results. To build these skills, this course will focus on nectar microbes at Stanford's nearby Jasper Ridge Biological Preserve. Students, working in teams, will develop novel research hypotheses and execute the necessary experiments and measurements to test these hypotheses. The capstone of the course will be an oral defense of students' findings, as well as a research paper in the style of a peer-reviewed journal article. Labs will be completed both on campus and at Jasper Ridge. Lab fee. Information about this class is available at <http://bio44.stanford.edu>. Satisfies WIM in Biology.

**BIO 4N. Peopleomics: The science and ethics of personalized genomic medicine. 3 Units.**

Exploration of the new field of personalized genomic medicine. Personalized medicine is based on the idea that each person's unique genome sequence can be used to predict risk of acquiring specific diseases, and to make more informed medical choices. The science behind these approaches; where they are heading in the future; and the ethical implications such technology presents. Lectures augmented with hands-on experience in exploring and analyzing a real person's genome.

**BIO 50S. Introduction to Cancer Biology. 3 Units.**

Introduction to the molecular basis of cancer. This course will examine the biological processes that are disrupted in cancer, such as DNA repair, cell cycle control and signaling pathways, as well as the science behind some current treatments. Prerequisites: general biology.

**BIO 51S. The Gene: The History and Science of our Genetic Code. 3 Units.**

This discussion-based course will use the novel *The Gene* by Siddhartha Mukherjee and other selected readings to explore the science behind our genetic code. We will cover topics such as regulation of gene expression, inheritance, genetic testing, manipulation of the genome, and the relationship between genetics and identity. Prerequisites: Instructor consent, AP Biology Recommended.

**BIO 52. I, Biologist: Diversity Improves the Science of Biology. 1 Unit.**

Disciplinary priorities, research agendas, and innovations are determined by the diversity of participants and problem-solving is more successful with a broad range of approaches. Using case studies in biological research, we propose to use these insights to help our students learn why a diverse scientific community leads to better discovery and improves the relevance of science to society. Our premise is that a diverse set of perspectives will impact not only how we learn science, but how we do science.

Same as: CSRE 52H

**BIO 53. Conservation Photography. 3 Units.**

Introduction to the field of conservation photography and the strategic use of visual communication in addressing issues concerning the environment and conservation. Students will be introduced to basic digital photography, digital image processing, and the theory and application of photographic techniques. Case studies of conservation issues will be examined through photographs and multimedia platforms including images, video, and audio. Lectures, tutorials, demonstrations, and optional field trips will culminate in the production of individual and group projects. This course is identical to Bio 7N, so students enrolled in the former should not take this course. Open to undergraduates and graduate students. Students must have access to a DSLR camera and lenses - we can accept up to 20 students who can share 10 course-provided cameras and lenses, by application.

**BIO 5N. Tipping Point for Planet Earth: How Close Are We to the Edge?. 3 Units.**

We will explore why the earth is headed toward a tipping point: a change that is so rapid, so extreme, and so unexpected that humanity may not be able to recover. We will cover synergies between people, stuff, storms, hunger, thirst, toxins, disease and war. Students will read chapters from the instructor's new book, *Tipping Point for Planet Earth*, and will participate in class discussions. Each student will produce their own projects based on one of the course themes.

**BIO 60. Introduction to Problem Solving in Biology. 4 Units.**

Why is Lyme disease spreading? How does HIV become drug resistant? How do other animals affect our disease risk? In BIO 60 students will examine actual case studies to experience how different scientific approaches are used to battle infectious disease. They will evaluate information presented in the popular media and the scientific literature, and will directly participate in the scientific process through hands-on collection, documentation and analyses of authentic scientific data. Students will cultivate their scientific curiosity by discovering the natural world with a Foldscope, the "origami paper microscope" (<https://microcosmos.foldscope.com>). Students will build critical thinking skills by creating hypotheses, and designing experiments that pertain to problems in infectious disease. Students will work in teams to expand their thinking and will practice communicating science to different audiences.

**BIO 61. Science as a Creative Process. 4 Units.**

What is the process of science, and why does creativity matter? We'll delve deeply into the applicability of science in addressing a vast range of real-world problems. This course is designed to teach the scientific method as it's actually practiced by working scientists. It will cover how to ask a well-posed question, how to design a good experiment, how to collect and interpret quantitative data, how to recover from error, and how to communicate findings. Facts matter! Course topics will include experimental design, statistics and statistical significance, formulating appropriate controls, modeling, peer review, and more. The course will incorporate a significant hands-on component featuring device fabrication, testing, and measurement. Among other "Dorm Science" activities, we'll be distributing Arduino microcontroller kits and electronic sensors, then use these items, along with other materials, to complete a variety of group and individual projects outside the classroom. The final course assignment will be to develop and write a scientific grant proposal to test a student-selected myth or scientific controversy. Although helpful, no prior experience with electronics or computer programming is required. Recommended for freshmen.

Same as: APPPHYS 61

**BIO 62. Experimental strategy and the bacterial world. 4 Units.**

Microbiology is a major foundation of all modern biology. Many aspects of experimental strategy, logic, and analysis originated in the fields of bacterial genetics and physiology. In BIO 62, we will use prokaryotic biology to review fundamentals of molecular biology and energetics, and in lab work we will work with experimental design and data interpretation. Research on prokaryotes has greatly expanded through genomic and population analysis, and we will use these approaches to ask questions about the hidden worlds around and inside us: the microbiome. Prerequisites: None. This course is not appropriate for students who received a 4 or 5 in AP biology.

**BIO 7N. Introduction to Conservation Photography. 3 Units.**

Introduction to the field of conservation photography and the strategic use of visual communication in addressing issues concerning the environment and conservation. Students will be introduced to basic digital photography, digital image processing, and the theory and application of photographic techniques. Case studies of conservation issues will be examined through photographs and multimedia platforms including images, video, and audio. Lectures, tutorials, demonstrations, and optional field trips will culminate in the production of individual and group projects.

**BIO 7S. Introduction to Biology. 3 Units.**

Introduction to several major fields of biology, including biochemistry, cell biology, genetics, evolution, and biodiversity. Introduces the general approaches used by scientists to study life and explores recent advances in each area during weekly discussion section. Not intended for biology majors, but provides the foundation for higher-level biology courses. Prerequisite: high school biology.

**BIO 7SL. Introduction to Biology Lab. 2 Units.**

Optional laboratory to be taken with BIO7S. Introduction to basic biological laboratory techniques, including microscopy, identification of biomolecules, assaying enzyme activity, genetic manipulation of microorganisms, assaying the effects of gene mutation on protein function, and using PCR to genotype organisms.

**BIO 802. TGR Dissertation. 0 Units.****BIO 81. Introduction to Ecology. 4 Units.**

This course will introduce you to the first principles of the science of ecology, the study of interactions between organisms and their environment. Prerequisites: None.

**BIO 82. Genetics. 4 Units.**

The focus of the course is on the basic mechanisms underlying the transmission of genetic information and on the use of genetic analysis to study biological and medical questions. Major topics will include: (1) the use of existing genetic variation in humans and other species to identify genes that play an important role in determining traits and disease-susceptibility, (2) the analysis of mutations in model organisms and their use in the investigation of biological processes and questions and (3) using genetic information for diagnosis and the potential for genetic manipulations to treat disease. Prerequisites: None.

**BIO 83. Biochemistry & Molecular Biology. 4 Units.**

Introduction to the molecular and biochemical basis of life. Lecture topics include the structure and function of proteins, nucleic acids, lipids and carbohydrates, energy metabolism, signal transduction, epigenetics and DNA repair. The course will also consider how defects in these processes cause disease. Prerequisites: None.

**BIO 84. Physiology. 4 Units.**

The fundamental concepts and systems of animal and plant physiology are the subject matter of this course. Prerequisites: None.

**BIO 86. Cell Biology. 4 Units.**

This course will focus on the basic structures inside cells and how they execute cellular functions. Topics include organelles, membrane trafficking, the cytoskeleton, cell division, and signal transduction. Classic and recent primary literature will be incorporated into lectures with an emphasis on state of the art experimental approaches. Prerequisites: None.

**BIO 8N. Human Origins. 3 Units.**

A survey of the anatomical and behavioral evidence for human evolution and of the increasingly important information from molecular genetics. Emphasis on the split between the human and chimpanzee lines 6-7 million years ago, the appearance of the australopiths by 4.1 million years ago, the emergence of the genus *Homo* about 2.5 million years ago, the spread of *Homo* from Africa 1.7-1.6 million years ago, the subsequent divergence of *Homo* into different species on different continents, and the expansion of fully modern humans (*Homo sapiens*) from Africa about 50,000 years ago to replace the Neanderthals and other non-modern Eurasians.

**BIO 8S. Introduction to Human Physiology. 4 Units.**

Normal functioning and pathophysiology of major organ systems: nervous, respiratory, cardiovascular, renal, digestive, and endocrine. Additional topics include integrative physiology, clinical case studies, and applications in genomics-based personalized medicine.

## Cancer Biology (CBIO)

**CBIO 101. Cancer Biology. 4 Units.**

Experimental approaches to understanding the origins, diagnosis, and treatment of cancer. Focus on key experiments and discoveries with emphasis on genetics, molecular biology, and cell biology. Topics include carcinogens, tumor virology, oncogenes, tumor suppressor genes, cell cycle regulation, angiogenesis, invasion and metastasis, cancer genomics, cancer epidemiology, and cancer therapies. Discussion sections based on primary research articles that describe key experiments in the field. Satisfies Central Menu Areas 1 or 2 for Bio majors. Prerequisite: Biology or Human Biology core or equivalent, or consent of instructor. Same as: PATH 101

**CBIO 240. Molecular and Genetic Basis of Cancer. 4 Units.**

Required for first-year Cancer Biology graduate students. Focus is on fundamental concepts in the molecular biology of cancer, including oncogenes, tumor suppressor genes, and cellular signaling pathways. Emphasis will be given to seminal discoveries and key experiments in the field of cancer molecular biology. Course consists of two 1 hour lectures and one 2 hour discussion per week. Enrollment of undergraduates requires consent of the course director.

**CBIO 242. Cellular and Clinical Aspects of Cancer. 4 Units.**

Required for first-year Cancer Biology graduate students, and for first- and second-year medical students intending to complete the Cancer Biology Scholarly Concentration. Focus is on the cellular biology of cancer, including discussion of basic biology including tumor angiogenesis, metabolism, and immunology, as well as clinical oncology and cancer therapeutics. Emphasis will be given to seminal discoveries and key experiments in the field of cancer biology and oncology. Course consists of two 1 hour lectures and one 2 hour discussion per week. Enrollment of undergraduates requires consent of the course director.

**CBIO 243. Principles of Cancer Systems Biology. 3 Units.**

Focus is on major principles of cancer systems biology research that integrates experimental and computational biology in order to systematically unravel the complexity of cancer. The opportunity to embark on cancer systems biology research has been enabled by the rapid emergence of numerous and increasingly accessible technologies that provide global DNA, RNA and protein expression profiles of cells under a variety of conditions following environmental, drug and genetic perturbations. Course addresses the challenge of how to analyze high-dimensional and highly-multiplexed data in order to synthesize biologically and clinically relevant insights and generate hypotheses for further functional testing. Aims to broaden student exposure to the experimental and computational skills needed to apply the emerging principles of systems biology to the study of cancer.

**CBIO 244. Lecture Series in Cancer Systems Biology. 1 Unit.**

Presents new concepts in the field of cancer systems biology, demonstrating the integration of novel experimental and computational approaches for addressing outstanding critical questions in cancer biology. Invited speakers share insights about state-of-the-art trends and advice on navigating a career in cancer systems biology. Course required for CSBS Fellows.

**CBIO 245. Lecture Seminar Series in Cancer Biology Program. 1 Unit.**

Invited speakers share insights about state-of-the-art trends. Presents new concepts in the field of cancer biology. Science talks presented by students.



**CBIO 246. Clinical Cancer Research Internship Program. 1 Unit.**

Graduate students interested in this course will contact the primary instructor Dr. Majeti and the course director Drs. Attardi and Sage by email. A prerequisite for the course is the successful completion of the online training component for HIPAA certification: [link](#). In addition, the following is required: 1. Documented proof of Measles, Mumps & Rubella immunity in the form of vaccine dates or positive blood tests. 2. Documented proof of Varicella (chicken pox) immunity in the form of vaccine dates or positive blood tests. 3. Annual TB screening (PPD for US born or born in Canada and QFT for foreign born of high risk TB countries). 4. Annual Influenza vaccine (between Nov 1-March 31). In the first component of the course, Dr. Majeti will identify an oncologist (adult or pediatrics) actively working in the clinic that the student can shadow that quarter for a minimum of 4 hours and will put the student in contact with the clinician. Shadowing hours can be at any time of the week or the weekend. The clinician will contact Dr. Majeti to confirm that the student has shadowed him/her for 4 hours. In the second component of the course, Dr. Majeti will inform the student when the oncology clinical tumor board meets. The student must attend at least 3 tumor board sessions in the quarter (1h30 each). In the third component of the course, the student will write a one-page analysis of a clinical paper related to cancer biology.

**CBIO 260. Teaching in Cancer Biology. 1-10 Unit.**

Practical experience in teaching by serving as a teaching assistant in a cancer biology course. Unit values are allotted individually to reflect the level of teaching responsibility assigned to the student.

**CBIO 275. Tumor Immunology. 3 Units.**

Tumor Immunology focuses on the mechanisms by which tumors can escape from and subvert the immune system and conversely on the ability of innate and adaptive arms of the immune system to recognize and eliminate tumors. Topics include: tumor antigens, tumor immunosurveillance and immunoeediting, tumor immunotherapy (including CAR-T and checkpoint antibodies) and cancer vaccines. Tracks the historical development of our understanding of modulating tumor immune response and discusses their relative significance in the light of current research findings. Prerequisite: for undergraduates, human biology or biology core. Same as: IMMUNOL 275

**CBIO 280. Cancer Biology Journal Club. 1 Unit.**

Required of and limited to first- and second-year graduate students in Cancer Biology. Recent papers in the literature presented by graduate students. When possible, discussion relates to and precedes cancer-related seminars at Stanford. Attendance at the relevant seminar required.

**CBIO 299. Directed Reading in Cancer Biology. 1-18 Unit.**

Prerequisite: consent of instructor.

**CBIO 399. Graduate Research. 1-18 Unit.**

Students undertake investigations sponsored by individual faculty members. Cancer Biology Ph.D. students must register as soon as they begin dissertation-related research work.

**CBIO 801. TGR Project. 0 Units.**

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**CBIO 802. TGR Dissertation. 0 Units.**

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## Chemical Engineering (CHEMENG)

**CHEMENG 10. The Chemical Engineering Profession. 1 Unit.**

Open to all undergraduates. Overview of and careers in chemical engineering; opportunities to develop networks with working professionals. Panel discussions on career paths and post-graduation opportunities available. Areas include biotechnology, electronics, energy, environment, management consulting, nanotechnology, and graduate school in business, law, medicine, and engineering.

**CHEMENG 100. Chemical Process Modeling, Dynamics, and Control. 3 Units.**

Mathematical methods applied to engineering problems using chemical engineering examples. The development of mathematical models to describe chemical process dynamic behavior. Analytical and computer simulation techniques for the solution of ordinary differential equations. Dynamic behavior of linear first- and second-order systems. Introduction to process control. Dynamics and stability of controlled systems. Prerequisites: CHEMENG 20 or ENGR 20; CME 102 or MATH 53.

**CHEMENG 110. Equilibrium Thermodynamics. 3 Units.**

Thermodynamic properties, equations of state, properties of non-ideal systems including mixtures, and phase and chemical equilibria. Prerequisite: CHEM 171 or equivalent.

**CHEMENG 120A. Fluid Mechanics. 4 Units.**

The flow of isothermal fluids from a momentum transport viewpoint. Continuum hypothesis, scalar and vector fields, fluid statics, non-Newtonian fluids, shell momentum balances, equations of motion and the Navier-Stokes equations, creeping and potential flow, parallel and nearly parallel flows, time-dependent parallel flows, boundary layer theory and separation, introduction to drag correlations. Prerequisites: junior in Chemical Engineering or consent of instructor; CHEMENG 100 and CME 102 or equivalent.

**CHEMENG 120B. Energy and Mass Transport. 4 Units.**

General diffusive transport, heat transport by conduction, Fourier's law, conduction in composites with analogies to electrical circuits, advection-diffusion equations, forced convection, boundary layer heat transport via forced convection in laminar flow, forced convection correlations, free convection, free convection boundary layers, free convection correlations and application to geophysical flows, melting and heat transfer at interfaces, radiation, diffusive transport of mass for dilute and non-dilute transfer, mass and heat transport analogies, mass transport with bulk chemical reaction, mass transport with interfacial chemical reaction, evaporation. Prerequisite CHEMENG 120A or consent of instructor.

**CHEMENG 12SC. An Exploration of Art Materials: The Intersection of Art and Science. 2 Units.**

There is growing interest in the intersection of art and science, whether from artists adapting technology to suit their visions or from scientists and engineers seeking to explain various visual effects. To take advantage of possible creative sparks at the art/science interface, it is necessary for fuzzies and techies to have some knowledge of the language used by the other side. This interface will be explored through examining approaches used by an artist and an engineer in the context of the materials science of cultural objects. In-class lectures, hands-on studio practice, and field trips will be used to illustrate these different perspectives. At the heart of the scientific approach is the notion that a cultural object, e.g., a painting, is a physical entity comprising materials with different physical properties and different responses to environmental stresses presented by light, heat, and water. In support of this outlook, in-class lectures and discussions will focus on the basic concepts of color, optics, mechanics, composite structures, and response of the object to environmental stress, and we will visit Bay Area museums to see how artists employ such techniques. The hands-on studio experience is designed to increase students' confidence and develop their appreciation of differences in materials. It is not necessary to have any artistic training, only a willingness to experiment. The in-class studio projects will include working with line and shadow; color, binders, and mordants; global sources of pigments; substrates and writing; and material failure. Students will make one technical presentation on a topic in one of the five areas relevant to a painting: color, optics, mechanics, composites, and stress response. In addition, they will prepare one essay on the issues surrounding the intersection of art and science. Finally, they will complete a project related to one of the thematic areas covered in the hands-on studio sessions and make a final oral presentation describing their project.

**CHEMENG 130. Separation Processes. 3 Units.**

Analysis and design of equilibrium and non-equilibrium separation processes. Possible examples: distillation, liquid-liquid extraction, flash distillation, electrophoresis, centrifugation, membrane separations, chromatography, and reaction-assisted separation processes. Prerequisite CHEMENG 110 or consent of instructor.

**CHEMENG 140. Micro and Nanoscale Fabrication Engineering. 3 Units.**

(Same as CHEMENG 140) Survey of fabrication and processing technologies in industrial sectors, such as semiconductor, biotechnology, and energy. Chemistry and transport of electronic and energy device fabrication. Solid state materials, electronic devices and chemical processes including crystal growth, chemical vapor deposition, etching, oxidation, doping, diffusion, thin film deposition, plasma processing. Micro and nanopatterning involving photolithography, unconventional soft lithography and self assembly. Recommended: CHEM 33, 171, and PHYSICS 55.

Same as: CHEMENG 240

**CHEMENG 142. Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations. 3 Units.**

(Formerly 124/224) Introduction to heterogeneous catalysis, including models of surface reactivity, surface equilibria, kinetics of surface reactions, electronic and geometrical effects in heterogeneous catalysis, trends in reactivity, catalyst structure and composition, electro-catalysis and photo-catalysis. Selected applications and challenges in energy transformations will be discussed. Prerequisites: CHEM 31AB or 31X, CHEM 171, CHEM 175 or CHEMENG 170 or equivalents. Recommended: CHEM 173.

Same as: CHEMENG 242

**CHEMENG 150. Biochemical Engineering. 3 Units.**

Systems-level combination of chemical engineering concepts with biological principles. The production of protein pharmaceuticals as a paradigm to explore quantitative biochemistry and cellular physiology, the elemental stoichiometry of metabolism, recombinant DNA technology, synthetic biology and metabolic engineering, fermentation development and control, product isolation and purification, protein folding and formulation, and biobusiness and regulatory issues. Prerequisite: CHEMENG 181 (formerly 188) or BIOSCI 41 or equivalent.

**CHEMENG 160. Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life. 4 Units.**

The relationships between molecular structure, morphology, and the unique physical, chemical, and mechanical behavior of polymers and other types of soft matter are discussed. Topics include methods for preparing synthetic polymers and examination of how enthalpy and entropy determine conformation, solubility, mechanical behavior, microphase separation, crystallinity, glass transitions, elasticity, and linear viscoelasticity. Case studies covering polymers in biomedical devices and microelectronics will be covered. Recommended: ENGR 50 and Chem 31A or equivalent.

Same as: BIOE 158, MATSCI 158

**CHEMENG 162. Polymers for Clean Energy and Water. 3 Units.**

The first five weeks of this course will be devoted to the fundamental aspects of polymers necessary to understand the applications in energy and the environment. These include: polymer chain configuration, morphology of semi-crystalline and amorphous solids, thermal transition behavior, thermodynamics of polymer blends and block copolymers, and the time/temperature dependence of linear viscoelasticity. The remaining five weeks of class will be devoted to applications, with special emphasis on membrane transport, including ion transport in fuel cell exchange membranes, gas transport in hydrogen enrichment membranes, and water transport in desalination membranes. In addition, completely degradable biocomposites will be discussed. Prerequisites: CHEM 31 A,B or CHEM 31X, CHEM 33, CHEM 171.

Same as: CHEMENG 262

**CHEMENG 170. Kinetics and Reactor Design. 3 Units.**

Chemical kinetics, elementary reactions, mechanisms, rate-limiting steps, and quasi-steady state approximations. Ideal isothermal and non-isothermal reactors; design principles. Steady state and unsteady state operation of reactors; conversion and limitations of thermodynamic equilibrium. Enzymes and heterogeneous catalysis and catalytic reaction mechanisms. Prerequisites: 110, 120A, 120B.

**CHEMENG 174. Environmental Microbiology I. 3 Units.**

Basics of microbiology and biochemistry. The biochemical and biophysical principles of biochemical reactions, energetics, and mechanisms of energy conservation. Diversity of microbial catabolism, flow of organic matter in nature: the carbon cycle, and biogeochemical cycles. Bacterial physiology, phylogeny, and the ecology of microbes in soil and marine sediments, bacterial adhesion, and biofilm formation. Microbes in the degradation of pollutants. Prerequisites: CHEM 33, 35, and BIOSCI 41, CHEMENG 181 (formerly 188), or equivalents. Same as: CEE 274A, CHEMENG 274

**CHEMENG 180. Chemical Engineering Plant Design. 4 Units.**

Open to seniors in chemical engineering or by consent of instructor. Application of chemical engineering principles to the design of practical plants for the manufacture of chemicals and related materials. Topics: flow-sheet development from a conceptual design, equipment design for distillation, chemical reactions, heat transfer, pumping, and compression; estimation of capital expenditures and production costs; plant construction.

**CHEMENG 181. Biochemistry I. 4 Units.**

Structure and function of major classes of biomolecules, including proteins, carbohydrates and lipids. Mechanistic analysis of properties of proteins including catalysis, signal transduction and membrane transport. Students will also learn to critically analyze data from the primary biochemical literature. Satisfies Central Menu Area 1 for Bio majors. Prerequisites: CHEM 35 and 135 or 171.

Same as: CHEM 181, CHEMENG 281

**CHEMENG 183. Biochemistry II. 3 Units.**

Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area 1 for Bio majors. Prerequisite: CHEM 181 or CHEM 143 or CHEMENG 181/281.

Same as: CHEM 183, CHEMENG 283

**CHEMENG 185A. Chemical Engineering Laboratory A. 4 Units.**

First quarter of two-quarter sequence. Experimental aspects of chemical engineering. Experimental research skills will be developed and practiced through guided lab modules. Emphasizes laboratory work, experimental design, and development of communication skills. In addition to lectures, students are required to attend one weekly lab section (5 hours each) where lab work will be conducted in student pairs. Students must enroll in a lab section on Axess. Final project will be a written research proposal prepared by student teams to be carried out in the following quarter in CHEMENG185B. Satisfies the Writing in the Major (WIM) requirement. Prerequisites: CHEMENG 120A, CHEMENG 120B, CHEMENG 181.

**CHEMENG 185B. Chemical Engineering Laboratory B. 4 Units.**

Second quarter of two-quarter sequence. Experimental aspects of chemical engineering. Emphasizes experimental design, project execution, team organization, and communication skills. Lab section times will not be assigned, though students should expect to spend at least 5 hours per week on average in the lab working on their team research projects. Labs will typically be available M-F between 9am-6pm; to be arranged separately. Prerequisite: CHEMENG 185A. Corequisite: CHEMENG 150.

**CHEMENG 190. Undergraduate Research in Chemical Engineering. 1-6 Unit.**

Laboratory or theoretical work for undergraduates under the supervision of a faculty member. Research in one of the graduate research groups or other special projects in the undergraduate chemical engineering lab. Students should consult advisers for information on available projects. Course may be repeated.

**CHEMENG 190H. Undergraduate Honors Research in Chemical Engineering. 1-5 Unit.**

For Chemical Engineering majors pursuing a B.S. with Honors degree who have submitted an approved research proposal to the department. Unofficial transcript must document BSH status and at least 9 units of 190H research for a minimum of 3 quarters. May be repeated for credit.

**CHEMENG 191H. Undergraduate Honors Seminar. 1 Unit.**

For Chemical Engineering majors approved for B.S. with Honors research program. Honors research proposal must be submitted and unofficial transcript document BSH status prior to required concurrent registration in 190H and 191H. May be repeated for credit. Corequisite: 190H.

**CHEMENG 196. Creating New Ventures in Engineering and Science-based Industries. 3 Units.**

Open to seniors and graduate students interested in the creation of new ventures and entrepreneurship in engineering and science intensive industries such as chemical, energy, materials, bioengineering, environmental, clean-tech, pharmaceuticals, medical, and biotechnology. Exploration of the dynamics, complexity, and challenges that define creating new ventures, particularly in industries that require long development times, large investments, integration across a wide range of technical and non-technical disciplines, and the creation and protection of intellectual property. Covers business basics, opportunity viability, creating start-ups, entrepreneurial leadership, and entrepreneurship as a career. Teaching methods include lectures, case studies, guest speakers, and individual and team projects.

Same as: CHEM 196, CHEM 296, CHEMENG 296

**CHEMENG 20. Introduction to Chemical Engineering. 4 Units.**

Overview of chemical engineering through discussion and engineering analysis of physical and chemical processes. Topics: overall staged separations, material and energy balances, concepts of rate processes, energy and mass transport, and kinetics of chemical reactions. Applications of these concepts to areas of current technological importance: biotechnology, energy, production of chemicals, materials processing, and purification. Prerequisite: CHEM 31.

Same as: ENGR 20

**CHEMENG 240. Micro and Nanoscale Fabrication Engineering. 3 Units.**

(Same as CHEMENG 140) Survey of fabrication and processing technologies in industrial sectors, such as semiconductor, biotechnology, and energy. Chemistry and transport of electronic and energy device fabrication. Solid state materials, electronic devices and chemical processes including crystal growth, chemical vapor deposition, etching, oxidation, doping, diffusion, thin film deposition, plasma processing. Micro and nanopatterning involving photolithography, unconventional soft lithography and self assembly. Recommended: CHEM 33, 171, and PHYSICS 55.

Same as: CHEMENG 140

**CHEMENG 242. Basic Principles of Heterogeneous Catalysis with Applications in Energy Transformations. 3 Units.**

(Formerly 124/224) Introduction to heterogeneous catalysis, including models of surface reactivity, surface equilibria, kinetics of surface reactions, electronic and geometrical effects in heterogeneous catalysis, trends in reactivity, catalyst structure and composition, electro-catalysis and photo-catalysis. Selected applications and challenges in energy transformations will be discussed. Prerequisites: CHEM 31AB or 31X, CHEM 171, CHEM 175 or CHEMENG 170 or equivalents. Recommended: CHEM 173.

Same as: CHEMENG 142

**CHEMENG 25B. Biotechnology. 3 Units.**

Biology and chemistry fundamentals, genetic engineering, cell culture, protein production, pharmaceuticals, genomics, viruses, gene therapy, evolution, immunology, antibodies, vaccines, transgenic animals, cloning, stem cells, intellectual property, governmental regulations, and ethics. Prerequisites: CHEM 31 and MATH 20 or equivalent course.

Same as: ENGR 25B

**CHEMENG 25E. Energy: Chemical Transformations for Production, Storage, and Use. 3 Units.**

An introduction and overview to the challenges and opportunities of energy supply and consumption. Emphasis on energy technologies where chemistry and engineering play key roles. Review of energy fundamentals along with historical energy perspectives and current energy production technologies. In depth analyses of solar thermal systems, biofuels, photovoltaics and electrochemical devices (batteries and fuel cells).

Prerequisites: high school chemistry or equivalent.

Same as: ENGR 25E

**CHEMENG 262. Polymers for Clean Energy and Water. 3 Units.**

The first five weeks of this course will be devoted to the fundamental aspects of polymers necessary to understand the applications in energy and the environment. These include: polymer chain configuration, morphology of semi-crystalline and amorphous solids, thermal transition behavior, thermodynamics of polymer blends and block copolymers, and the time/temperature dependence of linear viscoelasticity. The remaining five weeks of class will be devoted to applications, with special emphasis on membrane transport, including ion transport in fuel cell exchange membranes, gas transport in hydrogen enrichment membranes, and water transport in desalination membranes. In addition, completely degradable biocomposites will be discussed. Prerequisites: CHEM 31 A,B or CHEM 31X, CHEM 33, CHEM 171.

Same as: CHEMENG 162

**CHEMENG 274. Environmental Microbiology I. 3 Units.**

Basics of microbiology and biochemistry. The biochemical and biophysical principles of biochemical reactions, energetics, and mechanisms of energy conservation. Diversity of microbial catabolism, flow of organic matter in nature: the carbon cycle, and biogeochemical cycles. Bacterial physiology, phylogeny, and the ecology of microbes in soil and marine sediments, bacterial adhesion, and biofilm formation. Microbes in the degradation of pollutants. Prerequisites: CHEM 33, 35, and BIOSCI 41, CHEMENG 181 (formerly 188), or equivalents.

Same as: CEE 274A, CHEMENG 174

**CHEMENG 281. Biochemistry I. 4 Units.**

Structure and function of major classes of biomolecules, including proteins, carbohydrates and lipids. Mechanistic analysis of properties of proteins including catalysis, signal transduction and membrane transport. Students will also learn to critically analyze data from the primary biochemical literature. Satisfies Central Menu Area 1 for Bio majors. Prerequisites: CHEM 35 and 135 or 171.

Same as: CHEM 181, CHEMENG 181

**CHEMENG 283. Biochemistry II. 3 Units.**

Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area 1 for Bio majors. Prerequisite: CHEM 181 or CHEM 143 or CHEMENG 181/281.

Same as: CHEM 183, CHEMENG 183

**CHEMENG 296. Creating New Ventures in Engineering and Science-based Industries. 3 Units.**

Open to seniors and graduate students interested in the creation of new ventures and entrepreneurship in engineering and science intensive industries such as chemical, energy, materials, bioengineering, environmental, clean-tech, pharmaceuticals, medical, and biotechnology. Exploration of the dynamics, complexity, and challenges that define creating new ventures, particularly in industries that require long development times, large investments, integration across a wide range of technical and non-technical disciplines, and the creation and protection of intellectual property. Covers business basics, opportunity viability, creating start-ups, entrepreneurial leadership, and entrepreneurship as a career. Teaching methods include lectures, case studies, guest speakers, and individual and team projects.

Same as: CHEM 196, CHEM 296, CHEMENG 196

**CHEMENG 300. Applied Mathematics in the Chemical and Biological Sciences. 3 Units.**

Mathematical solution methods via applied problems including chemical reaction sequences, mass and heat transfer in chemical reactors, quantum mechanics, fluid mechanics of reacting systems, and chromatography. Topics include generalized vector space theory, linear operator theory with eigenvalue methods, phase plane methods, perturbation theory (regular and singular), solution of parabolic and elliptic partial differential equations, and transform methods (Laplace and Fourier). Prerequisites: CME 102/ENGR 155A and CME 104/ENGR 155B, or equivalents.

Same as: CME 330

**CHEMENG 310. Microhydrodynamics. 3 Units.**

Transport phenomena on small-length scales appropriate to applications in microfluidics, complex fluids, and biology. The basic equations of mass, momentum, and energy, derived for incompressible fluids and simplified to the slow-flow limit. Topics: solution techniques utilizing expansions of harmonic and Green's functions; singularity solutions; flows involving rigid particles and fluid droplets; applications to suspensions; lubrication theory for flows in confined geometries; slender body theory; and capillarity and wetting. Prerequisites: 120A,B, 300, or equivalents.

Same as: ME 451D

**CHEMENG 31N. When Chemistry Meets Engineering. 3 Units.**

Preference to freshmen. Chemistry and engineering are subjects that are ubiquitous around us. But what happens when the two meet? Students will explore this question by diving into experimental problems that scientists and engineers have to face on a daily basis. Many processes that are taken for granted have been developed by understanding science at a very fundamental level and then applying it to large and important industrial processes. In this seminar, students will explore some of the basic concepts that are important to address chemical engineering problems through experimental work. Students will build materials for energy and environmental applications, understand how to separate mixtures into pure compounds, produce fuels, and will learn to look at the chemical properties of molecules that are part of daily life with a different eye.

**CHEMENG 320. Chemical Kinetics and Reaction Engineering. 3 Units.**

Theoretical and experimental tools useful in understanding and manipulating reactions mediated by small-molecules and biological catalysts. Theoretical: first classical chemical kinetics and transition state theory; then RRKM theory and Monte Carlo simulations. Experimental approaches include practical application of modern spectroscopic techniques, stopped-flow measurements, temperature-jump experiments, and single-molecule approaches to chemical and biological systems. Both theory and application are framed with regard to systems of particular interest, including industrially relevant enzymes, organometallic catalysts, heterogeneous catalysis, electron transfer reactions, and chemical kinetics within living cells.

**CHEMENG 340. Molecular Thermodynamics. 3 Units.**

Classical thermodynamics and quantum mechanics. Development of statistical thermodynamics to address the collective behavior of molecules. Establishment of theories for gas, liquid, and solid phases, including phase transitions and critical behavior. Applications include electrolytes, ion channels, surface adsorption, ligand binding to proteins, hydrogen bonding in water, hydrophobicity, polymers, and proteins.

**CHEMENG 345. Fundamentals and Applications of Spectroscopy. 3 Units.**

Development of theoretical approaches to spectroscopy, including spectroscopic transitions, transition probabilities, and selection rules. Application to photon and electron spectroscopies of the gas and solid phases. Topics: rotational spectroscopy; infrared and Raman vibrational spectroscopies; fluorescence spectroscopy; Auger, x-ray and ultraviolet photoelectron spectroscopies. Prerequisite: CHEM 271 or course in quantum mechanics.

Same as: PHOTON 345

**CHEMENG 355. Advanced Biochemical Engineering. 3 Units.**

Combines biological knowledge and methods with quantitative engineering principles. Quantitative review of biochemistry and metabolism; recombinant DNA technology and synthetic biology (metabolic engineering). The production of protein pharmaceuticals as a paradigm for the application of chemical engineering principles to advanced process development within the framework of current business and regulatory requirements. Prerequisite: CHEMENG 181 (formerly 188) or BIOSCI 41, or equivalent.

Same as: BIOE 355

**CHEMENG 35N. Renewable Energy for a Sustainable World. 3 Units.**

Preference to freshmen. Organized to prepare a renewable energy plan for California. Energy concepts and quantitation approaches are learned, energy needs and natural resources are assessed, and renewable energy technologies are evaluated for economic performance and environmental impact. An investment plan is developed along with implementation and research recommendations. The same concepts are then applied to Mexico as a second model system.

**CHEMENG 399. Graduate Research Rotation in Chemical Engineering. 1 Unit.**

Introduction to graduate level laboratory and theoretical work. Performance in this course comprises part of the mandatory evaluation for pre-candidacy standing and suitability to continue in the chemical engineering Ph.D. program.

**CHEMENG 410. Public Communication of Research. 1 Unit.**

Develop skills for communicating complex science to the public through writing, video, and public speaking. Learn how to work with the media to explain scientific discoveries without overselling the science. Work in small groups and one-on-one with writers and guest speaker; develop a short written piece and video explaining own research; develop skills that will translate to future scientific projects. Open to graduate students in the biosciences, chemistry, and engineering. Enrollment limited to 20.

**CHEMENG 420. Growth and Form. 3 Units.**

Advanced topics course examining the role of physical forces in shaping living cells, tissues, and organs, making use of D'Arcy Thompson's classic text *On Growth and Form*. The course begins with a review of relevant physical principles drawn from statistical physics, polymer theory, rheology and materials science. We then examine current knowledge of cellular mechanotransduction pathways, the roles of physical forces in guiding embryonic development, and the contribution of aberrant cellular response to mechanical cues in heart disease and cancer. The course concludes by examining current frontiers in stem cell biology and tissue engineering.

**CHEMENG 432. Electrochemical Energy Conversion. 3 Units.**

Electrochemistry is playing an increasingly important role in renewable energy. This course aims to cover the fundamentals of electrochemistry, and then build on that knowledge to cover applications of electrochemistry in energy conversion. Topics to be covered include fuel cells, solar water-splitting, CO<sub>2</sub> conversion to fuels and chemicals, batteries, redox flow cells, and supercapacitors. Prerequisites: CHEM 31AB or 31 X, CHEM 33, CHEM 171, CHEM 175 or CHEMENG 170, or equivalents. Recommended: CHEM 173.

**CHEMENG 442. Suspension Mechanics. 3 Units.**

The course will begin with a brief recap of low-Reynolds number hydrodynamics and the analytical foundations for the study of pair-level particle interactions in a Newtonian solvent. Extension to many-body interactions will be covered in detail, with an introductory overview of computational methods. Brownian motion, thermodynamic forces, and other interparticle forces will be discussed, and various approaches for theoretical modeling will be covered, including Fokker-Planck / Smoluchowski analysis and Langevin analysis. Theoretical and computational modeling of material properties via averaging techniques will be studied, in the context of micromechanical and continuum models. Landmark results in the microrheology and rheology of complex fluids will be covered, including sedimentation, non-Newtonian rheology (including shear thinning and thickening; viscoelasticity and memory behaviors; yield-stress behavior; glassy aging; diffusion; normal stress differences).

**CHEMENG 444. Electronic Structure Theory and Applications to Chemical Kinetics. 3 Units.**

Fundamentals of electronic structure theory to describe materials properties and chemical reactivity. nLearning objectives: Understand the basis for modern electronic structure calculations, understand the relationship between electronic structure, materials properties, and chemical kinetics, be able to read the current literature, be able to do own calculations. nImportant components of the lectures: An overview of quantum chemical methods, introduction to methods for periodic systems, density functional theory and current approximations to describe exchange and correlation effects, methods to describe excited states, transition state theory and methods to calculate partition functions. nThe Lab: Learning to do DFT calculations.

**CHEMENG 450. Advances in Biotechnology. 3 Units.**

Overview of cutting edge advances in biotechnology with a focus on therapeutic and health-related topics. Academic and industrial speakers from a range of areas including protein engineering, immuno-oncology, DNA sequencing, the microbiome, pharmacogenomics, industrial enzymes, synthetic biology, and more. Course is designed for students interested in pursuing a career in the biotech industry. Same as: BIOE 450

**CHEMENG 451. Chemical Principles in Drug Discovery and Development. 3 Units.**

Application of physical and organic chemistry to the discovery and subsequent product development of small molecule and macromolecular drugs. Course discusses key physical, chemical, and biological properties of drug candidates and how to measure them, how to engineer them. Discussion of principles of drug formulation and delivery. Graduate-level background in physical and organic chemistry recommended.

**CHEMENG 454. Synthetic Biology and Metabolic Engineering. 3 Units.**

Principles for the design and optimization of new biological systems. Development of new enzymes, metabolic pathways, other metabolic systems, and communication systems among organisms. Example applications include the production of central metabolites, amino acids, pharmaceutical proteins, and isoprenoids. Economic challenges and quantitative assessment of metabolic performance. Pre- or corequisite: CHEMENG 355 or equivalent. Same as: BIOE 454

**CHEMENG 456. Microbial Bioenergy Systems. 3 Units.**

Introduction to microbial metabolic pathways and to the pathway logic with a special focus on microbial bioenergy systems. The first part of the course emphasizes the metabolic and biochemical principles of pathways, whereas the second part is more specifically directed toward using this knowledge to understand existing systems and to design innovative microbial bioenergy systems for biofuel, biorefinery, and environmental applications. There also is an emphasis on the implications of rerouting of energy and reducing equivalents for the fitness and ecology of the organism. Prerequisites: CHEMENG 174 or 181 and organic chemistry, or equivalents.

Same as: CEE 274B

**CHEMENG 459. Frontiers in Interdisciplinary Biosciences. 1 Unit.**

Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

Same as: BIO 459, BIOE 459, BIOE 459, CHEM 459, PSYCH 459

**CHEMENG 462. Complex Fluids and Non-Newtonian Flows. 3 Units.**

Definition of a complex liquid and microrheology. Division of complex fluids into suspensions, solutions, and melts. Suspensions as colloidal and non-colloidal. Extra stress and relation to the stresslet. Suspension rheology including Brownian and non-Brownian fibers. Microhydrodynamics and the Fokker-Planck equation. Linear viscoelasticity and the weak flow limit. Polymer solutions including single mode (dumbbell) and multimode models. Nonlinear viscoelasticity. Intermolecular effects in nondilute solutions and melts and the concept of reptation. Prerequisites: low Reynolds number hydrodynamics or consent of instructor.

Same as: ME 455

**CHEMENG 464. Polymer Chemistry. 3 Units.**

Polymer material design, synthesis, characterization, and application. Topics include organic and kinetic aspects of polymerization, polymer characterization techniques, and structure and properties of bulk polymers for commercial applications and emerging technologies.

**CHEMENG 466. Polymer Physics. 3 Units.**

Concepts and applications in the equilibrium and dynamic behavior of complex fluids. Topics include solution thermodynamics, scaling concepts, semiflexibility, characterization of polymer size (light scattering, osmotic pressure, size-exclusion chromatography, intrinsic viscosity), viscoelasticity, rheological measurements, polyelectrolytes, liquid crystals, biopolymers, and gels.

**CHEMENG 469. Solid Structure and Properties of Polymers. 3 Units.**

Fundamental structure-properties relationships of solid polymers in bulk and thin films. Topics include chain conformations in bulk amorphous polymers, glass transition, crystallization, semi-crystalline morphology, liquid crystalline order, polymer blends, block copolymers, polymer networks/gels, polymers of high current interest, and experimental methods of characterizing polymer structure.

**CHEMENG 470. Complex Fluid Interfaces: Capillarity and Interfacial Dynamics. 3 Units.**

Complex fluid interfaces arise whenever amphiphiles (surfactants, phospholipids, polymers, colloidal particles) collect at liquid-fluid surfaces, imbuing them with nonlinear mechanical responses. Examples in nature include the cell membrane, lung surfactants, and the tear film. Industrial applications include emulsions and foams that require stabilization. The course discusses concepts in capillarity and wetting, interfacial fluid dynamics, thin film stability, the microstructure of self-organized monolayers and bilayers. Experimental microstructural methods (Brewster angle microscopy, fluorescence microscopy, grazing incidence x-ray diffraction) will be described. Prerequisite: 310 or equivalent.

**CHEMENG 482. The Startup Garage: Design. 4 Units.**

(Same as STRAMGT 356) The Startup Garage is an experiential lab course that focuses on the design, testing and launch of a new venture. Multidisciplinary student teams work through an iterative process of understanding user needs, creating a point of view statement, ideating and prototyping new product and services and their business models, and communicating the user need, product, service and business models to end-users, partners, and investors. In the autumn quarter, teams will: identify and validate a compelling user need and develop very preliminary prototypes for a new product or service and business models. Students form teams, conduct field work and iterate on the combination of business model -- product -- market. Teams will present their first prototypes (business model - product - market) at the end of the quarter to a panel of entrepreneurs, venture capitalists, angel investors and faculty.

Same as: SOMGEN 282

**CHEMENG 484. The Startup Garage: Testing and Launch. 4 Units.**

This is the second quarter of the two-quarter series. In this quarter, student teams expand the field work they started in the fall quarter. They get out of the building to talk to potential customers, partners, distributors, and investors to test and refine their business model, product/service and market. This quarter the teams will be expected to develop and test a minimally viable product, iterate, and focus on validated lessons on: the market opportunity, user need and behavior, user interactions with the product or service, business unit economics, sale and distribution models, partnerships, value proposition, and funding strategies. Teams will interact with customers, partners, distributors, investors and mentors with the end goal of developing and delivering a funding pitch to a panel of entrepreneurs, venture capitalists, angel investors and faculty.

Same as: SOMGEN 284

**CHEMENG 500. Special Topics in Protein Biotechnology. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 501. Special Topics in Semiconductor Processing. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 503. Special Topics in Biocatalysis. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 505. Special Topics in Microrheology. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 507. Special Topics in Polymer Physics and Molecular Assemblies. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 510. Special Topics in Transport Mechanics. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 513. Special Topics in Functional Organic Materials for Electronic and Optical Devices. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 514. Special Topics in Biopolymer Physics. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 515. Special Topics in Molecular and Systems Biology. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 516. Special Topics in Energy and Catalysis. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 517. Special Topics in Microbial Physiology and Metabolism. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 518. Special Topics in Advanced Biophysics and Protein Design. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 519. Special Topics in Interface Science and Catalysis. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 520. Special Topics in Biological Chemistry. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 521. Special Topics in Nanostructured Materials for Energy and the Environment. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 522. Special Topics in Soft Matter and Molecular Physics. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 523. Special Topics in Suspension Dynamics. 1 Unit.**

Recent developments and current research. May be repeated for credit. Prerequisite: graduate standing and consent of instructor.

**CHEMENG 600. Graduate Research in Chemical Engineering. 1-12 Unit.**

Laboratory and theoretical work leading to partial fulfillment of requirements for an advanced degree. Course may be repeated for credit.

**CHEMENG 60Q. Environmental Regulation and Policy. 3 Units.**

Preference to sophomores. How environmental policy is formulated in the U.S. How and what type of scientific research is incorporated into decisions. How to determine acceptable risk, the public's right to know of chemical hazards, waste disposal and clean manufacturing, brownfield redevelopment, and new source review regulations. The proper use of science and engineering including media presentation and misrepresentation, public scientific and technical literacy, and emotional reactions. Alternative models to formulation of environmental policy. Political and economic forces, and stakeholder discussions.

**CHEMENG 699. Colloquium. 1 Unit.**

Weekly lectures by experts from academia and industry in the field of chemical engineering. Course may be repeated for credit.

**CHEMENG 70Q. Masters of Disaster. 3 Units.**

Preference to sophomores. For students interested in science, engineering, politics, and the law. Learn from past disasters to avoid future ones. How disasters can be tracked to failures in the design process. The roles of engineers, artisans, politicians, lawyers, and scientists in the design of products. Failure as rooted in oversight in adhering to the design process. Student teams analyze real disasters and design new products presumably free from the potential for disastrous outcomes.

**CHEMENG 801. TGR Project. 0 Units.****CHEMENG 802. TGR Dissertation. 0 Units.****CHEMENG 80Q. Art, Chemistry, and Madness: The Science of Art Materials. 3 Units.**

Preference to sophomores. Chemistry of natural and synthetic pigments in five historical palettes: earth (paleolithic), classical (Egyptian, Greco-Roman), medieval European (Middle Ages), Renaissance (old masters), and synthetic (contemporary). Composite nature of paints using scanning electron microscopy images; analytical techniques used in art conservation, restoration, and determination of provenance; and inherent health hazards. Paintings as mechanical structures. Hands-on laboratory includes stretching canvas, applying gesso grounds, grinding pigments, preparing egg tempera paint, bamboo and quill pens, gilding and illumination, and papermaking.

**CHEMENG 90Q. Dare to Care: Compassionate Design. 3 Units.**

Imagine yourself with your abundant creativity, intellect, and passion, but your ability to move or speak is diminished. How would you face the world, how would you thrive at Stanford, how would you relay to people your ideas and creations? How would you share yourself and your ideas with the world? There are more than 50 million individuals in America with at least one disability, and in the current world of design, these differences are often overlooked. How do we as designers empower people of diverse physical abilities and provide them with means of self-expression? In Compassionate Design, students from any prospective major are invited to explore the engineering design process by examining the needs of persons with disabilities. Through invited guests, students will have the opportunity to directly engage people with different types of disabilities as a foundation to design products that address problems of motion and mobility, vision, speech and hearing. For example, in class, students will interview people who are deaf, blind, have cerebral palsy, or other disabling conditions. Students will then be asked, using the design tools they have been exposed to as part of the seminar, to create a particular component or device that enhances the quality of life for that user or users with similar limitations. Presentation skills are taught and emphasized as students will convey their designs to the class and instructors. Students will complete this seminar with a compassionate view toward design for the disabled, they will acquire a set of design tools that they can use to empower themselves and others in whatever direction they choose to go, and they will have increased confidence and abilities in presenting in front of an audience.

## Chemistry (CHEM)

**CHEM 1. Introduction to Organic Chemistry. 4 Units.**

First lecture class in summer organic intensive designed for those entering the medical field. Introduction to molecular structure and reactivity of functional groups. Explore chemical reactivity in the context of kinetics and thermodynamics. Prerequisite: College level general chemistry or an AP Chemistry score of 5.

**CHEM 10. Exploring Research and Problem Solving Across the Sciences. 2 Units.**

Development and practice of critical problem solving and study skills using wide variety of scientific examples that illustrate the broad yet integrated nature of current research. Student teams will have the opportunity to explore and present on topics revolving around five central issues: energy, climate change, water resources, medicine, and food & nutrition from a chemical perspective. Course offered in August prior to start of fall quarter.

**CHEM 110. Directed Instruction/Reading. 1-2 Unit.**

Undergraduates pursue a reading program under supervision of a faculty member in Chemistry; may also involve participation in lab. Prerequisites: superior work in 31A,B, 31X, or 33; and consent of instructor.

**CHEM 111. Exploring Chemical Research at Stanford. 1 Unit.**

Preference to freshmen and sophomores. Department faculty describe their cutting-edge research and its applications.

**CHEM 130. Organic Chemistry Laboratory. 3 Units.**

Intermediate organic chemistry laboratory, including synthesis and spectroscopy. Nobel prize winning reactions and characterization techniques, such as Diels-Alder and modified Wittig reactions, as well as IR, NMR, and GCMS; Biodiesel synthesis and lipid characterization. Prerequisite: Chem 35 taken in Aut 2014-15 or later, or Chem 35 and 36. Corequisite: 131.

**CHEM 131. Organic Polyfunctional Compounds. 3 Units.**

Aromatic compounds, polysaccharides, amino acids, proteins, natural products, dyes, purines, pyrimidines, nucleic acids, and polymers. Prerequisite: 35.

**CHEM 132. Synthesis Laboratory. 3 Units.**

Focus is on longer syntheses with an emphasis upon using metal catalysts. Emphasis will be on complete characterization of final products using chromatographic and spectroscopic methods. Concludes with an individual synthesis project. Prerequisites: 35, 130.

**CHEM 134. Analytical Chemistry Laboratory. 5 Units.**

Classical analysis methods, statistical analyses, chromatography, and spectroscopy will be covered with an emphasis upon quantitative measurements and data analysis. WIM course with full lab reports and oral communication. Concludes with student-developed quantitative project. Prerequisite: Chem 35.

**CHEM 137. Macromolecular and Supramolecular Chemistry. 3 Units.**

The course covers the design and synthesis of polymers and supramolecular complexes. Polymer chemistry is built on our understanding of reactive organic intermediates and catalysis; supramolecular chemistry is based on our understanding of non-covalent interactions. Thus, application of such understandings to the synthesis of covalent and supramolecular polymers is a central theme of this course. Modern developments in polymer chemistry have allowed the synthesis of polymers with controlled molecular weights, architectures, tacticity, and rich functionalities. Such synthetic controls in macromolecular structures lead to diverse and tunable properties and functions of the produced materials. Therefore, this course also covers basic properties and structure-property relationships of macromolecules for rational design of structures and selection of chemistry. Prerequisite CHEM 35 and 131.

**CHEM 141. The Chemical Principles of Life I. 4 Units.**

This is the first course in a two-quarter sequence (Chem 141/143), which will examine biological science through the lens of chemistry. In this sequence students will gain a qualitative and quantitative understanding of the molecular logic of cellular processes, which include expression and transmission of the genetic code, enzyme kinetics, biosynthesis, energy storage and consumption, membrane transport, and signal transduction. Connections to foundational principles of chemistry will be made through structure-function analyses of biological molecules. Integrated lessons in structural, mechanistic, and physical chemistry will underscore how molecular science and molecular innovation have impacted biology and medicine. Prerequisites: CHEM 35, MATH 21 or equivalent.

**CHEM 143. The Chemical Principles of Life II. 4 Units.**

This is the second course in a two-quarter sequence (Chem 141/143), which will continue the discussion of biological science through the lens of chemistry. In this sequence students will gain a qualitative and quantitative understanding of the molecular logic of cellular processes, which include expression and transmission of the genetic code, enzyme kinetics, biosynthesis, energy storage and consumption, membrane transport, and signal transduction. Connections to foundational principles of chemistry will be made through structure-function analyses of biological molecules. Integrated lessons in structural, mechanistic, and physical chemistry will underscore how molecular science and molecular innovation have impacted biology and medicine. Prerequisite: Chem 141.

**CHEM 150. Single-Crystal X-ray Diffraction. 3 Units.**

Practical X-ray crystallography for small molecule compounds, which will emphasize crystal growth, measurement strategies, structure solution and refinement, and report generation. Example structures will include absolute configuration of organic compounds (with the heaviest atom being oxygen), metal containing complexes, disordered small molecules and twinning. Students will learn how to get from a new compound to a single crystal, and then to a cif-file ready for publication submission. They will gain knowledge of the underlying theory and concepts for each step of structure determination.

Same as: CHEM 250

**CHEM 151. Inorganic Chemistry I. 4 Units.**

Theories of electronic structure, stereochemistry, and symmetry properties of inorganic molecules. Topics: ionic and covalent interactions, electron-deficient bonding, and molecular orbital theories. Emphasis is on the chemistry of the metallic elements. An introduction to the Gaussian program will be covered in the discussion sections, used for electronic calculations in the computer and problem set exercises. Prerequisites: 35.

**CHEM 153. Inorganic Chemistry II. 3 Units.**

The theoretical aspects of inorganic chemistry. Group theory; many-electron atomic theory; molecular orbital theory emphasizing general concepts and group theory; ligand field theory; application of physical methods to predict the geometry, magnetism, and electronic spectra of transition metal complexes. Prerequisites: 151, 173.

**CHEM 155. Advanced Inorganic Chemistry. 3 Units.**

Chemical reactions of organotransition metal complexes and their role in homogeneous catalysis. Analogous patterns among reactions of transition metal complexes in lower oxidation states. Physical methods of structure determination. Prerequisite: one year of physical chemistry. Same as: CHEM 255

**CHEM 171. Physical Chemistry I. 4 Units.**

Laws of thermodynamics, properties of gases, phase transitions and phase equilibrium, chemical equilibrium, chemical kinetics, reaction rate, thermal motion and energy barriers, kinetic molecular models. The MATLAB programming language with hands-on experiences will be introduced in discussion sections and used for simulations of chemical systems. Prerequisites: CHEM 33; PHYS 41; either CME 100 or MATH 51.

**CHEM 173. Physical Chemistry II. 3 Units.**

Introduction to quantum chemistry: the basic principles of wave mechanics, the harmonic oscillator, the rigid rotator, infrared and microwave spectroscopy, the hydrogen atom, atomic structure, molecular structure, valence theory. Prerequisites: CHEM 171; CME 102 and CME 104 or MATH 53 or consent from instructor; PHYSICS 41, 43.

**CHEM 174. Electrochemical Measurements Lab. 3 Units.**

Introduction to modern electrochemical measurement in a hands-on, laboratory setting. Students assemble and use electrochemical cells including indicator, reference, working and counter electrodes, with macro, micro and ultramicro geometries, salt bridges, ion-selective membranes, electrometers, potentiostats, galvanostats, and stationary and rotated disk electrodes. The later portion of the course will involve a student-generated project to experimentally characterize some electrochemical system. Prerequisites: 134, 171, MATH 51, PHYSICS 44 or equivalent.

Same as: CHEM 274

**CHEM 175. Physical Chemistry III. 3 Units.**

Molecular theory of kinetics and statistical mechanics: transport and reactions in gases and liquids, ensembles and the Boltzmann distribution law, partition functions, molecular simulation, structure and dynamics of liquids. Diffusion and activation limited reactions, potential energy surfaces, collision theory, transition-state theory and Marcus theory of reaction rates. Prerequisites: 171, 173.

**CHEM 176. Spectroscopy Laboratory. 3 Units.**

Use of spectroscopic instrumentation to obtain familiarity with important types of spectrometers and spectroscopic method and to apply them to study molecular properties and physical chemical time-dependent processes. Spectrometers include electronic ultraviolet/visible absorption, fluorescence, Raman, Fourier transform infrared, and nuclear magnetic resonance. Prerequisite: 173.

**CHEM 181. Biochemistry I. 4 Units.**

Structure and function of major classes of biomolecules, including proteins, carbohydrates and lipids. Mechanistic analysis of properties of proteins including catalysis, signal transduction and membrane transport. Students will also learn to critically analyze data from the primary biochemical literature. Satisfies Central Menu Area 1 for Bio majors. Prerequisites: CHEM 35 and 135 or 171.

Same as: CHEMENG 181, CHEMENG 281

**CHEM 183. Biochemistry II. 3 Units.**

Focus on metabolic biochemistry: the study of chemical reactions that provide the cell with the energy and raw materials necessary for life. Topics include glycolysis, gluconeogenesis, the citric acid cycle, oxidative phosphorylation, photosynthesis, the pentose phosphate pathway, and the metabolism of glycogen, fatty acids, amino acids, and nucleotides as well as the macromolecular machines that synthesize RNA, DNA, and proteins. Medical relevance is emphasized throughout. Satisfies Central Menu Area 1 for Bio majors. Prerequisite: CHEM 181 or CHEM 143 or CHEMENG 181/281.

Same as: CHEMENG 183, CHEMENG 283

**CHEM 184. Biological Chemistry Laboratory. 3 Units.**

Modern techniques in biological chemistry including protein purification, characterization of enzyme kinetics, heterologous expression of His-tagged fluorescent proteins, site-directed mutagenesis, and single-molecule fluorescence microscopy. Prerequisite: 181.

**CHEM 185. Biophysical Chemistry. 3 Units.**

Primary literature based seminar/discussion course covering classical and contemporary papers in biophysical chemistry. Topics include: protein structure and stability, folding, single molecule fluorescence and force microscopy, simulations, ion channels, GPCRs, and ribosome structure/function. Course is restricted to undergraduates: required for majors on the Biological Chemistry track, but open to students from the regular track. Prerequisites: Chem 171, 173 and 181.



**CHEM 187B. Natural Product Biosynthesis: Chemical Logic and Enzymatic Machinery. 1 Unit.**

This course provides an overview of the biosynthesis of the five major classes of small molecule natural products, including polyketides, nonribosomal peptides, terpene/isoprenoid scaffolds, alkaloids, and phenylpropanoids. Focus will be on the chemical logic for bond-forming chemical steps in each natural product class and the kinds of enzyme catalysts required to effect complexity-generating molecular scaffolds. This short course runs for the first five weeks of the quarter, from January through the second week of February. Prerequisite: Chem 181 or equivalent.

Same as: CHEM 287B

**CHEM 190. Advanced Undergraduate Research. 1-5 Unit.**

Limited to undergraduates who have completed Chem 35 and/or Chem 134, or by special arrangement with a faculty member. May be repeated 8 times for a max of 27 units. Prerequisite: 35 or 134. Corequisite: 300.

**CHEM 196. Creating New Ventures in Engineering and Science-based Industries. 3 Units.**

Open to seniors and graduate students interested in the creation of new ventures and entrepreneurship in engineering and science intensive industries such as chemical, energy, materials, bioengineering, environmental, clean-tech, pharmaceuticals, medical, and biotechnology. Exploration of the dynamics, complexity, and challenges that define creating new ventures, particularly in industries that require long development times, large investments, integration across a wide range of technical and non-technical disciplines, and the creation and protection of intellectual property. Covers business basics, opportunity viability, creating start-ups, entrepreneurial leadership, and entrepreneurship as a career. Teaching methods include lectures, case studies, guest speakers, and individual and team projects.

Same as: CHEM 296, CHEMENG 196, CHEMENG 296

**CHEM 1L. Organic Chemistry Lab 1. 2 Units.**

Hands on exploration of laboratory reactions & phenomena discussed in Chem 1. Learn techniques for separation of compounds: distillation, extraction and chromatography (TLC, GCMS) while investigating the nature and properties of organic compounds such as boiling points, polarity, solubility and chirality. Prerequisite: Chem 33 (or course equivalent) or Chem 1 co-requisite.

**CHEM 2. Organic Chemistry of Carbonyl Containing Molecules. 4 Units.**

Second lecture class in the summer organic intensive series focusing on the synthesis and reactivity of small molecules, with particular emphasis on those that possess the carbonyl functional group. Discuss the importance of the carbonyl functional group to biochemistry. Prerequisite: Chem 33 or Chem 1 or equivalent.

**CHEM 200. Research and Special Advanced Work. 1-15 Unit.**

Qualified graduate students undertake research or advanced lab work not covered by listed courses under the direction of a member of the teaching staff. For research and special work, students register for 200.

**CHEM 221. Advanced Organic Chemistry. 3 Units.**

Physical organic chemistry: molecular structures, bonding, and non-covalent interactions; thermodynamic and kinetic understanding of reactivity and reaction mechanism. Prerequisite: 175.

**CHEM 223. Advanced Organic Chemistry. 3 Units.**

Continuation of 221. Modern synthetic organic chemistry with an emphasis on structure, reactivity, and stereocontrol. Prerequisite: 221 or consent of instructor.

**CHEM 225. Advanced Organic Chemistry. 3 Units.**

Chemistry is driven by ones understanding of structure and mechanism and ones ability to make molecules. This course is intended to address the universal mechanistic and structural foundations of organic chemistry with an emphasis on new synthetic methods, selectivity analysis, computer-based strategies for the design and synthesis of complex molecules, concepts for innovative problems solving and, importantly, how to put these skills together in the generation of impactful ideas and proposals directed at solving problems in science as required for a career in molecular science. Prerequisite: 223 or consent of instructor.

**CHEM 225T. Advanced Organic Chemistry. 3 Units.**

Organic reactions, new synthetic methods with special attention to catalysis and atom economy, selectivity analysis, and exercises in the syntheses of complex molecules.

**CHEM 226. Synthesis and Analysis at the Chemistry-Biology Interface. 3 Units.**

Focus on the combined use of organic chemistry and molecular biology to make, manipulate and measure biomacromolecules. Synthetic methods for design and construction of peptides, proteins and nucleic acids; methods for bioconjugation and labeling; fluorescence tools; intracellular delivery strategies; combinatorial selection methods. Prerequisite: One year of undergraduate organic chemistry. Completion of a course in molecular biology is helpful but not required.

**CHEM 227. Therapeutic Science at the Chemistry - Biology Interface. 3 Units.**

Explores the design and enablement of new medicines that were born from a convergence of concepts and techniques from chemistry and biology. Topics include fundamental methods for biomolecule synthesis and engineering and application to hybrid chemical/biologic drugs, as well as modern approaches for target discovery and validation. Prerequisite: One year of undergraduate organic chemistry, as well as familiarity with concepts in biochemistry and molecular biology.

**CHEM 229. Organic Chemistry Seminar. 1 Unit.**

Required of graduate students majoring in organic chemistry. Students giving seminars register for 231.

**CHEM 231. Organic Chemistry Seminar Presentation. 1 Unit.**

Required of graduate students majoring in organic chemistry for the year in which they present their organic seminar. Second-year students must enroll all quarters.

**CHEM 233A. Creativity in Organic Chemistry. 1 Unit.**

Required of second- and third-year Ph.D. candidates in organic chemistry. The art of formulating, writing, and orally defending a research progress report (A) and two research proposals (B, C). Second-year students register for A and B; third-year students register for C. A: Aut, B: Spr, C: Spr.

**CHEM 233B. Creativity in Organic Chemistry. 1 Unit.**

Required of second- and third-year Ph.D. candidates in organic chemistry. The art of formulating, writing, and orally defending a research progress report (A) and two research proposals (B, C). Second-year students register for A and B; third-year students register for C. A: Aut, B: Spr, C: Spr.

**CHEM 233C. Creativity in Organic Chemistry. 1 Unit.**

Required of second- and third-year Ph.D. candidates in organic chemistry. The art of formulating, writing, and orally defending a research progress report (A) and two research proposals (B, C). Second-year students register for A and B; third-year students register for C. A: Aut, B: Spr, C: Spr.

**CHEM 235. Applications of NMR Spectroscopy. 3 Units.**

The uses of NMR spectroscopy in chemical and biochemical sciences, emphasizing data acquisition for liquid samples and including selection, setup, and processing of standard and advanced experiments.

**CHEM 250. Single-Crystal X-ray Diffraction. 3 Units.**

Practical X-ray crystallography for small molecule compounds, which will emphasize crystal growth, measurement strategies, structure solution and refinement, and report generation. Example structures will include absolute configuration of organic compounds (with the heaviest atom being oxygen), metal containing complexes, disordered small molecules and twinning. Students will learn how to get from a new compound to a single crystal, and then to a cif-file ready for publication submission. They will gain knowledge of the underlying theory and concepts for each step of structure determination.

Same as: CHEM 150

**CHEM 251. Advanced Inorganic Chemistry. 3 Units.**

Primarily intended for first-year graduate students, as a review of some of the basic concepts in inorganic chemistry. Specific topics covered will include: symmetry, group theory, electronic structure of molecules and solids, and reactivity of coordination complexes. Prerequisite: Advanced undergraduate-level inorganic chemistry.

**CHEM 253. Advanced Inorganic Chemistry. 3 Units.**

Electronic structure and physical properties of transition metal complexes. Ligand field and molecular orbital theories, magnetism and magnetic susceptibility, electron paramagnetic resonance including hyperfine interactions and zero field splitting and electronic absorption spectroscopy including vibrational interactions. Prerequisite: 153 or the equivalent.

**CHEM 255. Advanced Inorganic Chemistry. 3 Units.**

Chemical reactions of organotransition metal complexes and their role in homogeneous catalysis. Analogous patterns among reactions of transition metal complexes in lower oxidation states. Physical methods of structure determination. Prerequisite: one year of physical chemistry. Same as: CHEM 155

**CHEM 258A. Research Progress in Inorganic Chemistry. 1 Unit.**

Required of all second-, third-, and fourth-year Ph.D. candidates in inorganic chemistry. Students present their research progress in written and oral forms (A); present a seminar in the literature of the field of research (B); and formulate, write, and orally defend a research proposal (C). Second-year students register for A; third-year students register for B; fourth-year students register for C.

**CHEM 258B. Research Progress in Inorganic Chemistry. 1 Unit.**

Required of all second-, third-, and fourth-year Ph.D. candidates in inorganic chemistry. Students present their research progress in written and oral forms (A); present a seminar in the literature of the field of research (B); and formulate, write, and orally defend a research proposal (C). Second-year students register for A; third-year students register for B; fourth-year students register for C.

**CHEM 258C. Research Progress in Inorganic Chemistry. 1 Unit.**

Required of all second-, third-, and fourth-year Ph.D. candidates in inorganic chemistry. Students present their research progress in written and oral forms (A); present a seminar in the literature of the field of research (B); and formulate, write, and orally defend a research proposal (C). Second-year students register for A; third-year students register for B; fourth-year students register for C.

**CHEM 259. Inorganic Chemistry Seminar. 1 Unit.**

Required of graduate students majoring in inorganic chemistry.

**CHEM 25N. Science in the News. 3 Units.**

Preference to freshmen. Possible topics include: diseases such as avian flu, HIV, and malaria; environmental issues such as climate change, atmospheric pollution, and human population; energy sources in the future; evolution; stem cell research; nanotechnology; and drug development. Focus is on the scientific basis for these topics as a basis for intelligent discussion of societal and political implications. Sources include the popular media and scientific media for the nonspecialist, especially those available on the web.

**CHEM 261. Computational Chemistry. 3 Units.**

Introduction to computational chemistry methods and tools that can be used to interpret and guide experimental research. Project based and hands-on experience with electronic structure calculations, obtaining minimum energy structures and reaction pathways, molecular simulation and modeling. Prerequisite: knowledge of undergraduate level quantum mechanics at the level of Chem 173.

**CHEM 26N. The What, Why, How and Wow's of Nanotechnology. 3 Units.**

Preference to freshmen. Introduction to nanotechnology with discussion of basic science at the nanoscale, its difference from molecular and macroscopic scales, and implications and applications. Developments in nanotechnology in the past two decades, from imaging and moving single atoms on surfaces to killing cancer cells with nanoscale tools and gadgets.

**CHEM 271. Advanced Physical Chemistry. 3 Units.**

The principles of quantum mechanics. General formulation, mathematical methods, and applications of quantum theory. Different representations of quantum theory, i. e., the Dirac, Schrödinger, matrix, and density matrix methods. Time independent exactly solvable problems and approximate methods including time independent perturbation theory and the variational method. Atomic energy calculations, angular momentum, and introduction to molecular structure methods. Time dependent methods. Time dependent perturbation theory applied to various problems such as absorption and emission of radiation. Time dependent density matrix formalism applied to coherent coupling of radiation fields to molecular systems, e.g., NMR and optical spectroscopy. Prerequisite: 175 or equivalent course.

**CHEM 273. Advanced Physical Chemistry. 3 Units.**

Statistical mechanics is a fundamental bridge that links microscopic world of quantum mechanics to macroscopic thermodynamic properties. We discuss the principles and methods of statistical mechanics from the ensemble point of view. Applications include statistical thermodynamics, quantum systems, heat capacities of gases and solids, chemical equilibrium, pair correlation functions in liquids, and phase transitions. Prerequisite: 271.

**CHEM 274. Electrochemical Measurements Lab. 3 Units.**

Introduction to modern electrochemical measurement in a hands-on, laboratory setting. Students assemble and use electrochemical cells including indicator, reference, working and counter electrodes, with macro, micro and ultramicro geometries, salt bridges, ion-selective membranes, electrometers, potentiostats, galvanostats, and stationary and rotated disk electrodes. The later portion of the course will involve a student-generated project to experimentally characterize some electrochemical system. Prerequisites: 134, 171, MATH 51, PHYSICS 44 or equivalent.

Same as: CHEM 174

**CHEM 275. Advanced Physical Chemistry. 3 Units.**

Covering angular momentum theory with a special emphasis on scattering dynamics and the interaction of radiation and matter. Recommended: Chem 273 and either Chem 271 or Physics 230.

**CHEM 277. Materials Chemistry and Physics. 3 Units.**

Topics: structures and symmetries and of solid state crystalline materials, chemical applications of group theory in solids, quantum mechanical electronic band structures of solids, phonons in solids, synthesis methods and characterization techniques for solids including nanostructured materials, selected applications of solid state materials and nanostructures. May be repeated for credit.

**CHEM 278A. Research Progress in Physical Chemistry. 1 Unit.**

Required of all second- and third-year Ph.D. candidates in physical and biophysical chemistry and chemical physics. Second-year students present their research progress and plans in brief written and oral summaries (A); third-year students prepare a written progress report (B). A: Win, B: Win.

**CHEM 278B. Research Progress in Physical Chemistry. 1 Unit.**

Required of all second- and third-year Ph.D. candidates in physical and biophysical chemistry and chemical physics. Second-year students present their research progress and plans in brief written and oral summaries (A); third-year students prepare a written progress report (B). A: Win, B: Win.

**CHEM 279. Physical Chemistry Seminar. 1 Unit.**

Required of graduate students majoring in physical chemistry. May be repeated for credit.

**CHEM 27N. Light and Life. 3 Units.**

Preference given to freshman. Light plays a central role in many biological processes and color affects everything in our world. This includes familiar processes such as photosynthesis and vision, but also proton pumps in the organisms that make the Bay purple, green fluorescent protein (GFP), the light from fireflies, the blue and red light receptors responsible for directing how plants grow, the molecules responsible for fall colors, and repair enzymes such as DNA photolyase. Light is also used to interrogate (e.g. super-resolution microscopy) and manipulate (optogenetics) biological systems. Light causes sunburn, but can also be used in combination with special molecules to treat diseases. We will discuss the nature of light, how it is measured, how it is generated in the laboratory, how molecules are excited, and how one measures the fate of this excitation in simple molecules and complex biological systems. Chem 31X or 31A/B preferred, but not required.

**CHEM 280. Single-Molecule Spectroscopy and Imaging. 3 Units.**

Theoretical and experimental techniques necessary to achieve single-molecule sensitivity in laser spectroscopy: interaction of radiation with spectroscopic transitions; systematics of signals, noise, and signal-to-noise; modulation and imaging methods; and analysis of fluctuations; applications to modern problems in biophysics, cellular imaging, physical chemistry, single-photon sources, and materials science. Prerequisites: 271, previous or concurrent enrollment in 273.

**CHEM 285. Biophysical Chemistry. 3 Units.**

Primary literature based seminar/discussion course covering classical and contemporary papers in biophysical chemistry. This is intended to provide an introduction to critical analysis of papers in the literature through intensive discussion and evaluation. Topics include (among others): protein structure and stability, folding, single molecule fluorescence and force microscopy, simulations, ion channels, GPCRs, and ribosome structure/function. Course is limited to 15 students and priority will be given to first year Chemistry graduate students.

**CHEM 287B. Natural Product Biosynthesis: Chemical Logic and Enzymatic Machinery. 1 Unit.**

This course provides an overview of the biosynthesis of the five major classes of small molecule natural products, including polyketides, nonribosomal peptides, terpene/isoprenoid scaffolds, alkaloids, and phenylpropanoids. Focus will be on the chemical logic for bond-forming chemical steps in each natural product class and the kinds of enzyme catalysts required to effect complexity-generating molecular scaffolds. This short course runs for the first five weeks of the quarter, from January through the second week of February. Prerequisite: Chem 181 or equivalent.

Same as: CHEM 187B

**CHEM 28N. Science Innovation and Communication. 3 Units.**

Preference to freshmen. The course will explore evolutionary and revolutionary scientific advances; their consequences to society, biotechnology, and the economy; and mechanisms for communicating science to the public. The course will engage academic and industrial thought leaders and provide an opportunity for students to participate in communicating science to the public. This fusion of journalism and science has led to a new undergraduate organization (faSCI(n)ate), a web site and video presentations. It is an opportunity to share the fun, excitement and importance of science with others.

**CHEM 291. Introduction to Nuclear Magnetic Resonance. 3 Units.**

Introduction to quantum and classical descriptions of NMR; analysis of pulse sequences and nuclear spin coherences via density matrices and the product operator formalism; NMR spectrometer design; Fourier analysis of time-dependent observable magnetization; NMR relaxation in liquids and solids; NMR strategies for biological problem solving. Prerequisite: Chem 173.

**CHEM 296. Creating New Ventures in Engineering and Science-based Industries. 3 Units.**

Open to seniors and graduate students interested in the creation of new ventures and entrepreneurship in engineering and science intensive industries such as chemical, energy, materials, bioengineering, environmental, clean-tech, pharmaceuticals, medical, and biotechnology. Exploration of the dynamics, complexity, and challenges that define creating new ventures, particularly in industries that require long development times, large investments, integration across a wide range of technical and non-technical disciplines, and the creation and protection of intellectual property. Covers business basics, opportunity viability, creating start-ups, entrepreneurial leadership, and entrepreneurship as a career. Teaching methods include lectures, case studies, guest speakers, and individual and team projects.

Same as: CHEM 196, CHEMENG 196, CHEMENG 296

**CHEM 297. Bio-Inorganic Chemistry. 3 Units.**

Overview of metal sites in biology. Metalloproteins as elaborated inorganic complexes, their basic coordination chemistry and bonding, unique features of the protein ligand, and the physical methods used to study active sites. Active site structures are correlated with function. Prerequisites: 153 and 173, or equivalents.

Same as: BIOPHYS 297

**CHEM 299. Teaching of Chemistry. 1-3 Unit.**

Required of all teaching assistants in Chemistry. Techniques of teaching chemistry by means of lectures and labs.

**CHEM 29N. Chemistry in the Kitchen. 3 Units.**

Preference to Freshmen. This course examines the chemistry relevant to food and drink preparation, both in homes and in restaurants, which makes what we consume more pleasurable. Good cooking is more often considered an art rather than a science, but a small bit of understanding goes a long way to make the preparation and consumption of food and drink more enjoyable. The intention is to have demonstrations and tastings as a part of every class meeting. We will examine some rather familiar items in this course: eggs, dairy products, meats, breads, vegetables, pastries, and carbonated beverages. We shall playfully explore the chemistry that turns food into meals. A high-school chemistry background is assumed; bring to class a good appetite and a healthy curiosity.

**CHEM 2L. Organic Chemistry Lab II. 2 Units.**

Provides hands on experience with modern chemical methods for preparative and analytical chemistry including GCMS, UV-VIS and IR spectroscopy. Learn how chemoselectivity of reactions can be achieved, synthesize bioactive molecules such as pain relievers, and explore how sunscreens can be made more effective. Prerequisite: Chem 1L. Co-requisite: Chem 2.

**CHEM 3. Organic Chemistry of Biomolecules. 4 Units.**

Third lecture class in summer organic intensive focusing on the structure and reactivity of a class of larger molecules, the biomolecules. Topics covered of interest to biochemistry include aromatic compounds, amines and heterocycles, amino acids, proteins, polysaccharides, nucleic acids and polymers. Prerequisite: Chem 35 or Chem 2 or course equivalent.

**CHEM 300. Department Colloquium. 1 Unit.**

Required of graduate students. May be repeated for credit.

**CHEM 301. Research in Chemistry. 2 Units.**

Required of graduate students who have passed the qualifying examination. Open to qualified graduate students with the consent of the major professor. Research seminars and directed reading deal with newly developing areas in chemistry and experimental techniques. May be repeated for credit. Search for adviser name on Axess.

**CHEM 31A. Chemical Principles I. 5 Units.**

For students with moderate or no background in chemistry. Stoichiometry; periodicity; electronic structure and bonding; gases; enthalpy; phase behavior. Emphasis is on skills to address structural and quantitative chemical questions; lab provides practice. Recitation.

**CHEM 31AC. Problem Solving in Science. 1 Unit.**

Development and practice of critical problem solving skills using chemical examples. Limited enrollment. Prerequisite: consent of instructor. Corequisite: CHEM 31A.

**CHEM 31B. Chemical Principles II. 5 Units.**

Chemical equilibrium; acids and bases; oxidation and reduction reactions; chemical thermodynamics; kinetics. Lab. Prerequisite: CHEM 31A.

**CHEM 31BC. Problem Solving in Science. 1 Unit.**

Development and practice of critical problem solving skills using chemical examples. Limited enrollment and with permission of the instructor. Corequisite: 31B.

**CHEM 31X. Chemical Principles Accelerated. 5 Units.**

Accelerated; for students with substantial chemistry background. Chemical equilibria concepts, equilibrium constants, acids and bases, chemical thermodynamics, quantum concepts, models of ionic and covalent bonding, atomic and molecular orbital theory, periodicity, and bonding properties of matter. Recitation. Prerequisites: AP chemistry score of 5 or passing score on chemistry placement test, and AP Calculus AB score of 4 or Math 20. Recommended: high school physics.

**CHEM 33. Structure and Reactivity of Organic Molecules. 5 Units.**

Introduction to organic chemistry. Learn to relate three dimensional structure of organic molecules to their chemical and physical properties. Introduced to a variety of functional groups that exhibit patterns of reactivity and learn how to predict products of a reaction in the context of thermodynamics and kinetics. Two hour weekly lab section accompanies the course to introduce the techniques of separation and identification of organic compounds. Prerequisite: 31A,B, or 31X, or AP Chemistry score of 5.

**CHEM 33C. Problem Solving in Science. 1 Unit.**

Development and practice of critical problem solving skills using chemical examples. Limited enrollment. Prerequisite: consent of instructor. Corequisite: CHEM 33.

**CHEM 35. Organic Chemistry of Bioactive Molecules. 5 Units.**

Focuses on the structure and reactivity of natural and synthetic bioactive molecules. Covers fundamental concepts underlying chemical reactivity and the logic of chemical synthesis for an appreciation of the profound impact of organic chemistry on humankind in fields ranging from medicine to earth and planetary science. A three hour lab section provides hands on experience with modern chemical methods for preparative and analytical chemistry. Prerequisite: Chem 33.

**CHEM 390. Curricular Practical Training for Chemists. 1 Unit.**

For Chemistry majors who need work experience as part of their program of study. Confer with Chem student services office for signup.

**CHEM 3L. Organic Chemistry Lab III. 2 Units.**

Advanced organic lab course that introduces multi-step synthesis, NMR spectroscopy, and polymer chemistry. Learn how to use modern analytical and spectroscopic techniques to determine the structure of organic compounds. Prerequisite: Chem 2L or course equivalent.

**CHEM 4. Biochemistry: Chemistry of Life. 4 Units.**

A four-week intensive biochemistry course from a chemical perspective. The chemical basis of life, including the biomolecular chemistry of amino acids, proteins, carbohydrates, lipids, and nucleic acids, as well as enzyme kinetics and mechanisms, thermodynamics, and core metabolism, control, and regulation. Recitation includes group work on case studies that support the daily lecture material. Prerequisites: CHEM 33, 35, 131 or 1 year of organic chemistry; Math 19, 20, 21 or 41, 42 or 1 year of single variable calculus.

**CHEM 459. Frontiers in Interdisciplinary Biosciences. 1 Unit.**

Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

Same as: BIO 459, BIOG 459, BIOE 459, CHEMENG 459, PSYCH 459

**CHEM 802. TGR Dissertation. 0 Units.**

## Civil & Environ Engineering (CEE)

**CEE 1. Introduction to Environmental Systems Engineering. 1 Unit.**

Field trips visiting environmental systems installations in Northern California, including coastal, freshwater, and urban infrastructure. Requirements: Several campus meetings, and field trips. Enrollment limited; priority given to undergraduates who have declared Environmental Systems Engineering major. Contact [hildemann@stanford.edu](mailto:hildemann@stanford.edu) to request enrollment/permission code.

**CEE 100. Managing Sustainable Building Projects. 4 Units.**

Managing the life cycle of buildings from the owner, designer, and contractor perspectives emphasizing sustainability goals; methods to define, communicate, coordinate, and manage multidisciplinary project objectives including scope, quality, life cycle cost and value, schedule, safety, energy, and social concerns; roles, responsibilities, and risks for project participants; virtual design and construction methods for product, organization, and process modeling; lifecycle assessment methods; individual writing assignment related to a real world project.

**CEE 101A. Mechanics of Materials. 4 Units.**

Introduction to beam and column theory. Normal stress and strain in beams under various loading conditions; shear stress and shear flow; deflections of determinate and indeterminate beams; analysis of column buckling; structural loads in design; strength and serviceability criteria. Lab experiments. Prerequisites: ENGR 14.

**CEE 101B. Mechanics of Fluids. 4 Units.**

Physical properties of fluids and their effect on flow behavior; equations of motion for incompressible ideal flow, including the special case of hydrostatics; continuity, energy, and momentum principles; control volume analysis; laminar and turbulent flows; internal and external flows in specific engineering applications including pipes and open channels; elements of boundary-layer theory. The Tuesday lectures, which are preparation for the labs, will start at 12:30pm. Lab experiments will illustrate conservation principles and flows of real fluids, analysis of errors and modeling of simple fluid systems. Students seeking to take this course without the laboratory will need to enroll in CEE 162A but must get permission first from the instructor. Prerequisites: E14, Physics 41, Math 51, or CME 100.

**CEE 101C. Geotechnical Engineering. 3-4 Units.**

Introduction to the principles of soil mechanics. Soil classification, shear strength and stress-strain behavior of soils, consolidation theory, analysis and design of earth retaining structures, introduction to shallow and deep foundation design, slope stability. Lab projects. Prerequisite: ENGR 14. Recommended: 101A.

**CEE 101D. Computations in Civil and Environmental Engineering. 3 Units.**

Computational and visualization methods in the design and analysis of civil and environmental engineering systems. Focus is on applications of MATLAB. How to develop a more lucid and better organized programming style.

Same as: CEE 201D

**CEE 101S. Science & Engineering Problem-Solving with MatLab.. 3 Units.**

Introduction to the application of MATLAB as a powerful tool to solve a variety of science and engineering problems. Exposure to computational and visualization tools available through MATLAB to analyze, solve, and visualize some common problems of interest in science and engineering. Prerequisite: Calculus. Note: students enrolling in CEE 201S must seek the consent of instructor.

Same as: CEE 201S

**CEE 102. Legal Principles in Design, Construction, and Project Delivery. 3 Units.**

Introduction to the key legal principles affecting design, construction and the delivery of infrastructure projects. The course begins with an introduction to the structure of law, including principles of contract, negligence, professional responsibility, intellectual property, land use and environmental law, then draws on these concepts to examine current and developing means of project delivery.

**CEE 107A. Understanding Energy. 3-5 Units.**

Energy is a fundamental driver of human development and opportunity. At the same time, our energy system has significant consequences for our society, political system, economy, and environment. For example, energy production and use is the number one source of greenhouse gas emissions. In taking this course, students will not only understand the fundamentals of each energy resource – including significance and potential, conversion processes and technologies, drivers and barriers, policy and regulation, and social, economic, and environmental impacts – students will also be able to put this in the context of the broader energy system and think critically about how and why society has chosen particular energy resources. Both depletable and renewable energy resources are covered, including oil, natural gas, coal, nuclear, biomass and biofuel, hydroelectric, wind, solar thermal and photovoltaics (PV), geothermal, and ocean energy, with cross-cutting topics including electricity, storage, climate change, sustainability, green buildings, energy efficiency, transportation, and the developing world. The course is 4 units, which includes lecture and in-class discussion, readings and videos, assignments, and two off-site field trips. Enroll for 5 units to also attend the Workshop, an interactive discussion section on cross-cutting topics that meets once per week for 80 minutes (timing TBD based on student schedules). The 3-unit option requires instructor approval - please contact Diana Ginnebaugh. Website: <http://web.stanford.edu/class/cee207a/> Course was formerly called Energy Resources. Prerequisites: Algebra. May not be taken for credit by students who have completed CEE 107S.

Same as: CEE 207A, EARTHSYS 103

**CEE 107R. E3: Extreme Energy Efficiency. 2 Units.**

Be part of a unique and intense six day course about extreme energy efficiency taking place during Spring Break 2018 at Rocky Mountain Institute's Innovation Center in Basalt, Colorado! The course will focus on efficiency techniques' design, performance, choice, evolution, integration, barrier-busting, profitable business-led implementation, and implications for energy supply, competitive success, environment, development, security, etc. Examples will span very diverse sectors, applications, issues, and disciplines, with each day covering a different energy theme: buildings, transportation, industry, and implementation and implications, including renewable energy synergy and integration. Solid technical grounding and acquaintance with basic economics and business concepts will both be helpful. Rocky Mountain Institute (RMI) will design a series of lectures, exercises, and interactive activities synthesizing integrative design principles. Students will be introduced to Factor 10 Engineering, the approach for optimizing the whole system for multiple benefits. Students will work closely and interactively with RMI staff including Amory Lovins, cofounder and Chief Scientist of Rocky Mountain Institute (RMI). Exercises will illuminate challenges RMI has faced and solutions it has created in real-world design. Students will explore clean-sheet solutions that meet end-use demands and optimize whole-system resource efficiency, often with expanding rather than diminishing returns to investments, i.e. making big savings cheaper than small ones. Students will meet as a class once during winter quarter to discuss preparation and spring break logistics. Students must pay for their own travel to and from Basalt, CO (~\$400-\$600). Course will take place Sunday, March 25 - Friday, March 30. Lodging and food will be covered during the course. Must apply - instructor approval required. All backgrounds and disciplines, both undergraduate and graduate, are welcome to apply. Prerequisite - completion of one of the following courses is required: CEE 107A, CEE 207A, Earthsys 103, CEE 107S, CEE 207S, CEE 176A, CEE 176B. Contact Diana Ginnebaugh at [moongdes@stanford.edu](mailto:moongdes@stanford.edu) for an application. Course website: <https://web.stanford.edu/class/cee207r/>.

Same as: CEE 207R

**CEE 107S. Energy Resources: Fuels and Tools. 3 Units.**

Energy is a vital part of our daily lives. This course examines where that energy comes from, and the advantages and disadvantages across different fuels. Contextual analysis of energy decisions for transportation and electricity generation around the world. Energy resources covered include oil, biomass, natural gas, nuclear, hydropower, wind, solar, geothermal, and emerging technologies. Prerequisites: Algebra. Note: may not be taken by students who have completed CEE 173A, CEE 207 or EARTHSYS 103.

Same as: CEE 207S

**CEE 10A. Introduction to Architecture. 2 Units.**

This class introduces students to the discipline of architecture and to the fundamental question: What is an architect and how is architecture distinct from other arts and sciences? To answer this question, the class will focus on concepts important to the practice of architecture including: project conception, drawing, modeling, materials, structure, form, and professionalism. These terms will be investigated through short talks, site visits, historical precedent, in-class exercises, panel discussions and two on-campus case studies. No prior knowledge of architecture is required.

**CEE 10B. Presentation Skills. 0 Units.**

TBD.

**CEE 112A. Industry Applications of Virtual Design & Construction. 2-4 Units.**

Building upon the concept of VDC Scorecard, CEE 112A/212A investigates in the management of Virtual Design and Construction (VDC) programs and projects in the building industry. Interacting with experts and professionals in real estate, architecture, engineering, construction and technology providers, students will learn from the industry applications of Building Information Modeling and its relationship with Integrated Project Delivery, Sustainable Design and Construction. Students will conduct case studies to evaluate the maturity of VDC planning, adoption, technology and performance in practice. Students taking 3 or 4 units will be paired up with independent research or case study projects on the industry applications of VDC. No prerequisite. See CEE112B/212B in the Winter Quarter and CEE 112C/212C in the Spring Quarter.

**CEE 112B. Industry Applications of Virtual Design & Construction. 2-4 Units.**

CEE 112B/212B is a practicum on the Industry Applications on Virtual Design and Construction (VDC). Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC and Building Information Modeling (BIM). Students can choose between one of the two project topics: [1] Industrialized Construction with Virtual Parts (No Prerequisite) or [2] Industry Benchmarking & Applications of the VDC Management Scorecard (Suggested Prerequisite: CEE 112A/212A).  
Same as: CEE 212B

**CEE 112C. Industry Applications of Virtual Design & Construction. 2-4 Units.**

Following the Autumn- and Winter-quarter course series, CEE 112C/212C is an industry-focused and project-based practicum that focuses on the industry applications of Virtual Design and Construction (VDC). Students will be paired up with industry-based VDC projects with public owners and private developers, such as GSA Public Buildings Service, the Hong Kong Mass Transit Railway, Optima, Walt Disney Imagineering, Microsoft facilities and/or other CIFE International members. Independently, students will conduct case studies and/or develop VDC and building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC. Prerequisite: CEE 112A/212A, CEE 112B/212B, CEE 159C/259C, CEE 159D/259D, or Instructor's Approval.  
Same as: CEE 212C

**CEE 112D. Industry Applications of Virtual Design and Construction. 2-4 Units.**

A continuation of the CEE 112/212 series, CEE 112D/212D is an industry-focused and project-based practicum that focuses on the industry applications of Virtual Design and Construction (VDC). Students will be paired up with industry-based VDC research or application opportunities with public owners and private developers, professional associations, and/or other member organizations of the Center for Integrated Facility Engineering at Stanford. Independently, students will conduct case studies, research activities, and/or develop VDC and building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC. Prerequisite: CEE110/210, CEE 112C/212C, CEE 122B/222B, or Instructor's Approval.  
Same as: CEE 212D

**CEE 113. Patterns of Sustainability. 1-4 Unit.**

This seminar examines the interrelated sustainability of the natural, built and social environments of places in which we live. Several BOSP centers and the home Stanford campus will hold this 1-2 unit seminar simultaneously and collaborate with a shared curriculum, assignments, web conference and a Wiki. The goal of the collaborative arrangement is to expose, share, compare and contrast views of sustainability in different parts of the world. We will look at and assess aspects of sustainability of the places we are living from a theoretical perspective from the literature, from observations and interviews in the countries in which we study.

Same as: CEE 213

**CEE 120A. Building Information Modeling Workshop. 2-4 Units.**

The foundational Building Information Modeling course introduces techniques for creating, managing, and applying of building information models in the building design and construction process. The course covers processes and tools for creating, organizing, and working with 2D and 3D computer representations of building components and geometries to produce models used in architectural design, construction planning and documentation, rendering and visualization, simulation and analysis.

Same as: CEE 220A

**CEE 120B. Building Information Modeling Workshop. 2-4 Units.**

This course builds upon the Building Information Model concepts introduced in 120A/220A and illustrates how BIM modeling tools are used to design, analyze, and model building systems including structural, mechanical, electrical, plumbing and fire protection. Course covers the physical principles, design criteria, and design strategies for each system and explores processes and tools for modeling those systems and analyzing their performance. Topics include: building envelopes, access systems, structural systems modeling and analysis, mechanical / HVAC systems, plumbing and fire protection systems, electrical systems, and systems integration/coordination.

Same as: CEE 220B

**CEE 120C. Parametric Design and Optimization. 2-4 Units.**

This course explores tools and techniques for computational design and parametric modeling as a foundation for design optimization. Class sessions will introduce several parametric design modeling platforms and scripting environments that enable rapid generation of 3D models and enable rapid evaluation of parametrically-driven design alternatives. Topics to be featured include: Principles of parametric design vs. direct modeling; Design exploration using parametric modeling platforms (Revit/FormIt, Rhino); Visual scripting languages and environments (Dynamo, Grasshopper, DesignScript); Single- and multi-dimensional optimization techniques and guidance strategies.

Same as: CEE 220C

**CEE 120S. Building Information Modeling Special Study. 2-4 Units.**

Special studies of Building Information Modeling strategies and techniques focused on creating, managing, and applying models in the building design and construction process. Processes and tools for creating, organizing, and working with 2D and 3D computer representations of building components to produce models used in design, construction planning, visualization, and analysis.

Same as: CEE 220S

**CEE 122A. Computer Integrated Architecture/Engineering/Construction. 2 Units.**

Undergraduates serve as apprentices to graduate students in the AEC global project teams in CEE 222A. Apprentices participate in all activities of the AEC team, including the goals, objectives, constraints, tasks, and process of a crossdisciplinary global AEC teamwork in the concept development phase of a comprehensive building project. Prerequisite: consent of instructor.

Same as: A/E/C

**CEE 122B. Computer Integrated A/E/C. 2 Units.**

Undergraduates serve as apprentices to graduate students in the AEC global project teams in CEE 222B. Project activity focuses on modeling, simulation, life-cycle cost, and cost benefit analysis in the project development phase. Prerequisite: CEE 122A.

**CEE 124. Sustainable Development Studio. 1-5 Unit.**

(Graduate students register for 224A.) Project-based. Sustainable design, development, use and evolution of buildings; connections of building systems to broader resource systems. Areas include architecture, structure, materials, energy, water, air, landscape, and food. Projects use a cradle-to-cradle approach focusing on technical and biological nutrient cycles and information and knowledge generation and organization. May be repeated for credit.

**CEE 124X. Disasters, Decisions, Development in Sustainable Urban Systems (CEE). 1-5 Unit.**

CEE 224X of the CEE 224XYZ SUS Project series is joining forces with D3: Disasters, Decisions, Development to offer D3+SUS which will connect principles of sustainable urban systems with the challenge of increasing resilience in the San Francisco Bay Area. The project-based learning course is designed to align with the Resilient By Design | Bay Area Challenge Collaborative Research Phase (<http://resilientbayarea.org>); students will learn the basic concepts of resilience and tools of risk analysis while applying those mindsets and toolsets to a collective research product delivered to the RBD community. Students who take D3+SUS are encouraged to continue on to CE 224Y and CEE 224Z, in which teams will be paired with local partners and will develop interventions to improve the resilience of local communities. For more information, visit <http://sus.stanford.edu/courses>. (Cardinal Course certified by the Haas Center).

Same as: CEE 224X

**CEE 124Y. Sustainable Urban Systems Project. 1-5 Unit.**

Sustainable Urban Systems (SUS) Project is a project-based learning experience being piloted for an upcoming new SUS M.S. Program within CEE. Students are placed in small interdisciplinary teams (engineers and non-engineers, undergraduate and graduate level) to work on complex design, engineering, and policy problems presented by external partners in a real urban setting. Multiple projects are offered throughout the academic year and may span multiple quarters. Students are expected to interact with professionals and community stakeholders, conduct independent team work outside of class sessions, and submit deliverables over a series of milestones. To view project descriptions and apply, visit <http://sus.stanford.edu/courses/>.

Same as: CEE 224Y, GEOPHYS 118Y, GEOPHYS 218Y

**CEE 124Z. Sustainable Urban Systems Project. 1-5 Unit.**

Sustainable Urban Systems (SUS) Project is a project-based learning experience being piloted for an upcoming new SUS M.S. Program within CEE. Students are placed in small interdisciplinary teams (engineers and non-engineers, undergraduate and graduate level) to work on complex design, engineering, and policy problems presented by external partners in a real urban setting. Multiple projects are offered throughout the academic year and may span multiple quarters. Students are expected to interact with professionals and community stakeholders, conduct independent team work outside of class sessions, and submit deliverables over a series of milestones. To view project descriptions and apply, visit <http://sus.stanford.edu/courses/>.

Same as: CEE 224Z, GEOPHYS 118Z, GEOPHYS 218Z

**CEE 125. Defining Smart Cities: Visions of Urbanism for the 21st Century. 1-2 Unit.**

In a rapidly urbanizing world, the city paves the way toward sustainability and social well-being. But what does it mean for a city to be smart? Does that also make it sustainable or resilient or livable? This seminar delves into current debates about urbanism through weekly talks by experts on topics such as big data, human-centered design, urban sustainability, and natural capital. The goal of the seminar is to explore how advances in information communication technologies affect the built environment at various scales (e.g., cities, districts, neighborhoods, blocks, buildings) and to understand the role of multiple actors working at the intersection of technology and urbanism. The seminar will provoke vigorous discussion of how urban spaces are shaped, for better or worse, by the complex interaction of technology, human societies, and the natural environment. Students taking the course for 2 units / letter grade will propose an independent research project and present their work at a final symposium.

Same as: CEE 225, URBANST 174

**CEE 126. International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development. 4-5 Units.**

Comparative approach to sustainable cities, with focus on international practices and applicability to China. Tradeoffs regarding land use, infrastructure, energy and water, and the need to balance economic vitality, environmental quality, cultural heritage, and social equity. Student teams collaborate with Chinese faculty and students partners to support urban sustainability projects. Limited enrollment via application; see [internationalurbanization.org](http://internationalurbanization.org) for details. Prerequisites: consent of the instructor(s).

Same as: EARTH SYS 138, IPS 274, URBANST 145

**CEE 126X. Hard Earth: Stanford Graduate-Student Talks Exploring Tough Environmental Dilemmas. 1 Unit.**

Stanford's graduate students are a trove of knowledge – and, just as important, curiosity – about environmental sustainability. This seminar will feature talks by graduate students that explore the biggest, most bedeviling questions about environmental sustainability locally and around the world. The course will be structured as follows: every other week, we will hear hour-long graduate student talks about sustainability questions and their research, and on the off weeks, we will discuss the unanswered, debatable questions that relate to the previous week's talk.

Same as: EARTH 126X

**CEE 126Y. Hard Earth: Stanford Graduate-Student Talks Exploring Tough Environmental Dilemmas. 1 Unit.**

Stanford's graduate students are a trove of knowledge – and, just as important, curiosity – about environmental sustainability. This seminar will feature talks by graduate students that explore the biggest, most bedeviling questions about environmental sustainability locally and around the world. The course will be structured as follows: every other week, we will hear hour-long graduate student talks about sustainability questions and their research, and on the off weeks, we will discuss the unanswered, debatable questions that relate to the previous week's talk.

Same as: EARTH 126Y

**CEE 126Z. Hard Earth: Stanford Graduate-Student Talks Exploring Tough Environmental Dilemmas. 1 Unit.**

Stanford's graduate students are a trove of knowledge – and, just as important, curiosity – about environmental sustainability. This seminar will feature talks by graduate students that explore the biggest, most bedeviling questions about environmental sustainability locally and around the world. The course will be structured as follows: every other week, we will hear hour-long graduate student talks about sustainability questions and their research, and on the off weeks, we will discuss the unanswered, debatable questions that relate to the previous week's talk.

Same as: EARTH 126Z

**CEE 129S. Climate Change Adaptation in the Coastal Built Environment. 1 Unit.**

How will climate change impact coastal ports and harbors around the world? Leading experts discuss the latest science, policy, and engineering research on this important issue, including the necessary response to protect ports and harbors from significant sea-level rise and storm surge. Focus is on the built environment. Guest speakers. CEE 229/129 for research option. See [www.groupspaces.com/seaports2100](http://www.groupspaces.com/seaports2100). Same as: CEE 229S

**CEE 130. Architectural Design: 3-D Modeling, Methodology, and Process. 5 Units.**

Preference to Architectural Design majors; others by consent of instructor. Projects investigate conceptual approaches to the design of key architectural elements, such as wall and roof. Functional and structural considerations. Focus is on constructing 3-D models in a range of materials; 3-D computer modeling. Students keep a graphic account of the evolution of their design process. Final project entails design of a simple structure. Limited enrollment. Pre- or corequisite: CEE 31 or 31Q.

**CEE 131A. Professional Practice: Mixed-Use Design in an Urban Setting. 4 Units.**

The delivery of a successful building design program involves unique collaboration between architect and client. This course will endeavor to teach the skills necessary for a designer to identify, evaluate, conceptualize and fully document a complex mixed-use urban design. Students will complete the course with a detailed knowledge of the consultants, engineers and other professionals needed for a complete program. Course deliverables will include three short assignments and a final project consisting of basic schematic drawings for the selected project. Guest presenters will cover topics of interest. Lectures, discussions, in-class studio-work and an oral presentation. Pre-requisite: CEE 130.

**CEE 131B. Financial Management of Sustainable Urban Systems. 3 Units.**

Focus is on financial management of sustainable urban systems. The course will study different kinds of financial services available, the management of financial resources, and relationships to financial service providers. The course will also study how financial services and relationships to financial service providers can be used to accomplish construction management, energy, and architecture work in sustainable urban systems. The learning outcome is an understanding of how financial services can be used in development of sustainable urban systems. The course work is structured so that there are three modules: 1) general knowledge of financial management, 2) in-depth application in construction management, energy, or architecture, and 3) comparison of similarities and differences in-between the in-depth applications. Students will focus on one of the in-depth applications in a group work, and present the result of this application to students that make other applications. A key learning aspect is the understanding of how finance is used in construction management, energy, and architecture work. Students should be able to show the value, financial viability, and risk management of sustainable urban system development in construction management, energy, and architecture. Students should be able to finance construction management, energy, and architecture work. Readings include applications of finance and management to construction management, energy, or architecture. Guest speakers include developers, financial managers at construction firms, managers at energy firms, construction managers.

**CEE 131C. How Buildings are Made -- Materiality and Construction Methods. 4 Units.**

This course will provide an introduction to the materials and methods used in building construction. A combination of in-class lectures, reading assignments, and building site visits will provide students with an awareness of construction materials and their use within building systems. All relevant building types and construction materials will be explored, including wood, steel, concrete and masonry. Building foundations and basic structural systems will be explained. Building envelope elements will be considered, with an analysis of various glass and glazing materials, cladding types, and roofing systems. Interior Floor, wall and ceiling finishes will be discussed. New and emerging building trends will also be examined, such as prefabricated and modular construction. Guest presenters, drawn from Bay Area consulting firms, will cover several topics of interest. Students will have an opportunity to experience real world material applications at local construction sites, and gain a thorough understanding of the construction process.

**CEE 131D. Urban Design Studio. 5 Units.**

The practical application of urban design theory. Projects focus on designing neighborhood and downtown regions to balance livability, revitalization, population growth, and historic preservation. Same as: URBANST 171

**CEE 132H. Responsive Structures. 3 Units.**

This Design Build seminar investigates the use of metal as a structural, spatial and organizational medium. We will examine the physical properties of post-formable plywood, and develop a structural system and design which respond to site and programmatic conditions. The process includes model building, prototyping, development of joinery, and culminates in the full scale installation of the developed design on campus. This course may be repeated for credit (up to three times). Class meeting days/times are as follows: April 14, 9a-5p; April 28, 10a-5p; May 3, 7-9p; May 19, 10a-6:30p; May 20, 10a-6:30p. Same as: CEE 32H

**CEE 132Q. Office of Metropolitan Architecture: Workshop of the New. 4-5 Units.**

This seminar investigates all aspects of the work of the Office of Metropolitan Architecture (OMA) and its leader Rem Koolhaas. Topics for class research and inquiry include but are not limited to: Koolhaas's early work at the Architectural Association and the founding of OMA, the publications of OMA and their style of presentation and theoretical foundations, the importance of AMO, and the architects who have left OMA and founded their own practices and how these differ from OMA. Each student completes an in-depth research paper and an in-class presentation. Same as: ARTHIST 262

**CEE 133F. Principles of Freehand Drawing. 3 Units.**

Traditional methods of depicting shape, form, and surface are applied to the discipline of architectural drawing. Students develop abilities to observe visual phenomenon analytically and translate subjects onto a two-dimensional surface in a variety of media. Drawing techniques such as modeling form, shading, rendering materials, and articulating landscaping are explored. Linear perspective exercises provide a foundation for the construction of drawings to illustrate cohesive design proposals. Step-by-step constructions, quick freehand sketches from slides, and on-location studies.



**CEE 133G. Architectural History & Drawing in Eastern Europe. 2 Units.**

Students in this seminar will travel to Prague, Czech Republic and Krakow, Poland for a week of historical morning walks and discussions about architectural and urbanism in each city. Afternoon sketching sessions will focus attention on some of the locations visited earlier that day. Buildings, sites and monuments from the Middle Ages to the present will be assessed, questioned, and drawn. Short reading assignments and/or films provide a background for each day's examination of a section of these two cities. Possible day trips may include site visits to Auschwitz and the Wieliczka Salt Mine. Casual late afternoon excursions will complement themes of the course. Upon returning to Stanford, the seminar will meet four times to discuss observations and organize a small exhibition of the sketches made during the trip.

**CEE 134B. Intermediate Arch Studio. 5 Units.**

This studio offers students experience in working with a real site and a real client program to develop a community facility. Students will develop site analysis, review a program for development and ultimately design their own solutions that meet client and community goals. Sustainability, historic preservation, community needs and materials will all play a part in the development of students final project. Students will also gain an understanding of graphic conventions, verbal and presentation techniques. Course may be repeated for credit.

Same as: CEE 234B

**CEE 137B. Advanced Architecture Studio. 6 Units.**

This course will focus on the topic of interdisciplinary collaboration and its role in the development of design concepts. Specifically, the integration of structural with architectural considerations to produce a unified urban, spatial, tectonic and structural proposition will be our field of investigation. This course is an architecture studio course where class time will be spent primarily in individual or group desk critiques and pin-up sessions. May be repeat for credit. Total completions allowed: 3. Additionally, there will be lectures, case study presentations and a field trip. Prerequisites: required: CEE 31 (or 31Q) Drawing, CEE 110 BIM and CEE 130 Design.

Same as: CEE 237B

**CEE 139. Design Portfolio Methods. 4 Units.**

The portfolio is an essential creative tool used to communicate academic work, design philosophies, and professional intent. This course will explore elements of graphic design, presentation, communication, binding, printing, and construction, yielding a final portfolio (physical and digital) for professional, academic or personal purposes. Limited enrollment. Prerequisites: two Art, Design, or Architecture studio courses, or consent of instructor.

Same as: CEE 239

**CEE 141A. Infrastructure Project Development. 3 Units.**

Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities, and communications sectors. Analysis of the condition of the nation's infrastructure and how projects are planned and financed. Focus is on public works in the U.S. The role of public and private sectors through a step-by-step study of the project development process. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare project environmental impact statements.

Same as: CEE 241A

**CEE 141B. Infrastructure Project Delivery. 3 Units.**

Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities, and communications sectors. Analysis of how projects are designed, constructed, operated, and maintained. Focus is on public works projects in the U.S. Alternative project delivery approaches and organizational strategies. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare finance/design/build/operate/maintain project proposals.

Same as: CEE 241B

**CEE 141C. Global Infrastructure Projects Seminar. 1-2 Unit.**

Nine current global infrastructure projects presented by top project executives or company leaders from industry. Water, transportation, energy and communication projects are featured. Course provides comparisons of project development, win and delivery approaches for mega-projects around the world. Alternative project delivery methods, the role of public and private sector, different project management and construction strategies, and lessons learned. The course also includes field trips to local mega-projects.

Same as: CEE 241C

**CEE 144. Design and Innovation for the Circular Economy. 3 Units.**

The last 150 years of our industrial evolution have been material and energy intensive. The linear model of production and consumption manufactures goods from raw materials, wells and uses them, and then discards the products as waste. Circular economy provides a framework for systems-level redesign. It builds on schools of thought including regenerative design, performance economy industrial ecology, blue economy, biomimicry, and cradle to cradle. This course introduces the concepts of the circular economy and applies them to case studies of consumer products, household goods, and fixed assets. nStudents will conduct independent projects on circular economy. Students may work alone or in small teams under the guidance of the teaching team and various collaborators worldwide. Class is limited to 14 students. All disciplines are welcome. This class fulfills the Writing & Rhetoric 2 requirement. Prerequisite: PWR 1.

**CEE 146S. Engineering Economics and Sustainability. 3 Units.**

Engineering Economics is a subset of the field of economics that draws upon the logic of economics, but adds that analytical power of mathematics and statistics. The concepts developed in this course are broadly applicable to many professional and personal decisions, including making purchasing decisions, deciding between project alternatives, evaluating different processes, and balancing environmental and social costs against economic costs. The concepts taught in this course will be increasingly valuable as students climb the career ladder in private industry, a non-governmental organization, a public agency, or in founding their own startup. Eventually, the ability to make informed decisions that are based in fundamental analysis of alternatives is a part of every career. As such, this course is recommended for engineering and non-engineering students alike. This course is taught exclusively online in every quarter it is offered. (Prerequisites: MATH 19 or 20 or approved equivalent.).

Same as: ENGR 60

**CEE 151. Negotiation. 3 Units.**

Students learn to prepare for and conduct negotiations in a variety of arenas including getting a job, managing workplace conflict, negotiating transactions, and managing personal relationships. Interactive class. The internationally travelled instructor who has mediated cases in over 75 countries will require students to negotiate real life case studies and discuss their results in class. Application required before first day of class; students should enroll on Axess and complete the application on Canvas before March 18.

Same as: CEE 251, EARTH 251, PUBLPOL 152

**CEE 155. Introduction to Sensing Networks for CEE. 3-4 Units.**

Introduce the design and implementation of sensor networks for monitoring the built and natural environment. Emphasis on the integration of modern sensor and communication technologies, signal processing and statistical models for network data analysis and interpretation to create practical deployments to enable sustainable systems, in areas such as energy, weather, transportation and buildings. Students will be involved in a practical project that may involve deploying a small sensor system, data models and analysis and signal processing. Limited enrollment.

Same as: CEE 255

**CEE 156. Building Systems. 4 Units.**

HVAC, lighting, and envelope systems for commercial and institutional buildings, with a focus on energy efficient design. Knowledge and skills required in the development of low-energy buildings that provide high quality environment for occupants.

Same as: CEE 256

**CEE 159. Managing Construction Innovation - Practicum. 2-4 Units.**

CEE 159/259 students join Stanford researchers in developing performance metrics and key performance indicators, which inform the assessment and management of productivity policies, industry initiatives, progressive enterprises, global projects or experimental processes in the construction industry. This project-based practicum builds upon a global network of government agencies, professional institutions and member companies collaborating with the Center for Integrated Facility Engineering (CIFE). Through a series of Global Construction Innovation Case Studies, students will develop applied research skills that are essential for academic research, internships or industry practice, while gaining insights into innovative and industrialized construction practice, such as the industry applications of Building Information Modeling (BIM), Integrated Project Delivery (IPD), Lean Methodology, Prefabricated Prefinished Volumetric Construction (PPVC), Smart Cities or Virtual Design and Construction (VDC). Note to students: this course may be taken repeat for credit for up to 9 cumulative units.

Same as: CEE 259

**CEE 161C. Natural Ventilation of Buildings. 3 Units.**

An introduction to natural ventilation design, including an in-depth discussion of the fluid mechanics of natural ventilation, and a review of models and measurements of naturally ventilated buildings. Overview of the design process, from assessing feasibility to commissioning. Discussion of physical processes in natural ventilation, including buoyancy- and wind- driven flow, and important fluid mechanics and heat transfer concepts and equations. Steady flow characteristics of openings, steady and unsteady envelope models. Internal air motion, zonal models and stratification. CFD and its applications, scale modeling and full-scale measurements. Throughout the course the Y2E2 building natural ventilation system and temperature measurements will be used to illustrate the different concepts and methods.

**CEE 161I. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation. 3 Units.**

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

Same as: CEE 261I, EARTHSYS 146A, ESS 246A

**CEE 162A. Mechanics of Fluids. 3 Units.**

Formerly CEE 101X. Course content is the same as CEE 101B but without the Tuesday lecture and lab component. Permission of the instructor is required first to enroll in CEE 162A. Prerequisites: E14, Physics 41 (formerly 63) Math 51.

**CEE 162D. Introduction to Physical Oceanography. 4 Units.**

Formerly CEE 164. The dynamic basis of oceanography. Topics: physical environment; conservation equations for salt, heat, and momentum; geostrophic flows; wind-driven flows; the Gulf Stream; equatorial dynamics and ENSO; thermohaline circulation of the deep oceans; and tides. Prerequisite: PHYSICS 41 (formerly 53).

Same as: CEE 262D, EARTHSYS 164, ESS 148

**CEE 162E. Rivers, Streams, and Canals. 3-4 Units.**

Formerly CEE 161A/264A. Introduction to the movement of water through natural and engineered channels, streams, and rivers. Basic equations and theory (mass, momentum, and energy equations) for steady and unsteady descriptions of the flow. Application of theory to the design of flood-control and canal systems. Flow controls such as weirs and sluice gates; gradually varied flow; Saint-Venant equations and flood waves; and method of characteristics. Open channel flow laboratory experiments: controls such as weirs and gates, gradually varied flow, and waves. Limited enrollment in lab section. Prerequisite: CEE 101B or CEE 162A.

Same as: CEE 262E

**CEE 162F. Coastal Engineering. 3 Units.**

Introduction to the relevant processes that shape the coastline, including the hydrodynamical forcing and the resultant coastal morphology. Discussion of the natural response of coastal systems to forcing by the environment (e.g. waves, tides, storms) and how this forcing affects the sediment budget along the coast. Engineering solutions for mitigation of erosion and the associated advantages and disadvantages of such solutions. Prerequisite: CEE 101B or equivalent.

**CEE 162I. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation. 3 Units.**

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: MATH 51 or CME100; and PHYSICS 41; and CEE 162A or CEE 101B or a graduate class in fluid dynamics or consent of the instructor.

Same as: CEE 262I, EARTHSYS 146B, ESS 246B

**CEE 165C. Water Resources Management. 3 Units.**

Optimal equilibrium between water supply and water demand, under specific local and regional physical, environmental, social and economic constraints. Principles in the context of sustainable development, increasing water scarcity in many parts of the world, and hydrologic uncertainty including that associated with climate change. Operations and water quality in reservoirs, river basins, and groundwater systems; non-conventional water sources; demand management options; and the institutional and legal framework.

Same as: CEE 265C

**CEE 166A. Watersheds and Wetlands. 4 Units.**

Introduction to the occurrence and movement of water in the natural environment and its role in creating and maintaining terrestrial, wetland, and aquatic habitat. Hydrologic processes, including precipitation, evaporation, transpiration, snowmelt, infiltration, subsurface flow, runoff, and streamflow. Rivers and lakes, springs and swamps. Emphasis is on observation and measurement, data analysis, modeling, and prediction. Prerequisite: CEE 101B or CEE 162A or equivalent. (Freyberg).

Same as: CEE 266A

**CEE 166B. Floods and Droughts, Dams and Aqueducts. 4 Units.**

Sociotechnical systems associated with human use of water as a resource and the hazards posed by too much or too little water. Potable and non-potable water use and conservation. Irrigation, hydroelectric power generation, rural and urban water supply systems, storm water management, flood damage mitigation, and water law and institutions. Emphasis is on engineering design. Prerequisite: 166A or equivalent. (Freyberg).

Same as: CEE 266B

**CEE 166D. Water Resources and Water Hazards Field Trips. 2 Units.**

Introduction to water use and water hazards via weekly field trips to local and regional water resources facilities (dams, reservoirs, fish ladders and hatcheries, pumping plants, aqueducts, hydropower plants, and irrigation systems) and flood damage mitigation facilities (storm water detention ponds, channel modifications, flood control dams, and reservoirs). Each trip preceded by an orientation lecture.

Same as: CEE 266D

**CEE 169. Environmental and Water Resources Engineering Design. 5 Units.**

Application of fluid mechanics, hydrology, water resources, environmental sciences, and engineering economy fundamentals to the design of a system addressing a complex problem of water in the natural and constructed environment. Problem changes each year, generally drawn from a challenge confronting the University or a local community. Student teams prepare proposals, progress reports, oral presentations, and a final design report. Prerequisite: senior in Civil Engineering or Environmental Engineering; 166B.

**CEE 170S. Environmental Disasters. 2 Units.**

Mining and critical review of scientific literature for environmental impacts, especially chemical contamination caused by natural and anthropogenic disasters. Focus is on the development of research review skills, critical thinking and discussion of findings.

Same as: CEE 270S

**CEE 171. Environmental Planning Methods. 3 Units.**

Intended primarily for juniors and seniors; first year graduate students welcome. Course introduces key environmental policy design and implementation concepts and provides opportunities to work with a range of environmental planning methods. Environmental laws and regulations (e.g., US Clean Water Act and the US National Environmental Policy Act) are examined. Course demonstrates how firms have gone beyond regulatory compliance and introduced environmental sustainability issues into core business strategies. Course uses a simulated negotiation of a financial penalty between a student team representing the US EPA (and other government agencies) and a team representing a firm that is out of compliance with Clean Water Act regulations. Professionals with experience in such negotiations provide coaching for student teams. Prerequisites: MATH 51. Recommended: 70.

**CEE 171F. New Indicators of Well-Being and Sustainability. 3 Units.**

Explore new ways to better measure human development, comprehensive wealth and sustainability beyond standard economic indicators such as income and GDP. Examine how new indicators shape global, national and local policy worldwide. Well-being topics include health, happiness, trust, inequality and governance. Sustainability topics include sustainable development, environmental performance indicators, material flow analysis and decoupling, and inclusive wealth indicators. Students will build their own indicator of well-being and sustainability for a term paper.

Same as: CEE 271F

**CEE 172. Air Quality Management. 3 Units.**

Quantitative introduction to the engineering methods used to study and seek solutions to current air quality problems. Topics: global atmospheric changes, urban sources of air pollution, indoor air quality problems, design and efficiencies of pollution control devices, and engineering strategies for managing air quality. Prerequisites: 70, MATH 51.

**CEE 172A. Indoor Air Quality. 2-3 Units.**

Factors affecting the levels of air pollutants in the built indoor environment. The influence of ventilation, office equipment, floor coverings, furnishings, cleaning practices, and human activities on air quality including carbon dioxide, VOCs, resuspended dust, and airborne molds and fungi. Limited enrollment, preference to CEE students. Prerequisites: Math 42 or 21 and CEE 70, or equivalents.

Same as: CEE 278C

**CEE 174A. Providing Safe Water for the Developing and Developed World. 3 Units.**

This course will cover basic hydraulics and the fundamental processes used to provide and control water, and will introduce the basics of engineering design. In addition to understanding the details behind the fundamental processes, students will learn to feel comfortable developing initial design criteria (30% designs) for fundamental processes. Students should also develop a feel for the typical values of water treatment parameters and the equipment involved. The course should enable students to work competently in environmental engineering firms or on non-profit projects in the developing world such as Engineers without Borders. Pre-requisite: Chem31B/X.

**CEE 174B. Wastewater Treatment: From Disposal to Resource Recovery. 3 Units.**

This course builds upon CEE 174A, covering basic hydraulics and the fundamental processes used to treat wastewater. In addition to understanding the details behind the fundamental processes, students will learn to feel comfortable developing initial design criteria (30% designs) for fundamental processes. Students should also develop a feel for the typical values of water treatment parameters and the equipment involved. After covering conventional processes, the class addresses newer processes used to meet emerging treatment objectives, including nutrient removal, composting of biosolids and recycling of wastewater for beneficial uses, including potable reuse. Pre-requisites: CEE 174A.

**CEE 175A. California Coast: Science, Policy, and Law. 3-4 Units.**

This interdisciplinary course integrates the legal, scientific, and policy dimensions of how we characterize and manage resource use and allocation along the California coast. We will use this geographic setting as the vehicle for exploring more generally how agencies, legislatures, and courts resolve resource-use conflicts and the role that scientific information and uncertainty play in the process. Our focus will be on the land-sea interface as we explore contemporary coastal land-use and marine resource decision-making, including coastal pollution, public health, ecosystem management; public access; private development; local community and state infrastructure; natural systems and significant threats; resource extraction; and conservation, mitigation and restoration. Students will learn the fundamental physics, chemistry, and biology of the coastal zone, tools for exploring data collected in the coastal ocean, and the institutional framework that shapes public and private decisions affecting coastal resources. There will be 3 to 4 written assignments addressing policy and science issues during the quarter, as well as a take-home final assignment. Special Instructions: In-class work and discussion is often done in interdisciplinary teams of students from the School of Law, the School of Engineering, the School of Humanities and Sciences, and the School of Earth, Energy, and Environmental Sciences. Students are expected to participate in class discussion and field trips. Elements used in grading: Participation, including class session and field trip attendance, writing and quantitative assignments. Cross-listed with Civil & Environmental Engineering (CEE 175A/275A), Earth Systems (EARTHSYS 175/275), and Law (LAW 2510). Open to graduate students and to advanced undergraduates with instructor consent.

Same as: CEE 275A

**CEE 175P. Persuasive Communication for Environmental Scientists, Practitioners, and Entrepreneurs. 2 Units.**

Achieving environmental goals depends not only on innovative ideas and great science but also persuasive communication. What makes communication persuasive? The ability of the communicator to create value for his or her audience. This course will teach students how to: 1) focus on their audience and 2) create value for their audience using research-proven communication techniques. Students will master these techniques through oral and written exercises so that, after taking this course, they will speak and write more persuasively.

Same as: CEE 275P

**CEE 175Q. Changing Human Behavior: Drivers and Barriers in Environmental Action. 2 Units.**

Beyond the scientific and technological challenges of climate change, there are important psychological factors and barriers to individual attitude and behavior change. Students will analyze and identify barriers to individual action; distinguish between targeting individual behaviors vs. attitudes; understand specific psychological challenges and opportunities that climate change raises; develop strategies to address these factors in contexts where behavior change is sought. Students will propose and develop their own ideas for addressing a specific psychological barrier to individual action in an environmental context.

**CEE 175S. Environmental Entrepreneurship and Innovation. 3 Units.**

Our current infrastructure for provision of critical services—clean water, energy, transportation, environmental protection; requires substantial upgrades. As a complement to the scientific and engineering innovations taking place in the environmental field, this course emphasizes the analysis of economic factors and value propositions that align value chain stakeholder interests.

Same as: CEE 275S

**CEE 176A. Energy Efficient Buildings. 3-4 Units.**

Quantitative evaluation of technologies and techniques for reducing energy demand of residential-scale buildings. Heating and cooling load calculations, financial analysis, passive-solar design techniques, water heating systems, photovoltaic system sizing for net-zero-energy all-electric homes. Offered for 3 or 4 units; the 4-unit option includes a lab.

**CEE 176B. Electric Power: Renewables and Efficiency. 3-4 Units.**

This course introduces analysis, sizing and performance estimations (electrical and financial) of renewable energy systems on both sides of the electric meter with an emphasis on photovoltaics and wind-power systems. Basic electric power generation, transmission and distribution, as well as distributed generation will be introduced. Optional Laboratory section for a 4th unit of credit.

**CEE 176C. Energy Storage Integration - Vehicles, Renewables, and the Grid. 3 Units.**

This course will provide in-depth introduction to existing energy storage solutions being used on the electric grid and in vehicles with a primary focus on batteries and electrochemical storage. We will discuss the operating characteristics, cost and efficiency of these technologies and how tradeoff decisions can be made. Special attention will be given to system-level integration of new storage technologies, including chargers, inverters, battery management systems and controls, into the existing vehicle and grid infrastructure. Further investigations include issues relating to integration of electric vehicle charging with demand-side management, scheduled renewable energy absorption and local grid balancing. Class format involves regular guest lectures, required lab participation, and field trips to relevant sites. Enrollment is limited; if you are interested in taking the course, please fill out a brief questionnaire at <http://goo.gl/forms/i3YH91Qx05n> Please contact [jtaggart@stanford.edu](mailto:jtaggart@stanford.edu) with any questions regarding the application or course information.

Same as: CEE 276C

**CEE 176G. Sustainability Design Thinking. 3 Units.**

Application design thinking to make sustainability compelling, impactful and realizable. Analysis of contextual, functional and human-centered design thinking techniques to promote sustainable design of products and environments by holistically considering space, form, environment, energy, economics, and health. Includes Studio project work in prototyping, modeling, testing, and realizing sustainable design ideas.

Same as: CEE 276G

**CEE 177. Aquatic Chemistry and Biology. 4 Units.**

Introduction to chemical and biological processes in the aqueous environment. Basic aqueous equilibria; the structure, behavior, and fate of major classes of chemicals that dissolve in water; redox reactions; the biochemistry of aquatic microbial life; and biogeochemical processes that govern the fate of nutrients and metals in the environment and in engineered systems. Prerequisite: CHEM 31.

**CEE 177L. Smart Cities & Communities. 3 Units.**

A city is comprised of people and a complex system of systems. Data provides the connective tissue between those systems. Smart cities use information technology (IT) to harness that data for operational efficiency, efficacy of government services, and sustainability. Key enablers covered include: IoT, open data, analytics, cloud and cognitive computing, and systems of engagement. System case studies will include: water, energy, transportation, buildings, food production, urban design, and social services. The evolving relationship between a city and its citizens as well as the risks / challenges of smart cities will also be explored.

Same as: CEE 277L

**CEE 177S. Design for a Sustainable World. 1-5 Unit.**

Technology-based problems faced by developing communities worldwide. Student groups partner with organizations abroad to work on concept, feasibility, design, implementation, and evaluation phases of various projects. Past projects include a water and health initiative, a green school design, seismic safety, and medical device. Admission based on written application and interview. See <http://esw.stanford.edu> for application. (Staff).

Same as: CEE 277S

**CEE 177X. Current Topics in Sustainable Engineering. 1-3 Unit.**

This course is the first half of a two quarter, project-based design course that addresses the cultural, political, organizational, technical, and business issues at the heart of implementing sustainable engineering projects in the developing world. Students will be placed into one of three project teams and tackle a real-world design challenge in partnership with social entrepreneurs and NGOs. In CEE 177X/277X, students will gain the background skills and context necessary to effectively design engineering projects in developing nations. (Cardinal Course certified by the Haas Center). Instructor consent required.

Same as: CEE 277X

**CEE 178. Introduction to Human Exposure Analysis. 3 Units.**

(Graduate students register for 276.) Scientific and engineering issues involved in quantifying human exposure to toxic chemicals in the environment. Pollutant behavior, inhalation exposure, dermal exposure, and assessment tools. Overview of the complexities, uncertainties, and physical, chemical, and biological issues relevant to risk assessment. Lab projects. Recommended: MATH 51. Apply at first class for admission.

Same as: CEE 276

**CEE 179A. Water Chemistry Laboratory. 3 Units.**

(Graduate students register for 273A.) Laboratory application of techniques for the analysis of natural and contaminated waters, emphasizing instrumental techniques.

Same as: CEE 273A

**CEE 179C. Environmental Engineering Design. 5 Units.**

Application of engineering fundamentals including environmental engineering, hydrology, and engineering economy to a design problem. Enrollment limited; preference to seniors in Civil and Environmental Engineering.

**CEE 179F. Frontiers of Anaerobic Treatment. 1 Unit.**

This seminar will present the latest findings on the operation and performance of ground-breaking anaerobic treatment processes for domestic wastewater. Specifically, this seminar will examine the performance of the Staged Anaerobic Fluidized-bed Membrane Bioreactor (SAF-MBR) using results from ongoing operations at the Codiga Resource Recover Center and from previous and parallel research efforts. The seminars will incorporate a description of the fundamentals of anaerobic treatment processes, a discussion of how the SAF-MBR process is different from typical anaerobic processes, and insights from operations along with implications for system design. Course work will include explorations of the costs, benefits, and market potential of this technology.

Same as: CEE 279F

**CEE 179S. Seminar: Issues in Environmental Science, Technology and Sustainability. 1-2 Unit.**

Invited faculty, researchers and professionals share their insights and perspectives on a broad range of environmental and sustainability issues. Students critique seminar presentations and associated readings.

Same as: CEE 279S, EARTHSYS 179S, ESS 179S

**CEE 17SC. Water and Power in the Pacific Northwest: The Columbia River. 2 Units.**

This seminar will explore the nature of and coupling between water and energy resources in the Pacific Northwest, using the Columbia River as our case study. We will explore the hydrologic, meteorologic, and geologic basis of water and energy resources, and the practical, social, environmental, economic, and political issues surrounding their development in the West. The Columbia River and its watershed provide a revealing prototype for examining these issues. A transnational, multi-state river with the largest residual populations of anadromous salmonids in the continental US, it provides a substantial fraction of the electrical energy produced in the Northwest (the Grand Coulee dam powerhouse on the Columbia is the largest-capacity hydropower facility in the US), it is a major bulk commodity transportation link to the interior West via its barge navigation system, it provides the water diversions supporting a large area of irrigated agriculture in Washington and Idaho, and its watershed is home to significant sources of solar and wind energy. We will use the Columbia to study water and energy resources, and especially their coupling, in the context of rapid climate change, ecosystem impacts, economics, and public policy. We will begin with a week of classroom study and discussion on campus, preparing for the field portion of the seminar. We will then travel to the Columbia basin, spending approximately 10 days visiting a number of water and energy facilities across the watershed, e.g., solar, wind, and natural gas power plants; dams and reservoirs with their powerhouses, fish passage facilities, navigation locks, and flood-mitigation systems; an irrigation project; operation centers; and offices of regulatory agencies. We will meet with relevant policy experts and public officials, along with some of the stakeholders in the basin. Over the summer students will be responsible for assigned readings from several sources, including monographs, online materials, and recent news articles. During the trip, students will work in small groups to analyze and assess one aspect of the coupling between water and energy resources in the Northwest. The seminar will culminate in presentations on these analyses. Travel expenses during the seminar will be provided (except incidentals) by the Bill Lane Center for the American West and Sophomore College.

Same as: EARTHSYS 16SC, ENERGY 12SC

**CEE 180. Structural Analysis. 4 Units.**

Analysis of beams, trusses, frames; method of indeterminate analysis by consistent displacement, least work, superposition equations, moment distribution. Introduction to matrix methods and computer methods of structural analysis. Prerequisite: 101A and ENGR 14.

**CEE 181. Design of Steel Structures. 4 Units.**

Concepts of the design of steel structures with a load and resistance factor design (LRFD) approach; types of loading; structural systems; design of tension members, compression members, beams, beam-columns, and connections; and design of trusses and frames.

Prerequisite: 180.

**CEE 182. Design of Reinforced Concrete Structures. 3-4 Units.**

Properties of concrete and reinforcing steel; behavior of structural elements subject to bending moments, shear forces, torsion, axial loads, and combined actions; design of beams, slabs, columns and footings; strength design and serviceability requirements; design of simple structural systems for buildings. Prerequisite: 180.

**CEE 183. Integrated Civil Engineering Design Project. 4 Units.**

Studio format. Design concepts for civil engineering facilities from schematic design through construction, taking into account sustainable engineering issues. Design exercises culminating in the design of a civil engineering facility, emphasizing structural systems and materials and integration with architectural, construction and other project requirements. Prerequisites: CEE 180, 181, 182; CEE 120 (or equivalent background in BIM), civil engineering major; architectural design major with instructor consent.

**CEE 195. Fundamentals of Structural Geology. 3 Units.**

Techniques for mapping using GPS and differential geometry to characterize structures; dimensional analysis and scaling relations; kinematics of deformation and flow; measurement and analysis of stress; elastic deformation and properties of rock; brittle deformation including fracture and faulting; linear viscous flow including folding and magma dynamics; model development and methodology. Models of tectonic processes are constructed and solutions visualized using MATLAB.

Prerequisites: GS 1, MATH 51.

Same as: GS 111

**CEE 196. Engineering Geology and Global Change. 3 Units.**

The application of geology and global change to the planning, design, and operation of engineering projects. Case histories taught in a seminar setting and field trips emphasize the impact of geology and global change on both individual engineering works and the built environment by considering Quaternary history and tectonics, anthropogenic sea level rise, active geologic processes, engineering properties of geologic deposits, site exploration, and professional ethics. Prerequisite: GS 1 or consent of instructor.

Same as: GS 115

**CEE 198. Directed Reading or Special Studies in Civil Engineering. 1-4 Unit.**

Written report or oral presentation required. Students must obtain a faculty sponsor.

**CEE 199. Undergraduate Research in Civil and Environmental Engineering. 1-4 Unit.**

Written report or oral presentation required. Students must obtain a faculty sponsor.

**CEE 199A. Special Projects in Architecture. 1-4 Unit.**

Faculty-directed study or internship. May be repeated for credit. Prerequisite: consent of instructor.

**CEE 199B. Directed Studies in Architecture. 1-4 Unit.**

Projects may include studio-mentoring activities, directed reading and writing on topics in the history and theory of architectural design, or investigations into design methodologies.

**CEE 199E. Outreach and Mentoring Program Development in CEE. 1-2 Unit.**

Open to undergraduates who are declared majors in Civil Engineering, Environmental Engineering, Atmosphere/Energy, and Architectural Design. Will brainstorm and develop an innovative curriculum and engaging activities for CEE 10 (Intro. to the Civil & Environmental Engineering Professions).

**CEE 199H. Undergraduate Honors Thesis. 2-3 Units.**

For students who have declared the Civil Engineering B.S. honors major and have obtained approval of a topic for research under the guidance of a CEE faculty adviser. Letter grade only. Written thesis or oral presentation required. (Staff).

**CEE 199L. Independent Project in Civil and Environmental Engineering. 1-4 Unit.**

Prerequisite: Consent of Instructor.

**CEE 199S. Undergraduate Summer Research in Civil and Environmental Engineering. 1-6 Unit.**

Investigation of a research topic in civil and environmental engineering. For students admitted to the Stanford Summer Session program. Written report or oral presentation required. Students must obtain a faculty or research staff sponsor.

**CEE 1A. Graphics Course. 2 Units.**

This course, intended for students taking a design studio, will focus on presentation theories, skills and design approaches. Through readings and exercises, and ultimately the student's own work, students will develop skill and complexity in their graphic and verbal presentations.

**CEE 200A. Teaching of Civil and Environmental Engineering. 1 Unit.**

Required of CEE Ph.D. students. Strategies for effective teaching and introduction to engineering pedagogy. Topics: problem solving techniques and learning styles, individual and group instruction, the role of TAs, balancing other demands, grading. Teaching exercises. Register for quarter of teaching assistantship. 200A. Aut, 200B. Win, 200C. Spr.

**CEE 200B. Teaching of Civil and Environmental Engineering. 1 Unit.**

Required of CEE Ph.D. students. Strategies for effective teaching and introduction to engineering pedagogy. Topics: problem solving techniques and learning styles, individual and group instruction, the role of TAs, balancing other demands, grading. Teaching exercises. Register for quarter of teaching assistantship. May be repeated for credit. 200A. Aut, 200B. Win, 200C. Spr.

**CEE 200C. Teaching of Civil and Environmental Engineering. 1 Unit.**

Required of CEE Ph.D. students. Strategies for effective teaching and introduction to engineering pedagogy. Topics: problem solving techniques and learning styles, individual and group instruction, the role of TAs, balancing other demands, grading. Teaching exercises. Register for quarter of teaching assistantship. May be repeated for credit. 200A. Aut, 200B. Win, 200C. Spr.

**CEE 201D. Computations in Civil and Environmental Engineering. 3 Units.**

Computational and visualization methods in the design and analysis of civil and environmental engineering systems. Focus is on applications of MATLAB. How to develop a more lucid and better organized programming style.

Same as: CEE 101D

**CEE 201S. Science & Engineering Problem-Solving with MatLab.. 3 Units.**

Introduction to the application of MATLAB as a powerful tool to solve a variety of science and engineering problems. Exposure to computational and visualization tools available through MATLAB to analyze, solve, and visualize some common problems of interest in science and engineering. Prerequisite: Calculus. Note: students enrolling in CEE 201S must seek the consent of instructor.

Same as: CEE 101S

**CEE 202. Construction Law and Claims. 3 Units.**

Concepts include the preparation and analysis of construction claims, cost overrun and schedule delay analysis, general legal principles, contracts, integrated project delivery, public private partnerships and the resolution of construction disputes through ADR and litigation. Requires attendance of the ten weeks of Monday classes and the first five weeks of Wednesday classes.

**CEE 203. Probabilistic Models in Civil Engineering. 3-4 Units.**

Introduction to probability modeling and statistical analysis in civil engineering. Emphasis is on the practical issues of model selection, interpretation, and calibration. Application of common probability models used in civil engineering including Poisson processes and extreme value distributions. Parameter estimation. Linear regression.

**CEE 204. Structural Reliability. 3-4 Units.**

Procedures for evaluating the safety of structural components and systems. First-and second-order estimates of failure probabilities of engineered systems. Sensitivity of failure probabilities to assumed parameter values. Measures of the relative importance of random variables. Reliability of systems with multiple failure modes. Reliability updating. Simulation methods and variance reduction techniques. Prerequisite: 203 or equivalent.

**CEE 205A. Structural Materials Testing and Simulation. 3-4 Units.**

Hands-on laboratory experience with fabrication, computer simulation, and experimental testing of material and small-scale structural components. Comparison of innovative and traditional structural materials. Behavior and application of high-performance fiber reinforced concrete materials for new design, fiber-reinforced polymeric materials for structural retrofits and introduction to sustainable, bio-based composites. Prerequisites: basic course in reinforced concrete design CEE 182 or equivalent.

**CEE 205B. Advanced Topics in Structural Concrete. 3 Units.**

Concepts and application of strut and tie modeling including deep beams, design for torsion resistance, beam-column joints, bridge components, and post-tensioned anchor zones. Course project integrating computer simulation and physical experimentation of a structural concrete component. Prerequisites: CEE 285A or equivalent.

**CEE 206. Decision Analysis for Civil and Environmental Engineers. 3 Units.**

Current challenges in selecting an appropriate site, alternate design, or retrofit strategy based on environmental, economic, and social factors can be best addressed through applications of decision science. Basics of decision theory, including development of decision trees with discrete and continuous random variables, expected value decision making, utility theory value of information, and elementary multi-attribute decision making will be covered in the class. Examples will cover many areas of civil and environmental engineering problems. Prerequisite: CEE 203 or equivalent.

**CEE 207A. Understanding Energy. 3-5 Units.**

Energy is a fundamental driver of human development and opportunity. At the same time, our energy system has significant consequences for our society, political system, economy, and environment. For example, energy production and use is the number one source of greenhouse gas emissions. In taking this course, students will not only understand the fundamentals of each energy resource – including significance and potential, conversion processes and technologies, drivers and barriers, policy and regulation, and social, economic, and environmental impacts – students will also be able to put this in the context of the broader energy system and think critically about how and why society has chosen particular energy resources. Both depletable and renewable energy resources are covered, including oil, natural gas, coal, nuclear, biomass and biofuel, hydroelectric, wind, solar thermal and photovoltaics (PV), geothermal, and ocean energy, with cross-cutting topics including electricity, storage, climate change, sustainability, green buildings, energy efficiency, transportation, and the developing world. The course is 4 units, which includes lecture and in-class discussion, readings and videos, assignments, and two off-site field trips. Enroll for 5 units to also attend the Workshop, an interactive discussion section on cross-cutting topics that meets once per week for 80 minutes (timing TBD based on student schedules). The 3-unit option requires instructor approval - please contact Diana Ginnebaugh. Website: <http://web.stanford.edu/class/cee207a/> Course was formerly called Energy Resources. Prerequisites: Algebra. May not be taken for credit by students who have completed CEE 107S.

Same as: CEE 107A, EARTHSYS 103

**CEE 207R. E3: Extreme Energy Efficiency. 2 Units.**

Be part of a unique and intense six day course about extreme energy efficiency taking place during Spring Break 2018 at Rocky Mountain Institute's Innovation Center in Basalt, Colorado! The course will focus on efficiency techniques' design, performance, choice, evolution, integration, barrier-busting, profitable business-led implementation, and implications for energy supply, competitive success, environment, development, security, etc. Examples will span very diverse sectors, applications, issues, and disciplines, with each day covering a different energy theme: buildings, transportation, industry, and implementation and implications, including renewable energy synergy and integration. Solid technical grounding and acquaintance with basic economics and business concepts will both be helpful. Rocky Mountain Institute (RMI) will design a series of lectures, exercises, and interactive activities synthesizing integrative design principles. Students will be introduced to Factor 10 Engineering, the approach for optimizing the whole system for multiple benefits. Students will work closely and interactively with RMI staff including Amory Lovins, cofounder and Chief Scientist of Rocky Mountain Institute (RMI). Exercises will illuminate challenges RMI has faced and solutions it has created in real-world design. Students will explore clean-sheet solutions that meet end-use demands and optimize whole-system resource efficiency, often with expanding rather than diminishing returns to investments, i.e. making big savings cheaper than small ones. Students will meet as a class once during winter quarter to discuss preparation and spring break logistics. Students must pay for their own travel to and from Basalt, CO (~\$400-\$600). Course will take place Sunday, March 25 - Friday, March 30. Lodging and food will be covered during the course. Must apply - instructor approval required. All backgrounds and disciplines, both undergraduate and graduate, are welcome to apply. Prerequisite - completion of one of the following courses is required: CEE 107A, CEE 207A, Earthsys 103, CEE 107S, CEE 207S, CEE 176A, CEE 176B. Contact Diana Ginnebaugh at [moongdes@stanford.edu](mailto:moongdes@stanford.edu) for an application. Course website: <https://web.stanford.edu/class/cee207r/>.

Same as: CEE 107R

**CEE 207S. Energy Resources: Fuels and Tools. 3 Units.**

Energy is a vital part of our daily lives. This course examines where that energy comes from, and the advantages and disadvantages across different fuels. Contextual analysis of energy decisions for transportation and electricity generation around the world. Energy resources covered include oil, biomass, natural gas, nuclear, hydropower, wind, solar, geothermal, and emerging technologies. Prerequisites: Algebra. Note: may not be taken by students who have completed CEE 173A, CEE 207 or EARTHSYS 103.

Same as: CEE 107S

**CEE 209B. Disaster Risk and International Development Seminar. 2 Units.**

The human and economic impacts of natural disasters are ever increasing and disproportionately affecting lower-income countries. In fact there is mounting evidence that these ever more frequent shocks threaten to reverse development progress in low-income countries. This seminar course will explore the theory and practice of disaster risk reduction in international development contexts. Weekly readings (and occasional guest lectures) will cover key issues in development theory, a history of "a risk society", participation, human-centered planning, ethics in engineering, and other topics. The seminar will be structured through weekly readings, brief writing responses and group discussion.

**CEE 212A. Industry Applications of Virtual Design & Construction. 2-4 Units.**

Building upon the concept of the VDC Scorecard, CEE 112A/212A investigates in the management of Virtual Design and Construction (VDC) programs and projects in the building industry. Interacting with experts and professionals in real estate, architecture, engineering, construction and technology providers, students will learn from the industry applications of Building Information Modeling and its relationship with Integrated Project Delivery, Sustainable Design and Construction, and Virtual Design and Construction. Students will conduct case studies to evaluate the maturity of VDC planning, adoption, technology and performance in practice. Students taking 3 or 4 units will be paired up with independent research or case study projects on the industry applications of VDC. No prerequisite. See CEE 112B/212B in the Winter Quarter and CEE 112C/212C in the Spring Quarter.

**CEE 212B. Industry Applications of Virtual Design & Construction. 2-4 Units.**

CEE 112B/212B is a practicum on the Industry Applications on Virtual Design and Construction (VDC). Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC and Building Information Modeling (BIM). Students can choose between one of the two project topics: [1] Industrialized Construction with Virtual Parts (No Prerequisite) or [2] Industry Benchmarking & Applications of the VDC Management Scorecard (Suggested Prerequisite: CEE 112A/212A).

Same as: CEE 112B

**CEE 212C. Industry Applications of Virtual Design & Construction. 2-4 Units.**

Following the Autumn- and Winter-quarter course series, CEE 112C/212C is an industry-focused and project-based practicum that focuses on the industry applications of Virtual Design and Construction (VDC). Students will be paired up with industry-based VDC projects with public owners and private developers, such as GSA Public Buildings Service, the Hong Kong Mass Transit Railway, Optima, Walt Disney Imagineering, Microsoft facilities and/or other CIFE International members. Independently, students will conduct case studies and/or develop VDC and building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC. Prerequisite: CEE 112A/212A, CEE 112B/212B, CEE 159C/259C, CEE 159D/259D, or Instructor's Approval. Same as: CEE 112C

**CEE 212D. Industry Applications of Virtual Design and Construction. 2-4 Units.**

A continuation of the CEE 112/212 series, CEE 112D/212D is an industry-focused and project-based practicum that focuses on the industry applications of Virtual Design and Construction (VDC). Students will be paired up with industry-based VDC research or application opportunities with public owners and private developers, professional associations, and/or other member organizations of the Center for Integrated Facility Engineering at Stanford. Independently, students will conduct case studies, research activities, and/or develop VDC and building information models (BIM) using off-the-shelf technologies for project analysis, collaboration, communication and optimization. Students will gain insights and develop skills that are essential for academic research, internships or industry practice in VDC. Prerequisite: CEE110/210, CEE 112C/212C, CEE 122B/222B, or Instructor's Approval. Same as: CEE 112D

**CEE 213. Patterns of Sustainability. 1-4 Unit.**

This seminar examines the interrelated sustainability of the natural, built and social environments of places in which we live. Several BOSP centers and the home Stanford campus will hold this 1-2 unit seminar simultaneously and collaborate with a shared curriculum, assignments, web conference and a Wiki. The goal of the collaborative arrangement is to expose, share, compare and contrast views of sustainability in different parts of the world. We will look at and assess aspects of sustainability of the places we are living from a theoretical perspective from the literature, from observations and interviews in the countries in which we study.

Same as: CEE 113

**CEE 217. Renewable Energy Infrastructure. 2 Units.**

Construction of renewable energy infrastructure: geothermal, solar thermal, solar photovoltaic, wind, biomass. Construction and engineering challenges and related issues and drivers for performance, cost, and environmental impact. Context of renewable energy infrastructure development including comparison of the types of renewable energy, key economic, environmental, and social contextual factors, applicability of a type of renewable energy given a context, related barriers and opportunities. Class project to plan a start-up for developing a type of energy infrastructure based on an engineering innovation.

**CEE 220A. Building Information Modeling Workshop. 2-4 Units.**

The foundational Building Information Modeling course introduces techniques for creating, managing, and applying of building information models in the building design and construction process. The course covers processes and tools for creating, organizing, and working with 2D and 3D computer representations of building components and geometries to produce models used in architectural design, construction planning and documentation, rendering and visualization, simulation and analysis.

Same as: CEE 120A

**CEE 220B. Building Information Modeling Workshop. 2-4 Units.**

This course builds upon the Building Information Model concepts introduced in 120A/220A and illustrates how BIM modeling tools are used to design, analyze, and model building systems including structural, mechanical, electrical, plumbing and fire protection. Course covers the physical principles, design criteria, and design strategies for each system and explores processes and tools for modeling those systems and analyzing their performance. Topics include: building envelopes, access systems, structural systems modeling and analysis, mechanical / HVAC systems, plumbing and fire protection systems, electrical systems, and systems integration/coordination.

Same as: CEE 120B

**CEE 220C. Parametric Design and Optimization. 2-4 Units.**

This course explores tools and techniques for computational design and parametric modeling as a foundation for design optimization. Class sessions will introduce several parametric design modeling platforms and scripting environments that enable rapid generation of 3D models and enable rapid evaluation of parametrically-driven design alternatives. Topics to be featured include: Principles of parametric design vs. direct modeling; Design exploration using parametric modeling platforms (Revit/FormIt, Rhino); Visual scripting languages and environments (Dynamo, Grasshopper, DesignScript); Single- and multi-dimensional optimization techniques and guidance strategies. Same as: CEE 120C

**CEE 220S. Building Information Modeling Special Study. 2-4 Units.**

Special studies of Building Information Modeling strategies and techniques focused on creating, managing, and applying models in the building design and construction process. Processes and tools for creating, organizing, and working with 2D and 3D computer representations of building components to produce models used in design, construction planning, visualization, and analysis.

Same as: CEE 120S

**CEE 221A. Planning Tools and Methods in the Power Sector. 3-4 Units.**

This course covers the planning methods most commonly used in the power sector today. It covers both the fundamental methods used and their applications to electricity generation, transmission and distribution planning, integrated resource planning using both energy efficiency and renewable resources as well as utility finance and ratemaking. The methods covered will include forecasting (time series, regression and the use of markets), resource assessment (including energy efficiency and demand-side management) optimization (in power markets operation and in expansion planning) and the processes used in decision-making.

**CEE 222A. Computer Integrated Architecture/Engineering/Construction (AEC) Global Teamwork. 3 Units.**

AEC students engage in a crossdisciplinary, collaborative, geographically distributed, and multicultural project-based teamwork. AEC teams exercise their domain knowledge and information technologies in a multidisciplinary context focusing on the design and construction concept development phase of a comprehensive building project. Prerequisite: interview with Instructor in Autumn Quarter.

**CEE 222B. Computer Integrated Architecture/Engineering/Construction (AEC) Global Teamwork. 2 Units.**

Global AEC student teams continue their project activity focusing on the most challenging concept developed in 222A and chosen jointly with their client. Comprehensive team project focusing on design and construction, including: project development and documentation; detailing, 3D and 4D modeling, simulation, sustainable concepts, cost benefit analysis, and life-cycle cost analysis; and final project presentation of product and process. Prerequisite: CEE 222A.

**CEE 223. Materials for Sustainable Built Environments. 3 Units.**

In this course, students will learn about new and traditional construction materials for use in sustainable building and infrastructure projects. Materials will include cement-based materials and fiber-reinforced polymer composites for structural and non-structural applications, as well as novel materials for e.g., facades, insulation, and paving. Material properties, their performance over time and their impact on people and the environment will be discussed. Course project as well as some hands-on laboratory work. Pre-requisite: CEE 101A or equivalent.



**CEE 223A. Cement-based Materials, Properties and Durability. 2 Units.**

Students will develop an understanding of the chemical and physical processes of cement and concrete hydration, strength development, mechanical performance and durability. Students will learn how the properties of materials and admixture combine to create a wide range of cement-based materials used in the built environment. The course will address sustainable construction, including the use of alternative cements, admixtures, and aggregates. Students will apply the principles in this course to various aspects of civil and structural engineering, including innovative mix design specification and review, structural investigations and failure analysis, and cementitious materials research.

**CEE 224A. Sustainable Development Studio. 1-5 Unit.**

(Undergraduates, see 124.) Project-based. Sustainable design, development, use and evolution of buildings; connections of building systems to broader resource systems. Areas include architecture, structure, materials, energy, water, air, landscape, and food. Projects use a cradle-to-cradle approach focusing on technical and biological nutrient cycles and information and knowledge generation and organization. May be repeated for credit.

**CEE 224S. Sustainable Urban Systems Seminar. 1 Unit.**

The Sustainable Urban Systems (SUS) Seminar Series will feature speakers from academia, practice, industry, and government who are on the forefront of research and innovation in sustainable urban systems. The SUS Seminar will be open to the public; students will have the option of obtaining 1 unit of course credit based on attendance and completion of writing assignments.

**CEE 224X. Disasters, Decisions, Development in Sustainable Urban Systems (CEE). 1-5 Unit.**

CEE 224X of the CEE 224XYZ SUS Project series is joining forces with D3: Disasters, Decisions, Development to offer D3+SUS which will connect principles of sustainable urban systems with the challenge of increasing resilience in the San Francisco Bay Area. The project-based learning course is designed to align with the Resilient By Design | Bay Area Challenge Collaborative Research Phase (<http://resilientbayarea.org>); students will learn the basic concepts of resilience and tools of risk analysis while applying those mindsets and toolsets to a collective research product delivered to the RBD community. Students who take D3+SUS are encouraged to continue on to CE 224Y and CEE 224Z, in which teams will be paired with local partners and will develop interventions to improve the resilience of local communities. For more information, visit <http://sus.stanford.edu/courses/>. (Cardinal Course certified by the Haas Center). Same as: CEE 124X

**CEE 224Y. Sustainable Urban Systems Project. 1-5 Unit.**

Sustainable Urban Systems (SUS) Project is a project-based learning experience being piloted for an upcoming new SUS M.S. Program within CEE. Students are placed in small interdisciplinary teams (engineers and non-engineers, undergraduate and graduate level) to work on complex design, engineering, and policy problems presented by external partners in a real urban setting. Multiple projects are offered throughout the academic year and may span multiple quarters. Students are expected to interact with professionals and community stakeholders, conduct independent team work outside of class sessions, and submit deliverables over a series of milestones. To view project descriptions and apply, visit <http://sus.stanford.edu/courses/>.

Same as: CEE 124Y, GEOPHYS 118Y, GEOPHYS 218Y

**CEE 224Z. Sustainable Urban Systems Project. 1-5 Unit.**

Sustainable Urban Systems (SUS) Project is a project-based learning experience being piloted for an upcoming new SUS M.S. Program within CEE. Students are placed in small interdisciplinary teams (engineers and non-engineers, undergraduate and graduate level) to work on complex design, engineering, and policy problems presented by external partners in a real urban setting. Multiple projects are offered throughout the academic year and may span multiple quarters. Students are expected to interact with professionals and community stakeholders, conduct independent team work outside of class sessions, and submit deliverables over a series of milestones. To view project descriptions and apply, visit <http://sus.stanford.edu/courses/>.

Same as: CEE 124Z, GEOPHYS 118Z, GEOPHYS 218Z

**CEE 225. Defining Smart Cities: Visions of Urbanism for the 21st Century. 1-2 Unit.**

In a rapidly urbanizing world, the city paves the way toward sustainability and social well-being. But what does it mean for a city to be smart? Does that also make it sustainable or resilient or livable? This seminar delves into current debates about urbanism through weekly talks by experts on topics such as big data, human-centered design, urban sustainability, and natural capital. The goal of the seminar is to explore how advances in information communication technologies affect the built environment at various scales (e.g., cities, districts, neighborhoods, blocks, buildings) and to understand the role of multiple actors working at the intersection of technology and urbanism. The seminar will provoke vigorous discussion of how urban spaces are shaped, for better or worse, by the complex interaction of technology, human societies, and the natural environment. Students taking the course for 2 units / letter grade will propose an independent research project and present their work at a final symposium.

Same as: CEE 125, URBANST 174

**CEE 226. Life Cycle Assessment for Complex Systems. 3-4 Units.**

Life cycle modeling of products, industrial processes, and infrastructure/building systems; material and energy balances for large interdependent systems; environmental accounting; and life cycle costing. These methods, based on ISO 14000 standards, are used to examine emerging technologies, such as biobased products, building materials, building integrated photovoltaics, and alternative design strategies, such as remanufacturing, dematerialization, LEED, and Design for Environment: DfE. Student teams complete a life cycle assessment of a product or system chosen from industry.

**CEE 226E. Advanced Topics in Integrated, Energy-Efficient Building Design. 2-3 Units.**

This class explores innovative methods for designing, developing, and financing high performance, low energy buildings. Students will learn best practices to reduce building energy buildings. Students will learn best practices to reduce building energy use and integrate solar PV generation in pursuit of commercial Net Zero Energy buildings. Lectures include presentations and panels featuring leading practitioners and researchers in the field. Optional site visits to local Net Zero Energy and LEED buildings provide context to support lectures. CEE 176A and CEE 156/256 or similar courses are recommended prerequisites but not required. All students are expected to participate in a group-based, term project focused on the design and development of a Net Zero Energy building. Students taking the course for two units will not be required to complete in-class assignments for individual homework assignments.

**CEE 227. Global Project Finance. 4 Units.**

Public and private sources of finance for large, complex, capital-intensive projects in developed and developing countries. Benefits and disadvantages, major participants, risk sharing, and challenges of project finance in emerging markets. Financial, economic, political, cultural, and technological elements that affect project structures, processes, and outcomes. Case studies. Limited enrollment.

**CEE 228. Methods in Urban Systems. 3 Units.**

Introduction to quantitative tools and methods for solving problems in urban systems, including geographic information science (GIS), modeling, data analysis, and programming methodologies.

**CEE 229S. Climate Change Adaptation in the Coastal Built Environment. 1 Unit.**

How will climate change impact coastal ports and harbors around the world? Leading experts discuss the latest science, policy, and engineering research on this important issue, including the necessary response to protect ports and harbors from significant sea-level rise and storm surge. Focus is on the built environment. Guest speakers. CEE 229/129 for research option. See [www.groupspaces.com/seaports2100](http://www.groupspaces.com/seaports2100). Same as: CEE 129S

**CEE 230. Urban Development and Governance. 3 Units.**

Introduction to urban planning, policy, politics, and governance by a lecture team from SPUR. Focus on the U.S., California, and the Bay Area.

**CEE 234B. Intermediate Arch Studio. 5 Units.**

This studio offers students experience in working with a real site and a real client program to develop a community facility. Students will develop site analysis, review a program for development and ultimately design their own solutions that meet client and community goals. Sustainability, historic preservation, community needs and materials will all play a part in the development of students final project. Students will also gain an understanding of graphic conventions, verbal and presentation techniques. Course may be repeated for credit. Same as: CEE 134B

**CEE 235. CapaCity Design Studio. 5 Units.**

Silicon Valley's rapid expansion has created explosive urban development in a fragile and under-prepared natural context. Delicate coastal ecology and rapid urbanization (expanding technology headquarters, new residential housing, parking, services, etc.) are competing for space. The same land also serves the regional functions of transport, open space, recreation, water supply, flood protection and wastewater treatment. Compounding the problems between these competing factors are global climate change instabilities increasing the certainty of catastrophic flooding, infrastructure collapse, and other urban resilience challenges. Students will be immersed in a process that allows them to understand and spatially identify these risks, develop a vocabulary and understanding of innovative tools to respond to them, and then work with expert practitioners to create unique design responses. Students will be provided with urban design frameworks (for planning, site development, and conservation) combined with advanced sustainable design concepts (such as resource co-optimization, and adaptable infrastructure platforms, and high performance urban ecology) by working with expert lecturers and in small groups. Students will ultimately develop a series of visual and technical presentations to propose a final thesis for a local intervention that could be replicated in other coastal contexts globally. This course has been designed to develop student learning through a project-based format. Students will be organized into design teams of 3 or 4 and will have the semester to collaborate with partners on an interdisciplinary proposal including policy and design recommendations.

**CEE 237B. Advanced Architecture Studio. 6 Units.**

This course will focus on the topic of interdisciplinary collaboration and its role in the development of design concepts. Specifically, the integration of structural with architectural considerations to produce a unified urban, spatial, tectonic and structural proposition will be our field of investigation. This course is an architecture studio course where class time will be spent primarily in individual or group desk critiques and pin-up sessions. May be repeat for credit. Total completions allowed: 3. Additionally, there will be lectures, case study presentations and a field trip. Prerequisites: required: CEE 31 (or 31Q) Drawing, CEE 110 BIM and CEE 130 Design. Same as: CEE 137B

**CEE 239. Design Portfolio Methods. 4 Units.**

The portfolio is an essential creative tool used to communicate academic work, design philosophies, and professional intent. This course will explore elements of graphic design, presentation, communication, binding, printing, and construction, yielding a final portfolio (physical and digital) for professional, academic or personal purposes. Limited enrollment. Prerequisites: two Art, Design, or Architecture studio courses, or consent of instructor. Same as: CEE 139

**CEE 240. Project Assessment and Budgeting. 3 Units.**

Course objectives: 1) learn the processes of determining the quantities of permanent materials required and the associated construction quantities; 2) learn the capabilities of construction equipment; 3) be introduced to the make-up of construction crews; 4) design concrete form systems; 5) utilize the historic productivity of a crew to estimate the cost of construction; 6) write construction logic to create a critical path project schedule; 7) distribute the cost of construction over schedule activities to generate a cash flow curve and monthly payment schedule for the project. Construction engineering: A construction project that has reached final design must be quantified, a delivery schedule developed, it's final total price determined and the month by month demand for cash payments established. Each student will perform these activities to satisfy a "Course Project" requirement utilizing actual project design drawings obtained from the companies of the Guest Lectures and others. Guest Lecturers from: Disney Construction, Pankow Construction, Granite Construction, Stacy & Witbeck Incorporated.

**CEE 241. Managing Fabrication and Construction. 4 Units.**

Methods to manage the physical production of construction projects; design, analysis, and optimization of the fabricate-assemble process including performance metrics. Project management techniques and production system design including: push versus pull methods; master scheduling and look-ahead scheduling; scope, cost, and schedule control; earned value analysis; critical path method; location-based scheduling; 4D modeling; workflow; trade coordination; methods to understand uncertainty and reduce process variability; and supply chain systems including made-to-stock, engineered-to-order, and made-to-order. Prerequisite: 100 or consent of instructor. Recommended corequisite: 240.

**CEE 241A. Infrastructure Project Development. 3 Units.**

Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities, and communications sectors. Analysis of the condition of the nation's infrastructure and how projects are planned and financed. Focus is on public works in the U.S. The role of public and private sectors through a step-by-step study of the project development process. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare project environmental impact statements. Same as: CEE 141A

**CEE 241B. Infrastructure Project Delivery. 3 Units.**

Infrastructure is critical to the economy, global competitiveness and quality of life. Topics include energy, transportation, water, public facilities, and communications sectors. Analysis of how projects are designed, constructed, operated, and maintained. Focus is on public works projects in the U.S. Alternative project delivery approaches and organizational strategies. Case studies of real infrastructure projects. Industry guest speakers. Student teams prepare finance/design/build/operate/maintain project proposals. Same as: CEE 141B

**CEE 241C. Global Infrastructure Projects Seminar. 1-2 Unit.**

Nine current global infrastructure projects presented by top project executives or company leaders from industry. Water, transportation, energy and communication projects are featured. Course provides comparisons of project development, win and delivery approaches for mega-projects around the world. Alternative project delivery methods, the role of public and private sector, different project management and construction strategies, and lessons learned. The course also includes field trips to local mega-projects.

Same as: CEE 141C

**CEE 241P. Integrated Management of Fabrication and Construction. 3-4 Units.**

Application of the fundamental fabrication and construction management concepts covered in CEE 241T to an actual project; integrated software environments; integration of scope, schedule, and cost information for scheduling, estimating, and progress control; scope management with BIM; off-site fabrication vs. on-site construction and supply chain coordination; group project; project permitting, potential for a joint project with CEE 242P. Prerequisites: CEE 210, CEE 241T.

**CEE 242. Organization Design for Projects and Companies. 3-4 Units.**

Introduction to organizational behavior and organizational design for construction projects and companies. Class incorporates readings, individual, small group and large group case study assignments. Students use computer simulation to design real-world project organizations.

**CEE 242P. Designing Project Organizations. 2 Units.**

Sequel to CEE 242T. Course develops information-processing approach for designing project and project-based company organizations to deliver sustainable construction projects; includes design of organizations and work processes for integrated project delivery and public-private partnership concession project delivery. Term project applies computer-based organization simulation to optimize design of project organization for a participating company.

**CEE 242R. Project Risk Analysis. 3 Units.**

Teaches principles and methods for quantitative modeling and mitigation of risks in project planning, design, construction and operation, using new MS Excel capabilities and standardized probability distributions. Several case studies will be covered, including ongoing work with PG&E to roll up operational risks.

**CEE 242T. Organizational Behavior and Design for Construction. 2 Units.**

Introduction to organizational behavior and organizational design for Architecture, Engineering and Construction projects and companies. Class incorporates readings, individual and group case study assignments. Students use computer simulation to analyze project organizations and predict schedule, cost and quality risks. This class is a prerequisite for CEE 242P.

**CEE 243. Intro to Urban Sys Engrg. 3 Units.**

This course is an introduction to the interdisciplinary domain of urban systems engineering. It will provide you with a high-level understanding of the motivation for studying sustainable cities and urban systems, systems-based modeling approaches and the social actor theories embedded in the urban sustainability decision making process. Coursework will be comprised of three group mini-projects corresponding to course modules.

**CEE 244. Accounting, Finance & Valuation for Engineers & Constructors. 2 Units.**

Concepts of financial accounting and economics emphasizing the construction industry. Financial statements, accounting concepts, project accounting methods, and the nature of project costs. Case study of major construction contractor. Ownership structure, working capital, and the sources and uses of funds.

**CEE 246. Entrepreneurship in Civil & Environmental Engineering. 3-4 Units.**

CEE 246 is a team project-based course geared toward developing entrepreneurial businesses related to civil and environmental engineering. With support of industry mentors, students are guided through the process of identifying opportunities, developing business plans, and determining funding sources. The class culminates with presentations to industry experts and venture capitalists (VC) to mimic typical investor pitches. The goal is to provide students with the knowledge and network to realize their business idea. Students must submit the following application before enrolling in this course: <https://goo.gl/forms/jWaTr5ZTG05WBsoE2>.

**CEE 246B. Real Estate Development and Finance. 3 Units.**

Introduction to the Real Estate Development Process from conception, feasibility analysis, due diligence, entitlements, planning, financing, market analysis, contract negotiation, construction, marketing, asset management and disposition. Pro-forma and Financial modeling in Real Estate. Financing options for different types of Real Estate projects and products. Redevelopment projects. Affordable Housing. The class will combine lectures, case studies, field work (Group Project) and guest speakers. Recommended knowledge of spreadsheets. Prerequisites: highly recommended Engineering Economy (CEE 246A or ENGR 60) or any Introduction to Finance class (concepts of Present Worth and IRR). Attendance to the first class is mandatory.

**CEE 246S. Real Estate Finance Seminar or Real Estate Career Development Seminar. 1 Unit.**

Real Estate Development and Finance presented by industry guest speakers. Executives from different Real Estate companies will give an overview of their business and projects. (Residential, Retail, Commercial, Mixed Used, REITs, Redevelopment Projects, Affordable Housing, public and private real estate companies, real estate funds, etc.). Short Real Estate Case Studies will be given as homework. Two optional field trips. Attendance to the first class is mandatory.

**CEE 247A. Network Governance. 3-4 Units.**

This course aims at providing students with insights, concepts and skills needed to understand the dynamics of multi-actor interaction processes in uncertain and often highly politicized contexts and to be able to cope with technological and strategic uncertainties and risks including the unpredictable behavior of actors. They will develop knowledge, skills and competences about how to manage divergent and conflicting interests of different actors including principles of integrative negotiation, communication and mediation.

**CEE 248. Introduction to Real Estate Development. 2 Units.**

This course will offer students an introduction to Real Estate Development. Senior Principals from Sares Regis, a regional commercial and residential real estate development company, will cover topics on all aspects of the development process. Guest speakers from the fields of architecture and engineering, finance and marketing will participate in some of the classes. They will offer the students a window into the world of how houses, apartments, office buildings and public facilities are conceived of, brought through the design and approval process, financed, marketed and then sold and/or rented. There will be nine 1.5-hour lectures (robust class discussion encouraged). Throughout the quarter, the students will work on a group case study assignment about one local project that is currently being built or was recently completed. This assignment will be due in the form of a presentation during the final exam period. No prior knowledge of real estate is required. Classes commence on April 5th and complete on May 31st. Number of students is limited to 30. Undergraduates must apply by submitting a one-page essay explaining their interest in taking the class to [mradyk@srgnc.com](mailto:mradyk@srgnc.com) by March 8, 2018.

**CEE 249. Labor and Industrial Relations: Negotiations, Strikes, and Dispute Resolution. 2 Units.**

Labor/management negotiations, content of a labor agreement, strikes, dispute resolution, contemporary issues affecting labor and management, and union versus open shop competitiveness in the marketplace. Case studies; presentations by union leaders, legal experts, and contractor principals. Simulated negotiation session with union officials and role play in an arbitration hearing.

**CEE 251. Negotiation. 3 Units.**

Students learn to prepare for and conduct negotiations in a variety of arenas including getting a job, managing workplace conflict, negotiating transactions, and managing personal relationships. Interactive class. The internationally travelled instructor who has mediated cases in over 75 countries will require students to negotiate real life case studies and discuss their results in class. Application required before first day of class; students should enroll on Axess and complete the application on Canvas before March 18.

Same as: CEE 151, EARTH 251, PUBLPOL 152

**CEE 252. Construction Methods for Concrete and Steel Structures. 3 Units.**

Providing technical support for concrete and steel construction operations on buildings or infrastructure projects. Concrete materials, construction properties of fresh concrete. Resources and operations for batching, transporting, placing, finishing, and curing concrete. Design, fabrication, and use of formwork. Special operations and formwork systems. Detailing, fabricating, erecting, and connecting structural steel. Lifting equipment and lift planning. Welding processes, operations, and quality control. Readings, exercises and course projects.

**CEE 252Q. Construction Engineering Fundamentals. 2 Units.**

Construction engineering is a series of technical activities to meet project objectives related to cost and schedule, safety, quality, and sustainability. These activities include: 1) designing temporary works and construction work processes; 2) providing the required temporary and permanent resources; and 3) integrating activities to consider construction during all project phases and between projects. The objectives of CEE 252Q are to learn about the technical fundamentals, resources, and field operations required to complete construction engineering activities and to develop a foundation for continued related learning. The course requires reviewing recorded presentations and other online resources, completing queries, participating in class sessions with guest speakers and in field trips, and completing group exercises and projects. The exercises, completed by all of the student groups, include construction engineering activities for earthwork, concrete construction, and steel erection. Each group will also complete a project to analyze one of the following types of systems or facilities: building electrical systems, lighting systems, HVAC systems, control systems, solar photovoltaic power plant, and wind turbine power plant.

**CEE 255. Introduction to Sensing Networks for CEE. 3-4 Units.**

Introduce the design and implementation of sensor networks for monitoring the built and natural environment. Emphasis on the integration of modern sensor and communication technologies, signal processing and statistical models for network data analysis and interpretation to create practical deployments to enable sustainable systems, in areas such as energy, weather, transportation and buildings. Students will be involved in a practical project that may involve deploying a small sensor system, data models and analysis and signal processing. Limited enrollment.

Same as: CEE 155

**CEE 256. Building Systems. 4 Units.**

HVAC, lighting, and envelope systems for commercial and institutional buildings, with a focus on energy efficient design. Knowledge and skills required in the development of low-energy buildings that provide high quality environment for occupants.

Same as: CEE 156

**CEE 258. Donald R. Watson Seminar in Construction Engineering and Management. 1 Unit.**

Presentations from construction industry leaders. Discussions with speakers from various segments of industry regarding career options. Student groups interact with industry representatives after class.

**CEE 258B. Donald R. Watson Seminar in Construction Engineering and Management. 1 Unit.**

Weekly seminars and field trips focusing on technical aspects of concrete and steel construction. Submission of abstract and paper required.

**CEE 259. Managing Construction Innovation - Practicum. 2-4 Units.**

CEE 159/259 students join Stanford researchers in developing performance metrics and key performance indicators, which inform the assessment and management of productivity policies, industry initiatives, progressive enterprises, global projects or experimental processes in the construction industry. This project-based practicum builds upon a global network of government agencies, professional institutions and member companies collaborating with the Center for Integrated Facility Engineering (CIFE). Through a series of Global Construction Innovation Case Studies, students will develop applied research skills that are essential for academic research, internships or industry practice, while gaining insights into innovative and industrialized construction practice, such as the industry applications of Building Information Modeling (BIM), Integrated Project Delivery (IPD), Lean Methodology, Prefabricated Prefinished Volumetric Construction (PPVC), Smart Cities or Virtual Design and Construction (VDC). Note to students: this course may be taken repeat for credit for up to 9 cumulative units.

Same as: CEE 159

**CEE 259A. Construction Problems. 1-3 Unit.**

Group-selected problems in construction techniques, equipment, or management; preparation of oral and written reports. Guest specialists from the construction industry. See 299 for individual studies. Prerequisites: graduate standing in CEM program and consent of instructor.

**CEE 259B. Construction Problems. 1-3 Unit.**

Group-selected problems in construction techniques, equipment, or management; preparation of oral and written reports. Guest specialists from the construction industry. See 299 for individual studies. Prerequisites: graduate standing in CEM program and consent of instructor.

**CEE 260A. Physical Hydrogeology. 4 Units.**

(Formerly GES 230.) Theory of underground water occurrence and flow, analysis of field data and aquifer tests, geologic groundwater environments, solution of field problems, and groundwater modeling. Introduction to groundwater contaminant transport and unsaturated flow. Lab. Prerequisite: elementary calculus.

Same as: ESS 220

**CEE 260C. Contaminant Hydrogeology and Reactive Transport. 3 Units.**

Decades of industrial activity have released vast quantities of contaminants to groundwater, threatening water resources, ecosystems and human health. What processes control the fate and transport of contaminants in the subsurface? What remediation strategies are effective and what are the tradeoffs among them? How are these processes represented in models used for regulatory and decision-making purposes? This course will address these and related issues by focusing on the conceptual and quantitative treatment of advective-dispersive transport with reacting solutes, including modern methods of contaminant transport simulation. Some Matlab programming / program modification required. Prerequisite: Physical Hydrogeology ESS 220 / CEE 260A (Gorelick) or equivalent and college-level course work in chemistry. Same as: ESS 221

**CEE 261A. The Atmospheric Boundary Layer: Fundamental Physics and Modeling. 3 Units.**

An introduction to the Atmospheric Boundary Layer (ABL), including measurements and simulations of ABL flows. Wind and flow, turbulent transport, buoyancy and virtual potential temperature, the diurnal cycle. Derivation of the governing equations, simplifications and assumptions. Turbulence kinetic energy and its budget, ABL stability, the Richardson number and the Obukhov length. Analysis of boundary layer turbulence. Overview of field and wind tunnel measurement techniques, and of computational models from meso- to micro-scale. A discussion of micro-scale applications, including pedestrian wind comfort, pollutant dispersion and wind loading, and an introduction to uncertainty quantification for ABL flows. Prerequisites: Knowledge of fluid mechanics.

**CEE 261B. Physics of Wind Energy. 3 Units.**

Formerly CEE 261. An introduction to the analysis and modeling of wind energy resources and their extraction. Topics include the physical origins of atmospheric winds; vertical profiles of wind speed and turbulence over land and sea; the wind energy spectrum and its modification by natural topography and built environments; theoretical limits on wind energy extraction by wind turbines and wind farms; modeling of wind turbine aerodynamics and wind farm performance. Final project will focus on development of a new wind energy technology concept. Prerequisites: CEE 262A or ME 351A.

Same as: ENERGY 262, ME 262

**CEE 261I. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation. 3 Units.**

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.

Same as: CEE 161I, EARTHSYS 146A, ESS 246A

**CEE 262A. Hydrodynamics. 3-4 Units.**

The flow of incompressible viscous fluid; emphasis is on developing an understanding of fluid dynamics that can be applied to environmental flows. Topics: kinematics of fluid flow; equations of mass and momentum conservation (including density variations); some exact solutions to the Navier-Stokes equations; appropriate analysis of fluid flows including Stokes flows, potential flows, and laminar boundary layers; and an introduction to the effects of rotation and stratification through scaling analysis of fluid flows. Prerequisites: 101B or consent of instructor; and some knowledge of vector calculus and differential equations.

**CEE 262B. Transport and Mixing in Surface Water Flows. 3-4 Units.**

Application of fluid mechanics to problems of pollutant transport and mixing in the water environment. Mathematical models of advection, diffusion, and dispersion. Application of theory to problems of transport and mixing in rivers, estuaries, and lakes and reservoirs. Recommended: 262A and CME 102 (formerly ENGR 155A), or equivalents.

**CEE 262C. Hydrodynamics and Sediment Transport Modeling. 3 Units.**

Introduction to numerical methods for modeling surface water flows and sediment transport in rivers, lakes, estuaries and the coastal ocean. The first half of the course will focus on development of hydrodynamics models in one-, two-, and three dimensions, including numerical methods for the shallow water equations and momentum and scalar transport, and turbulence modeling. The second half of the course will incorporate sediment transport models into the hydrodynamics models covered in the first half of the quarter, along with discussion of bottom boundary layers in steady and wave-driven flows, bedform dynamics, suspended and bedload transport, and cohesive sediment dynamics. Prerequisite: CEE262A or ME351A or equivalent.

**CEE 262D. Introduction to Physical Oceanography. 4 Units.**

Formerly CEE 164. The dynamic basis of oceanography. Topics: physical environment; conservation equations for salt, heat, and momentum; geostrophic flows; wind-driven flows; the Gulf Stream; equatorial dynamics and ENSO; thermohaline circulation of the deep oceans; and tides. Prerequisite: PHYSICS 41 (formerly 53).

Same as: CEE 162D, EARTHSYS 164, ESS 148

**CEE 262E. Rivers, Streams, and Canals. 3-4 Units.**

Formerly CEE 161A/264A. Introduction to the movement of water through natural and engineered channels, streams, and rivers. Basic equations and theory (mass, momentum, and energy equations) for steady and unsteady descriptions of the flow. Application of theory to the design of flood-control and canal systems. Flow controls such as weirs and sluice gates; gradually varied flow; Saint-Venant equations and flood waves; and method of characteristics. Open channel flow laboratory experiments: controls such as weirs and gates, gradually varied flow, and waves. Limited enrollment in lab section. Prerequisite: CEE 101B or CEE 162A.

Same as: CEE 162E

**CEE 262F. Ocean Waves. 3 Units.**

The fluid mechanics of surface gravity waves in the ocean of relevance to engineers and oceanographers. Topics include irrotational waves, wave dispersion, wave spectra, effects of bathymetry (shoaling), mass transport, effects of viscosity, and mean currents driven by radiation stresses. Prerequisite: CEE 262A or a graduate class in fluid mechanics.

**CEE 262G. Sediment Transport Modeling. 3 Units.**

Formerly CEE 264. Mechanics of sediment transport in rivers, estuaries and coastal oceans, with an emphasis on development of models and application of three-dimensional software tools. Topics include bottom boundary layers in steady and wave-driven flows, bedform dynamics, suspended and bedload transport, cohesive sediments. Prerequisites: CEE262A or consent of instructor.

**CEE 262I. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation. 3 Units.**

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: MATH 51 or CME100; and PHYSICS 41; and CEE 162A or CEE 101B or a graduate class in fluid dynamics or consent of the instructor.

Same as: CEE 162I, EARTHSYS 146B, ESS 246B

**CEE 263A. Air Pollution Modeling. 3-4 Units.**

The numerical modeling of urban, regional, and global air pollution focusing on gas chemistry and radiative transfer. Stratospheric, free-tropospheric, and urban chemistry. Methods for solving stiff systems of chemical ordinary differential, including the multistep implicit-explicit method, Gear's method with sparse-matrix techniques, and the family method. Numerical methods of solving radiative transfer, coagulation, condensation, and chemical equilibrium problems. Project involves developing a basic chemical ordinary differential equation solver. Prerequisite: CS 106A or equivalent.

**CEE 263B. Numerical Weather Prediction. 3-4 Units.**

Numerical weather prediction. Continuity equations for air and water vapor, the thermodynamic energy equation, and momentum equations derived for the atmosphere. Numerical methods of solving partial differential equations, including finite-difference, finite-element, semi-Lagrangian, and pseudospectral methods. Time-stepping schemes: the forward-Euler, backward-Euler, Crank-Nicolson, Heun, Matsuno, leapfrog, and Adams-Bashforth schemes. Boundary-layer turbulence parameterizations, soil moisture, and cloud modeling. Project developing a basic weather prediction model. Prerequisite: CS 106A or equivalent.

**CEE 263C. Weather and Storms. 3 Units.**

Daily and severe weather and global climate. Topics: structure and composition of the atmosphere, fog and cloud formation, rainfall, local winds, wind energy, global circulation, jet streams, high and low pressure systems, inversions, el Niño, la Niña, atmosphere/ocean interactions, fronts, cyclones, thunderstorms, lightning, tornadoes, hurricanes, pollutant transport, global climate and atmospheric optics. Same as: CEE 63

**CEE 263D. Air Pollution and Global Warming: History, Science, and Solutions. 3 Units.**

Survey of Survey of air pollution and global warming and their renewable energy solutions. Topics: evolution of the Earth's atmosphere, history of discovery of chemicals in the air, bases and particles in urban smog, visibility, indoor air pollution, acid rain, stratospheric and Antarctic ozone loss, the historic climate record, causes and effects of global warming, impacts of energy systems on pollution and climate, renewable energy solutions to air pollution and global warming. UG Reqs: GER: DBNatSci. Same as: CEE 64

**CEE 263G. Energy Policy in California and the West. 1 Unit.**

This seminar provides an in-depth analysis of the role of California state agencies and Western energy organizations in driving energy policy development, technology innovation, and market structures, in California, the West and internationally. The course covers three areas: 1) roles and responsibilities of key state agencies and Western energy organizations; 2) current and evolving energy and climate policies; and 3) development of the 21st century electricity system in California and the West. The seminar will also provide students a guideline of what to expect in professional working environment. Specific meeting dates for the course are as follows: April 21 10am-2pm/ May 12 10am-1pm/ June 2 10am-1pm.

Same as: POLISCI 73, PUBLPOL 73

**CEE 263S. Atmosphere/Energy Seminar. 1 Unit.**

Interdisciplinary seminar with talks by researchers and practitioners in the fields of atmospheric science and renewable energy engineering. Addresses the causes of climate, air pollution, and weather problems and methods of addressing these problems through renewable and efficient energy systems. May be repeated for credit.

**CEE 265A. Sustainable Water Resources Development. 3 Units.**

Alternative criteria for judging the sustainability of projects. Application of criteria to evaluate sustainability of water resources projects in several countries. Case studies illustrate the role of political, social, economic, and environmental factors in decision making. Influence of international aid agencies and NGOs on water projects. Evaluation of benefit-cost analysis and environmental impact assessment as techniques for enhancing the sustainability of future projects. Limited enrollment. Prerequisite: graduate standing in Environmental and Water Studies, or consent of instructor.

**CEE 265C. Water Resources Management. 3 Units.**

Optimal equilibrium between water supply and water demand, under specific local and regional physical, environmental, social and economic constraints. Principles in the context of sustainable development, increasing water scarcity in many parts of the world, and hydrologic uncertainty including that associated with climate change. Operations and water quality in reservoirs, river basins, and groundwater systems; non-conventional water sources; demand management options; and the institutional and legal framework. Same as: CEE 165C

**CEE 265D. Water and Sanitation in Developing Countries. 1-3 Unit.**

Economic, social, political, and technical aspects of sustainable water supply and sanitation service provision in developing countries. Service pricing, alternative institutional structures including privatization, and the role of consumer demand and community participation in the planning process. Environmental and public health considerations, and strategies for serving low-income households. Limited enrollment. Prerequisite: consent of instructor, see jennadavis.stanford.edu for application.

**CEE 265E. Adaptation to Sea Level Rise and Extreme Weather Events. 3 Units.**

Students are introduced to basic aspects of climate change in the context of sea level rise and the intensity and frequency of extreme-weather events. Climate change adaptations are adjustments in behaviors, plans and projects to reduce society's vulnerability to climate change impacts. Major adaptation approaches relevant to civil and environmental engineers are reviewed. Adaptation measures considered include structural and ecologically-based measures for dealing with sea level rise and storm surges, as well as planned migration and managed retreat (i.e., deliberately altering flood defenses to allow flooding of presently protected areas). Strategies for adaptation to changes in extreme weather events, including floods and droughts, are also considered; examples include disaster response management systems and weather insurance. Illustrations of innovative adaptation measures taken by cities are featured as are techniques associated with climate-smart agriculture. Common barriers to climate change adaptation are also reviewed. Limited enrollment. Admission preference given to students in CEE graduate programs for Environmental Engineering, EFMH and EES followed by seniors doing the coastal focus area within the CEE Department's Environmental Systems Engineering major.

**CEE 266A. Watersheds and Wetlands. 4 Units.**

Introduction to the occurrence and movement of water in the natural environment and its role in creating and maintaining terrestrial, wetland, and aquatic habitat. Hydrologic processes, including precipitation, evaporation, transpiration, snowmelt, infiltration, subsurface flow, runoff, and streamflow. Rivers and lakes, springs and swamps. Emphasis is on observation and measurement, data analysis, modeling, and prediction. Prerequisite: CEE 101B or CEE 162A or equivalent. (Freyberg). Same as: CEE 166A

**CEE 266B. Floods and Droughts, Dams and Aqueducts. 4 Units.**

Sociotechnical systems associated with human use of water as a resource and the hazards posed by too much or too little water. Potable and non-potable water use and conservation. Irrigation, hydroelectric power generation, rural and urban water supply systems, storm water management, flood damage mitigation, and water law and institutions. Emphasis is on engineering design. Prerequisite: 166A or equivalent. (Freyberg). Same as: CEE 166B

**CEE 266C. Dams, Reservoirs, and their Sustainability. 3 Units.**

An investigation of dams and reservoirs and their short- and long-term costs, benefits, and impacts. Dam safety, operating rules and reoperation in response to change, fish passage, reservoir sediment management, fish passage and habitat, dam removal. Heavy reliance on case studies, technical literature, and discussion. Enrollment limited. Graduate status or permission of the instructor. Prerequisite: CEE 266A, 266B, or equivalents.

**CEE 266D. Water Resources and Water Hazards Field Trips. 2 Units.**

Introduction to water use and water hazards via weekly field trips to local and regional water resources facilities (dams, reservoirs, fish ladders and hatcheries, pumping plants, aqueducts, hydropower plants, and irrigation systems) and flood damage mitigation facilities (storm water detention ponds, channel modifications, flood control dams, and reservoirs). Each trip preceded by an orientation lecture.

Same as: CEE 166D

**CEE 268. Groundwater Flow. 3-4 Units.**

Flow and mass transport in porous media. Applications of potential flow theory and numerical modeling methods to practical groundwater problems: flow to and from wells, rivers, lakes, drainage ditches; flow through and under dams; streamline tracing; capture zones of wells; and mixing schemes for in-situ remediation. Prerequisites: calculus and introductory fluid mechanics.

**CEE 269A. Environmental Engineering Seminar. 1 Unit.**

Presentations on current research in environmental engineering by Civil & Environmental Engineering faculty.

**CEE 269B. Environmental Engineering Seminar. 1 Unit.**

Presentations on current research, practice and thinking in environmental engineering by visiting academics and practitioners.

**CEE 269C. Environmental Engineering Seminar. 1 Unit.**

Presentations on current research, practice and thinking in environmental engineering by visiting academics and practitioners.

**CEE 270. Movement and Fate of Organic Contaminants in Waters. 3 Units.**

Transport of chemical constituents in surface and groundwater including advection, dispersion, sorption, interphase mass transfer, and transformation; impacts on water quality. Emphasis is on physicochemical processes and the behavior of hazardous waste contaminants. Prerequisites: undergraduate chemistry and calculus. Recommended: 101B.

**CEE 270B. Environmental Organic Reaction Chemistry. 2-3 Units.**

With over 70,000 chemicals now in production worldwide, predicting their fate in the environment is a difficult task. The course focuses on developing two key skills. First, students should develop the ability to derive mass balance equations used to quantify the fate of chemicals in the environment. With so many chemicals having been introduced in the past ~60 years, many of the key parameters needed for mass balance models have not been measured experimentally. The class builds on CEE 270, which developed methods of predicting equilibrium partitioning coefficients. For many situations involving reactions of target contaminants, equilibrium is not attained. The course develops methods of predicting the reactivity of chemicals based upon their chemical structures both qualitatively and quantitatively. natural reaction processes covered include acid-base speciation, nucleophilic substitution, oxidation/reduction reactions, and photochemical reactions. Key treatment reactions (ozone, UV treatment and advanced oxidation) are also covered. Prerequisites: CEE 270, Chem 31B/X.

**CEE 270S. Environmental Disasters. 2 Units.**

Mining and critical review of scientific literature for environmental impacts, especially chemical contamination caused by natural and anthropogenic disasters. Focus is on the development of research review skills, critical thinking and discussion of findings.

Same as: CEE 170S

**CEE 271A. Physical and Chemical Treatment Processes. 3 Units.**

Physical and chemical unit operations for water treatment, emphasizing process combinations for drinking water supply. Application of the principles of chemistry, rate processes, fluid dynamics, and process engineering to define and solve water treatment problems by flocculation, sedimentation, filtration, disinfection, oxidation, aeration, and adsorption. Investigative paper on water supply and treatment. Prerequisites: CEE 101B (or CEE 162A); CEE 270. Recommended: 273.

**CEE 271B. Environmental Biotechnology. 4 Units.**

Stoichiometry, kinetics, and thermodynamics of microbial processes for the transformation of environmental contaminants. Design of dispersed growth and biofilm-based processes. Applications include treatment of municipal and industrial waste waters, detoxification of hazardous chemicals, and groundwater remediation. Prerequisites: 270; 177 or 274A or equivalents.

**CEE 271D. Introduction to Wastewater Treatment Process Modeling. 2 Units.**

The course will present a structured protocol for simulator application comprising project definition, data collection and reconciliation, model set-up, calibration and validation, and simulation and result interpretation. This course will include a series of guided simulation exercises evaluating resource consumption (e.g., electrical energy, natural gas, chemicals) and resource recovery (e.g., biogas, struvite, biosolids, recycled water) from a variety of treatment plant configurations. Coursework will consist of guided simulation exercises, an end-of-the-quarter project evaluating an assigned plant configuration, and presenting model results to the class. Enrollment will be limited, with preference to CEE graduate students.

**CEE 271F. New Indicators of Well-Being and Sustainability. 3 Units.**

Explore new ways to better measure human development, comprehensive wealth and sustainability beyond standard economic indicators such as income and GDP. Examine how new indicators shape global, national and local policy worldwide. Well-being topics include health, happiness, trust, inequality and governance. Sustainability topics include sustainable development, environmental performance indicators, material flow analysis and decoupling, and inclusive wealth indicators. Students will build their own indicator of well-being and sustainability for a term paper. Same as: CEE 171F

**CEE 271M. Transport Phenomena: Momentum, heat and mass transport. 3 Units.**

Heat, mass and momentum transfer theory from the viewpoint of basic transport equations. Steady and unsteady state; laminar and turbulent flow; boundary layer theory. Prerequisites: fluid mechanics, ordinary differential equations.

Same as: CEE 371M

**CEE 272. Coastal Contaminants. 3-4 Units.**

Coastal pollution and its effects on ecosystems and human health. The sources, fate, and transport of human pathogens and nutrients. Background on coastal ecosystems and coastal transport phenomena including tides, waves, and cross shelf transport. Introduction to time series analysis with MATLAB. Undergraduates require consent of instructor.

**CEE 272R. Modern Power Systems Engineering. 3 Units.**

Focus is on Power Engineering from a systems point of view. Topics covered may include modeling of generation, transmission and distribution systems, load flow analysis, transient and steady-state stability analysis. Special emphasis given to modern market operations and dispatch, modeling intermittent controllable power sources, storage technologies, mechanisms for demand response, sensing the grid and the role of market mechanisms for deep integration. Course content may vary year to year.

**CEE 272T. SmartGrids and Advanced Power Systems Seminar. 1-2 Unit.**

A series of seminar and lectures focused on power engineering. Renowned researchers from universities and national labs will deliver bi-weekly seminars on the state of the art of power system engineering. Seminar topics may include: power system analysis and simulation, control and stability, new market mechanisms, computation challenges and solutions, detection and estimation, and the role of communications in the grid. The instructors will cover relevant background materials in the in-between weeks. The seminars are planned to continue throughout the next academic year, so the course may be repeated for credit. Same as: EE 292T

**CEE 273. Aquatic Chemistry. 3 Units.**

Chemical principles and their application to the analysis and solution of problems in aqueous geochemistry (temperatures near 25° C and atmospheric pressure). Emphasis is on natural water systems and the solution of specific chemical problems in water purification technology and water pollution control. Prerequisites: CHEM 31 and 33, or equivalents.

**CEE 273A. Water Chemistry Laboratory. 3 Units.**

(Graduate students register for 273A.) Laboratory application of techniques for the analysis of natural and contaminated waters, emphasizing instrumental techniques.  
Same as: CEE 179A

**CEE 273B. The Business of Water. 2 Units.**

One of the fastest growing economic sectors is the water field, and private water companies are playing an increasingly important role in improving water management around the world. In some cases, however, the involvement of private companies in the water sector has also proven controversial (e.g., when private companies have taken over public water supply systems in developing countries such as Bolivia). This course will look at established or emerging businesses in the water sector and the legal, economic, and social issues that they generate. These businesses include investor-owned water utilities, water technology companies (e.g., companies investing in new desalination or water recycling technologies), water-right funds (who directly buy and sell water rights), social impact funds, innovative agricultural operations, water concessionaires, and infrastructure construction companies and investors. Each week will focus on a different business and company. Company executives will attend the class session and discuss their business with the class. In most classes, we will examine (1) the viability and efficacy of the company's business plan, (2) the legal and/or social issues arising from the business' work, and (3) how the business might contribute to improved water management and policy. Each student will be expected to write (1) two short reflection papers during the course of the quarter on businesses that present to the class, and (2) a 15-page paper at the conclusion of the class on either a water company of the student's choice or a policy initiative that can improve the role that business plays in improving water management (either in a particular sector or more generally). Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper.

**CEE 273C. Environmental Engineering Applications of Membrane Technology. 3 Units.**

Introduction to membrane technology and processes with applications in R&D, water/wastewater treatment, and renewable energy. Membrane separation principles, reverse osmosis, nanofiltration, membrane characterization techniques, mass transport phenomena, fouling processes, rejection of salts and trace organics, brine disposal system design, energy and cost considerations, and pre- and post-treatment procedures. Case studies in environmental sustainability issues related to full scale treatment engineering.

**CEE 273D. Wastewater Treatment Process Simulators and Their Use for Emerging Technologies. 2 Units.**

Process simulators are used widely for analysis and design of municipal and industrial wastewater treatment facilities. The current generation of simulators integrates biological, chemical, and physical process models that enable steady-state and dynamic "whole plant" simulation of liquid and solids treatment process performance. This course reinforces the concepts presented in CEE 271A, CEE 271B, and CEE 273 and shows how these concepts are applied to analyze and design treatment systems for BOD removal, energy recovery, phosphorus removal and recovery, and nitrogen removal using BioWin TM 4, a commercially-available software package. A process-specific model for anaerobic treatment of domestic wastewater will also be developed for the new Staged Anaerobic Fluidized Membrane Bioreactor (SAF-MBR) based on the International Water Association (IWA) Anaerobic Digester Model No. 1 (ADM1) and implemented using the simulation software Aquasim.

**CEE 273F. Urban Water Use Efficiency and Conservation. 2 Units.**

Introduction to water reuse, including membrane treatment, groundwater infiltration, artificial turf, and runoff collection and use.

**CEE 274A. Environmental Microbiology I. 3 Units.**

Basics of microbiology and biochemistry. The biochemical and biophysical principles of biochemical reactions, energetics, and mechanisms of energy conservation. Diversity of microbial catabolism, flow of organic matter in nature: the carbon cycle, and biogeochemical cycles. Bacterial physiology, phylogeny, and the ecology of microbes in soil and marine sediments, bacterial adhesion, and biofilm formation. Microbes in the degradation of pollutants. Prerequisites: CHEM 33, 35, and BIOSCI 41, CHEMENG 181 (formerly 188), or equivalents.  
Same as: CHEMENG 174, CHEMENG 274

**CEE 274B. Microbial Bioenergy Systems. 3 Units.**

Introduction to microbial metabolic pathways and to the pathway logic with a special focus on microbial bioenergy systems. The first part of the course emphasizes the metabolic and biochemical principles of pathways, whereas the second part is more specifically directed toward using this knowledge to understand existing systems and to design innovative microbial bioenergy systems for biofuel, biorefinery, and environmental applications. There also is an emphasis on the implications of rerouting of energy and reducing equivalents for the fitness and ecology of the organism. Prerequisites: CHEMENG 174 or 181 and organic chemistry, or equivalents.  
Same as: CHEMENG 456

**CEE 274D. Pathogens and Disinfection. 3 Units.**

Introduction to epidemiology, major pathogens and infectious diseases, the immune system, movement and survival of pathogens in the environment, transfer of virulence and antibiotic resistance genes, and pathogen control, with an emphasis on public health engineering measures (disinfection). Prerequisite: 274A.

**CEE 274P. Environmental Health Microbiology Lab. 3-4 Units.**

Microbiology skills including culture-, microscope-, and molecular-based detection techniques. Focus is on standard and EPA-approved methods to enumerate and isolate organisms used to assess risk of enteric illnesses, such as coliforms, enterococci, and coliphage, in drinking and recreational waters including lakes, streams, and coastal waters. Student project to assess the microbial water quality of a natural water. Limited enrollment; priority to CEE graduate students. An application form must be filed and approved before admission to the class.

**CEE 274S. Hopkins Microbiology Course. 3-12 Units.**

(Formerly GES 274S.) Four-week, intensive. The interplay between molecular, physiological, ecological, evolutionary, and geochemical processes that constitute, cause, and maintain microbial diversity. How to isolate key microorganisms driving marine biological and geochemical diversity, interpret culture-independent molecular characterization of microbial species, and predict causes and consequences. Laboratory component: what constitutes physiological and metabolic microbial diversity; how evolutionary and ecological processes diversify individual cells into physiologically heterogeneous populations; and the principles of interactions between individuals, their population, and other biological entities in a dynamically changing microbial ecosystem. Prerequisites: CEE 274A and CEE 274B, or equivalents.  
Same as: BIO 274S, BIOHOPK 274, ESS 253S



**CEE 275A. California Coast: Science, Policy, and Law. 3-4 Units.**

This interdisciplinary course integrates the legal, scientific, and policy dimensions of how we characterize and manage resource use and allocation along the California coast. We will use this geographic setting as the vehicle for exploring more generally how agencies, legislatures, and courts resolve resource-use conflicts and the role that scientific information and uncertainty play in the process. Our focus will be on the land-sea interface as we explore contemporary coastal land-use and marine resource decision-making, including coastal pollution, public health, ecosystem management; public access; private development; local community and state infrastructure; natural systems and significant threats; resource extraction; and conservation, mitigation and restoration. Students will learn the fundamental physics, chemistry, and biology of the coastal zone, tools for exploring data collected in the coastal ocean, and the institutional framework that shapes public and private decisions affecting coastal resources. There will be 3 to 4 written assignments addressing policy and science issues during the quarter, as well as a take-home final assignment. Special Instructions: In-class work and discussion is often done in interdisciplinary teams of students from the School of Law, the School of Engineering, the School of Humanities and Sciences, and the School of Earth, Energy, and Environmental Sciences. Students are expected to participate in class discussion and field trips. Elements used in grading: Participation, including class session and field trip attendance, writing and quantitative assignments. Cross-listed with Civil & Environmental Engineering (CEE 175A/275A), Earth Systems (EARTHSYS 175/275), and Law (LAW 2510). Open to graduate students and to advanced undergraduates with instructor consent.

Same as: CEE 175A

**CEE 275B. Process Design for Environmental Biotechnology. 3 Units.**

Use of microbial bioreactors for degradation of contaminants and recovery of clean water, clean energy and/or green materials. Student teams design, operate, and analyze bioreactors and learn to write consulting style reports. Limited enrollment. Prerequisites: 271B.

**CEE 275C. Water, Sanitation and Health. 1-4 Unit.**

Students acquire basic knowledge to participate in a dialogue on water, sanitation and health issues in developing and developed countries. The focus is on enteric pathogenic pollutants. Material includes: Important pathogens, their modes of transmission and the diseases they cause, their fate and transport in the environment, and the means by which they are measured; statistical methods for processing and interpreting waterborne pollutant concentrations, and interpreting data from epidemiology studies; microbial source tracking; epidemiology and quantitative microbial risk assessment; reduction of pathogens in water and sludge; and non-experimental water, sanitation, and hygiene research. Several laboratory sessions will allow students to measure indicator bacteria and viruses using culture-based techniques and expose students to molecular methods for measuring health-relevant targets in water.

**CEE 275K. The Practice of Environmental Consulting. 2 Units.**

Class consists of eight interactive two-hour seminars with discussions, and will cover the evolution of the environmental consulting business, strategic choices and alternative business models for private and public firms, a review of the key operational issues in managing firm, organizational strategies, knowledge management and innovation, and ethical issues in providing professional services. Case studies will be used to illustrate key concepts. Selected reading materials drawn from the technical and business literature on the consulting business. Student groups will prepare and present an abbreviated business plan for an environmental based business. Enrollment limited to CEE MS and PHD students.

**CEE 275P. Persuasive Communication for Environmental Scientists, Practitioners, and Entrepreneurs. 2 Units.**

Achieving environmental goals depends not only on innovative ideas and great science but also persuasive communication. What makes communication persuasive? The ability of the communicator to create value for his or her audience. This course will teach students how to: 1) focus on their audience and 2) create value for their audience using research-proven communication techniques. Students will master these techniques through oral and written exercises so that, after taking this course, they will speak and write more persuasively.

Same as: CEE 175P

**CEE 275S. Environmental Entrepreneurship and Innovation. 3 Units.**

Our current infrastructure for provision of critical services-clean water, energy, transportation, environmental protection; requires substantial upgrades. As a complement to the scientific and engineering innovations taking place in the environmental field, this course emphasizes the analysis of economic factors and value propositions that align value chain stakeholder interests.

Same as: CEE 175S

**CEE 276. Introduction to Human Exposure Analysis. 3 Units.**

(Graduate students register for 276.) Scientific and engineering issues involved in quantifying human exposure to toxic chemicals in the environment. Pollutant behavior, inhalation exposure, dermal exposure, and assessment tools. Overview of the complexities, uncertainties, and physical, chemical, and biological issues relevant to risk assessment. Lab projects. Recommended: MATH 51. Apply at first class for admission.

Same as: CEE 178

**CEE 276C. Energy Storage Integration - Vehicles, Renewables, and the Grid. 3 Units.**

This course will provide in-depth introduction to existing energy storage solutions being used on the electric grid and in vehicles with a primary focus on batteries and electrochemical storage. We will discuss the operating characteristics, cost and efficiency of these technologies and how tradeoff decisions can be made. Special attention will be given to system-level integration of new storage technologies, including chargers, inverters, battery management systems and controls, into the existing vehicle and grid infrastructure. Further investigations include issues relating to integration of electric vehicle charging with demand-side management, scheduled renewable energy absorption and local grid balancing. Class format involves regular guest lectures, required lab participation, and field trips to relevant sites. Enrollment is limited; if you are interested in taking the course, please fill out a brief questionnaire at <http://goo.gl/forms/i3YH91Qx05n> Please contact [jtaggart@stanford.edu](mailto:jtaggart@stanford.edu) with any questions regarding the application or course information.

Same as: CEE 176C

**CEE 276G. Sustainability Design Thinking. 3 Units.**

Application design thinking to make sustainability compelling, impactful and realizable. Analysis of contextual, functional and human-centered design thinking techniques to promote sustainable design of products and environments by holistically considering space, form, environment, energy, economics, and health. Includes Studio project work in prototyping, modeling, testing, and realizing sustainable design ideas.

Same as: CEE 176G

**CEE 277D. Water, Health & Development in Africa. 1 Unit.**

Graduate seminar focused on emerging research in the areas of water supply, sanitation, hygiene and health in developing countries. Limited enrollment; instructor permission required.

**CEE 277F. Advanced Field Methods in Water, Health and Development. 1-10 Unit.**

Field methods for assessing household stored water quality, hand contamination, behaviors, and knowledge related to water, sanitation and health. Limited enrollment. Instructor consent required.

**CEE 277L. Smart Cities & Communities. 3 Units.**

A city is comprised of people and a complex system of systems. Data provides the connective tissue between those systems. Smart cities use information technology (IT) to harness that data for operational efficiency, efficacy of government services, and sustainability. Key enablers covered include: IoT, open data, analytics, cloud and cognitive computing, and systems of engagement. System case studies will include: water, energy, transportation, buildings, food production, urban design, and social services. The evolving relationship between a city and its citizens as well as the risks / challenges of smart cities will also be explored.

Same as: CEE 177L

**CEE 277S. Design for a Sustainable World. 1-5 Unit.**

Technology-based problems faced by developing communities worldwide. Student groups partner with organizations abroad to work on concept, feasibility, design, implementation, and evaluation phases of various projects. Past projects include a water and health initiative, a green school design, seismic safety, and medical device. Admission based on written application and interview. See <http://esw.stanford.edu> for application. (Staff).

Same as: CEE 177S

**CEE 277X. Current Topics in Sustainable Engineering. 1-3 Unit.**

This course is the first half of a two quarter, project-based design course that addresses the cultural, political, organizational, technical, and business issues at the heart of implementing sustainable engineering projects in the developing world. Students will be placed into one of three project teams and tackle a real-world design challenge in partnership with social entrepreneurs and NGOs. In CEE 177X/277X, students will gain the background skills and context necessary to effectively design engineering projects in developing nations. (Cardinal Course certified by the Haas Center). Instructor consent required.

Same as: CEE 177X

**CEE 278A. Air Pollution Fundamentals. 3 Units.**

The sources and health effects of gaseous and particulate air pollutants. The influence of meteorology on pollution: temperature profiles, stability classes, inversion layers, turbulence. Atmospheric diffusion equations, downwind dispersion of emissions from point and line sources. Removal of air pollutants via settling, diffusion, coagulation, precipitation. Mechanisms for ozone formation, in the troposphere versus in the stratosphere. Effects of airborne particle size and composition on light scattering/absorption, and on visual range. Prerequisites: MATH 51 or equivalent. Recommended: 101B, CHEM 31A, or equivalents.

**CEE 278C. Indoor Air Quality. 2-3 Units.**

Factors affecting the levels of air pollutants in the built indoor environment. The influence of ventilation, office equipment, floor coverings, furnishings, cleaning practices, and human activities on air quality including carbon dioxide, VOCs, resuspended dust, and airborne molds and fungi. Limited enrollment, preference to CEE students. Prerequisites: Math 42 or 21 and CEE 70, or equivalents.

Same as: CEE 172A

**CEE 279F. Frontiers of Anaerobic Treatment. 1 Unit.**

This seminar will present the latest findings on the operation and performance of ground-breaking anaerobic treatment processes for domestic wastewater. Specifically, this seminar will examine the performance of the Staged Anaerobic Fluidized-bed Membrane Bioreactor (SAF-MBR) using results from ongoing operations at the Codiga Resource Recover Center and from previous and parallel research efforts. The seminars will incorporate a description of the fundamentals of anaerobic treatment processes, a discussion of how the SAF-MBR process is different from typical anaerobic processes, and insights from operations along with implications for system design. Course work will include explorations of the costs, benefits, and market potential of this technology.

Same as: CEE 179F

**CEE 279S. Seminar: Issues in Environmental Science, Technology and Sustainability. 1-2 Unit.**

Invited faculty, researchers and professionals share their insights and perspectives on a broad range of environmental and sustainability issues. Students critique seminar presentations and associated readings.

Same as: CEE 179S, EARTHSYS 179S, ESS 179S

**CEE 279W. Innovation in Water Sector. 1 Unit.**

A project class on the diffusion of ReNUWit technologies into practice (David Sedlak is the overall course lead at UC Berkeley, Chris Higgins is the lead at Colorado School of Mines, and Dick Luthy is the lead at Stanford). Specifically, the class will examine the pathway through which ReNUWit's engineered wetland technologies will be adopted by utilities and consultants beyond our current group of industrial partners. We will work together to prepare background information that will be used in a 2-day workshop involving ReNUWit researchers, utility leaders and technical experts in early 2015.

**CEE 280. Advanced Structural Analysis. 3-4 Units.**

Theoretical development and computer implementation of direct stiffness method of structural analysis; virtual work principles; computation of element stiffness matrices and load vectors; direct assembly procedures; equation solution techniques. Analysis of two- and three-dimensional truss and frame structures, thermal loads, and substructuring and condensation techniques for large systems. Practical modeling techniques and programming assignments. Introduction to nonlinear analysis concepts. Prerequisites: elementary structural analysis and matrix algebra.

**CEE 281. Mechanics and Finite Elements. 3 Units.**

Fluid conduction and solid deformation; conservation laws: balance of mass and balance of momentum; generalized Darcy's law and Hooke's law in 3D; the use of tensors in mechanics; finite element formulation of boundary-value problems; variational equations and Galerkin approximations; basic shape functions, numerical integration, and assembly operations.

**CEE 282. Nonlinear Structural Analysis. 3-4 Units.**

Introduction to methods of geometric and material nonlinear analysis, emphasizing modeling approaches for framed structures. Large-displacement analysis, concentrated and distributed plasticity models, and nonlinear solution methods. Applications to frame stability and performance-based seismic design. Assignments emphasize computer implementation and applications. Prerequisites: 280 and an advanced course in structural behavior (e.g., 285A, 285B or equivalent).

**CEE 283. Structural Dynamics. 3-4 Units.**

Vibrations and dynamic response of simple structures under time dependent loads; dynamic analysis of single and multiple degrees of freedom systems; support motion; response spectra.

**CEE 284. Finite Element Methods in Structural Dynamics. 3-4 Units.**

Computational methods for structural dynamics analysis of discrete and continuous systems in free and forced vibration; finite element formulation; modal analysis; numerical methods; introduction to nonlinear dynamics; advanced topics. Prerequisites: 280, 283.

**CEE 285A. Advanced Structural Concrete Behavior and Design. 3-4 Units.**

Behavior and design of reinforced and prestressed concrete for building and bridge design. Topics will include flexural behavior, prestressed concrete design, and two-way slab design & analysis, among others.

**CEE 285B. Advanced Structural Steel Behavior and Design. 3-4 Units.**

Advanced topics in structural steel design. Topics include composite floor systems; bolted and welded connections; beam-column connections; innovative lateral load resisting systems. As part of this course students design a 15-story steel building. Prerequisite: basic course in structural steel design CEE181 or equivalent.

**CEE 287. Earthquake Resistant Design and Construction. 3-4 Units.**

Evaluation, design, and construction of structures in seismic regions. Factors influencing earthquake ground motions, design spectra, design of linear and nonlinear single- and multiple-degree-of-freedom-system structures, force-based and displacement-based design methods, capacity design, detailing and construction of steel and reinforced concrete structures, introduction to performance-based design, seismic isolation, and energy dissipation. Prerequisites: 283 and either 285A or 285B.

**CEE 288. Introduction to Performance Based Earthquake Engineering. 3-4 Units.**

Earthquake phenomena, faulting, ground motion, earthquake hazard formulation, effects of earthquakes on manmade structures, response spectra, Fourier spectra, soil effects on ground motion and structural damage, methods for structural damage evaluation, and formulation of the performance-based earthquake engineering problems. Prerequisites: 203, 283.

**CEE 289. Random Vibrations. 3-4 Units.**

Introduction to random processes. Correlation and power spectral density functions. Stochastic dynamic analysis of multi-degree-of-freedom structures subjected to stationary and non-stationary random excitations. Crossing rates, first-excursion probability, and distributions of peaks and extremes. Applications in earthquake, wind, and ocean engineering. Prerequisite: 203 or equivalent.

**CEE 290. Structural Performance and Failures. 2 Units.**

Basic concepts in the definition of satisfactory structural performance; key elements in structural performance; types of failures, ranging from reduced serviceability to total collapse; failure sources and their root cause allocation, emphasizing design/construction process failures; failure prevention mechanisms; illustration with real life examples.

**CEE 291. Solid Mechanics. 3 Units.**

Vector and tensor algebra; vector and tensor analysis; kinetics, basic physical quantities, global and local balance laws, representative material models of 1D and 3D continua at small strains; thermodynamics of general internal variable formulations of inelasticity; integration algorithms for inelastic 1D and 3D materials; basic solution techniques for boundary value problems in 1D and 3D.

**CEE 292. Continuum Mechanics. 3 Units.**

Introduction to vectors and tensors: kinematics, deformation, forces, and stress concept of continua; balance principles; aspects of objectivity; hyperelastic materials; thermodynamics of materials; variational principles. Prerequisite: CEE 291 or equivalent.  
Same as: ME 338

**CEE 293. Foundations and Earth Structures. 3 Units.**

Types, characteristics, analysis, and design of shallow and deep foundations; rigid and flexible retaining walls; braced excavations; settlement of footings in sands and clays; slope stability analysis by method of slices including search algorithms for the critical slip surface. Prerequisite: 101C or equivalent.

**CEE 294. Computational Poromechanics. 3 Units.**

Continuum and finite element formulations of steady-state and transient fluid conduction problems on geomechanics; elliptic, parabolic, and hyperbolic systems; variational inequality and free-boundary problems; three-dimensional consolidation theory; undrained condition, mesh locking, B-bar and strain projection methods; finite element formulations of multiphase dynamic problems. Computing assignments. Prerequisite: CEE 281 or equivalent.

**CEE 295. Plasticity Modeling and Computation. 3 Units.**

Rate-independent elastoplasticity; classical plasticity models for metals and cohesive-frictional materials; cap plasticity models for porous materials; return-mapping algorithm; shear bands, faults, and other discontinuities; Lagrange multipliers, penalty and augmented Lagrangian methods for frictional contact; multiscale techniques: extended finite element and strong discontinuity methods; fault rupture dynamics with bulk plasticity. Prerequisite: CEE 281 or equivalent.

**CEE 297M. Managing Critical Infrastructure. 2 Units.**

Safe and effective performance of infrastructure systems is critical to our economy, quality of life and safety. This course will present topics associated with risk analysis and management of critical civil infrastructure systems, tolerable risk and community resilience. Methods of risk analysis including systems analysis, reliability analysis, expert elicitation and systems analysis for spatially distributed infrastructure systems will be presented. Aspects of seismic and flood risk analysis will also be discussed. Case histories and lessons learned from Hurricane Katrina, Tohoku earthquake, among others will be presented. The evolution of change in the risk management of civil infrastructure systems; how they are analyzed, designed and operated is discussed. Guest speakers. Student presentations. (Prerequisite: CEE 203 or equivalent).

**CEE 298. Structural Engineering and Geomechanics Seminar. 1 Unit.**

Recommended for all graduate students. Lectures on topics of current interest in professional practice and research.

**CEE 299. Independent Study in Civil Engineering for CEE-MS Students. 1-5 Unit.**

Directed study for CEE-MS students on subjects of mutual interest to students and faculty. Student must obtain faculty sponsor.

**CEE 299L. Independent Project in Civil and Environmental Engineering. 1-4 Unit.**

Prerequisite: Consent of Instructor.

**CEE 29N. Managing Natural Disaster Risk. 3 Units.**

Natural disasters arise from the interaction of natural processes, such as earthquakes or floods, with human development that suffers safety-related and economic losses. We cannot predict exactly when those disasters will occur, or prevent them entirely, but we have a number of engineering and policy options that can reduce the impacts of such events.

**CEE 300. Thesis. 1-15 Unit.**

Research by Engineer candidates.  
Same as: Engineer Degree

**CEE 301. The Energy Seminar. 1 Unit.**

Interdisciplinary exploration of current energy challenges and opportunities, with talks by faculty, visitors, and students. May be repeated for credit.  
Same as: ENERGY 301, MS&E 494

**CEE 305. Damage and Failure Mechanics of Structural Systems. 3-4 Units.**

Examine the mechanics and failure mechanisms of structural deterioration mechanisms and hazards. Overview of fracture mechanics concepts as a general basis for analyzing brittle failure modes in steel and concrete structures. Analysis and design theory for corrosion, fatigue, fire and other damage mechanisms in steel and concrete structures. New methods for mitigation of these failure modes and hazards will be introduced, including new construction materials, structural designs and protection methods.

**CEE 306. Computational Fracture Mechanics. 3 Units.**

Brief review continuum mechanics; energy principles of mechanics; introduction to fracture mechanics; constrained problems; advanced finite element concepts like mixed, assumed, and enhanced strain methods; computational fracture strategies like cohesive finite elements, embedded and extended finite element methods. Prerequisite: CEE 281 or equivalent.

**CEE 308. Topics in Disaster Resilience Research. 1 Unit.**

This seminar will explore past and current research on disaster risk and resilience, towards the development of new frontiers in resilience engineering science research. Designed for graduate students engaged in the topic of risk and resilience research, the seminar will be organized around weekly readings and discussion groups. May be repeat for credit. Same as: GEOPHYS 308

**CEE 31. Accessing Architecture Through Drawing. 5 Units.**

Preference to Architectural Design and CEE majors; others by consent of instructor. Drawing architecture to probe the intricacies and subtleties that characterize contemporary buildings. How to dissect buildings and appreciate the formal elements of a building, including scale, shape, proportion, colors and materials, and the problem solving reflected in the design. Students construct conventional architectural drawings, such as plans, elevations, and perspectives. Limited enrollment.

**CEE 316. Sustainable Built Environment Research. 3 Units.**

Intended for early stage Ph.D. students in Sustainable Design and Construction (SDC). Covers dominant methodological approaches at the intersection of engineering, social management science and computer science. Overviews an array of methods available for research, focusing on methods commonly used in SDC. Publications using various methods will be analyzed, and journal review processes will be discussed. Major deliverable is research proposal using one or more of the methods discussed. Students will gain familiarity with the array of methods available for SDC research, know how to apply the methods in their own research area, and receive guidance on publishing their research in scientific journals.

**CEE 31Q. Accessing Architecture Through Drawing. 5 Units.**

Preference to sophomores. Drawing architecture provides a deeper understanding of the intricacies and subtleties that characterize contemporary buildings. How to dissect buildings and appreciate the formal elements of a building, including scale, shape, proportion, colors and materials, and the problem solving reflected in the design. Students construct conventional architectural drawings, such as plans, elevations, and perspectives. Limited enrollment.

**CEE 320. Integrated Facility Engineering. 1 Unit.**

Individual and group presentations on goals, research, and state-of-practice of virtual design and construction in support of integrated facility engineering, including objectives for the application and further development of virtual design and construction technologies. May be repeated for credit.

**CEE 322. Data Analytics for Urban Systems. 3 Units.**

TBA.

**CEE 323A. Infrastructure Finance and Governance. 1 Unit.**

Presentation and discussion of early stage or more mature research on a variety of topics related to financing, governance and sustainability of civil infrastructure projects by researchers associated with the Global Projects Center and visiting speakers. To obtain one unit of credit, students must attend and participate in all seminars, with up to two excused absences. Seminar meets weekly during Autumn, Winter and Spring Quarters.

**CEE 323B. Infrastructure Finance and Governance. 1 Unit.**

Presentation and discussion of early stage or more mature research on a variety of topics related to financing, governance and sustainability of civil infrastructure projects by researchers associated with the Global Projects Center and visiting speakers. To obtain one unit of credit, students must attend and participate in all seminars, with up to two excused absences. Seminar meets weekly during Autumn, Winter, and Spring quarters.

**CEE 323C. Infrastructure Finance and Governance. 1 Unit.**

Presentation and discussion of early stage or more mature research on a variety of topics related to financing, governance and sustainability of civil infrastructure projects by researchers associated with the Global Projects Center and visiting speakers. To obtain one unit of credit, students must attend and participate in all seminars, with up to two excused absences. Seminar meets weekly during Autumn, Winter and Spring Quarters.

**CEE 324. Industrialized Construction. 1-2 Unit.**

The course will present driving forces, comprehensive concepts, technologies, and managerial aspects of Industrialized Construction. Further a series of case studies of successful and failed industry implementations in Sweden, North America and Japan will be presented, showcasing process and technology platforms; use of renewable resources and other sustainable design and construction practices. The contrast between industrialized construction practices in Sweden, the U.S. and other countries is highlighted. Project-orientated vs. product-oriented approaches are essential, along with business models and strategies for industrialized construction companies and their opportunities for innovations. The course includes lectures, case studies, and course group-project assignments with leading companies in the industry. Visiting lecturer Dr Jerker Lessing, one of Sweden's leading experts on industrialized construction with more than 15 years of experience in this field, is giving this course. This is a unique opportunity to learn about this comprehensive, emerging construction concept. Dr Lessing's research at Lund University has pioneered the area of industrialized construction and established models and strategic perspectives that are widely adopted throughout academia and industry. Dr Lessing has published articles and books and he frequently lectures on the topic in Sweden and internationally. He is the Director and General manager of Research and Development at BoKlok, an industrialized house-building company which is a joint venture of the construction company SKANSKA and furniture giant IKEA. The class will be taught as a condensed two week course. Readings and discussions will be organized in the weeks before the lecture component of the class, a group project after. During weeks 1-5, class will not meet regularly and only meet a few times for reading discussions and guest speakers. When they occur, these meetings will be held either Tuesday or Thursday 8-9am in Y2E2 292A. A detailed class schedule will be available before the start of the quarter. Notes: Attendance Mandatory. No Exam. Case and Problem Discussion. CR/NC and Auditing Not Allowed. Eligible for SDC Building & Infrastructure Development concentration area requirement. Number of students limited to 20; prerequisites: CEE100 or equivalent. Please direct questions to jerker.lessing@boklok.se or adusser@stanford.edu and co.

**CEE 325. CapaCity Design Studio. 5 Units.**

Silicon Valley's rapid expansion has created explosive urban development in a fragile and under-prepared natural context. Delicate coastal ecology and rapid urbanization (expanding technology headquarters, new residential housing, parking, services, etc.) are competing for space. The same land also serves the regional functions of transport, open space, recreation, water supply, flood protection and wastewater treatment. Compounding the problems between these competing factors are global climate change instabilities increasing the certainty of catastrophic flooding, infrastructure collapse, and other urban resilience challenges. Students will be immersed in a process that allows them to understand and spatially identify these risks, develop a vocabulary and an understanding of innovative tools to respond to them, and then work with expert practitioners to create unique design responses. Students will be provided with urban design frameworks (for planning, site development, and conservation) combined with advanced sustainable design concepts (such as resource co-optimization, adaptable infrastructure platforms, and high performance urban ecology) by working with expert lecturers and in small groups. Students will ultimately develop a series of visual and technical presentations to propose a final thesis for a local intervention that could be replicated in other coastal contexts globally. This course has been designed to develop student learning through a project-based format. Students will be organized into design teams of 3 or 4 and will have the semester to collaborate with partners on an interdisciplinary proposal including policy and design recommendations.

**CEE 326. Autonomous Vehicle Frameworks Developing and Applying Comparison Metrics. 2-3 Units.**

Autonomous vehicles have been a fast-growing area of interest for research, development, and commercialization. This interdisciplinary research-based class explores methods for evaluating and comparing autonomous vehicles. Research teams find, define and assess metrics, including reaction time, time efficiency, error rate, safety, and information sharing. Collaborate with national and international experts. Consideration of economic, social and environmental implications. Independent and team projects will contribute to ongoing research.

**CEE 328A. Multidisciplinary Design and Simulation of Building Envelopes. 3 Units.**

Curtain walls are a manufactured product ubiquitous in the world of architecture and engineering that must meet structural, thermal, acoustic, environmental, and economic performance requirements. This course focuses on design strategies for building envelopes and explores new design approaches including parametric 3D modeling, simulation, and Multidisciplinary Design Optimization (MDO) methods that leverage computation to augment human abilities to identify novel, high performing solutions. Prerequisite: CEE 220A or equivalent. Limited to 16 students.

**CEE 32A. Psychology of Architecture. 3 Units.**

This course argues that architecture often neglects the interdisciplinary investigation of our internal psychological experience and the way it impacts our creation of space. How does our inner life influence external design? How are we impacted emotionally, physically, psychologically by the spaces we inhabit day to day? How might we intentionally imbue personal and public spaces with specific emotions? This seminar serves as a call to action for students interested in approaching architecture with a holistic understanding of the emotional impact of space. Sample topics addressed will include: conscious vs. unconscious design; the ego of architecture; psycho-spatial perspectives; ideas of home; integral/holistic architecture; phenomenology of inner and outer spaces; exploring archetypal architecture; and translating emotion through environment.

**CEE 32B. Design Theory. 4 Units.**

This seminar focuses on the key themes, histories, and methods of architectural theory – a form of architectural practice that establishes the aims and philosophies of architecture. Architectural theory is primarily written, but it also incorporates drawing, photography, film, and other media. One of the distinctive features of modern and contemporary architecture is its pronounced use of theory to articulate its aims. One might argue that modern architecture is modern because of its incorporation of theory. This course focuses on those early-modern, modern, and late-modern writings that have been and remain entangled with contemporary architectural thought and design practice. Rather than examine the development of modern architectural theory chronologically, it is explored architectural through thematic topics. These themes enable the student to understand how certain architectural theoretical concepts endure, are transformed, and can be furthered through his/her own explorations.

**CEE 32D. Construction: The Writing of Architecture. 4 Units.**

This seminar focuses on the construction of architectural writing. The class will analyze this idea through four topics: formal analysis, manifesto, translation, and preservation. The seminar is divided into two-week modules with each of these four concepts functioning as organizing principles. The first week of each module will involve familiarizing the seminar with both the terms and rhetorical tactics of the given theme by reading and analyzing specific texts and completing a short written analysis (1-2 pages). The second week will expand upon this foundation and involve further analysis in addition to each student writing a short paper (3-4 pages) drawing on the examples discussed and their own experiences in the discipline. The goal of the seminar is for each student to be able to analyze how an architectural writing is constructed and to develop his/her skills in the construction of his/her own writing.

**CEE 32F. Light, Color, and Space. 3 Units.**

This course explores color and light as a medium for spatial perception. Through the introduction of color theory, color mixing, and light analyses, students will learn to see and use light and color fields as a way to shape experience. We will examine the work of a range of architects and artist who use light and color to expand the field of perception (i.e. Rothko, Turrell, Eliasson, Holl, Aalto).

**CEE 32G. Architecture Since 1900. 4 Units.**

Art 142 is an introduction to the history of architecture since 1900 and how it has shaped and been shaped by its cultural contexts. The class also investigates the essential relationship between built form and theory during this period.

Same as: ARTHIST 142

**CEE 32H. Responsive Structures. 3 Units.**

This Design Build seminar investigates the use of metal as a structural, spatial and organizational medium. We will examine the physical properties of post-formable plywood, and develop a structural system and design which respond to site and programmatic conditions. The process includes model building, prototyping, development of joinery, and culminates in the full scale installation of the developed design on campus. This course may be repeated for credit (up to three times). Class meeting days/times are as follows: April 14, 9a-5p; April 28, 10a-5p; May 3, 7-9p; May 19, 10a-6:30p; May 20, 10a-6:30p.

Same as: CEE 132H

**CEE 32Q. Place: Making Space Now. 3 Units.**

This seminar argues that architects are ultimately "placemakers," and questions what that means in the contemporary world. Part I investigates the meaning of the word "place." Additional background for understanding contemporary place making will include a critique of the history of modern place-making through an examination of modern form. Part II examines two traditional notions of place by scale: from "home" to "the city." What elements give these conceptions of space a sense of place? To answer this question, themes such as memory, mapping, and boundary, among others, will be investigated. Part III presents challenges to the traditional notions of place discussed in Part II. Topics addressed include: What does it mean to be "out of place"? What sense of place does a nomad have, and how is this represented? What are the "non-places" and how can architects design for these spaces? Part IV addresses the need to re-conceptualize contemporary space. The role of digital and cyber technologies, the construction of locality in a global world, and the in-between places that result from a world in flux are topics discussed in this section of the seminar. Learning goals: Specific goals include close reading of texts, understanding of philosophical thinking and writing, argument under uncertainty, and developed concepts of place, space and architecture.

**CEE 32R. American Architecture. 4 Units.**

A historically based understanding of what defines American architecture. What makes American architecture American, beginning with indigenous structures of pre-Columbian America. Materials, structure, and form in the changing American context. How these ideas are being transformed in today's globalized world. Same as: AMSTUD 143A, ARTHIST 143A, ARTHIST 343A

**CEE 32S. The Situated Workplace and Public Life. 4 Units.**

The modern workplace has undergone fundamental change and continues to evolve. The context of work in many industries is today being shaped substantially by changing workforce demographics, the pervasiveness of mobile and embedded information technologies, hyper-connected work models on a global scale, evolving notions of health and well being, etc. Our public realm is changing too. People are moving to cities in greater numbers than ever before posing both challenges and opportunities related to new levels of density, sustainable resource management, resilient infrastructures, as well as new forms of civic engagement at neighborhood levels, to name but a few. These changes at an urban scale impact how and where public life happens and how it interacts with new modalities at work. This course will combine research, conceptual explorations, studio design work, seminars and guest lectures to explore the impact of the changing workplace on the morphology of the city by examining these bi-coastal seats of innovation. As the creative workplace continues to evolve, how will it engage the public realm within both well-established urban frameworks such as San Francisco and Boston, and emerging suburban contexts, such as Silicon Valley? The course will join graduate students from the Northeastern University School of Architecture with students from the Stanford University Architectural Design program. Students will reside primarily at their prospective universities and will travel selectively for site research, team charrettes and project reviews. Project sites on both coasts will be utilized for research and studio work. This is an opportunity for students from two top universities, both situated in the epicenters of workplace change, to explore and conduct valuable research on an issue that is changing their urban environments.

**CEE 32T. Making and Remaking the Architect: Edward Durell Stone and Stanford. 4 Units.**

How does an architect establish a career? How is an architect remembered? What makes a building significant and how should it be preserved, if at all? Fundamental questions about the practice and production of architecture will be examined in this seminar that focuses on the work of Edward Durell Stone (1902-78) and specifically on his work at Stanford and in Palo Alto. By 1955, Stone was so well established that he founded an office in Palo Alto to design the Stanford Medical Center (currently slated for destruction) and several other significant local public buildings, such as the Palo Alto Civic Center. Through site visits to his buildings, research in the Stanford archives, and interviews with architects who worked in his office (among other strategies), students will question how architecture produced in the immediate post-WWII period is thought about historically and how and when it should be preserved.

**CEE 32U. California Modernism: The Web of Apprenticeship. 4 Units.**

This course will study at the development of Modernism in pre and post WWII California. The class will investigate responses to climatic, technological, and cultural changes that were specific to the state but have now become an idealized trend. We will look at architects and landscape architects who apprenticed with significant design leaders and track how their involvement and explore resulted in changes in building technologies, and influenced the next generation of design thinking and experimentation. The investigations will occur through research, drawings and models, as well as site visits.

**CEE 32V. Architectural Design Lecture Series Course. 1 Unit.**

This seminar is a companion to the Spring Architecture and Landscape Architecture Lecture Series. Students will converse with lecturers before the lectures, attend the lecture, and prepare short documents (written, graphic, exploratory) for two of the lectures. The four course meeting dates will correspond with the lecture dates TBD. The meeting times are 4:30 PM -5:30 PM for the seminar and 6:30 - 7:45 for the lecture.

**CEE 32W. Making Meaning: A Purposeful Life in Design. 3 Units.**

As designers, how do we lead a life with meaning? What is a fulfilling life in design and how do we develop personal and professional practices that support this aim? This experiential course will explore how to nourish a purposeful life amidst a culture that can value productivity over presence in the field, identifying "busyness" as a marker of personal worth. How do we bring depth to not only the design process but our individual and collective lives as well? Investigations will include: exploring personal passions, discovering meaningful work in design, understanding work/life/play balance, practicing self-reflection, integrating wellness, cultivating community, and practicing design with integrity. Our time in class will be enjoyed sharing meals, discourse, play, and reflections with both the class cohort and designers that lead lives or purpose and meaning.

**CEE 32X. Modern and Contemporary World Architecture: A Cultural History in Twenty Five Buildings. 4 Units.**

This survey course is a guided tour of twenty five case studies from the last hundred years; interrogates how architecture responds to the aesthetic, technological, political, and cultural issues of the societies they belong to, all over the world. Same as: ARTHIST 141

**CEE 32Y. Architecture & Gender. 4 Units.**

This advanced seminar introduces students to the seemingly inconspicuous relation between architecture and gender. The course studies how modern societies create easily, controlled docile spaces, thus pursuing the absent bodies of its members - be it through symbolic or material means. This troubled history of the powers of architecture to neglect sexuality and impose strict gender roles is analyzed in class discussions through recent feminist and queer theoretical approaches and tested on case studies. Same as: ARTHIST 248A

**CEE 33A. Michelangelo Architect. 5 Units.**

The architecture of Michelangelo Buonarroti (1475-1564), "Father and Master of all the Arts," redefined the possibilities of architectural expression for generations. This course considers his civic, ecclesiastic, and palatial works. It proceeds from his beginnings in Medicean Florence to his fulfillment in Papal Rome. It examines the anxiety of influence following his death and his enduring legacy in modernism. Topics include: Michelangelo's debt to Classical and Early Renaissance prototypes; his transformation of the canon; the iterative sketch as disegno; architecture and the body; the queering of architectural language; sketch, scale, and materiality; Modernism and Michelangelo. The historiography of Michelangelo has predominantly favored studies in painting and sculpture. Our focus on architecture encourages students to test new ideas and alternative approaches to his work. Same as: ARTHIST 416A, ITALIAN 216

**CEE 341. Virtual Design and Construction. 3 Units.**

Virtual Design and Construction (VDC) starts by understanding the client's objectives for building performance and the translation of these objectives into measurable project and production objectives. Based on a culture of proactive and constructive engagement, three mutually supportive strategies are essential to achieve these objectives: (1) the knowledge of the many disciplines contributing to the design and construction of a buildable, usable, operable, and sustainable building needs to be orchestrated concurrently, (2) the information supporting the project team must be integrated and be accessible seamlessly, and (3) the workflow carried out by the project team must enable the creation of integrated knowledge and information and lead to decisions that stick. This course will teach all the essential elements of VDC. Prerequisite: 100 or consent of instructor. Recommended: CEE 240, CEE 241.

**CEE 345. Network Analysis for Urban Systems. 3 Units.**

The objectives of this course are to: 1) introduce you to the mathematical theory of networks and common metrics of networks; 2) develop an understanding of how to utilize network models to study urban systems; 3) provide an opportunity to apply network models to analyze a real urban system. Students are expected to have a strong background in calculus and linear algebra before taking this course and should be comfortable with the calculation and manipulation of matrices. Experience in a numerical scripting language (preferably Python, R or Matlab) is necessary for the final project. Coursework will consist of graded problem sets pertaining to both theory of networks and applications to urban systems. There will be a final project where students will be required to apply network based methods to the analysis of real data of an urban system. (subject to change).

**CEE 361. Turbulence Modeling for Environmental Fluid Mechanics. 2-4 Units.**

An introduction to turbulence and its modeling, including Reynolds-averaged and large-eddy simulation models. Derivation of closure approximations and models. Impact of numerical code truncation error on turbulence model value and accuracy. Discussion of typical models and their applications to turbulent flows in rivers, estuaries, the coastal ocean and the atmospheric boundary layer (e.g., wind turbines and weather models). Prerequisites: knowledge of hydrodynamics or atmosphere dynamics and the basics of transport and mixing in the environment; consent of instructor.

**CEE 362. Numerical Modeling of Subsurface Processes. 3-4 Units.**

Numerical modeling including: problem formulation, PDEs and weak formulations, and choice of boundary conditions; solution using the finite-element code COMSOL Multiphysics with a variety of solvers and pre- and postprocessing of data; and interpretation of results. Problems include: flow in saturated porous media with complex boundaries and heterogeneities; solute transport with common reaction models; effects of heterogeneity on dispersion, dilution, and mixing of solutes; variable-density flow and seawater intrusion; upscaling or coarsening of scale; and biofilm modeling. Enrollment limited to 5.

**CEE 362A. Uncertainty Quantification. 3 Units.**

Uncertainty analysis in computational science. Probabilistic data representation, propagation techniques and validation under uncertainty. Mathematical and statistical foundations of random variables and processes for uncertainty modeling. Focus is on state-of-the-art propagation schemes, sampling techniques, and stochastic Galerkin methods. The concept of model validation under uncertainty and the determination of confidence bounds estimates. Prerequisite: basic probability and statistics at the level of CME 106 or equivalent. Same as: ME 470

**CEE 362G. Imaging with Incomplete Information. 3-4 Units.**

Statistical and computational methods for inferring images from incomplete data. Bayesian inference methods are used to combine data and quantify uncertainty in the estimate. Fast linear algebra tools are used to solve problems with many pixels and many observations. Applications from several fields but mainly in earth sciences. Prerequisites: Linear algebra and probability theory. Same as: CME 262

**CEE 363A. Mechanics of Stratified Flows. 3 Units.**

The effects of density stratification on flows in the natural environment. Basic properties of linear internal waves in layered and continuous stratification. Flows established by internal waves. Internal hydraulics and gravity currents. Turbulence in stratified fluids. Prerequisites: 262A,B, CME 204.

**CEE 363B. Chaos and Turbulence. 3 Units.**

An overview of the statistical analysis of unsteady flows, with a focus on chaos and turbulence. Topics will include random variables and statistical analysis; self-similarity, scaling, and symmetries; the turbulent energy cascade and the Kolmogorov similarity hypotheses; intermittency, refined similarity, and multifractal analysis; mixing and transport in chaotic and turbulent flows; and an overview of the effects of additional conservation laws on flow statistics. Prerequisites: CEE 262A or ME 351A, or permission of instructor.

**CEE 363C. Ocean and Estuarine Modeling. 3 Units.**

Advanced topics in modeling for ocean and estuarine environments, including methods for shallow water, primitive, and nonhydrostatic equations on Cartesian, curvilinear, and unstructured finite-volume grid systems. Topics include accuracy and stability analyses, free-surface methods, nonhydrostatic solvers, turbulence modeling, vertical coordinate systems, and advanced Eulerian and Lagrangian advection techniques. Prerequisites: CEE262A or ME351A, CME 200, 206, or equivalents.

**CEE 363F. Oceanic Fluid Dynamics. 3 Units.**

Dynamics of rotating stratified fluids with application to oceanic flows. Topics include: inertia-gravity waves; geostrophic and cyclogeostrophic balance; vorticity and potential vorticity dynamics; quasi-geostrophic motions; planetary and topographic Rossby waves; inertial, symmetric, barotropic and baroclinic instability; Ekman layers; and the frictional spin-down of geostrophic flows. Prerequisite: CEE 262A or a graduate class in fluid mechanics. Same as: ESS 363F

**CEE 363G. Field Techniques in Coastal Oceanography. 3 Units.**

This course focuses on the design and implementation of coastal oceanographic field studies from implementation through analysis. A wide range of field instrumentation and techniques, including AUVs and scientific diving is covered. Field studies. Data collection and analysis under instructor guidance.

**CEE 363H. Topics in Stratified Turbulence. 2 Units.**

An exploration of classical and current papers dealing with the behavior of turbulence in stratified environments. This is a seminar-style class where each student will be expected to make presentations and lead discussions during the course of the quarter. Enrollment is limited and is based on the consent of the instructor. Prerequisites – graduate coursework in turbulence and stratified flows.

**CEE 364F. Advanced Topics in Geophysical Fluid Dynamics. 2-3 Units.**

A seminar-style class covering the classic papers on the theory of the large-scale ocean circulation. Topics include: wind-driven gyres, mesoscale eddies and geostrophic turbulence, eddy-driven recirculation gyres, homogenization of potential vorticity, the ventilated thermocline, subduction, and the abyssal circulation. Prerequisite: EESS 363F or CEE 363F. Recommended: EESS 246B.

Same as: ESS 364F

**CEE 365A. Advanced Topics in Environmental Fluid Mechanics and Hydrology. 2-6 Units.**

Students must obtain a faculty sponsor.

**CEE 365B. Advanced Topics in Environmental Fluid Mechanics and Hydrology. 2-6 Units.**

Students must obtain a faculty sponsor.

**CEE 365C. Advanced Topics in Environmental Fluid Mechanics and Hydrology. 2-6 Units.**

Students must obtain a faculty sponsor.

**CEE 365D. Advanced Topics in Environmental Fluid Mechanics and Hydrology. 2-6 Units.**

Students must obtain a faculty sponsor.

**CEE 370A. Environmental Research. 5-6 Units.**

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

**CEE 370B. Environmental Research. 5-6 Units.**

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

**CEE 370C. Environmental Research. 5-6 Units.**

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

**CEE 370D. Environmental Research. 3-6 Units.**

Introductory research experience for first-year Ph.D. students in the Environmental Engineering and Science program. 15-18 hours/week on research over three quarters. 370A requires written literature survey on a research topic; 370B requires oral presentation on experimental techniques and research progress; 370C requires written or oral presentation of preliminary doctoral research proposal. Students must obtain a faculty sponsor.

**CEE 371L. Helminthic Disease Monitoring and Control.. 5 Units.**

Assessment will be based upon weekly written and/or oral reports, with a final written critical review due at the end of the quarter.

**CEE 371M. Transport Phenomena: Momentum, heat and mass transport. 3 Units.**

Heat, mass and momentum transfer theory from the viewpoint of basic transport equations. Steady and unsteady state; laminar and turbulent flow; boundary layer theory. Prerequisites: fluid mechanics, ordinary differential equations.

Same as: CEE 271M

**CEE 374A. Introduction to Physiology of Microbes in Biofilms. 1-6 Unit.**

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

**CEE 374B. Introduction to Physiology of Microbes in Biofilms. 1-6 Unit.**

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

**CEE 374C. Introduction to Physiology of Microbes in Biofilms. 1-6 Unit.**

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

**CEE 374D. Introduction to Physiology of Microbes in Biofilms. 1-6 Unit.**

Diversification of biofilm populations, control of gene expression in biofilm environments, and evolution of novel genetic traits in biofilms.

**CEE 374M. Advanced Topics in Watershed Systems Modeling. 4 Units.**

Basic principles of watershed systems analysis is required for water resources evaluation, watershed-scale water quality issues, and watershed-scale pollutant transport problems. The dynamics of watershed-scale processes and the human impact on natural systems, and for developing remediation strategies are studied, including terrain analysis and surface and subsurface characterization procedures and analysis.

**CEE 374S. Advanced Topics in Microbial Pollution. 1-5 Unit.**

May be repeated for credit. Prerequisite: consent of instructor.

**CEE 374T. Advanced Topics in Coastal Pollution. 1-5 Unit.**

May be repeated for credit. Prerequisite: consent of instructor.

**CEE 374U. Advanced Topics in Submarine Groundwater Discharge. 1-5 Unit.**

May be repeated for credit. Prerequisite: consent of instructor.

**CEE 374V. Advanced Topics in Microbial Source Tracking. 1-5 Unit.**

May be repeated for credit. Prerequisite: consent of instructor.

**CEE 374W. Advanced Topics in Water, Health and Development. 1-18 Unit.**

Advanced topics in water, health and development. Emphasis on low-and-middle-income countries. Class content varies according to interests of students. Instructor consent required.

**CEE 374X. Advanced Topics in Multivariate Statistical Analysis. 1-6 Unit.**

Analysis of experimental and non-experimental data using multivariate modeling approaches. May be repeated for credit. Permission of instructor required for enrollment.

**CEE 375A. Water, Climate, and Health. 3 Units.**

Students in this course will review and discuss current literature on the water, climate, and human health nexus. We will review the climate-change projections from the most recent IPCC assessment and discuss their implications for water access and human health, with an emphasis on low- and middle-income countries. Each student will take responsibility for leading at least one class discussion, and will write a research proposal describing novel research on the water, climate and human health nexus. Course enrollment is capped. Permission to enroll must be obtained from the instructors through an application process.

**CEE 377. Research Proposal Writing in Environmental Engineering and Science. 1-3 Unit.**

For first- and second-year post-master's students preparing for thesis defense. Students develop progress reports and agency-style research proposals, and present a proposal in oral form. Prerequisite: consent of thesis adviser.



**CEE 378D. Seminar of Statistical Analysis of Multidisciplinary Primary Data. 1-3 Unit.**

Practical management and analysis techniques for primary data collected in multidisciplinary projects. Selection of appropriate statistical tests, interpretation of results, and effective communication of findings to lay audiences. Univariate, bivariate and multivariate techniques, including hypothesis testing, nonparametric statistics, regression analysis and matching. Use of SPSS statistical package. Limited enrollment. Prerequisite: consent of instructor.

**CEE 379. Introduction to PHD Studies in Civil and Environmental Engineering. 1 Unit.**

This seminar course will cover important topics for students considering a PhD in Civil and Environmental Engineering. Sessions will include presentations and discussions on career development, exploring research and adviser options, and the mechanics of PhD studies, including General Qualifying Exam requirements for all CEE PHD Students. In addition, CEE faculty will give presentations on their research. This seminar is required for CEE students considering a PhD or preparing to sit for the General Qualifying Exam in Civil and Environmental Engineering.

**CEE 381. Advanced Engineering Informatics. 1-4 Unit.****CEE 385. Performance-Based Earthquake Engineering. 3-4 Units.**

Synthesis and application of approaches to performance-based design and assessment that recently have been developed or are under development. Emphasis is on quantitative decision making based on life-cycle considerations that incorporate direct losses, downtime losses, and collapse, and the associated uncertainties. Hazard analysis, response simulation, damage and loss estimation, collapse prediction. Case studies. Prerequisites: 282, 287, and 288.

**CEE 398. Report on Civil Engineering Training. 1 Unit.**

On-the-job training under the guidance of experienced, on-site supervisors; meets the requirements for Curricular Practical Training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. Prerequisite: qualified offer of employment and consent of adviser as per I-Center procedures.

**CEE 399. Advanced Engineering Problems. 1-10 Unit.**

Individual graduate work under the direction of a faculty member on a subject of mutual interest. For Engineer Degree students and Pre-quals Doctoral students. Student must have faculty sponsor. May be repeated for credit.

**CEE 400. Thesis. 1-15 Unit.**

For students who have successfully completed the department general qualifying examination. Research and dissertation for the Ph.D. degree. Same as: Ph.D. Degree

**CEE 50N. Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay. 3 Units.**

This course will be focused around San Francisco Bay, the largest estuary on the Pacific coasts of both North and South America as a model ecosystem for understanding the critical importance and complexity of estuaries. Despite its uniquely urban and industrial character, the Bay is of immense ecological value and encompasses over 90% of California's remaining coastal wetlands. Students will be exposed to the basics of estuarine biogeochemistry, microbiology, ecology, hydrodynamics, pollution, and ecosystem management/restoration issues through lectures, interactive discussions, and field trips. Knowledge of introductory biology and chemistry is recommended. Same as: EARTHSYS 49N, ESS 49N

**CEE 6. Physics of Cities. 3 Units.**

An introduction to the modern study of complex systems with cities as an organizing focus. Topics will include: cities as interacting systems; cities as networks; flows of resources and information through cities; principles of organization, self-organization, and complexity; how the properties of cities scale with size; and human movement patterns. No particular scientific background is required, but comfort with basic mathematics will be assumed. Prerequisites: MATH 19 and 20, or the equivalent.

**CEE 63. Weather and Storms. 3 Units.**

Daily and severe weather and global climate. Topics: structure and composition of the atmosphere, fog and cloud formation, rainfall, local winds, wind energy, global circulation, jet streams, high and low pressure systems, inversions, el Niño, la Niña, atmosphere/ocean interactions, fronts, cyclones, thunderstorms, lightning, tornadoes, hurricanes, pollutant transport, global climate and atmospheric optics.

Same as: CEE 263C

**CEE 64. Air Pollution and Global Warming: History, Science, and Solutions. 3 Units.**

Survey of Survey of air pollution and global warming and their renewable energy solutions. Topics: evolution of the Earth's atmosphere, history of discovery of chemicals in the air, bases and particles in urban smog, visibility, indoor air pollution, acid rain, stratospheric and Antarctic ozone loss, the historic climate record, causes and effects of global warming, impacts of energy systems on pollution and climate, renewable energy solutions to air pollution and global warming. UG Reqs: GER: DBNatSci. Same as: CEE 263D

**CEE 70. Environmental Science and Technology. 3 Units.**

Introduction to environmental quality and the technical background necessary for understanding environmental issues, controlling environmental degradation, and preserving air and water quality. Material balance concepts for tracking substances in the environmental and engineering systems.

Same as: ENGR 90

**CEE 70N. Water, Public Health, and Engineering. 3 Units.**

Preference to frosh. Linkages between water, wastewater and public health, with an emphasis on engineering interventions. Topics include the history of water and wastewater infrastructure development in the U.S. and Europe; evolution of epidemiological approaches for water-related health challenges; biological and chemical contaminants in water and wastewater and their management; and current trends and challenges in access to water and sanitation around the world. Identifying ways in which freshwater contributes to human health; exposure routes for water- and sanitation-illness. Classifying illnesses by pathogen type and their geographic distribution. Identifying the health and economic consequences of water- and sanitation-related illnesses; costs and benefits of curative and preventative interventions. Interpreting data related to epidemiological and environmental concepts. No previous experience in engineering is required.

**CEE 70Q. The Food, Water, and Waste Nexus. 3 Units.**

This course will explore the connections between water access, fecal waste management, and food safety and provision in low- and middle-income countries. The interconnections between food, water, and waste will be discussed as it relates to human health and well-being. Topics that will be covered in the course include 1) farm to fork contamination pathways of food 2) food hygiene practices and barriers to implementation 3) waste water reuse practices 4) management of water for multiple uses 5) potential impact climate change may have on the connections of these systems. The students in the course will undertake individual research that explores the connections between these systems and identifies potential strategies to improve human health and well-being.

**CEE 73. Water: An Introduction. 3 Units.**

Lake Tahoe's waters are so clear you can follow a diver 70 feet below your boat. A Lake Erie summer often means that nearshore waters have a green surface scum obscuring everything below. California, suffering from drought, is seriously considering reclamation and direct potable reuse of sewage – aka toilet to tap. Can we (or should we) do this? Why is Tahoe clear, Erie green? This class introduces students to the fundamental tools and science used to understand and manage both natural and human-engineered water systems. Each student will use these tools to explore a water topic of their choosing.

**CEE 801. TGR Project. 0 Units.**

Same as: Engineer Degree

**CEE 802. TGR Dissertation. 0 Units.**

Same as: PhD degree

**CEE 80N. Engineering the Built Environment: An Introduction to Structural Engineering. 3 Units.**

In this seminar, students will be introduced to the history of modern bridges, buildings and other large-scale structures. Classes will include presentations on transformations in structural design inspired by the development of new materials, increased understanding of hazardous overloads and awareness of environmental impacts. Basic principles of structural engineering and how to calculate material efficiency and structural safety of structural forms will be taught using case studies. The course will include a field trip to a Bay Area large-scale structure, hands-on experience building a tower and computational modeling of bridges, and a paper and presentation on a structure or structural form of interest to the student. The goal of this course is for students to develop an understanding and appreciation of modern structures, influences that have led to new forms, and the impact of structural design on society and the environment. Students from all backgrounds are welcome.

**CEE 83. Seismic Design Workshop. 2 Units.**

Introduction to seismic design for undergraduate students. Structural design concepts are introduced based on physical and mathematical principles. General overview of mechanics of materials, structural analysis, structural systems and earthquake resistant design. The class is intended to prepare students for the EERI 2018 Seismic Design Competition, where students design, analyze and fabricate a five-foot tall balsa wood structure. Hands on workshops focus on numerical simulation using commercial software and experimental testing. All majors are welcome. Pre-requisite: Physics 41, recommended: ENGR 14.

## Classics (CLASSICS)

**CLASSICS 101G. Advanced Greek: Lyric Poetry. 3-5 Units.**

(Formerly CLASSGRK 111.) Invectives, love songs, drinking songs, elegies, and choral odes from 700-500 B.C.E. Readings include Sappho, Alcaeus, Archilochus, Mimnermus, Alcman, Solon, and Pindar. Classics majors and minors may repeat for credit with advance approval from the Director of Undergraduate Studies.

**CLASSICS 101L. Advanced Latin: Seneca. 3-5 Units.**

(Formerly CLASSLAT 111.) Classics majors and minors must take for a letter grade and may repeat for credit with advance approval from the Director of Undergraduate Studies.

**CLASSICS 102G. Advanced Greek: Greek Scientific Writings. 3-5 Units.**

(Formerly CLASSGRK 112.) Classics majors and minors may repeat for credit with advance approval from the Director of Undergraduate Studies.

**CLASSICS 102L. Advanced Latin: Rebel with a cause: Catiline. 3-5 Units.**

(Formerly CLASSLAT 112.) Beguiling. Riotous. Fallen. Lucius Sergius Catilina (108-62 BCE): Who was he? Reading of selections of Cicero's *Catilinarians* and *In Defense of Caelius*, and Sallust's *Catilinarian Conspiracy*. We will compare the three different Catilinarian villains within the framework of rhetoric, Cicero's and Sallust's styles (esp. metaphors), and explore the historian's possible debts to the orator. As needed, we will review questions of grammar and syntax, rhetorical terms, and historical context. Classics majors and minors must take course for letter grade. May be repeated for credit with advance approval from the Director of Undergraduate Studies.

**CLASSICS 103G. Advanced Greek: Plato's *Crito*. 3-5 Units.**

(Formerly CLASSGRK 113.) Classics majors and minors must take for a letter grade and may repeat for credit with advance approval from the Director of Undergraduate Studies.

**CLASSICS 103L. Advanced Latin: Ovid's *Metamorphoses*. 3-5 Units.**

(Formerly CLASSLAT 113.) Classics majors and minors must take course for a letter grade and may repeat for credit with advance approval from the Director of Undergraduate Studies.

**CLASSICS 104A. Latin Syntax. 4 Units.**

(Formerly CLASSLAT 175A/275A.) Intensive review of Latin syntax. Begins Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSICS 206A/B for supplemental courses. Prerequisite for undergraduates: three years of Latin. First-year graduate students register for CLASSICS 204A.

Same as: CLASSICS 204A

**CLASSICS 104B. Latin Syntax. 2 Units.**

(Formerly CLASSLAT 175B/275B) Intensive review of Latin syntax. Began with 104A/204A in Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSICS 206A/B for supplemental courses.

Prerequisite for undergraduates: three years of Latin. First-year graduate students register for CLASSICS 204B.

Same as: CLASSICS 204B

**CLASSICS 112. Introduction to Greek Tragedy: Gods, Heroes, Fate, and Justice. 4 Units.**

(Formerly CLASSGEN 110.) Gods and heroes, fate and free choice, gender conflict, the justice or injustice of the universe: these are just some of the fundamental human issues that we will explore in about ten of the tragedies of Aeschylus, Sophocles, and Euripides.

Same as: TAPS 167

**CLASSICS 116. Human Rights in Historical Perspective. 3-5 Units.**

The course will examine the way in issues now considered to be at the core of human rights concerns have been dealt with in different historical and cultural contexts. The themes of the course will center on human trafficking and slavery, sexual violence, and mass atrocity crimes such as genocide. The course will thus not be a chronological survey but rather thematic and comparative in its approach, including consideration, of course, of ancient societies in Greece, Rome, and China.

Same as: HUMRTS 106

**CLASSICS 11G. Intermediate Greek: Prose. 5 Units.**

(Formerly CLASSGRK 101.) Transition to reading narrative Grammar review and vocabulary-building.

**CLASSICS 11L. Intermediate Latin: Introduction to Literature. 5 Units.**

(Formerly CLASSLAT 101.) Phonology, morphology, semantics, and syntax. Readings in prose and poetry. Analysis of literary language, including rhythm, meter, word order, narrative, and figures of speech. May be repeat for credit.

**CLASSICS 121. Ecology in Philosophy and Literature. 3-5 Units.**

(Formerly CLASSGEN 116.) The basic principles of ecological thinking, exploring the ways that different writers represent and relate to the natural world. Some key questions: What is nature, and where do humans fit in the natural world? How exactly do humans differ from other animals? Do these differences make us superior beings? What are our ethical responsibilities towards the earth and its inhabitants? In what ways have the technologies of writing, television, and computers affected humankind's relationship to the natural world?.

**CLASSICS 123. Ancient Medicine. 3-4 Units.**

Contemporary medical practice traces its origins to the creation of scientific medicine by Greek doctors such as Hippocrates and Galen. Is this something of which modern medicine can be proud? The scientific achievements and ethical limitations of ancient medicine when scientific medicine was no more than another form of alternative medicine. Scientific medicine competed in a marketplace of ideas where the boundaries between scientific and social aspects of medicine were difficult to draw.

**CLASSICS 124. Ancient and Modern Medicine. 3-4 Units.**

Imagine a world where the Universe has a built-in purpose and point. How would this belief impact man's place in nature? Imagine a world where natural substances have "powers." How might this impact diet and pharmacology? Magical vs. scientific healing: a clear divide? Disease and dehumanization: epilepsy, rabies. Physical and mental health: black bile and melancholy. The ethical and scientific assumptions hidden in medical language and imagery. How ancient medicine and modern medicine (especially alternative medicine) illuminate each other.

**CLASSICS 126. Intermediate Greek: Sophocles' Antigone. 5 Units.**

(Formerly CLASSGRK 102.) Classics majors and minors may repeat for credit with advance approval from the Director of Undergraduate Studies.

**CLASSICS 12L. Intermediate Latin: Cicero and Catullus. 5 Units.**

(Formerly CLASSLAT 102.) In this class you will practice with and reinforce the advanced vocabulary, forms, and syntax of classical Latin you have previously acquired. The primary emphasis of this course is on developing fluency in reading Latin. You will have opportunities to discuss topics and issues raised by the readings. Your knowledge of the content and syntax of the readings will be assessed by several short translation/grammar quizzes. Classics majors and minors may repeat for credit with advance approval from the Director of Undergraduate Studies.

**CLASSICS 136. The Greek Invention of Mathematics. 3-5 Units.**

How was mathematics invented? A survey of the main creative ideas of ancient Greek mathematics. Among the issues explored are the axiomatic system of Euclid's Elements, the origins of the calculus in Greek measurements of solids and surfaces, and Archimedes' creation of mathematical physics. We will provide proofs of ancient theorems, and also learn how such theorems are even known today thanks to the recovery of ancient manuscripts.

Same as: MATH 163

**CLASSICS 137. Ancient Dance and its Modern Legacy. 3-5 Units.**

Descriptions of dance in the Greek and Greco-Roman world; theories about dance in antiquity; dance and the senses; modern and modernist dancers and choreographers discussing ancient dance.

Same as: CLASSICS 237, TAPS 165C, TAPS 265C

**CLASSICS 13G. Intermediate Greek: Homer's Iliad. 5 Units.**

(Formerly CLASSGRK 103.) Classics majors and minors may repeat for credit with advance approval from the Director of Undergraduate Studies.

**CLASSICS 13L. Intermediate Latin: Vergil's Aeneid, Books 7-12. 5 Units.**

(Formerly CLASSLAT 103.) Vocabulary, forms and syntax. Classics majors and minors may repeat for credit with advance approval from the Director of Undergraduate Studies.

**CLASSICS 14. Greek and Latin Roots of English. 3 Units.**

(Formerly CLASSGEN 9) Goal is to improve vocabulary, comprehension of written English, and standardized test scores through learning the Greek and Latin components of English. Focus is on patterns and processes in the formation of the lexicon. Terminology used in medicine, business, education, law, and humanities; introduction to principles of language history and etymology. Greek or Latin not required.

**CLASSICS 145. Early Christian Gospels. 4 Units.**

An exploration of Christian gospels of the first and second century. Emphasis on the variety of images and interpretations of Jesus and the good news, the broader Hellenistic and Jewish contexts of the gospels, the processes of developing and transmitting gospels, and the creation of the canon. Readings include the Gospel of John, the Gospel of Mark, the Gospel of Thomas, the Gospel of Mary and other canonical and non-canonical gospels.

Same as: RELIGST 132D

**CLASSICS 146. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire. 3-5 Units.**

Stretching from India to Ethiopia, the Persian Empire the largest empire before Rome has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the West and Greek democracy. This course will provide a general introduction to the Persian Empire, beginning in the 6th century BCE to the fall of Persia to Alexander the Great in 331 BCE. We shall not only examine the originality of the first world empire of antiquity, but the course will also attempt to present a broad picture of the diverse cultural institutions and religious practices found within the empire. Readings in translation from the royal edicts and the inscriptions of Cyrus, Darius, and Xerxes will allow us to better appreciate the subtle ways in which these Persian kings used religion to justify and propagate the most ambitious imperial agenda the world had ever seen. In concluding the quarter, students will evaluate contemporary representations of Persia and the Persians in politics and popular culture in a wide array of media, such as the recent film 300 and the graphic novel on which it is based, in an attempt to better appreciate the enduring legacy of the Greco-Persian wars.

Same as: CLASSICS 246, RELIGST 229, RELIGST 329

**CLASSICS 147. Priests, Prophets, and Kings: Religion and Society in Late Antique Iran. 4-5 Units.**

This course is designed as a broad introduction to the religious and social history of the Sasanian Empire, encompassing the period from 224-651 CE as well as the early years of Islamic rule in Iran. Among the topics we will discuss are: the lives and deeds of the powerful Iranian emperors such as Shapur I and II in relation to the the Roman emperors Diocletian and Constantine; the transformation of Zoroastrianism into a powerful official religion of the state and its subsequent orthodoxy; the emergence of the prophet Mani and the confrontation of Manicheism with the Zoroastrian priesthood; the conversion of Constantine to Christianity and its political and social ramifications in Iran; the establishment of an independent Iranian Christian church; the importance of Armenia in the Sasanian-Roman conflict; and a brief discussion of the history of the Jewish community under the Sasanians. We will end the quarter by examining the Arab-Islamic conquests of Iran and the profound social changes experienced by the Zoroastrian communities in the early centuries of Islam in Iran.

Same as: CLASSICS 247, RELIGST 209, RELIGST 309

**CLASSICS 148. Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran. 3-5 Units.**

Designed as a broad introduction to the world of ancient Iran, students will be introduced to the Indo-European inheritance in ancient Iranian culture; the shared world of ritual, religion, and mythology between Zoroastrianism in Iran and Vedic Hinduism in India; and to the contours of early Zoroastrian religious thought. We will also survey mythoepic literature in translation from the archaic Avesta through the late antique Zoroastrian Middle Persian corpus to the early medieval national epic of Iran, the Book of Kings of Ferdowsi.

Same as: CLASSICS 248, RELIGST 209E, RELIGST 309E

**CLASSICS 150. Majors Seminar. 5 Units.**

(Formerly CLASSGEN 176.) Required of Classics majors and minors in junior or senior year; students contemplating honors should take this course in junior year. Advanced skills course involving close reading, critical thinking, editing, and writing. In-class and take-home writing and revising exercises. Final paper topic may be on any subject related to Classics. Fulfills WIM requirement for Classics. Winter Quarter topic: investigating a wide range of ethical dilemmas raised by the ownership of the classical past in the 21st century. Spring Quarter topic: Why study Classics? The uses and abuses of classical studies.

**CLASSICS 151. Ten Things: An Archaeology of Design. 3 Units.**

(Formerly CLASSART 113/213.) Connections among science, technology, society and culture by examining the design of a prehistoric hand axe, Egyptian pyramid, ancient Greek perfume jar, medieval castle, Wedgwood teapot, Edison's electric light bulb, computer mouse, Sony Walkman, supersonic aircraft, and BMW Mini. Interdisciplinary perspectives include archaeology, cultural anthropology, science studies, history and sociology of technology, cognitive science, and evolutionary psychology.

Same as: ARCHLGY 151

**CLASSICS 154. Sailing the Wine-Dark Sea: Maritime Archaeology of the Ancient Mediterranean. 3-5 Units.**

(Formerly CLASSART 145.) Why do we care about shipwrecks? What can sunken sites and abandoned ports tell us about our past? Focusing primarily on the archaeological record of shipwrecks and harbors, along with literary evidence and contemporary theory, this course examines how and why ancient mariners ventured across the "wine-dark seas" of the Mediterranean for travel, warfare, pilgrimage, and especially commerce. We will explore interdisciplinary approaches to the development of maritime contacts and communication from the Bronze Age through the end of Roman era. At the same time, we will engage with practical techniques of maritime archaeology, which allows us to explore the material record first hand.

Same as: ARCHLGY 145

**CLASSICS 156. Design of Cities. 3-5 Units.**

Long-term, comparative and archaeological view of urban planning and design. Cities are the fastest changing components of the human landscape and are challenging our relationships with nature. They are the historical loci of innovation and change, are cultural hotspots, and present a tremendous challenge through growth, industrial development, the consumption of goods and materials. We will unpack such topics by tracking the genealogy of qualities of life in the ancient Near Eastern city states and those of Graeco-Roman antiquity, with reference also to prehistoric built environments and cities in the Indus Valley and through the Americas. The class takes an explicitly human-centered view of urban design and one that emphasizes long term processes.

Same as: ARCHLGY 156, CLASSICS 256

**CLASSICS 157. The Archaeology of Cyprus. 3-5 Units.**

This seminar course introduces students to the island of Cyprus in the eastern Mediterranean and its archaeology, from the origins of human occupation to the end of antiquity. Readings and discussions of material culture and texts will explore the history and practice of Cypriot archaeology in relation to those of Greece and the Near East. Key themes will include: islands and insularity, continuity vs. change, sex and identity, the rise of the state, regionalism, and imperial conquest. Suitable for both graduate and undergraduate students.

Same as: CLASSICS 257

**CLASSICS 158. Iconoclasm. 5 Units.**

By the seventh century three large political entities formed in the Mediterranean the Umayyads, the Carolingians, and the Byzantines each competed for legitimacy; all three emerged from the ashes of Late Antique culture, yet each tried to carve out an identity out of this common foundation. In this parting of the ways, the three empires took among others the issue of what constitutes an image and what role it plays in devotion. Eik'n, imago, ura became the basis on which to built differences and accuse the other political players of idolatry. This course explores medieval image theory, especially the phenomena of iconoclasm, iconophobia, and aniconism. The discussions focus on monuments in the Mediterranean as well as objects in the Cantor collection and facsimiles of manuscripts at the Bowes Art Library.

Same as: ARTHIST 209C, ARTHIST 409, CLASSICS 258, REES 409

**CLASSICS 15N. Saints, Warriors, Queens, and Cows. 3 Units.**

The literature of medieval Ireland (600-1400 AD) is rich in tales about war and adventure, pagan gods, and otherworld voyages. The sagas of kings and queens sit side by side (sometimes in the same medieval manuscripts) with stories of holy men and women, and exquisite poetry in praise of nature or important persons. We will explore this largely unfamiliar but fascinating world through careful reading of the primary texts, backed up by some secondary works on history, myth, and society. In addition, the influence of early Irish literature on such later writers as W. B. Yeats and Flann O'Brien will be investigated. Readings include heroic stories of Finn and Cú Chulainn; the Cattle Raid of Cooley; the Voyage of Bran; satires; bardic praise-poems; monastic poems; and Sweeney Astray (Buile Shuibhne).

**CLASSICS 160. Design Thinking for the Creative Humanities. 3-5 Units.**

This class introduces Design Thinking to students in the Humanities and Social Sciences. Under a growth mindset of creative exploration and experiment, we will share a tool kit drawn from design thinking and the arts to develop our imaginative capacity to innovate. The standpoint is that creative imagination is not a property of the artistic or design genius but comprises skills and competencies that can be easily learned and adapted to all sorts of circumstances: personal, organizational, business, community.

Same as: CLASSICS 260

**CLASSICS 161. Introduction to Greek Art I: The Archaic Period. 4 Units.**

This lecture course explores Greek art and culture from 1000-480. In the beginning archaic art forms are more abstract than life-like, closer to Calder than Michelangelo. While Homer describes the rippling muscles (and egos) of his heroes, vase-painters and sculptors prefer abstraction. This changes in the 7th C. as a result of commerce with the Near East and Egypt. Imported Near Eastern bronzes and ivories awaken the Greeks to a wider range of subjects, techniques and ambitions. Later in the century, Greeks in Egypt learn to carve hard stone from Egyptian masters. Throughout the 6th C. Greek artists assimilate what they had borrowed, compete with one another, defy their teachers, test the tolerance of the gods and eventually produce works of art that speak with a Greek accent. When the Persians invade the Acropolis in 480, they find artifacts with little trace of alien influence or imprint - omens of the defiant Greek military that would prevail at Salamis and Plataea.

Same as: ARTHIST 101

**CLASSICS 162. Introduction to Greek Art II: The Classical Period. 4 Units.**

The class begins with the art, architecture and political ideals of Periclean Athens, from the emergence of the city as the political and cultural center of Greece in 450 to its defeat in the Peloponnesian War in 404. It then considers how Athens and the rest of Greece proceed in the fourth century to rebuild their lives and the monuments that define them. Earlier artistic traditions endure, with subtle changes, in the work of sculptors such as Kephisodotos. Less subtle are the outlook and output of his son Praxiteles. In collaboration with Phryne, his muse and mistress, Praxiteles challenged the canons and constraints of the past with the first female nude in the history of Greek sculpture. His gender-bending depictions of gods and men were equally audacious, their shiny surfaces reflecting Plato's discussion of Eros and androgyny. Scopas was also a man of his time but pursued different interests. Drawn to the inner lives of men and woman, his tormented Trojan War heroes and victims are still scarred by memories of the Peloponnesian War, and a world away from the serene faces of the Parthenon. His famous Maenad, a devotee of Dionysos who has left this world for another, belongs to the same years as Euripides' Bacchae and, at the same time, anticipates the torsion and turbulence of Bernini and the Italian Baroque. In the work of these and other fourth century personalities, the stage is set for Alexander the Great and his conquest of a kingdom extending from Greece to the Indus River. (Formerly CLASSART 102).

Same as: ARTHIST 102

**CLASSICS 163. Artists, Athletes, Courtesans and Crooks. 5 Units.**

The seminar covers a range of topics devoted to the makers of Greek art and artifacts, the ancient Greeks who used them in life and the afterlife, and the miscreants - from Lord Elgin to contemporary tomb-looters and dealers- whose deeds have damaged, deracinated and desecrated temples, sculptures and grave goods. Readings include ancient texts in translation, books and articles by eloquent experts, legal texts and lively page-turners. Classes meet in the seminar room and the Cantor Center. Same as: ARTHIST 203

**CLASSICS 164. Roman Gladiators. 3-5 Units.**

In modern America, gladiators are powerful representatives of ancient Rome (Spartacus, Gladiator). In the Roman world, gladiators were mostly slaves and reviled, barred from certain positions in society and doomed to short and dangerous lives. A first goal of this course is to analyze Roman society not from the top down, from the perspective of politicians, generals and the literary elite, but from the bottom up, from the perspective of gladiators and the ordinary people in the stands. A second goal is to learn how work with very different kinds of evidence: bone injuries, ancient weapons, gladiator burials, laws, graffiti written by gladiators or their fans, visual images of gladiatorial combats, and the intricate architecture and social control of the amphitheater. A final goal is to think critically about modern ideas of Roman bloodthirst. Are these ideas justified, given the ancient evidence?

Same as: ARCHLGY 165

**CLASSICS 166. The Body in Roman Art. 4-5 Units.**

(Formerly CLASSART 105.) Ancient and modern ideas about the body as ideal and site of lived experience. Themes include representation, portrayal, power, metamorphosis, and replication. Works that exemplify Roman ideas of heroism and power versus works portraying nude women, erotic youth, preserved corpses, and suffering enemies. Recommended: background in ancient Mediterranean art, archaeology, history, or literature. May be repeated for credit.

Same as: ARCHLGY 166

**CLASSICS 168. Engineering the Roman Empire. 3-5 Units.**

(Formerly CLASSART 117.) Enter the mind, the drafting room, and the building site of the Roman architects and engineers whose monumental projects impressed ancient and modern spectators alike. This class explores the interrelated aesthetics and mechanics of construction that led to one of the most extensive building programs undertaken by a pre-modern state. Through case studies ranging from columns, domes and obelisks to road networks, machines and landscape modification, we investigate the materials, methods, and knowledge behind Roman innovation, and the role of designed space in communicating imperial identity.

Same as: ARCHLGY 118

**CLASSICS 169. Archaeology of Britannia. 3-4 Units.**

Life in the Roman Empire: this course is a broad introduction to the archaeology of one of the best known provinces of the empire.

Same as: ARCHLGY 169

**CLASSICS 16N. Sappho: Erotic Poetess of Lesbos. 3 Units.**

(Formerly CLASSGEN 24N.) Preference to freshmen. Sappho's surviving fragments in English; traditions referring to or fantasizing about her disputed life. How her poetry and legend inspired women authors and male poets such as Swinburne, Baudelaire, and Pound. Paintings inspired by Sappho in ancient and modern times, and composers who put her poetry to music.

Same as: FEMGEN 24N

**CLASSICS 171. Byzantine Art and Architecture, 300-1453 C.E.. 4 Units.**

(Formerly CLASSART 106/206.) This course explores the art and architecture of the Eastern Mediterranean: Constantinople, Jerusalem, Alexandria, Antioch, Damascus, Thessaloniki, and Palermo, 4th-15th centuries. Applying an innovative approach, we will probe questions of phenomenology and aesthetics, focusing our discussion on the performance and appearance of spaces and objects in the changing diurnal light, in the glitter of mosaics and in the mirror reflection and translucency of marble.

Same as: ARTHIST 106, ARTHIST 306

**CLASSICS 173. Hagia Sophia. 5 Units.**

By employing a methodology based in psychoacoustics, semiotics, and phenomenology, this course explores the relationship among sound, water, marble, meaning, and religious experience in the sixth-century church of Hagia Sophia built by emperor Justinian in Constantinople. We will read medieval sources describing the interior and ritual, make short movies exploring the shimmer of marble in buildings on campus, and study the acoustics of domed buildings through computer auralization done at Stanford's CCRMA (Center for Computer Research in Music and Acoustics).

Same as: ARTHIST 208, ARTHIST 408, CLASSICS 273

**CLASSICS 176. History of Muslim Science: from Alexandria to Baghdad. 3-5 Units.**

How the Muslim world in the Middle Ages preserved and transformed ancient science - and thus made modern science possible. The class follows the ideas and contributions of several key authors such as Al-Khwarizmi (author of the Algorithm), Omar Khayyam and Ibn-Sina, always looking for a key question: what was distinctive about Muslim science, in its own civilization?

**CLASSICS 177. Describing and Identifying Ancient Coins. 3-5 Units.**

In numismatics, as in all other disciplines dealing with documentary sources of the ancient world (like epigraphy and papyrology), it is essential to work hands-on with the primary material. This course, an optional accompaniment to the graduate seminar in ancient numismatics, will focus on practical work with ancient coins from the collection at the Cantor Arts Center: students will learn how to describe and identify ancient coins and how to properly catalogue and classify them. A special focus will be on the identification of fakes. Participants will be trained to use the main reference works on ancient coinages in the Frank L. Kovacs library, recently donated to Stanford University.

Same as: CLASSICS 277

**CLASSICS 178. Ancient Greek Political Thought. 3-5 Units.**

This class traces some of the intellectual roots of modern political thought to authors of classical antiquity, such as Herodotus, Thucydides, Plato, Xenophon, and Aristotle. We will read portions of their work, in translation, as well as discuss the historical background. Topics will include: political duty, citizenship, and leadership; the origins and rise of Athenian direct democracy; the development of Greek law, constitutional change, and responses to civic strife and civil war.

**CLASSICS 17N. To Die For: Antigone and Political Dissent. 3 Units.**

(Formerly CLASSGEN 6N.) Preference to freshmen. Tensions inherent in the democracy of ancient Athens; how the character of Antigone emerges in later drama, film, and political thought as a figure of resistance against illegitimate authority; and her relevance to contemporary struggles for women's and workers' rights and national liberation. Readings and screenings include versions of *Antigone* by Sophocles, Anouilh, Brecht, Fugard/Kani/Ntshona, Paulin, Glowacki, Gurney, and von Trotta. Same as: TAPS 12N

**CLASSICS 181. Classical Seminar: Origins of Political Thought. 3-5 Units.**

(Formerly CLASSHIS 133/333.) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change. Same as: CLASSICS 381, PHIL 176A, PHIL 276A, POLISCI 230A, POLISCI 330A

**CLASSICS 184. Ancient and Modern Slavery. 3-5 Units.**

The ancient Greeks and Roman created the largest and most durable slave system in world history. It formed one of the foundations of classical civilization. While cruelty and exploitation were ever-present features, ancient slavery was not race-based and many slaves came to be freed and fully integrated into society. We will investigate this complex institution from a comparative perspective and in the context of the experience of modern colonial slavery.

**CLASSICS 18N. The Artist in Ancient Greek Society. 3 Units.**

Given the importance of art to all aspects of their lives, the Greeks had reason to respect their artists. Yet potters, painters and even sculptors possessed little social standing. Why did the Greeks value the work of craftsmen but not the men themselves? Why did Herodotus dismiss those who worked with their hands as "mechanics?" What prompted Homer to claim that "there is no greater glory for a man than what he achieves with his own hands," provided that he was throwing a discus and not a vase on a wheel? Painted pottery was essential to the religious and secular lives of the Greeks. Libations to the gods and to the dead required vases from which to pour them. Economic prosperity depended on the export of wine and oil in durable clay containers. At home, depictions of gods and heroes on vases reinforced Greek values and helped parents to educate their children. Ceramic sets with scenes of Dionysian excess were reserved for elite symposia from which those who potted and painted them were excluded. Sculptors were less lowly but even those who carved the Parthenon were still regarded as "mechanics," with soft bodies and soft minds (Xenophon) "indifferent to higher things" (Plutarch). The seminar addresses these issues. Students will read and discuss texts, write response papers and present slide lectures and gallery talks on aspects of the artist's profession. Same as: ARTHIST 100N

**CLASSICS 198. Directed Readings. 1-15 Unit.**

(Formerly CLASSGEN 160.) May be repeated for credit. Same as: Undergraduate

**CLASSICS 199. Undergraduate Thesis: Senior Research. 1-10 Unit.**

(Formerly CLASSGEN 199.) May be repeated for credit.

**CLASSICS 19N. Eloquence Personified: How To Speak Like Cicero. 3 Units.**

This course is an introduction to Roman rhetoric, Cicero's Rome, and the active practice of speaking well. Participants read a short rhetorical treatise by Cicero, analyze one of his speeches as well as more recent ones by, e.g., Kennedy, Martin Luther King Jr., and Obama, and watch their oratorical performances. During the remainder of the term they practice rhetoric, prepare and deliver in class two (short) speeches, and write an essay.

**CLASSICS 1G. Beginning Greek. 5 Units.**

(Formerly CLASSGRK 1.) No knowledge of Greek is assumed. Vocabulary and syntax of the classical language.

**CLASSICS 1L. Beginning Latin. 5 Units.**

(Formerly CLASSLAT 1.) Vocabulary and syntax of the classical language. No previous knowledge of Latin is assumed.

**CLASSICS 201G. Survey of Greek Literature: Archaic Greek. 3-5 Units.**

(Formerly CLASSGEN 208A.) Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Greek and Latin material taught in alternate years.

**CLASSICS 201L. Survey of Latin Literature: Literature of the Roman Republic. 3-5 Units.**

(Formerly CLASSGEN 207A.) One-year sequence focusing on the origins, development, and interaction of Latin literature, history, and philosophy. Greek and Latin material taught in alternate years. Focus is on translation, textual criticism, genre, the role of Greece in shaping Roman literature, and oral versus written discourse.

**CLASSICS 202G. Survey of Greek Literature: Classical Greek. 3-5 Units.**

(Formerly CLASSGEN 208B.) Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Greek and Latin material taught in alternate years.

**CLASSICS 202L. Survey of Latin Literature: Augustan Age Latin. 3-5 Units.**

(Formerly CLASSGEN 207B.) Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Texts of Augustan literature required by the graduate syllabus, emphasizing poetry and major authors.

**CLASSICS 203G. Survey of Greek Literature: Hellenistic and Late Greek. 3-5 Units.**

(Formerly CLASSGEN 208C.) Required two-year sequence focusing on the origins, development, and interaction of Greek and Latin literature, history, and philosophy. Greek and Latin material taught in alternate years.

**CLASSICS 203L. Survey of Latin Literature: Imperial Latin. 3-5 Units.**

(Formerly CLASSGEN 207C.) One-year sequence focusing on the origins, development, and interaction of Latin literature, history, and philosophy. Greek and Latin material taught in alternate years.

**CLASSICS 204A. Latin Syntax. 4 Units.**

(Formerly CLASSLAT 175A/275A.) Intensive review of Latin syntax. Begins Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSICS 206A/B for supplemental courses. Prerequisite for undergraduates: three years of Latin. First-year graduate students register for CLASSICS 204A. Same as: CLASSICS 104A

**CLASSICS 204B. Latin Syntax. 2 Units.**

(Formerly CLASSLAT 175B/275B) Intensive review of Latin syntax. Began with 104A/204A in Autumn Quarter and continues through the fifth week of Winter Quarter. See CLASSICS 206A/B for supplemental courses. Prerequisite for undergraduates: three years of Latin. First-year graduate students register for CLASSICS 204B. Same as: CLASSICS 104B

**CLASSICS 205B. Greek Syntax: Prose Composition. 4 Units.**

(Formerly CLASSGRK 175B/275B.) Review of Greek grammar and instruction in Greek prose composition skills. Begins sixth week of Winter Quarter and continues through Spring Quarter. Prerequisite for undergraduates: three years of Greek. First-year graduate students register for 205A/B.

**CLASSICS 206A. The Semantics of Grammar. 2 Units.**

(Formerly CLASSGEN 205A.) Supplements CLASSICS 104A/204A. 206A: Tense, Aspect, Argument Structure, Location. 206B: Quantification, Plurality, Modification, Negation, Modality.

**CLASSICS 206B. The Semantics of Grammar. 2 Units.**

(Formerly CLASSGEN 205B.) Supplements CLASSICS 104B/204B. 206A: Tense, Aspect, Argument Structure, Location. 206B: Quantification, Plurality, Modification, Negation, Modality.

**CLASSICS 207L. The Pastoral in Post-Classical Literature. 1 Unit.**

For modern readers, the words pastoral and bucolic evoke picturesque scenes of pastureland and flocks of sheep in an Arcadian paradise first envisaged by the classical poets Theocritus and Virgil. This weekly reading group traces the long legacy of pastoral poetry in post-classical Latin literature, including the works of Dante, Petrarch, Boccaccio, Sannazaro, and Milton. Through the songs of their shepherds, we will rediscover the pastoral landscape as a site of intergenerational conflict between poets from antiquity to the Renaissance. All readings will be done in the original Latin. Prerequisite: at least one full year of Latin or permission of instructor. Course may be taken independently or as an optional extra weekly session of CLASSICS 102L Advanced Latin: Virgil's Eclogues and Georgics (in the latter case, please register for CLASSICS 102L).

**CLASSICS 208L. Latin 400-1700 CE. 1-2 Unit.**

Readings in later Latin, drawing on the vast bodies of texts from the late antique, medieval and early modern periods. Each week students will prepare selections in advance of class meetings; class time will be devoted to translation and discussion. Students taking this course will gain exposure to a wide range of later Latin texts; hone translation skills; and develop an awareness of the grammatical and stylistic features of post-classical Latin. The course is aimed both at classical Latinists seeking to broaden their reading experience and at medievalists and early modernists seeking to consolidate their Latin language skills. Sample readings: K.P. Harrington et al, *Medieval Latin* 2nd edn. M. Riley, *The Neo-Latin Reader*: selections from Petrarch to Rimbaud. Prior experience in Latin is required, preferably CLASSICS 11L. Equivalent accepted. Anyone unsure whether to take this course is encouraged to contact the instructor in advance. Same as: CLASSICS 6L, RELIGST 173X

**CLASSICS 211. PROSEMINAR: LATIN WORD ORDER. 2 Units.**

Latin word order is grammatically free but not pragmatically free. We will analyse the syntactic structures underlying the various Latin word orders and identify the pragmatic meanings they encode. Prerequisite: Classics 204.

**CLASSICS 212. Introduction to Latin Epigraphy. 2-3 Units.**

(Formerly CLASSGEN 219.) How to engage with epigraphic evidence through translation and contextualization of inscriptions. The materiality of inscriptions, geographical variation, and current scholarly debates in scholarship. How to use this evidence in research.

**CLASSICS 213. Proseminar: Documentary Papyrology. 3-5 Units.**

The focus will be on documentary papyrology. Students will be introduced to the basics of the discipline.

**CLASSICS 214. Proseminar: Ancient Numismatics. 3-5 Units.**

Graduate proseminar. Introductory overview of the heterogeneous coinages of antiquity, from the earliest coins of the Mediterranean to classical and Hellenistic Greek coins, Roman Republican, Imperial and provincial coinages as well as various ancient Oriental coinages. Topics include: numismatic terminology; techniques of coin production in antiquity; numismatic methodology (die studies; hoard studies; metrological analyses); quantifying coin production and ancient financial history; coins vs. other forms of money in antiquity; the study of ancient coinages in the Early Modern world. Students are expected to prepare talks on specific topics to be agreed upon. Required for ancient history graduate students; others by consent of instructor.

**CLASSICS 216. Advanced Paleography. 5 Units.**

This course will train students in the transcription and editing of original Medieval and Early Modern textual materials from c. 1000 to 1600, written principally in Latin and English (but other European languages are possible, too). Students will hone their archival skills, learning how to describe, read and present a range of manuscripts and single-leaf documents, before turning their hand to critical interpretation and editing. Students, who must already have experience of working with early archival materials, will focus on the full publication of one individual fragment or document as formal assessment.

Same as: HISTORY 315, RELIGST 329X

**CLASSICS 217. Western Receptions of Classical Latin Literature: Epic, Lyric, Elegy, Pastoral, Novel. 3-5 Units.**

This lecture class aims to explore the later reception of some major texts of Latin poetry and fiction in later European literatures and intellectual cultures from the medieval period until now, predominantly English but occasionally some other European modern languages [English translations supplied]. There will be some orientation in reception studies and its theory. Reading expectations will be mainly literary texts, no more than 100 pages in English per week; the course will look at translations and history of scholarship as well as literary adaptations. Particular attention will be paid to issues of cultural tension and later transformation of classical material in different historical and intellectual environments. It should be of interest to students of English and comparative literature as well as classicists.

**CLASSICS 21Q. Eight Great Archaeological Sites in Europe. 3-5 Units.**

(Formerly CLASSART 21Q.) Preference to sophomores. Focus is on excavation, features and finds, arguments over interpretation, and the place of each site in understanding the archaeological history of Europe. Goal is to introduce the latest archaeological and anthropological thought, and raise key questions about ancient society. The archaeological perspective foregrounds interdisciplinary study: geophysics articulated with art history, source criticism with analytic modeling, statistics interpretation. A web site with resources about each site, including plans, photographs, video, and publications, is the basis for exploring.

Same as: ARCHLGY 21Q

**CLASSICS 237. Ancient Dance and its Modern Legacy. 3-5 Units.**

Descriptions of dance in the Greek and Greco-Roman world; theories about dance in antiquity; dance and the senses; modern and modernist dancers and choreographers discussing ancient dance.

Same as: CLASSICS 137, TAPS 165C, TAPS 265C

**CLASSICS 244. Classical Seminar: Rethinking Classics. 4-5 Units.**

Literary and philosophical texts from Antiquity (including Homer, the Greek tragedians, Plato, Aristotle, Virgil, and Augustine). In each case, we will examine the cultural contexts in which each text was composed (e.g. political regimes and ideologies; attitudes towards gender and sexuality; hierarchies of class and status; discourses on "barbarians" and resident aliens). We will study various theoretical approaches to these books in an effort to "rethink" these texts in the 21st century.

Same as: DLCL 321

**CLASSICS 246. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire. 3-5 Units.**

Stretching from India to Ethiopia, the Persian Empire the largest empire before Rome has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the West and Greek democracy. This course will provide a general introduction to the Persian Empire, beginning in the 6th century BCE to the fall of Persia to Alexander the Great in 331 BCE. We shall not only examine the originality of the first world empire of antiquity, but the course will also attempt to present a broad picture of the diverse cultural institutions and religious practices found within the empire. Readings in translation from the royal edicts and the inscriptions of Cyrus, Darius, and Xerxes will allow us to better appreciate the subtle ways in which these Persian kings used religion to justify and propagate the most ambitious imperial agenda the world had ever seen. In concluding the quarter, students will evaluate contemporary representations of Persia and the Persians in politics and popular culture in a wide array of media, such as the recent film *300* and the graphic novel on which it is based, in an attempt to better appreciate the enduring legacy of the Greco-Persian wars.

Same as: CLASSICS 146, RELIGST 229, RELIGST 329

**CLASSICS 247. Priests, Prophets, and Kings: Religion and Society in Late Antique Iran. 4-5 Units.**

This course is designed as a broad introduction to the religious and social history of the Sasanian Empire, encompassing the period from 224-651 CE as well as the early years of Islamic rule in Iran. Among the topics we will discuss are: the lives and deeds of the powerful Iranian emperors such as Shapur I and II in relation to the the Roman emperors Diocletian and Constantine; the transformation of Zoroastrianism into a powerful official religion of the state and its subsequent orthodoxy; the emergence of the prophet Mani and the confrontation of Manicheism with the Zoroastrian priesthood; the conversion of Constantine to Christianity and its political and social ramifications in Iran; the establishment of an independent Iranian Christian church; the importance of Armenia in the Sasanian- Roman conflict; and a brief discussion of the history of the Jewish community under the Sasanians. We will end the quarter by examining the Arab-Islamic conquests of Iran and the profound social changes experienced by the Zoroastrian communities in the early centuries of Islam in Iran.

Same as: CLASSICS 147, RELIGST 209, RELIGST 309

**CLASSICS 248. Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran. 3-5 Units.**

Designed as a broad introduction to the world of ancient Iran, students will be introduced to the Indo-European inheritance in ancient Iranian culture; the shared world of ritual, religion, and mythology between Zoroastrianism in Iran and Vedic Hinduism in India; and to the contours of early Zoroastrian religious thought. We will also survey mythoepic literature in translation from the archaic Avesta through the late antique Zoroastrian Middle Persian corpus to the early medieval national epic of Iran, the *Book of Kings of Ferdowsi*.

Same as: CLASSICS 148, RELIGST 209E, RELIGST 309E

**CLASSICS 256. Design of Cities. 3-5 Units.**

Long-term, comparative and archaeological view of urban planning and design. Cities are the fastest changing components of the human landscape and are challenging our relationships with nature. They are the historical loci of innovation and change, are cultural hotspots, and present a tremendous challenge through growth, industrial development, the consumption of goods and materials. We will unpack such topics by tracking the genealogy of qualities of life in the ancient Near Eastern city states and those of Graeco-Roman antiquity, with reference also to prehistoric built environments and cities in the Indus Valley and through the Americas. The class takes an explicitly human-centered view of urban design and one that emphasizes long term processes.

Same as: ARCHLGY 156, CLASSICS 156

**CLASSICS 257. The Archaeology of Cyprus. 3-5 Units.**

This seminar course introduces students to the island of Cyprus in the eastern Mediterranean and its archaeology, from the origins of human occupation to the end of antiquity. Readings and discussions of material culture and texts will explore the history and practice of Cypriot archaeology in relation to those of Greece and the Near East. Key themes will include: islands and insularity, continuity vs. change, sex and identity, the rise of the state, regionalism, and imperial conquest. Suitable for both graduate and undergraduate students.

Same as: CLASSICS 157

**CLASSICS 258. Iconoclasm. 5 Units.**

By the seventh century three large political entities formed in the Mediterranean the Umayyads, the Carolingians, and the Byzantines each competed for legitimacy; all three emerged from the ashes of Late Antique culture, yet each tried to carve out an identity out of this common foundation. In this parting of the ways, the three empires took among others the issue of what constitutes an image and what role it plays in devotion. Eik'n, imago, ura became the basis on which to built differences and accuse the other political players of idolatry. This course explores medieval image theory, especially the phenomena of iconoclasm, iconophobia, and aniconism. The discussions focus on monuments in the Mediterranean as well as objects in the Cantor collection and facsimiles of manuscripts at the Bowes Art Library.

Same as: ARTHIST 209C, ARTHIST 409, CLASSICS 158, REES 409

**CLASSICS 260. Design Thinking for the Creative Humanities. 3-5 Units.**

This class introduces Design Thinking to students in the Humanities and Social Sciences. Under a growth mindset of creative exploration and experiment, we will share a tool kit drawn from design thinking and the arts to develop our imaginative capacity to innovate. The standpoint is that creative imagination is not a property of the artistic or design genius but comprises skills and competencies that can be easily learned and adapted to all sorts of circumstances ¿ personal, organizational, business, community.

Same as: CLASSICS 160

**CLASSICS 273. Hagia Sophia. 5 Units.**

By employing a methodology based in psychoacoustics, semiotics, and phenomenology, this course explores the relationship among sound, water, marble, meaning, and religious experience in the sixth-century church of Hagia Sophia built by emperor Justinian in Constantinople. We will read medieval sources describing the interior and ritual, make short movies exploring the shimmer of marble in buildings on campus, and study the acoustics of domed buildings through computer auralization done at Stanford's CCRMA (Center for Computer Research in Music and Acoustics).

Same as: ARTHIST 208, ARTHIST 408, CLASSICS 173

**CLASSICS 277. Describing and Identifying Ancient Coins. 3-5 Units.**

In numismatics, as in all other disciplines dealing with documentary sources of the ancient world (like epigraphy and papyrology), it is essential to work hands-on with the primary material. This course, an optional accompaniment to the graduate seminar in ancient numismatics, will focus on practical work with ancient coins from the collection at the Cantor Arts Center: students will learn how to describe and identify ancient coins and how to properly catalogue and classify them. A special focus will be on the identification of fakes. Participants will be trained to use the main reference works on ancient coinages in the Frank L. Kovacs library, recently donated to Stanford University.

Same as: CLASSICS 177



**CLASSICS 28N. Inequality: the Last 100,000 Years. 3 Units.**

(Formerly CLASSHIS 13N.) This seminar traces the evolution of resource inequality from the Stone Age to the present. Only this long-term perspective reveals the forces that drive inequality and allows us to address two key questions: what causes inequality, and what factors have been capable of reducing it, at least for a while? We are going to confront challenging arguments: that inequality has been closely tied up with overall economic and human development, and that over the long course of history, war, revolution and pestilence were the most effective equalizers of income and wealth. This class will help you appreciate contexts and complexities that are usually obscured by partisan polemics and short-term thinking. Seminar participants will be directly involved in the instructor's current research project on the history of inequality. Same as: HISTORY 15N

**CLASSICS 298. Directed Reading in Classics. 1-15 Unit.**

(Formerly CLASSGEN 260.)  
Same as: Graduate Students

**CLASSICS 29Q. Questioning the Gods: Religious Thought and Literature in Classical Antiquity. 3 Units.**

Ancient Greek and Roman literature and philosophy dealing with theology and ethics. What is a god, and why should gods care about you or me? Do you have a soul, and if so what might happen to it when you die? Should you try to be a good person, and if so, how? Learn viewing fundamental questions like these through the eyes of ancient Greek and Roman thinkers. We will read tragedies and epic poetry, wrestle with the philosophical arguments, and apply forms scientific reasoning developed more than 2,000 years ago. This course offers highly sophisticated perspectives on religious and ethical issues that are still vitally important today, as well as a firm grasp of the culture of classical antiquity and the means it offers of understanding the world and our place in it.

**CLASSICS 2G. Beginning Greek. 5 Units.**

(Formerly CLASSGRK 2.) Continuation of CLASSICS 1G. Vocabulary and syntax of the classical language.

**CLASSICS 2L. Beginning Latin. 5 Units.**

(Formerly CLASSLAT 2.) Vocabulary and syntax of the classical language. Prerequisite: CLASSICS 1L or equivalent placement.

**CLASSICS 301. Gateways to Classics. 1 Unit.**

(Formerly CLASSGEN 300A.) Focus on skills, methodologies and approaches in the study of Classics topics, with attention both to histories of the disciplines and to new developments. Required for first-year Classics graduate students.

**CLASSICS 302. Workshop on Teaching in Classics. 1 Unit.**

Introduction to pedagogical theories and techniques relevant to careers as Classics instructors. Classics faculty and advanced graduate students will lead sessions on language instruction, class discussions, assignments and feedback, and course design. Participants will read selections from modern scholarship on teaching and learning and engage in hands-on exercises.

**CLASSICS 304. Developing a Classics Dissertation Prospectus. 1-3 Unit.**

This workshop concentrates on the development process of writing a successful dissertation proposal and clarifies expectations of the defense process. Includes peer reviews of draft proposals with an aim to present provisional proposals by the end of term. Highly recommended for current third-year Classics Ph.D. students.

**CLASSICS 31. Greek Mythology. 3-5 Units.**

(Formerly CLASSGEN 18.) The heroic and divine in the literature, mythology, and culture of archaic Greece. Interdisciplinary approach to the study of individuals and society. Illustrated lectures. Readings in translation of Homer, Hesiod, Herodotus, and the poets of lyric and tragedy. Weekly participation in a discussion section is required during regular academic quarters (Aut, Win, Spr).

**CLASSICS 318. Aristophanes: Comedy, and Democracy. 4-5 Units.**

(Formerly CLASSGEN 304.) Intensive study of three plays in Greek (Knights, Peace, Ecclesiazusae) and the rest of the corpus in English, with reference to formal features and a focus on how Old Comedy related to the democratic practices of Athens.

**CLASSICS 327. Petronius and Apuleius. 4-5 Units.**

Petronius' *Satyricon* and Apuleius' *Metamorphoses* represent the surviving Latin novel. Differences between them. Readings include Petronius' dinner at Trimalchio's and Apuleius' love story of Cupid and Psyche. Philological analysis, history of the novel, and social history of the Roman empire. The afterlife of these texts. Recent scholarship.

**CLASSICS 328. Augustine on Memory, Time, and the Self. 3-5 Units.**

(Formerly CLASSGEN 336.) This course examines Augustine's "Confessions" as an autobiographical discourse. It investigates his theories of memory and of time and address different theories of the "self." How does memory and the passing of time affect the notion of the self? Does Augustine's "subjective" theory of time offer an identifiable self? Is the self constructed by narratives? We will locate these issues in their cultural context by investigating Christian and pagan discourses and practices in Late Antiquity.

**CLASSICS 329. Roman Spaces. 3-5 Units.**

How might we make sense of the physical environment in the Roman world? What are the most useful units by which to make sense of its parts? What is the character and impact of human interventions? We'll take a detailed but wide-ranging look at Mediterranean landscapes, emphasizing the period of Roman hegemony. Proceeding systematically, we will get the measure of each province triangulating ancient texts (Strabo, Pliny the elder, Pausanias) and documents; the archaeological record; and the landscape itself.

**CLASSICS 330. Satire. 3-5 Units.**

The concept of "satire" as a social and literary force will be examined with equal attention given to examples in Greek and Latin. Texts to be analyzed include Greek iambos from the 7th century BC to early Byzantine times; selected portions of Old Comedy; Herodas; Lucian; Lucilius; Horace, Ovid, Juvenal, Persius, and Martial. Particular attention will be paid to authorial self-fashioning; limitations on verbal abuse; and ideas of propriety. All texts to be read in the original languages, with supplementary readings in English and on occasion French, German or Italian.

**CLASSICS 331. Words and Things in the History of Classical Scholarship. 4-5 Units.**

How have scholars used ancient texts and objects since the revival of the classical tradition? How did antiquarians study and depict objects and relate them to texts and reconstructions of the past? What changed and what stayed the same as humanist scholarship gave way to professional archaeologists, historians, and philologists? Focus is on key works in the history of classics, such as Erasmus and Winckelmann, in their scholarly, cultural, and political contexts, and recent critical trends in intellectual history and the history of disciplines.

Same as: HISTORY 303F

**CLASSICS 335. Ekphrasis in Antiquity. 3-5 Units.**

What is "ekphrasis"? How was it theorized and practiced in antiquity? Description, interpretation, and the senses; The relationship between the verbal and the visual in antiquity from Homer to Philostratus.

**CLASSICS 336. Plato on Eros and Beauty. 3-5 Units.**

We read Plato's Symposium and Phaedrus; topics: love, beauty, language (oral and written). Graduate seminar, but open to seniors.

Same as: PHIL 306C

**CLASSICS 337. The Second Sophistic. 3-5 Units.**

The class will introduce students to the most important aspects of the Second Sophistic: linguistic and literary classicism, rhetoric and performance, typical literary forms. Particular emphasis will be on the social and political background of the movement (Greek identity, social distinction, sophists and gender). For students who wish to take the class for 4 or 5 units, part of the readings will be in the original Greek.

**CLASSICS 339. Catullus: Textual Criticism and Literary Interpretation. 3-5 Units.**

This seminar will read much of the work of the major Latin poet Catullus (including some of the longer poems) from the perspective of textual criticism and literary interpretation: the two are necessarily closely bound up, and the minimal and imperfect nature of the Catullan textual transmission gives excellent opportunities to concentrate on trying to work out what the poet wrote and why, as well as analysing his work from a literary perspective. It will give orientation in the principles and practice of textual criticism as well as on Catullus and late republican Latin poetry. Metre will also figure. We will read up to 12 pages of Latin per week with some secondary literature. A good knowledge of Latin is required.

**CLASSICS 34. Ancient Athletics. 3-4 Units.**

(Formerly CLASSGEN 34.) How the Olympic Games developed and how they were organized. Many other Greek festivals featured sport and dance competitions, including some for women, and showcased the citizen athlete as a civic ideal. Roman athletics in contrast saw the growth of large-scale spectator sports and professional athletes. Some toured like media stars; others regularly risked death in gladiatorial contests and chariot-racing. We will also explore how large-scale games were funded and how they fostered the development of sports medicine. Weekly participation in a discussion section is required; enroll in sections on coursework.

**CLASSICS 343. Poetics of the Iliad. 4-5 Units.**

(Formerly CLASSGRK 354.) The entire poem in Greek, with attention to issues of style and interpretation in light of the last 50 years of Homeric studies. Readings in secondary literature including key articles in French and German.

**CLASSICS 344. Plato on Eros, Logos, and Madness. 4-5 Units.**

The course focuses on Plato's Symposium and Phaedrus. It investigates the following topics: the role that eros plays in Plato's philosophy; the relation of love and beauty; the creation of metaphysical desire; Plato's conception of the gods, the divine Forms, and inspiration; philosophic madness and ecstatic thinking; oral dialogue vs. the written word; rhetoric, dialectic, and the limits of logos in the contemplation of truth.

**CLASSICS 345. Pantomime Dance in the Greco-Roman World. 3-5 Units.**

This seminar will examine the irresistible allure of pantomime dancing and its impressive popularity for several centuries; the remarkable social and political implications of pantomime performances until their effective banning in the sixth century A.D.; the relationship between pantomime performance and ancient dramatic texts and performances; the physical, sensual, and intellectual aspects of the genre; the body as a hermeneutic topos in the Imperial period and in Late Antiquity.

**CLASSICS 346. Aristotle's Protrepticus and its Background. 2-4 Units.**

In this seminar, we shall read Aristotle's Protrepticus. This is an early work of Aristotle that attempts to turn the reader to a philosophic life and it is by far the least read of his works on ethics. It was only recovered in the 19th century and only in the past 15 years or so do we have a reliable text. Thus studies of it are very much underdeveloped. We shall also read as background some other protreptic works by Plato and the rhetorician Isocrates. 2 unit option is only for Philosophy PhD students beyond the second year.

Same as: PHIL 315

**CLASSICS 35. Becoming Like God: An Introduction to Greek Ethical Philosophy. 3-5 Units.**

(Formerly CLASSGEN 35.) This course investigates key ethical philosophies in classical Greece. After reading several Greek tragedies (representing traditional Greek values), we examine the Greek philosophers' rejection of this tradition and their radically new ethical theories. Socrates, Plato, and Aristotle offered different ethical theories, but they shared basic conceptions of goodness and happiness. They argue that we could "become like gods" by achieving philosophic wisdom. What kind of wisdom is this? How does it make us ethically good and supremely happy people?.

**CLASSICS 353. Archaeology: Post-Humanist Agendas. 3-5 Units.**

How do people and their artifacts connect? Just what is the subject of archaeological history? A seminar reviewing the latest materialist approaches in archaeology and heritage studies.

Same as: ARCHLGY 353

**CLASSICS 355. Landscape & Archaeology. 3-5 Units.**

TBD.

Same as: ARCHLGY 355

**CLASSICS 356. Mediterranean Regionalism. 3-5 Units.**

The ancient world enjoys scholarly traditions of both grand pan-Mediterranean narratives and focused studies of the individual landscapes and peoples who comprise them. Within archaeology, these latter explorations generally rely on expedient geographical designations, modern political boundaries, or survey areas as focused regions for discussion. Defining and interrogating the regions created and experienced by ancient peoples and assembling these into a coherent larger ancient picture proves far more difficult. This seminar explores the varied forms of ancient regionalisms—from archaeological (architecture, ceramics, coinage, sculpture, etc.) to social (language, religion, etc.)—and tools for investigating such patterns of human interaction.

Same as: ARCHLGY 356

**CLASSICS 358. The Archaeology of Ancient Mediterranean Environments. 4-5 Units.**

This seminar examines the interplay between classical archaeologists' conceptions and analyses of ancient Mediterranean environments. These themes loom large now - during what might be called the environmental turn of the Anthropocene in the humanities and social sciences - and their increasing resonance provides the basis for critical reflection of the discipline's past and future trends. Topics will include: environmental determinism, non-human agency, the role of science in archaeological/historical practice, and the compartmentalization of environment/climate as analytic focus.

**CLASSICS 367. Mediterranean Networks. 3-5 Units.**

The ancient Mediterranean was highly interconnected is common knowledge, and the idea of integration has become a defining factory in current approaches to Greco-Roman cultural identities. Yet how connectivity functioned, and how we should effectively analyze it, are less well understood. This seminar highlights emerging network approaches—both broad theoretical network paradigms and specific network science methodologies—as conceptual tools for archaeological and historical investigations of cultural interaction (economic, religious, artistic, colonial, etc.) across the Mediterranean world.

Same as: ARCHLGY 367

**CLASSICS 37. Humanities Core: Great Books, Big Ideas -- Europe, The Ancient World. 3 Units.**

This course will journey through ancient literature from Homer to St. Augustine; it will introduce participants to some of its fascinating features and big ideas; and it will reflect on questions such as: What is a good life, a good society? Who is in and who is out and why? What is the meaning of honor, and should it be embraced or feared? Where does human subjectivity fit into a world of matter, cause and effect? When is rebellion justified? What happens when a way of life or thought is upended? Do we have any duties to the past?.

Same as: DLCL 11, HUMCORE 11

**CLASSICS 370. Topics in Roman Art and Visual Culture. 3-5 Units.**

Ancient Roman visual culture both reflected and actively shaped political, social, cultural and economic situations. Artworks, imagery and things seen played roles in constructing experience, intervening in human relationships, representing meaning, and framing possibility in particular ways. This seminar explores some of the most exciting recent work on Roman art and visual culture. Topics may include viewing and reception, materiality and object relations, framing, and others.

**CLASSICS 372. Archaeology of Roman Slavery. 4-5 Units.**

(Formerly CLASSART 342.) The archaeological study of Roman slavery has been severely limited by a focus on identifying the traces of slaves in the material record. This seminar explores a range of newer and more broadly conceived approaches to understanding slavery and slaves' experiences, including spatial analysis, bioarchaeology, epigraphy, visual imagery, and comparative archaeologies of slavery. Students will learn about the current state of research, work with different kinds of evidence and a range of methodologies, and develop original research projects of their own.

Same as: ARCHLGY 342

**CLASSICS 373. Reception and Literacy in Roman Art. 5 Units.**

(Formerly CLASSART 322.) Beyond a focus on artists and patrons: how Roman art was seen and understood by its contemporary viewers. Themes include memory, performance, gender, replication, and constructions of space. Goal is to draft a differentiated model of viewing and literacy, with attention to collective experience, hierarchy, access, and subversion.

Same as: ARTHIST 422

**CLASSICS 375. Julius Caesar in Context. 4-5 Units.**

We shall look at the material, cultural and intellectual, and political world of the late Roman republic through the eyes of Caesar. Topics include: engineering, the city of Rome, geography, ethnography, archaeology in Gaul, Latin linguistics, poetry and patronage, the calendar, and the idea of Romanitas. Historians, archaeologists, and philologists are all equally welcome.

**CLASSICS 378. Ancient Greek Law and Justice. 3-5 Units.**

The development and practice of law and legal procedure in the ancient Greek world, emphasizing the well documented case of classical Athens. Constitutional, criminal, and civil law, approached through analysis of actual laws and speeches by litigants in Athenian courtrooms. Review of a growing scholarship juxtaposing Greek law to other prominent legal traditions and exploring the role of law in Greek social relations, economics, and literature, and its relationship to Greek conceptions of justice.

Same as: POLISCI 337L

**CLASSICS 38. Humanities: An Introduction to How Humans Think About Themselves. 3 Units.**

Ever since humans evolved, we have been asking ourselves what we are and how we should live. This course is an introduction to the answers that have been offered, asking why they have varied so much and how they might continue to change in the future. Combining literary, archaeological, and anthropological evidence from around the world with the insights of biology, psychology, and the social sciences, the class will trace the story from the origins of modern humans some 200,000-300,000 years ago forward to our own age. Central topics will include what makes humans different from other animals, whether there is a universal human nature, and how the humanities differ from the sciences. The course is intended as an introduction to the global history of humanistic thought and as a foundation for more detailed study in the humanities.

Same as: HUMCORE 1

**CLASSICS 380. Ancient Empires. 4-5 Units.**

What is an empire? How did they begin? Why have some imperialists been successful, while others failed dismally? Why do some people collaborate with imperialism, while others resist fiercely? This seminar examines the empires of the ancient East Mediterranean between 800 and 300 BC, focusing on two great imperial powers (Assyria, Persia) and three smaller societies on the receiving end of imperial conquest (Israel, Egypt, Greece), and asking why societies that were successful in resisting imperialism often then tried to create empires themselves. The evidence used comes mainly from epigraphy, the Hebrew Bible, and Herodotus. Some background in ancient history and/or comparative politics preferred.

**CLASSICS 381. Classical Seminar: Origins of Political Thought. 3-5 Units.**

(Formerly CLASSHIS 133/333.) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

Same as: CLASSICS 181, PHIL 176A, PHIL 276A, POLISCI 230A, POLISCI 330A

**CLASSICS 382. High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests. 3-5 Units.**

Normative political theory combined with positive political theory to better explain how major texts may have responded to and influenced changes in formal and informal institutions. Emphasis is on historical periods in which catastrophic institutional failure was a recent memory or a realistic possibility. Case studies include Greek city-states in the classical period and the northern Atlantic community of the 17th and 18th centuries including upheavals in England and the American Revolutionary era.

Same as: POLISCI 231, POLISCI 331

**CLASSICS 384A. Ancient Greek Economic Development. 4-5 Units.**

(Formerly CLASSHIS 330A.) Drawing on Herodotus and other literary sources, ancient historians have traditionally seen classical Greece as a very poor land. Recent research, however (much of it conducted here at Stanford), suggests that Greece in fact saw substantial economic growth and rising standards of living across the first millennium BCE. This seminar tests the poor Hellas/wealthy Hellas models against literary and archaeological data. We will develop and test hypotheses to explain the rate and pace of economic change in the Greek world.

Same as: POLISCI 430A

**CLASSICS 384B. Ancient Greek Economic Development. 1-5 Unit.**

(Formerly CLASSHIS 330B.) Drawing on Herodotus and other literary sources, ancient historians have traditionally seen classical Greece as a very poor land. Recent research, however (much of it conducted here at Stanford), suggests that Greece in fact saw substantial economic growth and rising standards of living across the first millennium BCE. This seminar tests the poor Hellas/wealthy Hellas models against literary and archaeological data. We will develop and test hypotheses to explain the rate and pace of economic change in the Greek world.

Same as: POLISCI 430B

**CLASSICS 388. Histories of Greece. 3-5 Units.**

The first modern historical rewritings of ancient Greece: What made them modern? How did they shape what Greek history is today? Texts and things in the modern recovery of the Greek past; women, colonies, democracy and art as modern subjects of ancient Greek history; modern historiographical methods and theories in their social and cultural contexts; modern historicity and the Greek past. Reading includes ancient historians, Renaissance antiquarians, eighteenth-century Greek histories and Enlightenment writings on ancient Greeks, and current intellectual history scholarship.

**CLASSICS 389. Dark Ages Compared: Early Iron Age Greece and Early Medieval Britain. 3-5 Units.**

This seminar compares the collapse and revival of complex societies in Greece (1200-700 BC) and Britain (AD 400-800), looking at causes, economic, demographic, social, cultural, and political consequences, the uses of written and archaeological evidence, and what it means to call a period a "Dark Age." Some background in early Greek and/or Late Roman and early medieval history or archaeology is preferred.

**CLASSICS 39. Reinventing the Sophomore Experience. 1 Unit.**

The sophomore year brings a number of choices that undergraduates have to make. This course is a chance to explore those choices thoughtfully, without resorting to negative clichés ('sophomore slump'). Students will diagnose and discuss the issues at stake, including academic plans, campus life, work-life balance, longer-term life goals. The challenges and opportunities of leadership is an important theme, both in an abstract sense and practically: students will, in the course of the autumn term, design an event which will be held in the winter or spring term. This residentially-based course is aimed at students who have preassigned to Toyon's RISE program, Reinventing the Sophomore Experience. One unit only. Letter-grade only.

**CLASSICS 390. Origins of Political Thought. 3-5 Units.**

Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

Same as: PHIL 276D, POLISCI 430

**CLASSICS 396. Humanities+Design: Visualizing the Grand Tour. 4-5 Units.**

Study of the eighteenth-century Grand Tour of Italy through visualization tools of the digital age. Critical readings in both visual epistemology and current Grand Tour studies; interrogating the relationship between quantitative and qualitative approaches in digital humanities; what new insights in eighteenth-century British travel to Italy does data visualization offer us? Students will transform traditional texts and documents into digital datasets, developing individual data analysis projects using text mining, data capture and visualization techniques.

Same as: DLCL 396, HISTORY 336E

**CLASSICS 399. Dissertation Research in Classics. 1-10 Unit.**

(Formerly CLASSGEN 360.)

**CLASSICS 3G. Beginning Greek. 5 Units.**

(Formerly CLASSGRK 3.) Vocabulary and syntax of the classical language. Prerequisite: CLASSICS 2G or equivalent placement. CLASSICS 3G fulfills University language requirement.

**CLASSICS 3L. Beginning Latin. 5 Units.**

(Formerly CLASSLAT 3.) Vocabulary and syntax of the classical language. Prerequisite: CLASSICS 2L or equivalent placement. CLASSICS 3L fulfills the University language requirement.

**CLASSICS 40. Greek Philosophy. 4 Units.**

We shall cover the major developments in Greek philosophical thought, focusing on Plato, Aristotle, and the Hellenistic schools (the Epicureans, the Stoics, and the Sceptics). Topics include epistemology, metaphysics, psychology, ethics and political theory. No prereqs, not repeatable.

Same as: PHIL 100

**CLASSICS 42. Philosophy and Literature. 5 Units.**

Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track. Majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature, with particular focus on the question of value: what, if anything, does engagement with literary works do for our lives? Issues include aesthetic self-fashioning, the paradox of tragedy, the paradox of caring, the truth-value of fiction, metaphor, authorship, irony, make-believe, expression, edification, clarification, and training. Readings are drawn from literature and film, philosophical theories of art, and stylistically interesting works of philosophy. Authors may include Sophocles, Chaucer, Dickinson, Proust, Woolf, Borges, Beckett, Kundera, Charlie Kaufman; Barthes, Foucault, Nussbaum, Walton, Nehamas; Plato, Montaigne, Schopenhauer, Nietzsche, and Sartre. Taught in English.

Same as: COMPLIT 181, ENGLISH 81, FRENCH 181, GERMAN 181, ITALIAN 181, PHIL 81, SLAVIC 181

**CLASSICS 43. Exploring the New Testament. 4 Units.**

To explore the historical context of the earliest Christians, students will read most of the New Testament as well as many documents that didn't make the final cut. Non-Christian texts, Roman art, and surviving archeological remains will better situate Christianity within the ancient world. Students will read from the Dead Sea Scrolls, explore Gnostic gospels, hear of a five-year-old Jesus throwing divine temper tantrums while killing (and later resurrecting) his classmates, peruse an ancient marriage guide, and engage with recent scholarship in archeology, literary criticism, and history.

Same as: JEWISHST 86, RELIGST 86

**CLASSICS 4L. Intensive Beginning Latin. 12 Units.**

(Formerly CLASSLAT 10/210) Equivalent to a year of beginning Latin (three quarters; CLASSICS 1L, 2: and 3L), this course is designed to teach the fundamentals of the Latin language in eight weeks. We will focus primarily on acquiring the basics of Latin grammar, morphology, and vocabulary and developing basic reading skills. At the end of the course, students should be able to read easy Latin prose and poetry. We will be using Wheelock's Latin textbook and meeting three hours a day, four days a week. Grades will depend on class participation and on performance in weekly quizzes and in a final written exam. Classics majors and minors must take course for letter grade. CLASSICS 4L fulfills the University language requirement.

**CLASSICS 51. Introduction to Greek Archaeology. 3-5 Units.**

An introduction to the archaeology of ancient Greece, from the first city states through the cultural achievements of classical Athens to the conquest by Rome.

Same as: ARCHLGY 51

**CLASSICS 52. Introduction to Roman Archaeology. 3-5 Units.**

(Formerly CLASSART 81.) This course will introduce you to the material culture of the ancient Roman world, from spectacular imperial monuments in the city of Rome to cities and roads around the Mediterranean, from overarching environmental concerns to individual human burials, from elite houses and army forts to the lives of slaves, freedmen and gladiators. Key themes will be change and continuity over time; the material, spatial and visual workings of power; how Roman society was materially changed by its conquests and how conquered peoples responded materially to Roman rule.

Same as: ARCHLGY 81

**CLASSICS 54. Introduction to World Architecture. 5 Units.**

This lecture course surveys the history of architecture and urbanism, from the first societies to the present, in Europe, West and East Asia, the Americas, and Africa. The course progresses by case studies of exemplary monuments and cities, and examines the built environment as both cultural artifact and architectural event. It considers the social and political circumstances of architectural invention as well as plumbing the depth of artistic context by which particular formal choices resonate with an established representational culture.

Same as: ARTHIST 3

**CLASSICS 56. Introduction to the Visual Arts: Prehistoric through Medieval. 5 Units.**

A survey of the art and architecture from the cave paintings of Lascaux to the Gothic Cathedrals of France; the material is organized both chronologically and thematically and covers a multiplicity of religions: pagan, Christian, and Islamic.

Same as: ARTHIST 1A

**CLASSICS 57. Introduction to Digital Archaeology. 4 Units.**

While the tools of Digital Archaeology frequently change, using digital tools has been part of the discipline for decades. These tools and approaches provide new forms of research, visualization, and outreach to archaeological investigations. This course is designed to introduce students of archaeology to the digital research methods useful to the discipline, and provide them with hands-on experience in three types of digital method: digital mapping, visualization, and 3D modeling. The goal of the course is for students to learn about the state of digital archaeology, to become familiar with common methods, and become aware of the resources available for research.

Same as: ARCHLGY 47

**CLASSICS 6G. Biblical Greek. 3-5 Units.**

(Formerly CLASSGRK 5.) This is a one term intensive class in Biblical Greek. After quickly learning the basics of the language, we will then dive right into readings from the New Testament and the Septuagint, which is the ancient Greek translation of the Hebrew Bible. No previous knowledge of Greek required. If demand is high for a second term, an additional quarter will be offered in the Spring.

Same as: JEWISHST 5, RELIGST 171A

**CLASSICS 6L. Latin 400-1700 CE. 1-2 Unit.**

Readings in later Latin, drawing on the vast bodies of texts from the late antique, medieval and early modern periods. Each week students will prepare selections in advance of class meetings; class time will be devoted to translation and discussion. Students taking this course will gain exposure to a wide range of later Latin texts; hone translation skills; and develop an awareness of the grammatical and stylistic features of post-classical Latin. The course is aimed both at classical Latinists seeking to broaden their reading experience and at medievalists and early modernists seeking to consolidate their Latin language skills. Sample readings: n.K.P. Harrington et al, *Medieval Latin* 2nd edn. n.M. Riley, *The Neo-Latin Reader*: selections from Petrarch to Rimbaud. Prior experience in Latin is required, preferably CLASSICS 11L. Equivalent accepted. Anyone unsure whether to take this course is encouraged to contact the instructor in advance.

Same as: CLASSICS 208L, RELIGST 173X

**CLASSICS 7G. Biblical Greek. 3-5 Units.**

(Formerly CLASSGRK 6) This is a continuation of the Winter Quarter Biblical Greek Course. Pre-requisite: CLASSICS 6G (Formerly CLASSGRK 5) or a similar introductory course in Ancient Greek.

Same as: JEWISHST 5B

**CLASSICS 801. TGR M.A. Project. 0 Units.**

(Formerly CLASSGEN 801.)

**CLASSICS 802. TGR Ph.D. Dissertation. 0 Units.**

(Formerly CLASSGEN 802.)

**CLASSICS 81. Ancient Empires: Near East. 4-5 Units.**

Why do imperialists conquer people? Why do some people resist while others collaborate? This course tries to answer these questions by looking at some of the world's earliest empires. The main focus is on the expansion of the Assyrian and Persian Empires between 900 and 300 BC and the consequences for the ancient Jews, Egyptians, and Greeks. The main readings come from the Bible, Herodotus, and Assyrian and Persian royal inscriptions, and the course combines historical and archaeological data with social scientific approaches. Weekly participation in a discussion section is required.

**CLASSICS 82. The Egyptians. 3-5 Units.**

Overview of ancient Egyptian pasts, from predynastic times to Greco-Roman rule, roughly 3000 BCE to 30 BCE. Attention to archaeological sites and artifacts; workings of society; and cultural productions, both artistic and literary. Participation in class is required.

Same as: AFRICAAM 30, HISTORY 48, HISTORY 148

**CLASSICS 83. The Greeks. 4-5 Units.**

(Formerly CLASSHIS 101.) 250 years ago, for almost the first time in history, a few societies rejected kings who claimed to know what the gods wanted and began moving toward democracy. Only once before had this happened—in ancient Greece. This course asks how the Greeks did this, and what they can teach us today. It uses texts and archaeology to trace the material and military sides of the story as well as cultural developments, and looks at Greek slavery and misogyny as well as their achievements. Weekly participation in a discussion section is required.

Same as: HISTORY 101

**CLASSICS 84. The Romans. 3-5 Units.**

(Formerly CLASSHIS 60.) How did a tiny village create a huge empire and shape the world, and why did it fail? Roman history, imperialism, politics, social life, economic growth, and religious change. Weekly participation in a discussion section is required; enroll in sections on Coursework.

Same as: HISTORY 102A

## Communication (COMM)

**COMM 1. Introduction to Communication. 5 Units.**

Our world is being transformed by media technologies that change how we interact with one another and perceived the world around us. These changes are all rooted in communication practices, and their consequences touch on almost all aspects of life. In COMM 1 we will examine the effects of media technologies on psychological life, on industry, and on communities local and global through theorizing and demonstrations and critiques of a wide range of communication products and services.

**COMM 104W. Reporting, Writing, and Understanding the News. 5 Units.**

Techniques of news reporting and writing. The value and role of news in democratic societies. Gateway class to journalism. Prerequisite for all COMM 177/277 classes. Limited enrollment. Preference to COMM majors.

**COMM 106. Communication Research Methods. 4-5 Units.**

(Graduate students register for COMM 206.) Conceptual and practical concerns underlying commonly used quantitative approaches, including experimental, survey, content analysis, and field research in communication. Pre- or corequisite: STATS 60 or consent of instructor. Same as: COMM 206

**COMM 107S. Media, Culture, and the Politics of Gender. 3 Units.**

This course aims to provide a survey of various media and their role in the discursive construction of gender in and through culture. The first three weeks serve as an introduction to the historical and sociopolitical dimensions of gender, its intersection with media, and theoretical approaches to understanding it and political approaches to challenging it. Beginning with historical constructions of the gender binary, Foucault's *Herculine Barbin* an unearthed diary of a French hermaphrodite who lived an adolescent life in a Catholic orphanage for girls from about 1860-1870, is reclassified as a man, and commits suicide. The remainder of the course then tackles a range of media and examples of how they portray gender as well as examples of how they may be used to subvert oppressive gender roles or binaries, focusing on: the novel, film, music videos, news, and social media. Far from exhaustive, the readings and the topics covered are to provide a better, broader, but still-limited understanding of how media and culture construct gender, and how this also dramatically impacts the lives of queer and gender nonconforming individuals. For this reason, while the course does deal extensively with notions of masculinity, sexualization and objectification of, or the effects of sexism on, cisgendered women, a heavy focus of the course across many topics is on transgender individuals in media. These individuals, like *Herculine* in her time, unsettle this simplistic opposition through their very being and representation in public.

**COMM 108. Media Processes and Effects. 4-5 Units.**

(Graduate students register for COMM 208.) The process of communication theory construction including a survey of social science paradigms and major theories of communication. Recommended: 1 or PSYCH 1.  
Same as: COMM 208

**COMM 109S. Psychology of Technology & Human-Technology Interaction. 3 Units.**

Products of design surround us, and shape our lives. This course will explore the human relationship with technology from a psychological point of view, and probe how technology can be designed to work in concert with those who use it. To survey this vast space, the course will cover seminal readings in the areas of human factors, human-computer interaction, product design, and psychology. The course will also delve into the area of design, with a collaborative final project integrating design and psychology.

**COMM 112S. Welcome to Cyberspace: An Introduction to the Internet. 3 Units.**

In this introductory-level class we will investigate the Internet as a material technology created in a specific historical and cultural context and explore how its architecture has shaped the ways we work, think, and relate to each other in 2018. First, we will learn what the Internet is, how it works, and why it came to be. Next, by working through a variety of historical and analytical texts, we will examine the reality and mythologies of cyberspace. Key areas of interest include economics, law, and how people use the Internet to connect. Over the course of the quarter, you will gain skills to think critically and analytically about issues related to the Internet in today's world and articulate your own positions on them.

**COMM 113. Computational Methods in the Civic Sphere. 4-5 Units.**

The widespread availability of public data provides a rich opportunity for those who can efficiently filter, interpret, and visualize information. Course develops necessary technical skills for data collection, analysis, and publication, including data mining and web visualization, with a focus on civic affairs and government accountability. Open to all majors and a range of technical skill levels. Involves tackling new tools and technical concepts in the pursuit of engaging, public-facing projects. (Graduate students enroll in 213). Prerequisite: COMM 273D, CS 106A, or CS 106B.  
Same as: COMM 213

**COMM 113S. Digital Media and Behavior. 3 Units.**

This course will explore how self-representation, interface design, and media affordances affect both online and offline behavior. Readings and lectures will introduce students to theories in psychology, communication, and human-computer interaction. Students will learn about media affordances, trends in media consumption, and think about the societal implications of having mediated identities. The second half of the course will focus on how media consumption and self-representation, coupled with interface design, affect attitudes and offline behavior. Topics include deception, social interactions, activism, empathy, and prosocial behaviors within the context of social networks, gaming, augmented and virtual reality. The course will include a combination of written assignments, labs, a group project, and a tour of the Virtual Human Interaction Lab.

**COMM 116. Journalism Law. 4-5 Units.**

(Graduate students register for 216.) Laws and regulation impacting journalists. Topics include libel, privacy, news gathering, protection sources, fair trial and free press, theories of the First Amendment, and broadcast regulation. Prerequisite: Journalism M.A. student or advanced Communication major.  
Same as: COMM 216

**COMM 120W. Digital Media in Society. 4-5 Units.**

Contemporary debates concerning the social and cultural impact of digital media. Topics include the historical origins of digital media, cultural contexts of their development and use, and influence of digital media on conceptions of self, community, and state. Priority to juniors, seniors, and graduate students.  
Same as: AMSTUD 120, COMM 220

**COMM 121. Behavior and Social Media. 5 Units.**

This course examines behavioral approaches to understanding social media. The course will begin by discussing the design factors that shape behavior online, considering research in human-computer interaction that reflects and reveals communication practices and contexts. Next, the course will examine the psychological aspects of computer-mediated communication and virtual collaboration, including impression formation and management, deception, audience and social networks. Finally, the course will explore the ways in which human behavior is situated inside of social and institutional structures and cultural formations; and with that in mind, it will examine the complex interactions between behavior, society, and information technology.

**COMM 124. Lies, Trust, and Tech. 4-5 Units.**

Deception is one of the most significant and pervasive social phenomena of our age. Lies range from the trivial to the very serious, including deception between friends and family, in the workplace, and in security and intelligence contexts. At the same time, information and communication technologies have pervaded almost all aspects of human communication, from everyday technologies that support interpersonal interactions to, such as email and instant messaging, to more sophisticated systems that support organization-level interactions. Given the prevalence of both deception and communication technology in our personal and professional lives, an important set of questions have recently emerged about how humans adapt their deceptive practices to new communication and information technologies, including how communication technology affects the practice of lying and the detection of deception, and whether technology can be used to identify deception.  
Same as: COMM 224

**COMM 125. Perspectives on American Journalism. 4-5 Units.**

An examination of American journalism, focusing on how news is produced, distributed, and financially supported. Emphasis on current media controversies and puzzles, and on designing innovations in discovering and telling stories. (Graduate students register for COMM 225).  
Same as: AMSTUD 125, COMM 225

**COMM 127X. The Ethics of Anonymity. 1 Unit.**

When is it ethical to conceal your identity or to permit another to remain anonymous? What is the value to remaining unknown, and what might be the cost? Does anonymity free you to think, act, or be in ways you wouldn't otherwise? What else might it allow or constrain? How might your answers differ depending on the circumstances or context? In this one-unit lunchtime seminar, guest speakers will discuss topics that might include: anonymous sources in journalism; anonymity online; the history of anonymous authorship and attribution; whistleblowers and confidential informants; anonymous egg or sperm donors and birth parents; anonymity vs. confidentiality for research participants; anonymity and art; technology and anonymity.

Same as: CSRE 127X, ETHICSOC 2

**COMM 130N. The idea of a free press. 3-4 Units.**

Preference to freshmen. An examination of the meaning of freedom of the press, tied to but not bound by various Supreme Court rulings on the scope and purpose of the First Amendment's speech and press clauses. Discussions will include a look at the recent and rapid computerization of communication and what it portends for the future of a free press.

**COMM 131. Media Ethics and Responsibility. 4-5 Units.**

(Graduate students register for COMM 231.) The development of professionalism among American journalists, emphasizing the emergence of objectivity as a professional and the epistemological norm. An applied ethics course where questions of power, freedom, and truth autonomy are treated normatively so as to foster critical thinking about the origins and implications of commonly accepted standards of responsible journalism.

Same as: COMM 231

**COMM 133. Need to Know: The Tension between a Free Press and National Security Decision Making. 4-5 Units.**

This seminar examines the dynamic interaction at the highest levels of government and the media when news coverage of secret national security policy and operations impinges on United States defense, diplomatic and intelligence activities and decision making and affects the American political system. Prime examples: intelligence information about Russian hacking operations during the 2016 presidential election campaign, the unverified intelligence dossier on Donald Trump's Russian connections, the torrent of secret NSA programs disclosed by Edward Snowden. Students explore attitudes, practices, and actions by the media and the government through a series of case studies and simulations. Former editors, reporters, and government officials appear as guest speakers, including Michael Hayden, former director of the NSA and CIA. The goal of the course is to inform students about the vital but often fraught relationship between a free press and the government in a democratic society. For advanced undergraduates and graduate students. Application for enrollment required. The instructor is a former Washington bureau chief of The New York Times. Email Alexa Philippou (aphil723@stanford.edu) to request an application. Completed applications are due by 6pm (pacific) on March 25, 2018. Early applications welcome.

Same as: COMM 233

**COMM 135. Deliberative Democracy and its Critics. 3-5 Units.**

This course examines the theory and practice of deliberative democracy and engages both in a dialogue with critics. Can a democracy which emphasizes people thinking and talking together on the basis of good information be made practical in the modern age? What kinds of distortions arise when people try to discuss politics or policy together? The course draws on ideas of deliberation from Madison and Mill to Rawls and Habermas as well as criticisms from the jury literature, from the psychology of group processes and from the most recent normative and empirical literature on deliberative forums. Deliberative Polling, its applications, defenders and critics, both normative and empirical, will provide a key case for discussion.

Same as: AMSTUD 135, COMM 235, COMM 335, POLISCI 234P, POLISCI 334P

**COMM 137W. The Dialogue of Democracy. 4-5 Units.**

All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized.

Same as: AMSTUD 137, COMM 237, POLISCI 232T, POLISCI 332T

**COMM 138. Deliberative Democracy Practicum: Applying Deliberative Polling. 3-5 Units.**

In this course, students will work directly on a real-world deliberative democracy project using the method of Deliberative Polling. Students in this course will work in partnership with the Center for Deliberative Democracy at Stanford, a research center devoted to the research in democracy and public opinion around the world. This unique practicum will allow students to work on an actual Deliberative Polling project on campus. In just one quarter, the students will prepare for, implement, and analyze the results for an Deliberative Polling project. This is a unique opportunity that allows students to take part in the entire process of a deliberative democracy project. Through this practicum, students will apply quantitative and qualitative research methods in a local community or local high school and subsequently, analyze the relevant quantitative and qualitative data. Students will explore the underlying challenges and complexities of what it means to actually do community-engaged research in the real world. As such, this course will provide students with skills and experience in research design in deliberative democracy, community and stakeholder engagement, and the practical aspects of working in local communities. This practicum is a collaboration between the Center for Deliberative Democracy, the Bill Lane Center for the American West and the Haas Center for Public Service. nCDD website: <http://cdd.stanford.edu> Bill Lane Center website: <http://west.stanford.edu> Haas Center website: <https://haas.stanford.edu>.

Same as: COMM 238, CSRE 38

**COMM 140Q. Bubbles, Booms, and Busts: Representing the Economy. 3 Units.**

This course examines how various cultural representations of the economy shape popular imagination and everyday life. Focusing on the US, we will look at advertising, journalism, fiction, television, film, music, and finance industry texts to explore the representation of financial risk, crisis, and inequality for lay audiences at different historical moments. Students will be introduced to a range of disciplinary and methodological approaches to finance and representation including media studies, critical finance studies, history, sociology, and anthropology as we explore media production from such periods as the Depression era, postwar middle class growth, 1980 and 1990s financialization, and the 2008 financial crisis and its aftermath.

**COMM 142W. Media Economics. 4-5 Units.**

Uses economics to examine the generation and consumption of information in communication markets. Covers concepts that play a large role in information economics, including public goods, economies of scale, product differentiation, and externalities. Looks at individuals' information demands as consumers, producers, audience members, and voters. Topics include economics of Internet, sustainability of accountability journalism, and marketplace of ideas.

Same as: COMM 242

**COMM 143W. Communication Policy and Regulation. 4-5 Units.**

Focuses on the development, implementation, and evaluation of policies affecting communication markets. Policy issues include universal service, digital divide, Internet regulation, intellectual property, privacy, television violence, content diversity, media ownership, antitrust, and impact of news on government accountability. Examines political economy of communication policy and the evolution of policies across time.

Same as: COMM 243

**COMM 145. Personality and Digital Media. 4-5 Units.**

Personality describes people's characteristic patterns of thinking, feeling, and behaving. This course will introduce students to the ways personality is expressed in digital devices (e.g., computers, smartphones) and platforms (e.g., social networks, virtual worlds). Readings and lectures will introduce students to theories of personality, the practice of assessing personality, and the broader societal implications of having mediated personalities. Course assignments will require students to apply the course concepts to explore personality expression in various digitally mediated contexts.

Same as: COMM 245

**COMM 151. The First Amendment: Freedom of Speech and Press. 4-5 Units.**

Introduction to the constitutional protections for freedom of speech, press, and expressive association. All the major Supreme Court cases dealing with issues such as incitement, libel, hate speech, obscenity, commercial speech, and campaign finance. There are no prerequisites, but a basic understanding of American government would be useful. In addition to a final and midterm exam, students participate in a moot court on a hypothetical case. (Grad students register for COMM 251).

Same as: COMM 251, POLISCI 125P

**COMM 152. Constitutional Law. 3 Units.**

This course covers Supreme Court case law concerning governmental powers, equal protection, and certain fundamental rights. The course investigates the constitutional foundation for democratic participation in the United States, covering topics such as the Fourteenth Amendment's protections against discrimination on grounds of race, gender, and other classifications, as well as the individual rights to voting and intimate association, and an introduction to First Amendment rights of free speech and press. Students will be evaluated on class participation, a midterm moot court with both a written and oral component, and a take-home final exam. Lectures will be twice per week and a discussion section once per week.

Same as: COMM 252, POLISCI 126P

**COMM 153. Political Campaigning in the Internet Age. 3 Units.**

This course will acquaint students with the changing environment for campaigns posed by the rise of the Internet. So much of the traditional way analysts have understood campaigns has revolved around television as the primary mode of campaign communication. The rise of the Internet, nonlinear television programming, and mobile communication enables new forms of campaigning. This course will examine the relevant social science on these topics, while at the same time bringing in guest lecturers from industry, campaigns, and media. Requirements: Students will be required to complete a 25 page research paper on a topic relevant to the course.

Same as: COMM 253

**COMM 153A. Policy, Politics, and the Presidency: Understanding the 2016 Campaign from Start to Finish. 2 Units.**

(Same as LAW 7057). In 2016, Americans will once again go to the polls to select a new president. But what will actually happen behind-the-scenes between now and then is largely a mystery to most. This course will introduce students to the nuts-and-bolts of a presidential campaign. Each week, we will explore a different topic related to running for the presidency – policy formation, communications, grassroots strategy, digital outreach, campaign finance – and feature high-profile guest speakers who have served in senior roles on both Democratic and Republican campaigns. Students, guests, and faculty will also participate in discussions on how these topics will relate to the 2016 presidential contest, which will begin in earnest over the course of the quarter.

Same as: COMM 253A, POLISCI 72, PUBLPOL 146, PUBLPOL 246

**COMM 154. The Politics of Algorithms. 4-5 Units.**

Algorithms have become central actors in today's digital world. In areas as diverse as social media, journalism, education, healthcare, and policing, computing technologies increasingly mediate communication processes. This course will provide an introduction to the social and cultural forces shaping the construction, institutionalization, and uses of algorithms. In so doing, we will explore how algorithms relate to political issues of modernization, power, and inequality. Readings will range from social scientific analyses to media coverage of ongoing controversies relating to Big Data. Students will leave the course with a better appreciation of the broader challenges associated with researching, building, and using algorithms.

Same as: COMM 254, CSRE 154T, SOC 154

**COMM 157. Information Control in Authoritarian Regimes. 4-5 Units.**

Does information help autocrats and dictators stay in power? Or does information help topple authoritarian regimes? This course will examine how authoritarian regimes try to control information through surveillance, propaganda, and censorship, what influences the effectiveness of these information control measures, and how changes in technology (Internet, social media, mobile) affect the dynamics of information control.

Same as: COMM 257, COMM 357

**COMM 162. Campaigns, Voting, Media, and Elections. 4-5 Units.**

This course examines the theory and practice of American campaigns and elections. First, we will attempt to explain the behavior of the key players – candidates, parties, journalists, and voters – in terms of the institutional arrangements and political incentives that confront them. Second, we will use current and recent election campaigns as "laboratories" for testing generalizations about campaign strategy and voter behavior. Third, we examine selections from the academic literature dealing with the origins of partisan identity, electoral design, and the immediate effects of campaigns on public opinion, voter turnout, and voter choice. As well, we'll explore issues of electoral reform and their more long-term consequences for governance and the political process.

Same as: COMM 262, POLISCI 120B

**COMM 164. The Psychology of Communication About Politics in America. 4-5 Units.**

Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can manipulate poll results; corruption in survey research.

Same as: COMM 264, POLISCI 124L, PSYCH 170



**COMM 166. Virtual People. 4-5 Units.**

(Graduate students register for COMM 266.) The concept of virtual people or digital human representations; methods of constructing and using virtual people; methodological approaches to interactions with and among virtual people; and current applications. Viewpoints including popular culture, literature, film, engineering, behavioral science, computer science, and communication.

Same as: COMM 266

**COMM 171. Moving Pictures: Video Journalism for mobile and social platforms. 3-5 Units.**

(Graduate students register for 271.) Examine video journalism's crucial role in digital news media across mobile and social media platforms.

What are the specific needs of mobile platforms? How is new technology utilized to produce effective video news content? We'll examine case studies and hear from guest speakers about innovations in video journalism. Students produce short video journalism pieces using mobile tools, optimized for viewing on mobile devices. Prerequisite: Journalism MA student or instructor's consent.

Same as: COMM 271

**COMM 172. Media Psychology. 4-5 Units.**

(Graduate students register for COMM 272.) The literature related to psychological processing and the effects of media. Topics: unconscious processing; picture perception; attention and memory; emotion; the physiology of processing media; person perception; pornography; consumer behavior; advanced film and television systems; and differences among reading, watching, and listening.

Same as: COMM 272

**COMM 176. Advanced Digital Media Production. 4-5 Units.**

In-depth reporting and production using audio, images and video. Focus on an in-depth journalism project with appropriate uses of digital media: audio, photography, graphics, and video. Topics include advanced field techniques and approaches (audio, video, still) and emphasis on creating a non-fiction narrative arc in a multimedia piece of 10-12 minutes.

Prerequisite: COMM 275 or consent of instructor.

Same as: COMM 276

**COMM 177A. Computational Journalism. 4-5 Units.**

Focuses on using data and algorithms to lower the cost of discovering stories or telling stories in more engaging and personalized ways.

Project based assignments based on real-world challenges faced in newsrooms. Prior experience in journalism or computational thinking helpful. Prerequisite: Comm 273D, COMM 113/213, or the consent of instructor.

Same as: COMM 277A

**COMM 177C. Specialized Writing and Reporting: Environmental and Food System Journalism. 4-5 Units.**

Advanced reporting and writing course in the specific practices and standards of food journalism. This course begins with the assumption that students are familiar with the basics of reporting and research in journalism. We'll take those skills and apply them to the wide territory of food journalism, from farmer's markets to food waste, from travel and cultural writing to stories about agriculture and climate change.

We will read a range of the best food journalism and students will be charged with writing both long form narrative essays and short magazine style pieces. We'll talk about how to hone in on the truly interesting idea, how to get more out of the reporting process and how to turn the raw materials of research and interviews into polished, engaging prose. Admission by application only, available from [vv1@stanford.edu](mailto:vv1@stanford.edu). Deadline December 4.

Same as: COMM 277C, EARTHSYS 177C, EARTHSYS 277C

**COMM 177D. Specialized Writing and Reporting: Narrative Journalism. 4-5 Units.**

(Graduate students register for COMM 277D.) How to report, write, edit, and read long-form narrative nonfiction, whether for magazines, news sites or online venues. Tools and templates of story telling such as scenes, characters, dialogue, and narrative arc. How the best long-form narrative stories defy or subvert conventional wisdom and bring fresh light to the human experience through reporting, writing, and moral passion. Prerequisite: 104 or consent of instructor.

Same as: COMM 277D

**COMM 177E. Specialized Writing and Reporting: Telling the Story. 4-5 Units.**

This workshop will offer secrets to good storytelling, and constructive feedback every step of the way on a significant piece of journalism you want to publish. The instructor, a senior editor who has helped New York Times reporters win 10 Pulitzer Prizes, will teach the course along with some of those reporters as well as other journalists with expertise in various aspects of storytelling. The sessions will include 1) elements of a great story; 2) finding a great story; 3) reporting a story; 4) writing the proposal; 5) making a story come alive online; 6) giving feedback on and editing a story; 7) assuring your story gets maximum readership online. Your piece could be one you conceive for this class, or one you have already begun reporting. Prerequisite: COMM 104 or consent of instructor.

Same as: COMM 277E

**COMM 177I. Becoming a Watchdog: Law, Order & Algorithms. 4-5 Units.**

Graduate students register for COMM 277I.) Data and algorithms are transforming law enforcement and criminal justice, a shift that is ripe for rigorous journalistic exploration. This class is centered around several empirical projects in criminal justice, with the goal of fostering greater understanding, transparency, and public accountability. Students work in interdisciplinary teams, using a combination of statistical and journalistic methods. Some of the work may be published by news organizations or may be used to advance data journalism investigations. Students with a background in journalism (especially data journalism), statistics, computer science, law, or public policy are encouraged to participate. Enrollment is limited, and project teams will be selected during the first week of class. Prerequisite: COMM 104W, or consent of instructor.

Same as: COMM 277I

**COMM 177S. Specialized Writing and Reporting: Sports Journalism. 4-5 Units.**

(Graduate students register for COMM 277S.) Workshop. An examination of American sports writing from the 1920's Golden Age of Sports to present. Students become practitioners of the sports writing craft in an intensive laboratory. Hones journalistic skills such as specialized reporting, interviewing, deadline writing, creation of video projects, and conceptualizing and developing stories for print and online. Prerequisite: 104 or consent of instructor.

Same as: COMM 277S

**COMM 177Y. Specialized Writing and Reporting: Foreign Correspondence. 4-5 Units.**

(Graduate students register for COMM 277Y.) Study how being a foreign correspondent has evolved and blend new communication tools with clear narrative to tell stories from abroad in a way that engages a diversifying American audience in the digital age. Prerequisite: COMM 104W, COMM 279, or consent of instructor.

Same as: COMM 277Y

**COMM 195. Honors Thesis. 5 Units.**

Qualifies students to conduct communication research. Student must apply for department honors thesis program during Spring Quarter of junior year.

**COMM 199. Individual Work. 1-5 Unit.**

For students with high academic standing. May be repeated for credit.

**COMM 1B. Media, Culture, and Society. 5 Units.**

The institutions and practices of mass media, including television, film, radio, and digital media, and their role in shaping culture and social life. The media's shifting relationships to politics, commerce, and identity. Same as: AMSTUD 1B

**COMM 206. Communication Research Methods. 4-5 Units.**

(Graduate students register for COMM 206.) Conceptual and practical concerns underlying commonly used quantitative approaches, including experimental, survey, content analysis, and field research in communication. Pre- or corequisite: STATS 60 or consent of instructor. Same as: COMM 106

**COMM 208. Media Processes and Effects. 4-5 Units.**

(Graduate students register for COMM 208.) The process of communication theory construction including a survey of social science paradigms and major theories of communication. Recommended: 1 or PSYCH 1.

Same as: COMM 108

**COMM 212. Models of Democracy. 3-5 Units.**

Ancient and modern varieties of democracy; debates about their normative and practical strengths and the pathologies to which each is subject. Focus is on participation, deliberation, representation, and elite competition, as values and political processes. Formal institutions, political rhetoric, technological change, and philosophical critique. Models tested by reference to long-term historical natural experiments such as Athens and Rome, recent large-scale political experiments such as the British Columbia Citizens' Assembly, and controlled experiments. Same as: COMM 312

**COMM 213. Computational Methods in the Civic Sphere. 4-5 Units.**

The widespread availability of public data provides a rich opportunity for those who can efficiently filter, interpret, and visualize information. Course develops necessary technical skills for data collection, analysis, and publication, including data mining and web visualization, with a focus on civic affairs and government accountability. Open to all majors and a range of technical skill levels. Involves tackling new tools and technical concepts in the pursuit of engaging, public-facing projects. (Graduate students enroll in 213). Prerequisite COMM 273D, CS 106A, or CS 106B. Same as: COMM 113

**COMM 216. Journalism Law. 4-5 Units.**

(Graduate students register for 216.) Laws and regulation impacting journalists. Topics include libel, privacy, news gathering, protection sources, fair trial and free press, theories of the First Amendment, and broadcast regulation. Prerequisite: Journalism M.A. student or advanced Communication major.

Same as: COMM 116

**COMM 220. Digital Media in Society. 4-5 Units.**

Contemporary debates concerning the social and cultural impact of digital media. Topics include the historical origins of digital media, cultural contexts of their development and use, and influence of digital media on conceptions of self, community, and state. Priority to juniors, seniors, and graduate students.

Same as: AMSTUD 120, COMM 120W

**COMM 224. Lies, Trust, and Tech. 4-5 Units.**

Deception is one of the most significant and pervasive social phenomena of our age. Lies range from the trivial to the very serious, including deception between friends and family, in the workplace, and in security and intelligence contexts. At the same time, information and communication technologies have pervaded almost all aspects of human communication, from everyday technologies that support interpersonal interactions to, such as email and instant messaging, to more sophisticated systems that support organization-level interactions. Given the prevalence of both deception and communication technology in our personal and professional lives, an important set of questions have recently emerged about how humans adapt their deceptive practices to new communication and information technologies, including how communication technology affects the practice of lying and the detection of deception, and whether technology can be used to identify deception. Same as: COMM 124

**COMM 225. Perspectives on American Journalism. 4-5 Units.**

An examination of American journalism, focusing on how news is produced, distributed, and financially supported. Emphasis on current media controversies and puzzles, and on designing innovations in discovering and telling stories. (Graduate students register for COMM 225.).

Same as: AMSTUD 125, COMM 125

**COMM 231. Media Ethics and Responsibility. 4-5 Units.**

(Graduate students register for COMM 231.) The development of professionalism among American journalists, emphasizing the emergence of objectivity as a professional and the epistemological norm. An applied ethics course where questions of power, freedom, and truth autonomy are treated normatively so as to foster critical thinking about the origins and implications of commonly accepted standards of responsible journalism.

Same as: COMM 131

**COMM 233. Need to Know: The Tension between a Free Press and National Security Decision Making. 4-5 Units.**

This seminar examines the dynamic interaction at the highest levels of government and the media when news coverage of secret national security policy and operations impinges on United States defense, diplomatic and intelligence activities and decision making and affects the American political system. Prime examples: intelligence information about Russian hacking operations during the 2016 presidential election campaign, the unverified intelligence dossier on Donald Trump's Russian connections, the torrent of secret NSA programs disclosed by Edward Snowden. Students explore attitudes, practices, and actions by the media and the government through a series of case studies and simulations. Former editors, reporters, and government officials appear as guest speakers, including Michael Hayden, former director of the NSA and CIA. The goal of the course is to inform students about the vital but often fraught relationship between a free press and the government in a democratic society. For advanced undergraduates and graduate students. Application for enrollment required. The instructor is a former Washington bureau chief of The New York Times. Email Alexa Philippou (aphil723@stanford.edu) to request an application. Completed applications are due by 6pm (pacific) on March 25, 2018. Early applications welcome.

Same as: COMM 133

**COMM 235. Deliberative Democracy and its Critics. 3-5 Units.**

This course examines the theory and practice of deliberative democracy and engages both in a dialogue with critics. Can a democracy which emphasizes people thinking and talking together on the basis of good information be made practical in the modern age? What kinds of distortions arise when people try to discuss politics or policy together? The course draws on ideas of deliberation from Madison and Mill to Rawls and Habermas as well as criticisms from the jury literature, from the psychology of group processes and from the most recent normative and empirical literature on deliberative forums. Deliberative Polling, its applications, defenders and critics, both normative and empirical, will provide a key case for discussion.

Same as: AMSTUD 135, COMM 135, COMM 335, POLISCI 234P, POLISCI 334P

**COMM 237. The Dialogue of Democracy. 4-5 Units.**

All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized.

Same as: AMSTUD 137, COMM 137W, POLISCI 232T, POLISCI 332T

**COMM 238. Deliberative Democracy Practicum: Applying Deliberative Polling. 3-5 Units.**

In this course, students will work directly on a real-world deliberative democracy project using the method of Deliberative Polling. Students in this course will work in partnership with the Center for Deliberative Democracy at Stanford, a research center devoted to the research in democracy and public opinion around the world. This unique practicum will allow students to work on an actual Deliberative Polling project on campus. In just one quarter, the students will prepare for, implement, and analyze the results for an Deliberative Polling project. This is a unique opportunity that allows students to take part in the entire process of a deliberative democracy project. Through this practicum, students will apply quantitative and qualitative research methods in a local community or local high school and subsequently, analyze the relevant quantitative and qualitative data. Students will explore the underlying challenges and complexities of what it means to actually do community-engaged research in the real world. As such, this course will provide students with skills and experience in research design in deliberative democracy, community and stakeholder engagement, and the practical aspects of working in local communities. This practicum is a collaboration between the Center for Deliberative Democracy, the Bill Lane Center for the American West and the Haas Center for Public Service. nCDD website: <http://cdd.stanford.edu> Bill Lane Center website: <http://west.stanford.edu> Haas Center website: <https://haas.stanford.edu>.

Same as: COMM 138, CSRE 38

**COMM 242. Media Economics. 4-5 Units.**

Uses economics to examine the generation and consumption of information in communication markets. Covers concepts that play a large role in information economics, including public goods, economies of scale, product differentiation, and externalities. Looks at individuals; information demands as consumers, producers, audience members, and voters. Topics include economics of Internet, sustainability of accountability journalism, and marketplace of ideas.

Same as: COMM 142W

**COMM 243. Communication Policy and Regulation. 4-5 Units.**

Focuses on the development, implementation, and evaluation of policies affecting communication markets. Policy issues include universal service, digital divide, Internet regulation, intellectual property, privacy, television violence, content diversity, media ownership, antitrust, and impact of news on government accountability. Examines political economy of communication policy and the evolution of policies across time.

Same as: COMM 143W

**COMM 245. Personality and Digital Media. 4-5 Units.**

Personality describes people's characteristic patterns of thinking, feeling, and behaving. This course will introduce students to the ways personality is expressed in digital devices (e.g., computers, smartphones) and platforms (e.g., social networks, virtual worlds). Readings and lectures will introduce students to theories of personality, the practice of assessing personality, and the broader societal implications of having mediated personalities. Course assignments will require students to apply the course concepts to explore personality expression in various digitally mediated contexts.

Same as: COMM 145

**COMM 251. The First Amendment: Freedom of Speech and Press. 4-5 Units.**

Introduction to the constitutional protections for freedom of speech, press, and expressive association. All the major Supreme Court cases dealing with issues such as incitement, libel, hate speech, obscenity, commercial speech, and campaign finance. There are no prerequisites, but a basic understanding of American government would be useful. In addition to a final and midterm exam, students participate in a moot court on a hypothetical case. (Grad students register for COMM 251).

Same as: COMM 151, POLISCI 125P

**COMM 252. Constitutional Law. 3 Units.**

This course covers Supreme Court case law concerning governmental powers, equal protection, and certain fundamental rights. The course investigates the constitutional foundation for democratic participation in the United States, covering topics such as the Fourteenth Amendment's protections against discrimination on grounds of race, gender, and other classifications, as well as the individual rights to voting and intimate association, and an introduction to First Amendment rights of free speech and press. Students will be evaluated on class participation, a midterm moot court with both a written and oral component, and a take-home final exam. Lectures will be twice per week and a discussion section once per week.

Same as: COMM 152, POLISCI 126P

**COMM 253. Political Campaigning in the Internet Age. 3 Units.**

This course will acquaint students with the changing environment for campaigns posed by the rise of the Internet. So much of the traditional way analysts have understood campaigns has revolved around television as the primary mode of campaign communication. The rise of the Internet, nonlinear television programming, and mobile communication enables new forms of campaigning. This course will examine the relevant social science on these topics, while at the same time bringing in guest lecturers from industry, campaigns, and media. Requirements: Students will be required to complete a 25 page research paper on a topic relevant to the course.

Same as: COMM 153

**COMM 253A. Policy, Politics, and the Presidency: Understanding the 2016 Campaign from Start to Finish. 2 Units.**

(Same as LAW 7057). In 2016, Americans will once again go to the polls to select a new president. But what will actually happen behind-the-scenes between now and then is largely a mystery to most. This course will introduce students to the nuts-and-bolts of a presidential campaign. Each week, we will explore a different topic related to running for the presidency – policy formation, communications, grassroots strategy, digital outreach, campaign finance – and feature high-profile guest speakers who have served in senior roles on both Democratic and Republican campaigns. Students, guests, and faculty will also participate in discussions on how these topics will relate to the 2016 presidential contest, which will begin in earnest over the course of the quarter. Same as: COMM 153A, POLISCI 72, PUBLPOL 146, PUBLPOL 246

**COMM 254. The Politics of Algorithms. 4-5 Units.**

Algorithms have become central actors in today's digital world. In areas as diverse as social media, journalism, education, healthcare, and policing, computing technologies increasingly mediate communication processes. This course will provide an introduction to the social and cultural forces shaping the construction, institutionalization, and uses of algorithms. In so doing, we will explore how algorithms relate to political issues of modernization, power, and inequality. Readings will range from social scientific analyses to media coverage of ongoing controversies relating to Big Data. Students will leave the course with a better appreciation of the broader challenges associated with researching, building, and using algorithms. Same as: COMM 154, CSRE 154T, SOC 154

**COMM 257. Information Control in Authoritarian Regimes. 4-5 Units.**

Does information help autocrats and dictators stay in power? Or does information help topple authoritarian regimes? This course will examine how authoritarian regimes try to control information through surveillance, propaganda, and censorship, what influences the effectiveness of these information control measures, and how changes in technology (Internet, social media, mobile) affect the dynamics of information control. Same as: COMM 157, COMM 357

**COMM 262. Campaigns, Voting, Media, and Elections. 4-5 Units.**

This course examines the theory and practice of American campaigns and elections. First, we will attempt to explain the behavior of the key players – candidates, parties, journalists, and voters – in terms of the institutional arrangements and political incentives that confront them. Second, we will use current and recent election campaigns as "laboratories" for testing generalizations about campaign strategy and voter behavior. Third, we examine selections from the academic literature dealing with the origins of partisan identity, electoral design, and the immediate effects of campaigns on public opinion, voter turnout, and voter choice. As well, we'll explore issues of electoral reform and their more long-term consequences for governance and the political process. Same as: COMM 162, POLISCI 120B

**COMM 264. The Psychology of Communication About Politics in America. 4-5 Units.**

Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can manipulate poll results; corruption in survey research.

Same as: COMM 164, POLISCI 124L, PSYCH 170

**COMM 266. Virtual People. 4-5 Units.**

(Graduate students register for COMM 266.) The concept of virtual people or digital human representations; methods of constructing and using virtual people; methodological approaches to interactions with and among virtual people; and current applications. Viewpoints including popular culture, literature, film, engineering, behavioral science, computer science, and communication.

Same as: COMM 166

**COMM 271. Moving Pictures: Video Journalism for mobile and social platforms. 3-5 Units.**

(Graduate students register for 271.) Examine video journalism's crucial role in digital news media across mobile and social media platforms. What are the specific needs of mobile platforms? How is new technology utilized to produce effective video news content? We'll examine case studies and hear from guest speakers about innovations in video journalism. Students produce short video journalism pieces using mobile tools, optimized for viewing on mobile devices. Prerequisite: Journalism MA student or instructor's consent.

Same as: COMM 171

**COMM 272. Media Psychology. 4-5 Units.**

(Graduate students register for COMM 272.) The literature related to psychological processing and the effects of media. Topics: unconscious processing; picture perception; attention and memory; emotion; the physiology of processing media; person perception; pornography; consumer behavior; advanced film and television systems; and differences among reading, watching, and listening.

Same as: COMM 172

**COMM 273D. Public Affairs Data Journalism I. 4 Units.**

Even before the ubiquity of Internet access and high-powered computers, public accountability reporting relied on the concerted collection of observations and analytical problem-solving. We study the methods, and the data, used to discover leads and conduct in-depth reporting on public affairs, including election finance and safety regulations. Students gain practical experience with the digital tools and techniques of computer-assisted reporting. Prerequisite: Journalism M.A. student.

**COMM 274D. Public Affairs Data Journalism II. 4 Units.**

Learn how to find, create and analyze data to tell news stories with public service impact. Uses relational databases, advanced queries, basic statistics, and mapping to analyze data for storytelling. Assignments may include stories, blog posts, and data visualizations, with at least one in-depth project based on data analysis. Prerequisites: COMM 273D or Journalism M.A. student.

**COMM 275. Multimedia Storytelling: Reporting and Production Using Audio, Still Images, and Video. 3-4 Units.**

Multimedia assignments coordinated with deadline reporting efforts in COMM 273 from traditional news beats using audio, still photography, and video. Use of digital audio recorders and audio production to leverage voice-over narration, interviews, and natural sound; use of digital still cameras and audio to produce audio slideshows; and the combination of these media with video in post-production with Final Cut Pro. Prerequisite: Journalism M.A. student. Corequisite: COMM 273.

**COMM 276. Advanced Digital Media Production. 4-5 Units.**

In-depth reporting and production using audio, images and video. Focus on an in-depth journalism project with appropriate uses of digital media: audio, photography, graphics, and video. Topics include advanced field techniques and approaches (audio, video, still) and emphasis on creating a non-fiction narrative arc in a multimedia piece of 10-12 minutes. Prerequisite: COMM 275 or consent of instructor.

Same as: COMM 176

**COMM 277A. Computational Journalism. 4-5 Units.**

Focuses on using data and algorithms to lower the cost of discovering stories or telling stories in more engaging and personalized ways. Project based assignments based on real-world challenges faced in newsrooms. Prior experience in journalism or computational thinking helpful. Prerequisite: Comm 273D, COMM 113/213, or the consent of instructor.

Same as: COMM 177A

**COMM 277C. Specialized Writing and Reporting: Environmental and Food System Journalism. 4-5 Units.**

Advanced reporting and writing course in the specific practices and standards of food journalism. This course begins with the assumption that students are familiar with the basics of reporting and research in journalism. We'll take those skills and apply them to the wide territory of food journalism, from farmer's markets to food waste, from travel and cultural writing to stories about agriculture and climate change. We will read a range of the best food journalism and students will be charged with writing both long form narrative essays and short magazine style pieces. We'll talk about how to hone in on the truly interesting idea, how to get more out of the reporting process and how to turn the raw materials of research and interviews into polished, engaging prose. Admission by application only, available from [vv1@stanford.edu](mailto:vv1@stanford.edu). Deadline December 4.

Same as: COMM 177C, EARTHSYS 177C, EARTHSYS 277C

**COMM 277D. Specialized Writing and Reporting: Narrative Journalism. 4-5 Units.**

(Graduate students register for COMM 277D.) How to report, write, edit, and read long-form narrative nonfiction, whether for magazines, news sites or online venues. Tools and templates of story telling such as scenes, characters, dialogue, and narrative arc. How the best long-form narrative stories defy or subvert conventional wisdom and bring fresh light to the human experience through reporting, writing, and moral passion. Prerequisite: 104 or consent of instructor.

Same as: COMM 177D

**COMM 277E. Specialized Writing and Reporting: Telling the Story. 4-5 Units.**

This workshop will offer secrets to good storytelling, and constructive feedback every step of the way on a significant piece of journalism you want to publish. The instructor, a senior editor who has helped New York Times reporters win 10 Pulitzer Prizes, will teach the course along with some of those reporters as well as other journalists with expertise in various aspects of storytelling. The sessions will include 1) elements of a great story; 2) finding a great story; 3) reporting a story; 4) writing the proposal; 5) making a story come alive online; 6) giving feedback on and editing a story; 7) assuring your story gets maximum readership online. Your piece could be one you conceive for this class, or one you have already begun reporting. Prerequisite: COMM 104 or consent of instructor.

Same as: COMM 177E

**COMM 277I. Becoming a Watchdog: Law, Order & Algorithms. 4-5 Units.**

Graduate students register for COMM 277I.) Data and algorithms are transforming law enforcement and criminal justice, a shift that is ripe for rigorous journalistic exploration. This class is centered around several empirical projects in criminal justice, with the goal of fostering greater understanding, transparency, and public accountability. Students work in interdisciplinary teams, using a combination of statistical and journalistic methods. Some of the work may be published by news organizations or may be used to advance data journalism investigations. Students with a background in journalism (especially data journalism), statistics, computer science, law, or public policy are encouraged to participate. Enrollment is limited, and project teams will be selected during the first week of class Prerequisite: COMM 104W, or consent of instructor.

Same as: COMM 177I

**COMM 277S. Specialized Writing and Reporting: Sports Journalism. 4-5 Units.**

(Graduate students register for COMM 277S.) Workshop. An examination of American sports writing from the 1920's Golden Age of Sports to present. Students become practitioners of the sports writing craft in an intensive laboratory. Hones journalistic skills such as specialized reporting, interviewing, deadline writing, creation of video projects, and conceptualizing and developing stories for print and online. Prerequisite: 104 or consent of instructor.

Same as: COMM 177S

**COMM 277Y. Specialized Writing and Reporting: Foreign Correspondence. 4-5 Units.**

(Graduate students register for COMM 277Y.) Study how being a foreign correspondent has evolved and blend new communication tools with clear narrative to tell stories from abroad in a way that engages a diversifying American audience in the digital age. Prerequisite: COMM 104W, COMM 279, or consent of instructor.

Same as: COMM 177Y

**COMM 278. Journalism and Imaginative Writing in America. 5 Units.**

Walt Whitman spent twenty-five years as a journalist before publishing his first book of poems. Mark Twain was a journalist for twenty years before publishing his first novel. Topics include examination of how writers' backgrounds in journalism shaped the poetry or fiction for which they are best known; study of recent controversies surrounding writers who blurred the line between journalism and fiction. Writers include Whitman, Fanny Fern, Twain, Pauline Hopkins, Theodore Dreiser, Charlotte Perkins Gilman, Ernest Hemingway, Meridel LeSueur.

Same as: AMSTUD 257

**COMM 279. News Reporting & Writing Fundamentals. 3-4 Units.**

Learn beat reporting and writing skills including source development, interviewing, and story structure for news and features. Emphasis on developing news judgment, clear writing skills, and an ability to execute stories on deadline. Exercises and assignments mimic a newsroom. Students pursue local beats with a focus on public issues and complement written pieces with relevant data analyses and multimedia components. Prerequisite: Journalism M.A. student. Corequisite: COMM 275.

**COMM 280. Virtual Reality Journalism in the Public Sphere. 4 Units.**

The immersive space (cinematic VR and virtual reality) is journalism's newest and most exciting reporting and storytelling tool. We survey best practices and methods in this emerging medium and learn 360-degree video production and postproduction. Teams will illuminate issues and provoke conversation in the public sphere. Prerequisite: Preference to Journalism M.A. students. Please contact instructor for permission number to enroll.

**COMM 281. Exploring Computational Journalism. 3 Units.**

This course will explore the evolving field of computational journalism. Students will research and discuss the state of the field, and do projects in areas such as understanding the media ecosystem, stimulating media creation, and assessing media impact. Admission by application; please email James Hamilton at [jayth@stanford.edu](mailto:jayth@stanford.edu) to request application. Same as: CS 206

**COMM 289P. Journalism Thesis. 2-4 Units.**

MA thesis course. Focuses on development of in-depth journalism project, culminating in work of publishable quality.

**COMM 290. Media Studies M.A. Project. 1-2 Unit.**

Individual research for coterminal Media Studies students.

**COMM 291. Graduate Journalism Seminar. 1 Unit.**

Required of students in the graduate program in Journalism. Forum for current issues in the practice and performance of the press. The seminar frequently features Bay Area Journalists as guest speakers. May be repeated for credit.

**COMM 299. Individual Work. 1-4 Unit.**

**COMM 301. Communication Research, Curriculum Development and Pedagogy. 1 Unit.**

Designed to prepare students for teaching and research in the Department of Communication. Students will be trained in developing curriculum and in pedagogical practices, and will also be exposed to the research programs of various faculty members in the department. Required of all Ph.D. students.

**COMM 307. Summer Institute in Political Psychology. 3 Units.**

Lectures, discussion groups, and workshops addressing many applications of psychology to the analysis of political behavior. Public opinion, international relations, political decision-making, attitudes and beliefs, prejudice, social influence and persuasion, terrorism, news media influence, foreign policy, socialization, social justice.

**COMM 308. Graduate Seminar in Political Psychology. 1-3 Unit.**

For students interested in research in political science, psychology, or communication. Methodological techniques for studying political attitudes and behaviors. May be repeated for credit.

Same as: POLISCI 324

**COMM 311. Theory of Communication. 1-5 Unit.**

Basic communication theory for first-year Ph.D. students in the Department of Communication. Introduction to basic writings and concepts in communication research. The goal is an introduction to issues in the field that are common in communication research. First half of the class will emphasize classic literature about field organization, history and theory. Second half will emphasize contemporary theory in areas that students select.

**COMM 312. Models of Democracy. 3-5 Units.**

Ancient and modern varieties of democracy; debates about their normative and practical strengths and the pathologies to which each is subject. Focus is on participation, deliberation, representation, and elite competition, as values and political processes. Formal institutions, political rhetoric, technological change, and philosophical critique. Models tested by reference to long-term historical natural experiments such as Athens and Rome, recent large-scale political experiments such as the British Columbia Citizens' Assembly, and controlled experiments. Same as: COMM 212

**COMM 314. Ethnographic Methods. 1-5 Unit.**

This course offers an introduction to the practice and politics of ethnographic fieldwork. It provides a "how to" of ethnographic research, in which students will conduct an ethnographic project of their own, complemented by weekly readings and discussions. In the process, we will discuss the theory and epistemology of fieldwork, along with the practicalities and politics of fieldwork in different domains. We will examine different stages of ethnographic research (entering the field, conducting and recording fieldwork, exiting the field and writing it up), different methods (observations, interviews, "going along"), as well as distinct styles of ethnographic work (virtual ethnography, organizational ethnography, narrative ethnography, etc.). The course will serve as a participative workshop for students to exchange field notes, share practical advice, and consolidate their research interests. Prerequisite: Communication Ph.D. student, or consent of instructor.

Same as: SOC 319

**COMM 317. The Philosophy of Social Science. 1-5 Unit.**

Approaches to social science research and their theoretical presuppositions. Readings from the philosophy of the social sciences. Research design, the role of experiments, and quantitative and qualitative research. Cases from communication and related social sciences. Prerequisite: consent of instructor.

**COMM 318. Quantitative Social Science Research Methods. 1-5 Unit.**

An introduction to a broad range of social science research methods that are widely used in PhD work. Prerequisite: consent of instructor.

**COMM 320G. Advanced Topics in New Media and American Culture. 1-5 Unit.**

This course deals with advanced issues in computing and American cultural history since World War II. Primarily for Ph.D. students. Prerequisite: 220 or consent of instructor.

**COMM 324. Language and Technology. 3-5 Units.**

In this course we develop a model of how language reflects social and psychological dynamics in social media and other technologically-mediated contexts. The course lays out the main stages of analyzing language to understand social dynamics, including using theory to identify key discourse features, feature extraction, and classification and prediction. The course will draw on action-oriented language approaches to understand how people use language (e.g., grounding and joint action models), and then build on this approach to understand how discourse features from natural language can be used to answer questions from a wide range of social science questions, and ultimately, to the design of new technologies.

**COMM 326. Advanced Topics in Human Virtual Representation. 1-5 Unit.**

Topics include the theoretical construct of person identity, the evolution of that construct given the advent of virtual environments, and methodological approaches to understanding virtual human representation. Prerequisite: PhD student or consent of instructor.

**COMM 335. Deliberative Democracy and its Critics. 3-5 Units.**

This course examines the theory and practice of deliberative democracy and engages both in a dialogue with critics. Can a democracy which emphasizes people thinking and talking together on the basis of good information be made practical in the modern age? What kinds of distortions arise when people try to discuss politics or policy together? The course draws on ideas of deliberation from Madison and Mill to Rawls and Habermas as well as criticisms from the jury literature, from the psychology of group processes and from the most recent normative and empirical literature on deliberative forums. Deliberative Polling, its applications, defenders and critics, both normative and empirical, will provide a key case for discussion.

Same as: AMSTUD 135, COMM 135, COMM 235, POLISCI 234P, POLISCI 334P

**COMM 339. Questionnaire Design for Surveys and Laboratory Experiments: Social and Cognitive Perspectives. 4 Units.**

The social and psychological processes involved in asking and answering questions via questionnaires for the social sciences; optimizing questionnaire design; open versus closed questions; rating versus ranking; rating scale length and point labeling; acquiescence response bias; don't-know response options; response choice order effects; question order effects; social desirability response bias; attitude and behavior recall; and introspective accounts of the causes of thoughts and actions.

Same as: POLISCI 421K, PSYCH 231

**COMM 345. Personality Expression in Digitally Mediated Contexts. 1-5 Unit.**

Digital devices (e.g., computers, smartphones, wearables) and platforms (e.g., social media sites, forums, virtual worlds) mediate much of our daily life. Each time we use digital media for communication, information seeking, or entertainment, we leave behind psychologically revealing digital footprints. In this course, we will explore how digital footprints can be used to understand individual differences in thinking, feeling, and behaving. Class activities and assignments will require students to apply the concepts to their own research projects.

**COMM 350. New Media and Journalism. 1-5 Unit.**

New media technologies are transforming how people create and consume information. In this course, we study journalism as an organized field of practice to examine what digital technologies change -- and what they don't change -- about production, diffusion, and reception of news around the globe. The course will cover topics such as changing professional boundaries in a networked environment; the decentralization of news production with social media platforms; the changes in editorial judgement related to automation; the construction of algorithmic audiences; and the promises and challenges associated with data journalism. Moving beyond simplistic analyses of the internet as a universal explanation for all changes in journalism, this course explores how new technologies interact with existing practices, representations, and institutions.

Same as: SOC 326

**COMM 357. Information Control in Authoritarian Regimes. 4-5 Units.**

Does information help autocrats and dictators stay in power? Or does information help topple authoritarian regimes? This course will examine how authoritarian regimes try to control information through surveillance, propaganda, and censorship, what influences the effectiveness of these information control measures, and how changes in technology (Internet, social media, mobile) affect the dynamics of information control.

Same as: COMM 157, COMM 257

**COMM 360G. Political Communication. 1-5 Unit.**

An overview of research in political communication with particular reference to work on the impact of the mass media on public opinion and voting behavior. Limited to Ph.D. students. Prerequisite: 260 or consent of instructor.

Same as: POLISCI 425

**COMM 361. Law of Democracy. 3-5 Units.**

Combined with LAW 7036 (formerly Law 577). This course is intended to give students a basic understanding of the themes in the legal regulation of elections and politics. We will cover all the major Supreme Court cases on topics of voting rights, reapportionment/redistricting, ballot access, regulation of political parties, campaign finance, and the 2000 presidential election controversy. The course pays particular attention to competing political philosophies and empirical assumptions that underlie the Court's reasoning while still focusing on the cases as litigation tools used to serve political ends. Elements used in grading: Class participation and one day take home final exam. (POLISCI 327C; LAW 577).

Same as: POLISCI 327C

**COMM 362. Topics in Political Communication: Media Bias, Selective Exposure, and Political Polarization. 1-5 Unit.**

This course surveys theories of media bias, biased processing of information, and the empirical challenges facing researchers attempting to link changes in the composition of audiences to attitudinal and behavioral outcomes. (Limited to PhD students).

Same as: POLISCI 425S

**COMM 372G. Seminar in Psychological Processing. 1-5 Unit.**

Limited to Ph.D. students. Advanced topics. Prerequisite: 272 or consent of instructor.

**COMM 378. Media and Time. 1-5 Unit.**

As media technologies change, they radically restructure our experience of time. This course will bring together readings from media psychology and media history in order to understand this process. Students will explore issues such as the acceleration of everyday life, new modes of screen use, and the transformation of cultural categories such as *the narrative* and *the event*. Ultimately the course aims to help prepare students to consider time in scholarship about media.

**COMM 380. Curriculum Practical Training. 1-5 Unit.**

Practical experience in the communication industries. Prerequisite: consent of instructor. Meets requirements for Curricular Practical Training for students on F-1 visas. (Staff).

**COMM 382. Research in Computational Social Science. 1-5 Unit.**

Massive datasets are increasingly available for research as digital technologies pervade our lives. These data represent new opportunities for social science research, but prominent examples of data science research bear little resemblance to the research designs of social scientific inquiry. In this course, we use machine learning and statistical tools on large-scale datasets to answer social science questions of cause and effect. Familiarity with Python recommended. Enrollment limited to PhD students in COMM or Social Science who have completed or are currently taking graduate quantitative methods sequences in Economics, Political Science, Sociology, or Statistics. Contact blazzari@stanford.edu for a permission number to enroll (please include a current CV).

**COMM 384. Media Technology Theory. 3-5 Units.**

This course surveys major theoretical approaches to the study of media technologies, including Frankfurt School critical theory, media archaeology, actor network theory, science and technology studies, platform studies and theories of critical making. By the end of the course, students should have a rich familiarity with the literature in this area, as well as with exemplary empirical studies conducted within each tradition. Preference to Ph.D. students in Communication and Art and Art History. Consent of instructor required for non-PhD students.

Same as: ARTHIST 465

**COMM 386. Media Cultures of the Cold War. 3-5 Units.**

The intersection of politics, aesthetics, and new media technologies in the U.S. between the end of WW II and the fall of the Berlin Wall. Topics include the aesthetics of thinking the unthinkable in the wake of the atom bomb; abstract expressionism and 'modern man' discourse; game theory, cybernetics, and new models of art making; the rise of television, intermedia, and the counterculture; and the continuing influence of the early cold war on contemporary media aesthetics. Readings from primary and secondary sources in art history, communication, and critical theory.

Same as: ARTHIST 475

**COMM 397. Minor Research Project. 1-6 Unit.**

Individual research for Ph.D. candidates. Course may be repeated for credit.

**COMM 398. Major Research Project. 1-6 Unit.**

Individual research for Ph.D. candidates.

**COMM 399. Advanced Individual Work. 1-9 Unit.**

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**COMM 801. TGR Project. 0 Units.**

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**COMM 802. TGR Dissertation. 0 Units.**

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**COMM 86SI. College Media Lab: digital and reporting skills for student journalists. 1-2 Unit.**

Journalism, especially college journalism, is undergoing rapid change in the 21st century. As native digital users, we are uniquely positioned to create and innovate in the new media landscape. This class is designed to provide students with a hands-on education in digitally-fluent college media reporting. Topics include photo, video and data reporting, media rights and responsibilities, and communications careers outside of journalism. The 'basics' of writing, blogging, and reporting the news will be taught and applied throughout the quarter. Guest lectures from professional reporters, academics, and communications professionals. Work completed for this class can be submitted to The Stanford Daily for publication. Pizza provided.

## Compar Stud in Race & Ethnic (CSRE)

### CSRE 100. Grassroots Community Organizing: Building Power for Collective Liberation. 3-5 Units.

Taught by long-time community organizer, Beatriz Herrera. This course explores the theory, practice and history of grassroots community organizing as a method for developing community power to promoting social justice. We will develop skills for 1-on-1 relational meetings, media messaging, fundraising strategies, power structure analysis, and strategies organizing across racial/ethnic difference. And we will contextualize these through the theories and practices developed in the racial, gender, queer, environmental, immigrant, housing and economic justice movements to better understand how organizing has been used to engage communities in the process of social change. Through this class, students will gain the hard skills and analytical tools needed to successfully organize campaigns and movements that work to address complex systems of power, privilege, and oppression. As a Community-Engaged Learning course, students will work directly with community organizations on campaigns to address community needs, deepen their knowledge of theory and history through hands-on practice, and develop a critical analysis of inequality at the structural and interpersonal levels. Placements with community organizations are limited. Enrollment will be determined on the first day through a simple application process. Students will have the option to continue the course for a second quarter in the Winter, where they will execute a campaign either on campus or in collaboration with their community partner.

Same as: AFRICAAM 100, FEMGEN 100X, URBANST 108

### CSRE 100B. Grassroots Community Organizing Field Work. 1-5 Unit.

Continuation of projects and community engagement from CSRE 100. Prerequisite: completion of CSRE 100.

### CSRE 100P. Student and Community Organizing for Social Change. 1 Unit.

This course explores student and community organizing history, theories of practice, as well as models of social change through a mix of guest speakers from social justice groups, theoretical readings and practicum-based work. The major component of this course is participating in an intensive three-day skills-based training that will teach students how to be more strategic in their fight for justice on campus and in the community. The training consists of a series of presentations, exercises, and discussions that teach sets of skills and concepts related to student and community organizing. The course is designed for students with interests in student and community organizing, as well as those considering careers and leadership opportunities in a variety of nonprofit and social justice fields. This is designated as a one-unit course, with a community engaged learning option for two additional units. Proposed dates for intensive skills-based training are April 6th-8th and April 27th and 29th. Both dates are required.

### CSRE 101P. Student and Community Organizing for Social Change. 3 Units.

This course explores student and community organizing history, theories of practice, as well as models of social change through a mix of guest speakers from social justice groups, theoretical readings and practicum-based work. The major component of this course is participating in an intensive three-day skills-based training that will teach students how to be more strategic in their fight for justice on campus and in the community. The training consists of a series of presentations, exercises, and discussions that teach sets of skills and concepts related to student and community organizing. The course is designed for students with interests in student and community organizing, as well as those considering careers and leadership opportunities in a variety of nonprofit and social justice fields. This is designated as a one-unit course, with a community engaged learning option for two additional units. Proposed dates for intensive skills-based trainings are April 6th-8th and April 27th and 29th. Both dates are required.

### CSRE 102A. Art and Social Criticism. 5 Units.

Visual artists have long been in the forefront of social criticism in America. Since the 1960s, various visual strategies have helped emergent progressive political movements articulate and represent complex social issues. Which artists and particular art works/projects have become key anchors for discourses on racism, sexism, economic and social inequality, immigrant rights and climate change? We will learn about a spectrum of political art designed to raise social awareness, spark social change and rouse protest. The Art Workers Coalition's agit-prop opposing the Vietnam War and ACT-UP's emblematic signs and symbols during the AIDS/HIV crisis of the 1980s galvanized a generation into action. Works such as Judy Chicago's *The Dinner Party* (1979), Fred Wilson's *Mining the Museum* (1992), and Glenn Ligon's paintings appropriating fragments from African-American literature all raised awareness by excavating historical evidence of the long legacy resisting marginalization. For three decades feminist artists Barbara Kruger and the Guerilla Girls have combined institutional critique and direct address into a provocative form of criticality. Recent art for social justice is reaching ever broadening publics by redrawing the role of artist and audience exemplified by the democratization of poster making and internet campaigns of Occupy and the Movement for Black Lives. We will also consider the collective aesthetic activism in the Post-Occupy era including Global Ultra Luxury Faction, Climate Justice art projects, and the visual culture of Trump era mass protests. Why are each of these examples successful as influential and enduring markers of social criticism? What have these socially responsive practices contributed to our understanding of American history?

Same as: AFRICAAM 102B, AMSTUD 102, ARTHIST 162B, FEMGEN 102

### CSRE 103. Intergroup Communication. 3 Units.

In an increasingly globalized world, our ability to connect and engage with new audiences is directly correlated with our competence and success in any field. How do our intergroup perceptions and reactions influence our skills as communicators? This course uses experiential activities and discussion sections to explore the role of social identity in effective communication. The objective of the course is to examine and challenge our explicit and implicit assumptions about various groups to enhance our ability to successfully communicate across the complex web of identity.

Same as: PSYCH 103

### CSRE 103B. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices. 3-5 Units.

Focus is on classrooms with students from diverse racial, ethnic and linguistic backgrounds. Studies, writing, and media representation of urban and diverse school settings; implications for transforming teaching and learning. Issues related to developing teachers with attitudes, dispositions, and skills necessary to teach diverse students.

Same as: AFRICAAM 106, EDUC 103B, EDUC 337

### CSRE 103F. Intergroup Communication Facilitation. 1 Unit.

This is a TA training course for Psych 103 - Intergroup Communication.

Same as: PSYCH 103F

### CSRE 103S. Gender in Native American Societies. 5 Units.

Seminar examines the impact of colonialism on gender roles & gender relations in American Indian communities beginning with the 17th century to the present. Topics include demographic changes; social, political & economic transformations associated with biological & spiritual assaults; the dynamism & diversity of native societies. Sources include history, ethnography, biography, autobiography, the novel & film.

Same as: FEMGEN 103S, NATIVEAM 103S



**CSRE 105. Religion and War in America. 4 Units.**

Scholars have devoted much attention to wars in American history, but have not agreed as to whether religion was a major cause or simply a cover for political, economic, and other motives. We will compare interpretations that leave religion out, with those that take it into account. We will also look at the impact of war on the religious lives of ordinary Americans. We will examine both secondary as well as primary sources, beginning with King Philip's War in the 17th century, and ending with the "War on Terror" in the present day.

Same as: AMSTUD 105R, HISTORY 254D, HISTORY 354D, RELIGST 105

**CSRE 107. The Black Mediterranean: Greece, Rome and Antiquity. 4-5 Units.**

Explore problems of race and ethnicity as viable criteria in studying ancient societies and consider the question, What is the Mediterranean?, in relation to premodern evidence. Investigate the role of blackness as a marker of ethnicity; the demography of slavery and its roles in forming social identities; and environmental determinism as a factor in ethnic and racial thinking. Consider Greek and Roman perspectives and behavior, and their impact on later theories of race and ethnicity as well as the Mediterranean as a whole.

Same as: AFRICAAM 107C

**CSRE 108. Introduction to Feminist, Gender, and Sexuality Studies. 4-5 Units.**

Introduction to interdisciplinary approaches to gender, sexuality, queer, trans and feminist studies. Topics include the emergence of sexuality studies in the academy, social justice and new subjects, science and technology, art and activism, history, film and memory, the documentation and performance of difference, and relevant socio-economic and political formations such as work and the family. Students learn to think critically about race, gender, and sexuality from local and global perspectives.

Same as: AMSTUD 107, FEMGEN 101, TAPS 108

**CSRE 108C. Sugar and Slavery, Race and Revolution: The Caribbean 1450-1888. 3-5 Units.**

This course examines race and slavery across British, French, and Spanish islands, plus Brazil. The intensity of Caribbean slavery produced societies where more people were enslaved than free. The idea of "black" was invented and contested as Caribbean inhabitants leaned on African roots to shape new cultures. Sugar production sparked global wars and planted the seed of modern financial systems. Black people fought back, in ways large and small, marking the beginning of emancipation with the Haitian Revolution.

Same as: AFRICAAM 18C, HISTORY 8C, HISTORY 108C

**CSRE 108S. American Indian Religious Freedom. 3 Units.**

The persistence of tribal spiritual beliefs and practices in light of legal challenges (sacred geography and the 1st Amendment), treatment of the dead and sacred objects (repatriation), consumerism (New Age commodification), and cultural intellectual property protection (trademark, copyright, patent law). Focus is on contemporary issues and cases, analyzed through interdisciplinary scholarship and practical strategies to protect the fundamental liberty of American Indian religious freedom.

Same as: NATIVEAM 108S

**CSRE 109A. Federal Indian Law. 5 Units.**

Cases, legislation, comparative justice models, and historical and cultural material. The interlocking relationships of tribal, federal, and state governments. Emphasis is on economic development, religious freedom, and environmental justice issues in Indian country.

Same as: NATIVEAM 109A

**CSRE 109B. Indian Country Economic Development. 3 Units.**

The history of competing tribal and Western economic models, and the legal, political, social, and cultural implications for tribal economic development. Case studies include mineral resource extraction, gaming, and cultural tourism. 21st-century strategies for sustainable economic development and protection of political and cultural sovereignty.

Same as: NATIVEAM 109B

**CSRE 10A. Introduction to Identity, Diversity, and Aesthetics: Arts, Culture, and Pedagogy. 1 Unit.**

This weekly lecture series introduces students to the study of identity, diversity, and aesthetics through the work of leading artists and scholars affiliated with the Institute for Diversity in the Arts (IDA). This year's course highlights the educational impact of arts and culture. How can arts and culture help to advance pedagogies of liberation? Among other things, we will examine hip-hop education and how it illuminates ideas around culturally relevant and culturally sustaining pedagogies, indigenous knowledges, embodied knowledges, hip-hop feminisms, and community engaged research. We will look at case studies from East Palo Alto, CA and Cape Town, South Africa.

Same as: AFRICAAM 10A

**CSRE 10AY. Pacific Standard Time LA/LA creative projects in a Celebration Beyond Borders. 1-2 Unit.**

Students will have the opportunity to develop written and creative responses to the exploration of the region wide collaboration Pacific Standard Time LA/LA.

**CSRE 10SC. Inequality and Poverty in the United States. 2 Units.**

Social inequality is a feature of all advanced industrial societies. However, some societies have more inequality than others, and some types of inequality are more prominent in some societies than in others. Inequality in the United States is greater than in many other industrialized nations and has increased dramatically in the past forty years. Economic inequality, for example, is greater today than any time since the 1920s. Growing public awareness of this inequality has sparked a vigorous debate among politicians and public protests in city streets; some that have turned violent. The Occupy Movement was driven largely by resentment against the growing concentration of economic privilege within a small segment of society. Inequality was a prominent theme in the Bernie Sanders presidential campaign. Despite these debates and protests, there is no consensus about whether anything should be done to stem this trend. This class will focus on three domains of inequality in the United States: social class, gender, and racial inequality. The assigned reading and discussions will examine theories and research about the origins of social inequality; how inequality and poverty is reproduced over time; the consequences of inequality and poverty; and what might be done to reduce inequality and poverty in American society. Students will be expected to help lead and participate in class discussions, and to complete a weekly assignment based on the readings. In addition to the in-class instruction, students will have an opportunity to engage in public service activities directly related to poverty and inequality. Students will work with the Director of Community Engaged Learning (DCEL) from the Center for Comparative Studies in Race and Ethnicity who will assist with their participation in activities connected with social service agencies in the area, including agencies that deal with homelessness, food insecurity, and other needs.

Same as: SOC 11SC

**CSRE 110P. Mindful Leadership. 1-2 Unit.**

An exploration of one's inner life, ways of being in the world, and their expression in how one leads. Addresses the paradoxical task of merely paying attention to enhance our awareness of the socially constructed nature of reality and to feel comfortable to act with simplicity, empathy, and conviction. Through self-reflection, embodied practice, and creative expression through crossing borders students examine us and them. Mindful inquiry in expressed storytelling, collective knowing, appreciative intelligence, and is both scholarly and experiential.

Same as: LEAD 110

**CSRE 111. The California Missions: Art History and Reconciliation. 5 Units.**

Sites of the spirit and devotion, sites of genocide, foreboding actors in Alfred Hitchcock's *Vertigo*, the subject of fourth-grade school projects, the Spanish Missions of Alta California are complex sites of inquiry, their meanings and associations different for each visitor. This seminar examines the art and architecture of the California Missions built between 1769 and 1823. Constructed with local materials and decorated with reredos, paintings and sculptures from Mexico and Spain, the Missions are at once humble spaces and flagships of a belated global baroque. They were also the laboratories of indigenous artists and artisans. This course seeks to understand how Mission art was meant to function, how and why it was made, what its materials were, while asking what the larger role of art was in a global system of missions. Can the study of this art lead to the reconciliation of populations in North America and within the field of art history? The Missions require a specific reexamination of the relationship between European and colonial forms, not as objects of curiosity or diffusion but as viable and globally informed agents.

Same as: ARTHIST 211, NATIVEAM 211

**CSRE 112. Presidential Politics: Race, Gender, and Inequality in the 2016 Election. 3 Units.**

From the 2016 nomination process to the election. The complexities of identity and its role in uniting and dividing the electorate. Panels covering the media, political participation, and group affiliation.

Same as: AFRICAAM 109, POLISCI 123A

**CSRE 112X. Urban Education. 3-5 Units.**

(Graduate students register for EDUC 212 or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education.

Same as: AFRICAAM 112, EDUC 112, EDUC 212, SOC 129X, SOC 229X

**CSRE 113V. Freedom in Chains: Black Slavery in the Atlantic, 1400s-1800s. 5 Units.**

This course will focus on the history of slavery in the British, French, Spanish, Portuguese and Dutch Atlantic world(s), from the late 1400s to the 1800s. Its main focus will be on the experiences of enslaved Africans and their descendants. Between the sixteenth and nineteenth centuries, the Europeans forcibly embarked over 10 million Africans to the Americas. Drawing on methodologies used by historians, archaeologists and anthropologists, the course will reconstruct the daily lives and the socio-economic, cultural and political histories of these captives.

We will seek to hear their voices by investigating a variety of historical testimonies and recent scholarship. The course will examine slavery in the context of broader trends in Atlantic World studies, a field that has grown considerably in recent years, providing new ways of understanding historical developments across national boundaries. We will seek to identify commonalities and differences across time periods and regions and the reasons for those differences. Covered topics will include slave ship voyages, labor, agency, the creation of new identities (creolization), religion, race, gender, resistance, legacies, and memory.

Same as: AFRICAAM 113V, AFRICAST 113V, HISTORY 205D

**CSRE 114. Sound Tracks: Music, Memory, and Migration in the Twentieth Century. 3-4 Units.**

This course comprises a thematic exploration of forces, experiences, and after-effects of diasporas of communities in the Americas and Europe throughout the 20th century. Through close listening accompanied by historical and theoretical readings, students will gain deeper insights into the making of meaning in music and the role of music as a creative response to the challenges of migration and minority-status in the modern nation-state. Historical examples will draw from the Romani diaspora, Eastern-European Jewish liturgical sounds, the Mexican-US border, and from Jazz and the Blues. We explore issues of race, ethnicity, identity, nationalism, minoritization as they intersect in the sound tracks of diaspora.

Same as: MUSIC 114

**CSRE 117. Expanding Engineering Limits: Culture, Diversity, and Gender. 2-3 Units.**

This course investigates how culture, and diversity, including gender, shape who becomes an engineer, what problems get solved, and the quality of designs, technology, and products. We first examine the characteristics of engineering cultures – what are the interactions, symbols and ideas, and practices that define engineering? We then investigate how gender and other markers of diverse identities are interdependent and culturally constructed, how gender and other kinds of diversity are experienced in engineering cultures, and how these experiences have consequence for engineering innovation and the engineering profession. Finally, we analyze examples of cultural change in engineering and implications for engineering knowledge and practice. The course involves weekly presentations by distinguished scholars and engineers, readings, short writing assignments, small-group discussion, and exercises around one's own experiences in and related to engineering. Those taking the course for 3 units will also complete a research-based project, and must take the course for a letter grade to meet the undergraduate WAY-ED requirement.

Same as: CSRE 217, ENGR 117, FEMGEN 117, FEMGEN 217

**CSRE 117Q. Queer Arts: Remembering and Imagining Social Change. 4-5 Units.**

This interdisciplinary fine arts course is designed to examine the nature of artistic imagination, sources of creativity and the way this work helps shape social change. We will consider the relationship among muses, mentors and models for queer artists engaged in such fields as visual art, music, theatre, film, creative writing and dance. Exploring various cultures, lands and times, we will study the relationship between memory and vision in serious art. We will ask questions about the role of the artist in the academy and the broader social responsibility of the artist. We will locate some of the similarities and differences among artists, engage with different disciplines, and discover what we can learn from one another. This seminar requires the strong voices of all participants. To encourage students to take their ideas and questions beyond the classroom, we will be attending art events (performances, exhibits, readings) individually and in groups. The learning goals include a serious exploration of individual students' creativity, a more nuanced appreciation of diverse arts and a stronger understanding of the multifaceted nature of gender, race and class. Students will develop their abilities to write well-argued papers. They will stretch their imaginations in the written and oral assignments. And they will grow more confident as public speakers and seminar participants.

Same as: FEMGEN 117Q

**CSRE 117S. History of California Indians. 5 Units.**

Demographic, political, and economic history of California Indians, 1700s-1950s. Processes and events leading to the destruction of California tribes, and their effects on the groups who survived. Geographic and cultural diversity. Spanish, Mexican, and Anglo-American periods. The mission system.

Same as: HISTORY 250A, NATIVEAM 117S

**CSRE 118A. Digital Heritage: Bringing the Past Online with the Chinese American Historical Museum. 5 Units.**

Interpreting the past is no longer just for people like historians and archaeologists, and it's no longer confined to the pages of books. More and more, community-based organizations are gathering stories and perspectives from everyday people, and they're putting them out for the world to see online. With these big changes, what will be the future of thinking about the past? In this course, students will work through the dynamics of digital heritage through readings, discussion, and original research. The course centers around artifacts unearthed at the Market Street Chinatown in San Jose. Each student will analyze and gather stories relating to a single artifact in order to contribute to a multimedia exhibit for the Chinese American Historical Museum in San Jose. Class time will be devoted both to discussion and to work on artifact-based projects, and will also include a fieldtrip to the museum and collaboration time with members of the Chinese Historical and Cultural Project.

Same as: ANTHRO 118A, ASNAMST 118A

**CSRE 119. Novel Perspectives on South Africa. 2-3 Units.**

21st-century South Africa continues its literary effervescence. In this class we'll sample some recent novels and related writings to tease out the issues shaping the country (and to some degree the continent) at present. Is 'South African literature' a meaningful category today? What are the most significant features we can identify in new writings and how do they relate to contemporary social dynamics? The course will appeal to anyone interested in present-day Cape Town or Johannesburg, including students who have spent a term in BOSP-Cape Town or plan to do so in future. Both undergraduate and graduate students are welcome. 2-3 units. Course may be repeated for credit. All students will write short analyses from the prescribed texts. Students taking the course for three units will write an extended essay on a topic agreed with the instructor.

Same as: AFRICAAM 119, AFRICAAM 219, AFRICAST 119, AFRICAST 219

**CSRE 11W. Service-Learning Workshop on Issues of Education Equity. 1 Unit.**

Introduces students to a variety of issues at stake in the public education of at-risk high school youth in California. Participants will hear from some of the leading faculty in the School of Education as well as the Departments of Psychology, Sociology, and others, who will share perspectives on the problems and challenges of educating a diverse student body in the state's public school system. The service-learning component of the workshop is a mentoring project (Stanford Students for Educational Equity) with junior class history students from East Palo Alto Academy High School, a Stanford charter school.

Same as: HISTORY 11W

**CSRE 12. Presidential Politics: Race, Gender, and Inequality in the 2016 Election. 1 Unit.**

From the 2016 nomination process to the election. The complexities of identity and its role in uniting and dividing the electorate. Panels covering the media, political participation, and group affiliation.

Same as: AFRICAAM 12, POLISCI 74

**CSRE 120F. Buying Black: Economic Sovereignty, Race, and Entrepreneurship in the USA. 4-5 Units.**

This seminar examines how communities of color have critiqued and transformed capitalism in America through concepts of economic independence, entrepreneurship, and sovereignty. By tracing concepts such as the double-duty dollar, casino/tribal capitalisms, retail boycotts, and buying black, the course traces ethnic entrepreneurialism in America. Students will also consider the international context of such US-based movements, particularly in relation to American imperialism and global supply-chain capitalism.

Same as: AFRICAAM 120F, ANTHRO 120F

**CSRE 121. Discourse of the Colonized: Native American and Indigenous Voices. 5 Units.**

Using the assigned texts covering the protest movements in the 20th century to the texts written from the perspective of the colonized at the end of the 20th century, students will engage in discussions on decolonization. Students will be encouraged to critically explore issues of interest through two short papers and a 15-20 minute presentation on the topic of interest relating to decolonization for Native Americans in one longer paper. Approaching research from an Indigenous perspective will be encouraged throughout.

Same as: NATIVEAM 121

**CSRE 121F. Latinidad in Schools: Cultural and Psychological Perspectives on the Experience of Latinx Students. 3 Units.**

Latinxs are the fastest growing ethnic group in the United States and are still experiencing inequities within the American educational system. While efforts have been made to address Latinx student success, evidenced by the ever-increasing high school graduation rate, we are still seeing the largest aspiration-attainment gap in college for Latinx students. This course will be in a seminar structure and will cover the various topics that scholars have identified as key factors in the educational success of Latinx students. We will begin the course by examining what racial and ethnic identity are and how they play a role in academic achievement. Then we look at how various social contexts family, school, and policy influence Latinx students in particular. Finally, we will review the literature on college access and persistence for Latinx students and the factors that help or hinder student success. This course will provide students with an overview of Latinx educational experiences in the U.S.

Same as: CHILATST 121F

**CSRE 121L. Racial-Ethnic Politics in US. 5 Units.**

This course examines various issues surrounding the role of race and ethnicity in the American political system. Specifically, this course will evaluate the development of racial group solidarity and the influence of race on public opinion, political behavior, the media, and in the criminal justice system. We will also examine the politics surrounding the Multiracial Movement and the development of racial identity and political attitudes in the 21st century. PoliSci 150A, Stats 60 or Econ 1 is strongly recommended.

Same as: POLISCI 121L, PUBLPOL 121L

**CSRE 121X. Hip Hop, Youth Identities, and the Politics of Language. 3-4 Units.**

Focus is on issues of language, identity, and globalization, with a focus on Hip Hop cultures and the verbal virtuosity within the Hip Hop nation. Beginning with the U.S., a broad, comparative perspective in exploring youth identities and the politics of language in what is now a global Hip Hop movement. Readings draw from the interdisciplinary literature on Hip Hop cultures with a focus on sociolinguistics and youth culture.

Same as: AFRICAAM 121X, AMSTUD 121X, ANTHRO 121A, EDUC 121, LINGUIST 155

**CSRE 122E. Art in the Streets: Identity in Murals, Site-specific works, and Interventions in Public Spaces. 4 Units.**

This class will introduce students to both historical and contemporary public art practices and the expression of race and identity through murals, graffiti, site-specific works and performative interventions in public spaces. Involving lectures, guest speakers, field trips, and hands-on art practice, students will be expected to produce both an individual and group piece as a final project.

Same as: AFRICAAM 122E

**CSRE 122F. Histories of Race in Science and Medicine at Home and Abroad. 4 Units.**

This course has as its primary objective, the historical study of the intersection of race, science and medicine in the US and abroad with an emphasis on Africa and its Diasporas in the US. By drawing on literature from history, science and technology studies, sociology and other related disciplines, the course will consider the sociological and cultural concept of race and its usefulness as an analytical category. The course will explore how the study of race became its own "science" in the late-Enlightenment era, the history of eugenics—a science of race aimed at the ostensible betterment of the overall population through the systematic killing or "letting die" of humanity's "undesirable" parts, discuss how the ideology of pseudo-scientific racism underpinned the health policies of the French and British Empires in Africa, explore the fraught relationship between race and medicine in the US, discuss how biological notions of race have quietly slipped back into scientific projects in the 21st century and explore how various social justice advocates and scholars have resisted the scientific racisms of the present and future and/or proposed new paths towards a more equitable and accessible science.

Same as: AFRICAAM 122F, AFRICAST 122F, HISTORY 248D

**CSRE 123A. American Indians and the Cinema. 5 Units.**

Hollywood and the film industry have had a major influence on American society for nearly a century. Initially designed to provide entertainment, the cinema broadened its impact by creating images perceived as real and essentialist. Hollywood's Indians have been the main source of information about who American Indians are and Hollywood has helped shape inaccurate and stereotypical perceptions that continue to exist today. This course looks chronologically at cinematic interpretations and critically examines accurate portrayals of American Indians and of American history.

Same as: NATIVEAM 123A

**CSRE 123B. Literature and Human Experimentation. 3-5 Units.**

This course introduces students to the ways literature has been used to think through the ethics of human subjects research and experimental medicine. We will focus primarily on readings that imaginatively revisit experiments conducted on vulnerable populations: namely groups placed at risk by their classification according to perceived human and cultural differences. We will begin with Mary Shelley's *Frankenstein* (1818), and continue our study via later works of fiction, drama and literary journalism, including Toni Morrison's *Beloved*, David Feldshuh's *Miss Evers Boys*, Hannah Arendt's *Eichmann* and Vivien Spitz's *Doctors from Hell*, Rebecca Skloot's *Immortal Life of Henrietta Lacks*, and Kazuo Ishiguro's *Never Let Me Go*. Each literary reading will be paired with medical, philosophical and policy writings of the period; and our ultimate goal will be to understand modes of ethics deliberation that are possible via creative uses of the imagination, and literature's place in a history of ethical thinking about humane research and care. Note: This course must be taken for a letter grade to be eligible for WAYS credit.

Same as: AFRICAAM 223, COMPLIT 223, HUMBIO 175H, MED 220

**CSRE 123F. Navigating a Multicultural World: Practical recommendations for individuals, groups, & institutions. 4 Units.**

The world is becoming increasingly multicultural, as groups of different races, ethnicities, ages, genders, and socioeconomic classes are coming into closer and more frequent contact than ever before. With increased cultural contact comes the need to create spaces that are inclusive and culturally sensitive. In addition, individuals must learn to live, work, and communicate in a multicultural world. How can we leverage research from cultural psychology to promote the best possible individual, interpersonal, and institutional outcomes for all groups? This course will serve as an introduction on how to create multicultural worlds and individuals. Drawing heavily on research, this course begins with a review of what culture is and how it influences individual thoughts, emotions, and behaviors. We then discuss multiculturalism (e.g., what is it, what are some costs and benefits) before addressing how to promote optimal functioning in multicultural settings.

**CSRE 124A. Youth in the Global South: Beyond Active Subjects and Passive Objects. 5 Units.**

In this course, we will explore the wide variety of ways youth has been culturally constructed (as well as dynamically experienced) across the Global South. Youth is an enduring and powerful concept for understanding competing forms of cultural contestations and political transformations. In the wake of global economic inequality, political instabilities and the emergence of new indigenous movements and social demands, youth is simultaneously associated with discourses over "crisis" and "possibilities."

Same as: ANTHRO 142A

**CSRE 125E. Shades of Green: Redesigning and Rethinking the Environmental Justice Movements. 3-5 Units.**

Historically, discussions of race, ethnicity, culture, and equity in the environment have been relegated to the environmental justice movement, which often focuses on urban environmental degradation and remains separated from other environmental movements. This course will seek to break out of this limiting discussion. We will explore access to outdoor spaces, definitions of wilderness, who is and isn't included in environmental organizations, gender and the outdoors, how colonialism has influenced ways of knowing, and the future of climate change. The course will also have a design thinking community partnership project. Students will work with partner organizations to problem-solve around issues of access and diversity. We value a diversity of experiences and epistemological beliefs, and therefore undergraduates and graduate students from all disciplines are welcome.

Same as: EARTHSYS 125, EARTHSYS 225, URBANST 125

**CSRE 125V. The Voting Rights Act. 5 Units.**

Focus is on whether and how racial and ethnic minorities including African Americans, Asian Americans, and Latinos are able to organize and press their demands on the political system. Topics include the political behavior of minority citizens, the strength and effect of these groups at the polls, the theory and practice of group formation among minorities, the responsiveness of elected officials, and the constitutional obstacles and issues that shape these phenomena.

Same as: AFRICAAM 125V, POLISCI 125V

**CSRE 126B. Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population. 3-4 Units.**

Recently two laws in Brazil (10639/2003 and 13465/2008), which came about due to intense pressure from Black and Indigenous social movements throughout the 20th century, have introduced changes in public education curriculum policies. These new curriculum policies mandate that the study of Afro-Brazilian, African, and Indigenous histories and cultures must be taught at all educational levels including at the elementary, secondary, and post-secondary levels. As part of this mandate, educators are now directed to incorporate considerations of ethnic-racial diversity in relation to people's thinking and experiences. These policies aim to fight racism as well as other forms of discrimination, and moreover, encourage the building of more equitable pedagogies. This course will discuss past and current policies and practices in Brazilian education from the point of view of different social projects organized by Indigenous Peoples, Afro-Brazilians, Asian-Brazilians, as well as Euro-Brazilians. It will also focus on Latin American efforts to promote equity in education, as well as to articulate different points of view, and reinforce and build epistemologies that support the decolonization of thinking, behaviors, research and policies. As part of this process, the course will study the experiences of people demanding these new public policies in terms of the extent to which they were able to influence institutional structures and to establish particular policy reforms. The course will also analyze theoretical frameworks employed by opponents of these movements to resist policies that might challenge their privileged place in society. In doing this, the course will offer theoretical and methodological avenues to promote research that can counter hegemonic curricular policies and pedagogical practices. The course will be fully participatory and oriented towards generating ongoing conversations and discussion about the various issues that arose in Brazil in relation to these two recent laws. To meet these goals, we will do a close reading of relevant scholarly works, paying particular attention to their theoretical frameworks, research designs, and findings. Same as: AFRICAAM 126B, EDUC 136B, EDUC 236B, PUBLPOL 126B

**CSRE 127A. Can't Stop Won't Stop: A History Of The Hip-Hop Arts. 2-4 Units.**

This course explores the history and development of the hip-hop arts movement, from its precursor movements in music, dance, visual arts, literature, and folk and street cultures to its rise as a neighborhood subculture in the Bronx in the early 1970s through its local, regional and global expansion and development. Hip-hop aesthetics, structures, and politics will be explored within the context of the movement's rise as a post-multicultural form in an era of neoliberal globalization. (This course must be taken for a letter grade and a minimum of 3 units to satisfy a Ways requirement.) Same as: AFRICAAM 127A

**CSRE 127X. The Ethics of Anonymity. 1 Unit.**

When is it ethical to conceal your identity or to permit another to remain anonymous? What is the value to remaining unknown, and what might be the cost? Does anonymity free you to think, act, or be in ways you wouldn't otherwise? What else might it allow or constrain? How might your answers differ depending on the circumstances or context? In this one-unit lunchtime seminar, guest speakers will discuss topics that might include: anonymous sources in journalism; anonymity online; the history of anonymous authorship and attribution; whistleblowers and confidential informants; anonymous egg or sperm donors and birth parents; anonymity vs. confidentiality for research participants; anonymity and art; technology and anonymity. Same as: COMM 127X, ETHICSOC 2

**CSRE 128. What We Want is We: Identity in Visual Arts, Social Engagement, and Civic Propositions. 4 Units.**

This studio practicum examines contemporary culture through case studies on visual art, race theory, urban studies, and resistance legacies. This class looks at strategies of socially engaged art practices, community building endeavors, and the complications peculiar to these projects. From these case studies, students will make public art/text/performative experiments and learn research and grant writing approaches for designing long-term political projects. Students will translate their research into grant proposals that will be judged by a professional panel during the final week. Course guests include granting agencies/arts foundations and international artists, curators, city planners, and activists (live/video conferences).

**CSRE 129. Camus. 4-5 Units.**

"The Don Draper of Existentialism" for Adam Gopnik, "the ideal husband of contemporary letters" for Susan Sontag, and "the admirable conjunction of a man, of an action, and of a work" for Sartre, Camus embodies the very French figure of the "intellectuel engagé," or public intellectual. From his birth in 1913 into a poor family in Algeria to the Nobel Prize in Literature in 1957, from Saint Germain-des-Prés to his predilection for the mediterranean culture, Camus captured the quest for universalism, for the politics of justice, and engaged in the great ethical battles of his time, from the fight against nazism and communism, from questioning colonial rules to the haunting Algerian War, and his complex "silence" over the war. Camus the Algerian, Camus the moralist, Camus the Resistant: through readings and films, we will explore his multiple, long-lasting legacies. Readings from Albert Camus, Kamel Daoud, Mouloud Feraoun, Alice Kaplan, Orhan Pamuk, A.B. Yehoshua, Assia Djebar, Jean-Paul Sartre, Yasmina Khadra. Movies include "The Stranger," and "Far from Men." This course is a gateway for French Studies, with special emphasis on oral proficiency. Taught in French.

Same as: FRENCH 129, HISTORY 235F

**CSRE 129B. Literature and Global Health. 3-5 Units.**

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with a call made by the editor-in-chief of *The Lancet* for a literature of global health, namely fiction modeled on the social reform novels of the nineteenth century, understood to have helped readers develop a conscience for public health as the field emerged as a modern medical specialty. We will then spend the quarter understanding how colonial, postcolonial, and world literatures have answered and complicated this call. Readings will include prose fiction by Albert Camus, Joseph Conrad, Tsitsi Dangaremba, Amitav Ghosh, Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese, Paul Farmer. And each literary reading will be paired with medical, philosophical, and policy writings that deeply inform the field of global health. Note: To be eligible for WAYS credit, you must take the course for a Letter Grade.

Same as: AFRICAAM 229, AFRICAST 229, COMPLIT 229, FRENCH 229, HUMBIO 175L, MED 234

**CSRE 13. Digital Humanities and African American History Black History in the Age of the Digital Database. 1 Unit.**

The focus of this workshop is on the social and cultural histories and present conditions relating to social movements and the role of leaders and heroes in urban settings. The workshop seeks to foster historical consciousness of past struggles for justice through collective action as well as to introduce students to a diverse range of leaders of contemporary social justice movements. Additionally, as an underpinning concept, the course explores the changing meaning and importance of social and cultural heroes through history, literature, and music. Workshop activities will be divided between sessions with guest speakers and classes held to discuss background concepts and material. Same as: URBANST 103

**CSRE 130. Community-based Research As Tool for Social Change: Discourses of Equity in Communities & Classrooms. 3-5 Units.**

Issues and strategies for studying oral and written discourse as a means for understanding classrooms, students, and teachers, and teaching and learning in educational contexts. The forms and functions of oral and written language in the classroom, emphasizing teacher-student and peer interaction, and student-produced texts. Individual projects utilize discourse analytic techniques.

Same as: AFRICAAM 130, EDUC 123, EDUC 322

**CSRE 131. Genes and Identity. 5 Units.**

In recent decades genes have increasingly become endowed with the cultural power to explain many aspects of human life: physical traits, diseases, behaviors, ancestral histories, and identity. In this course we will explore a deepening societal intrigue with genetic accounts of personal identity and political meaning. Students will engage with varied interdisciplinary sources that range from legal cases to scientific articles, medical ethics guidelines, films, and ethnographies. We will explore several case studies where the use of DNA markers (either as proof of heritage or disease risk) has spawned cultural movements that are biosocial in nature. Examples include legal and political analyses of African ancestry testing as evidence in slavery reparations cases, debates on whether Black Freedman should be allowed into the Cherokee and Seminole Nations, considerations on whether people with genetic links to Jewish groups should have a right of return to Israel, close readings of The U.S. Food and Drug Administration's crackdown on personal genomics testing companies (such as 23andMe), examinations of genetic identity politics in health disparities funding and orphan disease research, inquiries into new social movements organized around gene-based definitions of personhood, and civil liberties concerns about genetic familial searching in forensic databases that disproportionately target specific minority groups as criminal suspects. Students will engage in a short observational pilot ethnographic project that allows them to further explore issues from the course for their final paper.

Same as: AFRICAAM 131, ANTHRO 131

**CSRE 132A. Social Inequality in Israel. 3 Units.**

Like the US, Israel is a nation of immigrants. Israel additionally shares with the US vast economic, ethnic/racial and gender gaps, which are shaped and are being shaped by the demographic diversity characterizing its society. The course will provide a comparative framework for analyzing social inequality in Israel. We will start by reviewing essential concepts and theories in the study of social stratification. We will then review the main cleavages characterizing Israeli society, while comparing them to gaps in other advanced societies and particularly the US. We will focus on class, gender and ethnicity as the main distinctions and will examine their implications for differences in life chances in several domains across the life course. We will conclude with a discussion of possible scenarios for change, which are relevant to both Israel and the US. Throughout the course, we will study critical thinking techniques and will use them for analyzing issues that are central for the analysis of social inequality in Israel and elsewhere.

Same as: JEWISHST 132A, SOC 102A

**CSRE 132J. Sociology of Jewishness. 3-5 Units.**

Examines the place of the Jewish people in society throughout various locales and historical periods to understand how interactions among Jews and with other groups have shaped Jewish identities. Topics include modernism, the Holocaust, Israel/nationhood, race/ethnicity, intermarriage, and assimilation. Uses theoretical, empirical, and historical material from multiple social scientific fields of study and explores the study of Judaism from several major sociological lenses.

Same as: JEWISHST 132D, SOC 132J

**CSRE 133A. Anthropology of the Middle East. 3-5 Units.**

This course examines social, political, and religious dimensions of various Middle Eastern societies. Key topics include the development of the modern nation-state, the Islamic revival, human rights, and discourses of democracy. Course materials include ethnographic studies, novels, and films, which provide a rich contextualization of social life and cultural politics in the region.

Same as: ANTHRO 133A

**CSRE 133B. Covering Islam: On What We Learn to See, Think and Hear about Islam & Muslims. 3-5 Units.**

In this course, students will think critically about how knowledge about Islam, Muslims, and Muslim Societies is produced and circulated. As a class, we will consider why and how certain kinds of ideas about Islam and Muslims become representative (i.e., authoritative discourse) while others ideas do not. This is an interdisciplinary class; course material will draw on readings from anthropology, literary criticism, history, sociology and media and cultural studies. We will also be engaging with other kinds of material, including news articles, editorials, documentaries, and films.

Same as: AFRICAST 133B, ANTHRO 133B

**CSRE 133J. WELFARE, WORK AND POVERTY.. 3 Units.**

Early theorists of the welfare state described it as a reaction to the emergence of needs and interests of specific social groups during processes of economic development and change. Later theorists countered that the welfare state does not merely react to social cleavages during times of economic change but rather works to actively shape them, in line with worldviews or the interests of dominant group members. Adopting the latter approach, the goal of this course is to provide the tools and knowledge necessary for a critical evaluation of the social services provided to Israeli citizens and their impact on social and economic inequalities. The course will survey various approaches to the understanding of the goals of the welfare state. A comparative and historical account of the development of the welfare state will be presented, while highlighting recent developments, such as the increase in poverty rates and the aging of the population. During the course, we will examine the diverse needs that are served by the welfare state, as well as major dilemmas associated with the provision of services. Throughout the course, we will study critical thinking techniques and will use them for analyzing issues that are central for the development of social policies in Israel and the US.

Same as: JEWISHST 133A, SOC 103A

**CSRE 133P. Ethics and Politics in Public Service. 4 Units.**

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford.

Same as: POLISCI 133Z, PUBLPOL 103Z, URBANST 122Z

**CSRE 134. Museum Cultures: Material Representation in the Past and Present. 3-5 Units.**

Students will open the "black box" of museums to consider the past and present roles of institutional collections, culminating in a student-curated exhibition. Today, museums assert their relevance as dynamic spaces for debate and learning. Colonialism and restitution, the politics of representation, human/object relationships, and changing frameworks of authority make museum work widely significant and consistently challenging. Through thinking-in-practice, this course reflexively explores "museum cultures": representations of self and other within museums and institutional cultures of the museum world itself. 3 credits (no final project) or 5 credits (final project). May be repeat for credit.

Same as: AMSTUD 134, ARCHLGY 134, ARCHLGY 234, ARTHIST 284B, EDUC 214, NATIVEAM 134

**CSRE 135. Islam in America. 4 Units.**

This course explores the history of Islam in North America with special emphasis on the experience of Muslims in the United States. Contrary to popularly held belief, Muslims have been critical participants in the construction of American identity from the 16th century onwards when Muslim slaves were forcibly brought to Colonial America. Our course will explore the diverse ways Muslims in America have imagined, practiced, and negotiated their religious identity. We will move chronologically, and we will focus upon three crucial themes: the convergence of constructions of racial, religious, and national identities in America; the ever-shifting terrain of notions of authority and authenticity amongst Muslims in America; and global resonances of the practices and ideas of American Muslims.

Same as: AFRICAAM 135A, AMSTUD 135X, GLOBAL 137, RELIGST 135

**CSRE 135H. Conversations in CSRE: Case Studies in the Stanford Community. 1-2 Unit.**

Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

Same as: ANTHRO 135H

**CSRE 135I. CSRE House Seminar: Race and Ethnicity at Stanford. 1-2 Unit.**

Race, ethnicity, gender, and religion using the tools, analytical skills and concepts developed by anthropologists.

Same as: ANTHRO 135I

**CSRE 135P. The Psychology of Diverse Community. 3 Units.**

This course is an exploration. Its aim is to identify distinguishing features of good diverse communities and articulate them well enough to offer principles or guidelines for how to design and manage such communities e.g. schools, universities, academic disciplines, etc.

Same as: PSYCH 135

**CSRE 136. White Identity Politics. 3-5 Units.**

Pundits proclaim that the 2016 Presidential election marks the rise of white identity politics in the United States. Drawing from the field of whiteness studies and from contemporary writings that push whiteness studies in new directions, this upper-level seminar asks, does white identity politics exist? How is a concept like white identity to be understood in relation to white nationalism, white supremacy, white privilege, and whiteness? We will survey the field of whiteness studies, scholarship on the intersection of race, class, and geography, and writings on whiteness in the United States by contemporary public thinkers, to critically interrogate the terms used to describe whiteness and white identities. Students will consider the perils and possibilities of different political practices, including abolishing whiteness or coming to terms with white identity. What is the future of whiteness? n\*Enrolled students will be contacted regarding the location of the course.

Same as: AFRICAAM 136B, ANTHRO 136B

**CSRE 138. Medical Ethics in a Global World: Examining Race, Difference and Power in the Research Enterprise. 5 Units.**

This course will explore historical as well as current market transformations of medical ethics in different global contexts. We will examine various aspects of the research enterprise, its knowledge-generating and life-saving goals, as well as the societal, cultural, and political influences that make medical research a site of brokering in need of oversight and emergent ethics. nThis seminar will provide students with tools to explore and critically assess the various technical, social, and ethical positions of researchers, as well as the role of the state, the media, and certain publics in shaping scientific research agendas. We will also examine how structural violence, poverty, global standing, and issues of citizenship also influence issues of consent and just science and medicine.

Same as: ANTHRO 138, ANTHRO 238

**CSRE 140C. Stand Up Comedy and the "Great American Joke" Since 1945. 5 Units.**

Development of American Stand Up Comedy in the context of social and cultural eruptions after 1945, including the Borscht Belt, the Chitlinz Circuit, the Cold War, censorship battles, Civil Rights and other social movements of the 60s and beyond. The artistry of stories, monologues, jokes, impersonations, persona, social satire, scatology, obscenity, riffs, rants, shtick, and more by such artists as Lenny Bruce, Dick Gregory, Richard Pryor, George Carlin, Margaret Cho, Sarah Silverman, Jon Stewart, Stephen Colbert, as well as precursors such as Mark Twain, minstrelsy and vaudeville and related films, TV shows, poems and other manifestations of similar sensibilities and techniques. Same as: AMSTUD 140

**CSRE 141. Gentrification. 5 Units.**

Neighborhoods in the Bay Area and around the world are undergoing a transformation known as gentrification. Middle- and upper-income people are moving into what were once low-income areas, and housing costs are on the rise. Tensions between newcomers and old timers, who are often separated by race, ethnicity, or sexual orientation, can erupt; high rents may force long-time residents to leave. In this class we will move beyond simplistic media depictions to explore the complex history, nature, causes and consequences of this process. Students will learn through readings, films, class discussions, and engagement with a local community organization. (Cardinal Course certified by the Haas Center). Same as: AFRICAAM 241A, URBANST 141

**CSRE 141E. Counterstory and Narrative Inquiry in Literature and Education. 3 Units.**

Counterstory is a method developed in critical legal studies that emerges out of the broad "narrative turn" in the humanities and social science. This course explores the value of this turn, especially for marginalized communities, and the use of counterstory as analysis, critique, and self-expression. Using an interdisciplinary approach, we examine counterstory as it has developed in critical theory, critical pedagogy, and critical race theory literatures, and explore it as a framework for liberation, cultural work, and spiritual exploration. Same as: EDUC 141, EDUC 341, LIFE 124

**CSRE 141S. Immigration and Multiculturalism. 5 Units.**

What are the economic effects of immigration? Do immigrants assimilate into local culture? What drives native attitudes towards immigrants? Is diversity bad for local economies and societies and which policies work for managing diversity and multiculturalism? We will address these and similar questions by synthesizing the conclusions of a number of empirical studies on immigration and multiculturalism. The emphasis of the course is on the use of research design and statistical techniques that allow us to move beyond correlations and towards causal assessments of the effects of immigration and immigration policy.

Same as: POLISCI 141A

**CSRE 141X. Intersectionality and Social Movements: Gender, Race, Sexuality and Collective Organizing. 4 Units.**

This course explores U.S. social movements from an intersectional perspective. How is social movement emergence related to participants' identities and experiences with inequality? How are the dynamics, targets and tactics of mobilized participants related to race, class, gender, age and/or sexuality? How have social movement scholars addressed the intersectional nature of identity and community? Readings include empirical and theoretical social movement texts, and discussion topics include feminist and civil rights movements, queer/LGBT movements, Occupy Wall Street and Black Lives Matter.

Same as: AFRICAAM 141X, FEMGEN 141, SOC 153

**CSRE 142A. What is Hemispheric Studies?. 5 Units.**

Will attempt to open up "America," beyond the United States. Have we reached the end of an era in our national literary imaginations? What is the utility and durability of the idea of the nation in a global era? New developments in hemispheric, Black Atlantic, and trans-american studies have raised questions about the very viability of US literary studies. Should we, as Franco Moretti suggests, map, count, and graph the relationships in our close (rhetorical) and "distant" readings of texts in the Americas? Topics include the definitions of concepts such as coloniality, modernity, time and the colonial difference, the encounters between world views of Europeans and indigenous Native American peoples, and the inventions of America, Latinamericanism, and Americanness.

**CSRE 144. Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class. 5 Units.**

Exploration of crossing borders within ourselves, and between us and them, based on a belief that understanding the self leads to understanding others. How personal identity struggles have meaning beyond the individual, how self healing can lead to community healing, how the personal is political, and how artistic self expression based in self understanding can address social issues. The tensions of victimization and agency, contemplation and action, humanities and science, embracing knowledge that comes from the heart as well as the mind. Studies are founded in synergistic consciousness as movement toward meaning, balance, connectedness, and wholeness. Engaging these questions through group process, journaling, reading, drama, creative writing, and storytelling. Study is academic and self-reflective, with an emphasis on developing and presenting creative works in various media that express identity development across borders.

Same as: ASNAMST 144, FEMGEN 144X

**CSRE 144G. Pop Feminism: Unrest and Unease in the Contemporary Feminist Moment. 3-5 Units.**

This course examines feminist reaction/expression/ to and in German and American pop culture. We will examine a feminist approach using a variety of different media, including film, music videos, and literature. We will consider the intersections of race and gender constructions, as well as the cultural aspects of each iteration of "pop." The course will be taught in English, but German-speaking students are encouraged to read in the original. nNote: This course contains sexually explicit content.

Same as: FEMGEN 144G, GERMAN 144

**CSRE 145. Race and Ethnic Relations in the USA. 4 Units.**

(Graduate students register for 245.) Race and ethnic relations in the U.S. and elsewhere. The processes that render ethnic and racial boundary markers, such as skin color, language, and culture, salient in interaction situations. Why only some groups become targets of ethnic attacks. The social dynamics of ethnic hostility and ethnic/racial protest movements.

Same as: SOC 145, SOC 245

**CSRE 145B. The African Atlantic. 3-5 Units.**

This course explores the central place Africa holds in prose writing emerging during early and modern periods of globalization across the Atlantic, including the middle passage, exploration and colonialism, black internationalism, decolonization, immigration, and diasporic return. We will begin with Equiano's Interesting Narrative (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of self-making or new citizenship, to evoke histories of racial unity or examine psychic and social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Conrad, Condé, Olinto), epic and prose poetry (Césaire, Walcott), theoretical reflection (Gilroy, Glissant, Mudimbe, Benitez-Rojo), and literary autobiography (Barack Obama, Saidiya Hartman). Note: To be eligible for WAYS credit, you must take COMPLIT 145B for a minimum of 3 Units and a Letter Grade.

Same as: AFRICAAM 148, AFRICAST 145B, COMPLIT 145B, COMPLIT 345B, FRENCH 145B, FRENCH 345B

**CSRE 145F. Race and Power. 5 Units.**

This course examines how race is made. We will pay close attention to how people engage with material, economic, scientific, and cultural forces to articulate human group difference as a given, and even natural. In this seminar, we will look at the construction of race as a literally made phenomenon, where historical, colonial, bodily, market, and humanitarian constituent elements both circulate and sediment racial understandings. To focus our readings and discussions we will divide this vast terrain into three units: race and the colonial encounter, race and biopower, and race and capital.

Same as: ANTHRO 145, ANTHRO 245

**CSRE 145H. Trauma, healing, and empowerment. 3 Units.**

This course will look at the ways in which humans are affected by the legacy of war, occupation and colonialism through themes of home, displacement, community, roots, identity, and inter-generational trauma. The approach is integrative, including scholarly investigation, embodied practice, and creative approach. This self-reflective process uses narrative, oral and written, as a means of becoming whole and healing personal, historical, and collective wounds.

Same as: LIFE 145

**CSRE 146. Community Matters: Research and Service with Community Organizations. 3-4 Units.**

(Taught in conjunction with URBANST 123B. Students participating in CRSI must enroll in CSRE 146. All others can enroll in either course.) This course focuses on issues of research design and how to select specific methodological strategies to assure ethical and effective partnership-based research. In this course, students will plan for their own participation in a CB(P)R project. Topical themes will include best practice strategies for (a) defining and selecting community problems or issues to be addressed, (b) generating relevant and useful research questions, (c) choosing specific means and methods for data collection [e.g., surveys, interviews, focus groups, etc.], (d) storing, organizing and analyzing data, (e) reflecting on and critiquing research findings, and (f) carrying out dissemination in ways that can be expected to enhance community power and advance community development. Students will be provided with opportunities to workshop their respective projects-in-development, (e.g., developing and sharing research questions, data collection instruments, strategies for engaging community constituents as co-researchers, etc.). Students will leave the course with a plan for participating in a CBPR project.

**CSRE 146A. Approaching Research and the Community. 2-3 Units.**

Comparative perspective on research with communities and basic overview of research methodologies, with an emphasis on the principles and practices of doing community-based research as a collaborative enterprise between academic researchers and community members. How academic scholarship can be made useful to communities. How service experiences and interests can be used to develop research questions in collaboration with communities and serve as a starting point for developing senior theses or other independent research projects. Through the coursework, students are encouraged to develop a draft proposal for an actual community-based research project. The course is highly recommended for students planning to apply for community-based summer research fellowships through the Haas Center for Public Service (Community-based Research Fellowship Program) or CRSE (Community Research Summer Internship). Students who complete the course will be given priority for these fellowships. This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: URBANST 123



**CSRE 146B. Approaching Research in the Community: Design and Methods. 3 Units.**

(Taught concurrently with CSRE 146; you may enroll in either course.) This course focuses on issues of research design and how to select specific methodological strategies to assure ethical and effective partnership-based research. In this course, students will plan for their own participation in a CB(P)R project. Topical themes will include best practice strategies for (a) defining and selecting community problems or issues to be addressed, (b) generating relevant and useful research questions, (c) choosing specific means and methods for data collection [e.g., surveys, interviews, focus groups, etc.], (d) storing, organizing and analyzing data, (e) reflecting on and critiquing research findings, and (f) carrying out dissemination in ways that can be expected to enhance community power and advance community development. Students will be provided with opportunities to workshop their respective projects-in-development, (e.g., developing and sharing research questions, data collection instruments, strategies for engaging community constituents as co-researchers, etc.). This is a required course for students participating in the Haas Center for Public Service; Community-based Research Fellows Program, but enrollment is open to all Stanford students.

Same as: URBANST 123B

**CSRE 146J. Studies in Ethnomusicology: Listening to the Local: Music Ethnography of the Bay Area. 3-5 Units.**

An introduction to music ethnography through student research on musical life in the Bay Area. Focus is on the intersections of music, social life, and cultural practice by engaging with people as they perform music and culture in situ. Techniques taught include participant-observation, interviewing and oral history, writing field-notes, recording, transcription, analysis, and ethnographic writing. Pre-/co-requisite (for music majors): MUSIC 22. (WIM at 4 units only.)

Same as: MUSIC 146J, MUSIC 246J

**CSRE 147J. Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music. 3-4 Units.**

The African American tradition of soul music from its origins in blues, gospel, and jazz to its influence on today's r&b, hip hop, and dance music. Style such as rhythm and blues, Motown, Southern soul, funk, Philadelphia soul, disco, Chicago house, Detroit techno, trip hop, and neo-soul. Soul's cultural influence and global reach; its interaction with politics, gender, place, technology, and the economy. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.)

Same as: AFRICAAM 19, AMSTUD 147J, MUSIC 147J, MUSIC 247J

**CSRE 147L. Studies in Music, Media, and Popular Culture: Latin American Music and Globalization. 3-4 Units.**

Focuses on vernacular music of Latin America and the Caribbean, including Mexico, Cuba, Dominican Republic, Peru, Brazil, Colombia, and Argentina. Musical examples discussed in relation to: globalization, migration, colonialism, nationalism, diaspora, indigeneity, politics, religion, dance, ethnicity, and gender. How music reflects and shapes cultures, identities, and social structures. Genres addressed: bachata, bossa nova, cumbia, forro, ranchero, reggaeton, rock, salsa, tango, and others. Seminar, guest performances, reading, listening, and analysis. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.)

Same as: CHILATST 147L, MUSIC 147L, MUSIC 247L

**CSRE 148. Comparative Ethnic Conflict. 4 Units.**

Causes and consequences of racial and ethnic conflict, including nationalist movements, ethnic genocide, civil war, ethnic separatism, politics, indigenous peoples' movements, and minority rights movements around the world.

Same as: SOC 148, SOC 248

**CSRE 149. The Laboring of Diaspora & Border Literary Cultures. 3-5 Units.**

Focus is given to emergent theories of culture and on comparative literary and cultural studies. How do we treat culture as a social force? How do we go about reading the presence of social contexts within cultural texts? How do ethno-racial writers re-imagine the nation as a site with many "cognitive maps" in which the nation-state is not congruent with cultural identity? How do diaspora and border narratives/texts strive for comparative theoretical scope while remaining rooted in specific local histories. Note: This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: COMPLIT 149, ILAC 149

**CSRE 149A. The Urban Underclass. 4 Units.**

(Graduate students register for 249.) Recent research and theory on the urban underclass, including evidence on the concentration of African Americans in urban ghettos, and the debate surrounding the causes of poverty in urban settings. Ethnic/racial conflict, residential segregation, and changes in the family structure of the urban poor.

Same as: SOC 149, SOC 249, URBANST 112

**CSRE 14N. Growing Up Bilingual. 3 Units.**

This course is a Freshman Introductory Seminar that has as its purpose introducing students to the sociolinguistic study of bilingualism by focusing on bilingual communities in this country and on bilingual individuals who use two languages in their everyday lives. Much attention is given to the history, significance, and consequences of language contact in the United States. The course focuses on the experiences of long-term US minority populations as well as that of recent immigrants.

Same as: CHILATST 14N, EDUC 114N

**CSRE 150. Race and Political Sociology. 3 Units.**

How race informs the theories and research within political sociology. The state's role in creation and maintenance of racial categories, the ways in which racial identity motivates political actors, how race is used to legitimate policy decisions, comparisons across racial groups. Emphasis on understanding the ways race operates in the political arena.

Same as: SOC 150, SOC 250

**CSRE 150A. Race and Crime. 3 Units.**

The goal of this course is to examine social psychological perspectives on race, crime, and punishment in the United States. Readings will be drawn not only from psychology, but also from sociology, criminology, economics, and legal studies. We will consider the manner in which social psychological variables may operate at various points in the criminal justice system- from policing, to sentencing, to imprisonment, to re-entry. Conducted as a seminar. Students interested in participating should attend the first session and complete online application for permission at <https://goo.gl/forms/CAut7RKX6MewBluG3>.

Same as: PSYCH 150

**CSRE 150B. RACE AND CRIME PRACTICUM. 2-4 Units.**

This practicum is designed to build on the lessons learned in Psych 150: Race & Crime. In this community service learning course, students will participate in community partnerships relevant to race and crime, as well as reflection to connect these experiences to research and course content. Interested students should complete an application for permission at: <https://goo.gl/forms/CAut7RKX6MewBluG3>.

Prerequisite: Psych 150 (taken concurrently or previously).

Same as: PSYCH 150B

**CSRE 150G. Performing Race, Gender, and Sexuality. 4 Units.**

This theory and practice-based course will examine performances by and scholarly texts about artists who critically and mindfully engage race, gender, and sexuality. Students will cultivate their skills as artist-scholars through written assignments and the creation of performance-based works in response to the assigned material. Attendance and written reflection on the TAPS Vital Signs: Performance Art in the 21st Century performance art series are required. The practical component of the class will also incorporate meditation into the process of preparing for, making, and critiquing performance. We will approach mindfulness as method and theory in our own practice, as well in relation to the works studied, while attending to the ethics and current debates concerning its use. Examples of artists studied include James Luna, Nao Bustamante, William Pope.L, Yoko Ono, Cassils, Adrian Piper, Guillermo Gomez-Peña, Nikki S. Lee, and Ana Mendieta.

Same as: FEMGEN 150G, TAPS 150G

**CSRE 150S. Nineteenth Century America. 5 Units.**

(Same as HISTORY 50B. History majors and others taking 5 units, register for 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture.

Same as: AFRICAAM 150B, AMSTUD 150B, HISTORY 150B

**CSRE 151D. Migration and Diaspora in American Art, 1800–Present. 4 Units.**

This lecture course explores American art through the lens of immigration, exile, and diaspora. We will examine a wide range of work by immigrant artists and craftsmen, paying special attention to issues of race and ethnicity, assimilation, displacement, and political turmoil. Artists considered include Emmanuel Leutze, Thomas Cole, Joseph Stella, Chiura Obata, Willem de Kooning, Mona Hatoum, and Julie Mehretu, among many others. How do works of art reflect and help shape cultural and individual imaginaries of home and belonging?

Same as: AMSTUD 151, ARTHIST 151, ARTHIST 351

**CSRE 152. Introduction to Improvisation in Dance: From Salsa to Vodun to Tap Dance. 3-4 Units.**

This seminar introduces students to Dance Studies by exploring the topic of improvisation, a central concept in multiple genres of dance and music. We will survey a range of improvised dance forms from salsa to vodun to tap dance through readings, video viewings, discussion, and movement exercises (no previous dance experience required). When studying each genre, we will examine how race, gender, sexuality, citizenship, and other power structures affect the practices and theorizations of improvisation. Topics include community and identity formation; questions of technique versus natural ability; improvisation as a spiritual practice; and the role of history in improvisers' quest for spontaneity. Course material will focus on improvised dance, but we will also read pertinent literature in jazz music, theatre, and the law.

Same as: AFRICAAM 52, TAPS 152

**CSRE 152K. Mixed-Race Politics and Culture. 5 Units.**

Today, almost one-third of Americans identify with a racial/ethnic minority group, and more than 9 million Americans identify with multiple races. What are the implications of such diversity for American politics and culture? This course approaches issues of race from an interdisciplinary perspective, employing research in the social sciences and humanities to assess how race shapes perceptions of identity as well as political behavior in 21st-century U.S. Issues surrounding the role of multiculturalism, immigration, acculturation, racial representation, and racial prejudice in American society. Topics include the political and social formation of race; racial representation in the media, arts, and popular culture; the rise and decline of the "one-drop rule" and its effect on political and cultural attachments; the politicization of census categories and the rise of the multiracial movement.

Same as: AFRICAAM 226, AMSTUD 152K, ENGLISH 152K

**CSRE 154. Anthropology of Drugs: Experience, Capitalism, Modernity. 5 Units.**

This course examines the significant role drugs play in shaping expressions of the self and social life; in the management populations, and in the production of markets and inequality. It engages these themes through cultural representations of drugs and drug use, analyses of scientific discourse, and social theory. Topics include: the social construction of the licit and illicit; the shifting boundaries of deviance, disease and pleasure; and the relationship between local markets and global wars.

Same as: ANTHRO 154, ANTHRO 254B

**CSRE 154C. Shall We Dance? Social Dancing as Political Practice. 3-4 Units.**

This seminar investigates social dancing as a political practice, and the dance floor as a place where race, ethnicity, class status, and sexuality are formed and contested. While many students may be familiar with salsa, and can imagine how it produces particular kinds of Latin/a femininities, this course asks students to expand the notion of social dancing beyond partner-dancing spheres. Course materials will focus on dance practices from the late-nineteenth century to present-day, ranging from rural Louisiana dancehalls to NYC nightclubs to Iranian backyards. We will examine how dances become racially coded (e.g., what makes a dance black or Latin@?), and understand how categories such as gender, class, and regionality intersect with such racializations. Students will engage in a range of activities, including reading, viewing films, and participating in occasional movement workshops (no previous dance experience required). Each student's final project will require independent, sustained, ethnographic research in a social dance setting of choice (e.g., student dance club, yoga studio, aerobics class, or YouTube).

**CSRE 154D. Black Magic: Ethnicity, Race, and Identity in Performance Cultures. 3-4 Units.**

In 2013, CaShawn Thompson devised a Twitter hashtag, #blackgirlmagic, to celebrate the beauty and intelligence of black women. Twitter users quickly adopted the slogan, using the hashtag to celebrate everyday moments of beauty, accomplishment, and magic. In contrast, #blackmagic is used to describe everything from the uncanny to the personal. This course examines the discursive phenomenon of "black magic" and its permutations throughout Anglo-American histories. We will investigate the binaries of black/dark, white/light magic that has entered our contemporary lexicon, reading material on religion, magic performance, and theater.

Same as: AFRICAAM 154G, FEMGEN 154G, TAPS 154G

**CSRE 154T. The Politics of Algorithms. 4-5 Units.**

Algorithms have become central actors in today's digital world. In areas as diverse as social media, journalism, education, healthcare, and policing, computing technologies increasingly mediate communication processes. This course will provide an introduction to the social and cultural forces shaping the construction, institutionalization, and uses of algorithms. In so doing, we will explore how algorithms relate to political issues of modernization, power, and inequality. Readings will range from social scientific analyses to media coverage of ongoing controversies relating to Big Data. Students will leave the course with a better appreciation of the broader challenges associated with researching, building, and using algorithms.

Same as: COMM 154, COMM 254, SOC 154

**CSRE 156. The Changing American City. 4 Units.**

After decades of decline, U.S. cities today are undergoing major transformations. Young professionals, Millennials, and members of the creative class are flocking to cities. Massive waves of immigration have transformed the racial and ethnic compositions of cities and their neighborhoods. Public housing projects that once defined the inner city are disappearing, and the recent housing boom and bust shook up the urban landscape. This class will include readings and discussion on contemporary developments in U.S. cities and how they relate to race, ethnicity, and class. Topics include immigration, gentrification, crime, public housing, and the housing crisis.

Same as: SOC 156A, SOC 256A, URBANST 156A

**CSRE 156J. Environment, Nature and Race. 3-5 Units.**

Environment, nature and race: Politics of belonging, exclusion, and embodiment. Scientific and popular understandings of race and ethnicity remain deeply entangled with ideas about "nature" and the "environment". This course will introduce students to some of the many ways that nature, environment, and race have been and remain intertwined, for better or for worse. What does it mean to claim race is "natural"? To what extent is race shaped by environment and vice versa? How are the politics of race linked to the politics of environmentalism? The class will begin with a brief treatment of current critical consensus on the biology of race and the cultural politics of race and nature, and move on to a theoretical discussion of how humans and "nature" interact. From there, the course moves into historical and ethnographic examples of the politics of race and the environment: the racialized and racializing character of particular environments; the ways that racial politics shape natural environments; and the politics of exclusion and belonging in environmental movements. Case studies will be both rural and urban and draw from anthropology, geography, history, and biology. The course will end by considering the recent resurgence of the race concept in biology. Same as: ANTHRO 156B

**CSRE 156T. Performing History: Race, Politics, and Staging the Plays of August Wilson. 4 Units.**

This course purposefully and explicitly mixes theory and practice. Students will read and discuss the plays of August Wilson, the most celebrated and most produced contemporary American playwright, that comprise his 20th Century History Cycle. Class stages scenes from each of these plays, culminating in a final showcase of longer scenes from his work as a final project.

Same as: AFRICAAM 156, TAPS 156, TAPS 356

**CSRE 157P. Solidarity and Racial Justice. 4-5 Units.**

Is multiracial solidarity necessary to overcome oppression that disproportionately affects certain communities of color? What is frontline leadership and what role should people play if they are not part of frontline communities? In this course we will critically examine practices of solidarity and allyship in movements for collective liberation. Through analysis of historical and contemporary movements, as well as participation in movement work, we will see how movements have built multiracial solidarity to address issues that are important to the liberation of all. We will also see how racial justice intersects with other identities and issues. This course is for students that want to learn how to practice solidarity, whether to be better allies or to work more effectively with allies. There will be a community engaged learning option for this course. Students who choose to participate in this option will either work with Stanford's DGen Office or a community organization that is explicitly devoted to multiracial movement-building.

Same as: AFRICAAM 157P, AMSTUD 157P, FEMGEN 157P

**CSRE 159I. Literature and Protest. 3-5 Units.**

How does literary art get involved in politics? What is the border between propaganda and art? This class examines moments when writers seem suddenly not only to represent politically charged topics and themes, but to have a part in bringing about political change. We'll look at case studies from the anti-apartheid movement in South Africa, the American Civil Rights struggle, 19th century Russia, and more.

Same as: AFRICAAM 159A, ENGLISH 159A

**CSRE 160J. Conjure Art 101: Performances of Ritual, Spirituality and Decolonial Black Feminist Magic. 2 Units.**

Conjure Art is a movement and embodied practice course looking at the work and techniques of artists of color who utilize spirituality and ritual practices in their art making and performance work to evoke social change. In this course we will discuss the work of artists who bring spiritual ritual in their art making while addressing issues of spiritual accountability and cultural appropriation. Throughout the quarter we will welcome guest artists who make work along these lines, while exploring movement, writing, singing and visual art making. This class will culminate in a performance ritual co-created by students and instructor.

Same as: AFRICAAM 160J, DANCE 160J

**CSRE 160M. Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture. 3-4 Units.**

This course will introduce students to the ways in which the Middle East has been represented and performed by/in the 'West' through dance, performance, and popular culture in both historical and contemporary contexts. A brief look through today's media sources exposes a wide range of racialized and gendered representations of the Middle East that shape the way the world imagines the Middle East to be. As postcolonial theorist Edward Said explains, the framework we call Orientalism establishes the ontological character of the Orient and the Oriental as inherently 'Other'. Starting with 19th century colonialism and continuing into the post-9/11 era, this course will trace the Western production, circulation, and consumption of representations of the Middle East as 'Other' in relation to global geopolitics. We will further examine dance forms produced in mid-twentieth century Iran and Egypt, with particular attention to nation-state building and constructions of gender. Finally, we will examine artistic productions and practices from the Middle East and Middle Eastern diasporic communities that respond to colonialism, war, displacement, secularism, and Euro-American Empire. Using dance studies, postcolonial feminist, and critical race theoretical frameworks, we will consider the gender, racial, political, and cultural implications of selected performance works and practices in order to analyze how bodies produce meaning in dance, performance art, theater, film, photography, and new media. Students will engage in multiple modes of learning; the course will include lectures, engaged group discussions, viewing of live and recorded performance, embodied participation in dance practice, student oral presentations, and a variety of writing exercises. Course assignments will culminate in a final research project related to class themes and methods.

Same as: DANCE 160M, FEMGEN 160M, TAPS 160M

**CSRE 162. The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History. 3-5 Units.**

This course explores the transition from Victorian to modern American womanhood by asking how Native, European, African, Mexican, and Asian American women navigated the changing sexual, economic, and political landscapes of the twentieth century. Through secondary readings, primary sources, films, music, and literature we explore the opportunities and boundaries on groups of women in the context of historical events that included immigration, urbanization, wartime, depression, the Cold War, as well as recurrent feminist and conservative political movements. Same as: AMSTUD 161, FEMGEN 161, HISTORY 61, HISTORY 161

**CSRE 162A. Spirituality and Nonviolent Urban and Social Transformation. 3 Units.**

A life of engagement in social transformation is often built on a foundation of spiritual and religious commitments. Case studies of nonviolent social change agents including Rosa Parks in the civil rights movement, César Chávez in the labor movement, and William Sloane Coffin in the peace movement; the religious and spiritual underpinnings of their commitments. Theory and principles of nonviolence. Films and readings. Service learning component includes placements in organizations engaged in social transformation. Service Learning Course (certified by Haas Center).

Same as: RELIGST 162X, URBANST 126

**CSRE 162V. Advanced Research in Black Performing Arts. 1 Unit.**

What is the history of Committee for Black Performing Arts (CBPA)? How did it come into being and how do we carry/re-member the legacy forward and into the future? In this course students will engage in the research and archiving process as we dig into the history of CBPA on the eve of its 50th anniversary. Activities will include, digitizing and cataloguing film, video and documents, conducting interviews with former students and professors of CBPA, and guest lecturers with professional archivists. Same as: DANCE 162V

**CSRE 164. Immigration and the Changing United States. 4 Units.**

The role of race and ethnicity in immigrant group integration in the U.S. Topics include: theories of integration; racial and ethnic identity formation; racial and ethnic change; immigration policy; intermarriage; hybrid racial and ethnic identities; comparisons between contemporary and historical waves of immigration.

Same as: CHILATST 164, SOC 164, SOC 264

**CSRE 165. Identity and Academic Achievement. 3 Units.**

How do social identities affect how people experience academic interactions? How can learning environments be better structured to support the success of all students? In this class, we will explore how a variety of identities such as race, gender, social class, and athletic participation can affect academic achievement, with the goal of identifying concrete strategies to make learning environments at Stanford and similar universities more inclusive. Readings will draw from psychology, sociology, education, and popular press. This class is a seminar format.

Same as: AFRICAAM 165, PSYCH 165

**CSRE 165I. Afro-German Art Forms. 3-5 Units.**

The past few years has seen a growth in scholars investigating the complex identities and histories of Black/Afro-Germans. While other groups in the African Diaspora have one common story (i.e. slavery in the context of the Americas), the same cannot be said for Afro-Germans. Their stories are varied and cannot be explained with one narrative. This course seeks to introduce students to varied Afro-German voices and experiences through literature, film, and theory. Students in this course can expect to: develop skills in literary, art and performance analysis; weigh the historical, political, social, cultural and ideological aspects of race in Germany; think about the way Afro-Germans complicate German national identity; recognize contributions of Afro-Germans. This course will be taught in English, but German-speaking students are encouraged to read in the original.

Same as: AFRICAAM 165G, GERMAN 165

**CSRE 166B. Immigration Debates in America, Past and Present. 3-5 Units.**

Examines the ways in which the immigration of people from around the world and migration within the United States shaped American nation-building and ideas about national identity in the twentieth century. Focuses on how conflicting ideas about race, gender, ethnicity, and citizenship with respect to particular groups led to policies both of exclusion and integration. Part One begins with the ways in which the American views of race and citizenship in the colonial period through the post-Reconstruction Era led to the passage of the Chinese Exclusion Act in 1882 and subsequently to broader exclusions of immigrants from other parts of Asia, Southern and Eastern Europe, and Mexico. Explores how World War II and the Cold War challenged racial ideologies and led to policies of increasing liberalization culminating in the passage of the 1965 Immigration Act, which eliminated quotas based on national origins and opened the door for new waves of immigrants, especially from Asia and Latin America. Part Two considers new immigration patterns after 1965, including those of refugees, and investigates the contemporary debate over immigration and immigration policy in the post 9/11 era as well as inequalities within the system and the impact of foreign policy on exclusions and inclusions.

Same as: HISTORY 166B, HISTORY 366B

**CSRE 167. Feminism and Contemporary Art. 4 Units.**

(Same as ARTHIST 176) The impact of second wave feminism on art making and art historical practice in the 70s, and its reiteration and transformation in contemporary feminist work. Topics: sexism and art history, feminist studio programs in the 70s, essentialism and self-representation, themes of domesticity, the body in feminist art making, bad girls, the exclusion of women of color and lesbians from the art historical mainstream, notions of performativity.

Same as: ARTHIST 176, ARTHIST 376, FEMGEN 176

**CSRE 167C. Wandering in Strange Lands: Science Fiction of the Black Atlantic. 3-5 Units.**

African-American culture critic Greg Tate once remarked that "Black people live the estrangement that science fiction authors imagine. In light of his observation, this course proposes to look at the black science fiction (SF) tradition from a variety of angles. Some examples: How do black authors use familiar speculative tropes, such as encounters with aliens, to comment on matters of race? What happens when tropes from African-American realist fiction, such as the passing narrative, become science fictionalized? How does the intersection of race and gender affect speculative works by black women? And perhaps the most central question: What do we gain by looking at matters of race through the lens of SF?"

**CSRE 168. New Citizenship: Grassroots Movements for Social Justice in the U.S.. 5 Units.**

Focus is on the contributions of immigrants and communities of color to the meaning of citizenship in the U.S. Citizenship, more than only a legal status, is a dynamic cultural field in which people claim equal rights while demanding respect for differences. Academic studies of citizenship examined in dialogue with the theory and practice of activists and movements. Engagement with immigrant organizing and community-based research is a central emphasis.

Same as: ANTHRO 169A, CHILATST 168, FEMGEN 140H

**CSRE 16A. Dynamic Australia: immigrant and indigenous experiences. 1 Unit.**

How did modern Australian society take shape? Within this larger framework, several subsidiary questions will guide us: What have been the experiences of immigrants, of Aborigines and Torres Strait Islanders, and how have their relations evolved over time? To what degree has Australia been formed by successive waves of immigration? What has been the fate of the Aboriginal peoples? How have intergroup relations evolved since the start of colonialism in the late 18th century? What have been the elements of racial formation, and how have they changed over time? What does it mean to be Australian in the 21st century? How might the creative arts (e.g. music, literature, drama, painting, dance) help us understand Australian identities and intergroup dynamics? As a course project, students are required to informally interview someone whose life history has involved large-scale displacement, voluntary or otherwise. This is intended as a means of sharpening awareness of migration as a feature of modern world history as articulated at the level of individuals and communities. This course is primarily intended for students enrolled in or waitlisted for the BOSP Summer Seminar in Sydney (June-July 2016). However, all participants will find it a wide-ranging introduction to Australian society and a case study in intergroup dynamics.

**CSRE 170. Introduction to American Indian Literature. 5 Units.**

This course provides a general introduction to American Indian literatures, beginning with early translations, including oral literatures and autobiographies, and continuing with contemporary poetry and fiction written by American Indian writers. We will want to pay particular attention to the American Indian writers; connections to a specific locale or place. In what ways are the stories and poems evocative of a long-standing relationship to a "home landscape"? What is the nature of the relationship? How is that relationship to place similar to or different from our own? At the same time, we will want to pay attention to the nature and scope of the various representations of American Indians in the texts we examine, and ask how the representations reinforce and/or dispel popular and often stereotypical images of American Indian people. Finally, we will want to be aware of and understand our position as readers, particularly as readers who come from and are constituted by historical, social, political, cultural, and ethnic worlds different from or similar to the worlds we find in the books that we are reading.

Same as: NATIVEAM 170

**CSRE 171H. Mexicans in the United States. 5 Units.**

This course explores the lives and experiences of Mexicans living in the United States, from 1848 to the present. Themes and topics include: the legacies of colonialism, the Mexican-American War, transnational migration, the effects of economic stratification, race and racialization, and the impact of sexual and gender ideologies on the lives of Mexicans residing north of the border.

Same as: AMSTUD 271, CHILATST 171, HISTORY 271

**CSRE 174. History of South Africa. 5 Units.**

(Same as HISTORY 47. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis.

Same as: AFRICAAM 147, HISTORY 147

**CSRE 174S. When Half is Whole: Developing Synergistic Identities and Mestiza Consciousness. 5 Units.**

This is an exploration of the ways in which individuals construct whole selves in societies that fragment, label, and bind us in categories and boxes. We examine identities that overcome the destructive dichotomies of *us* and *them*, *crossing* borders of race, ethnicity, culture, nation, sex, and gender. Our focus is on the development of hybrid and synergistic forms of identity and mestiza consciousness in which the whole is greater than the sum of its parts.

Same as: ASNAMST 174S

**CSRE 176S. Finding Meaning in Life's Struggles: Narrative Ways of Healing. 5 Units.**

We can find meaning in life's struggles through narrative ways of healing. The self-reflective, dynamic process of finding, telling, and living our stories connects us with our whole selves as well as with others. We find our stories through vulnerability and courage; tell them with humility and honesty; and live them authentically and responsibly. Our shared stories will focus on gratitude, acceptance, reconciliation, forgiveness and compassion, empowering us to overcome personal, community, and historical traumas and wounds. In a respectful, caring community we will discover our hidden wholeness by improvising with various experiential and embodied means of finding our stories; telling our stories in diverse ways, including writing, storytelling, music, and art; and living our stories by putting values into action.

Same as: TAPS 176S

**CSRE 177. Dramatic Writing: The Fundamentals. 4 Units.**

Course introduces students to the basic elements of playwriting and creative experimentation for the stage. Topics include: character development, conflict and plot construction, staging and setting, and play structure. Script analysis of works by contemporary playwrights may include: Marsha Norman, Patrick Shanley, August Wilson, Suzan-Lori Parks, Paula Vogel, Octavio Solis and others. Table readings of one-act length work required by quarter's end.

Same as: FEMGEN 177, TAPS 177, TAPS 277

**CSRE 177E. Well-Being in Immigrant Children & Youth: A Service Learning Course. 4 Units.**

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177A, EDUC 177A, HUMBIO 29A

**CSRE 177F. Well-Being in Immigrant Children & Youth: A Service Learning Course. 4 Units.**

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177B, EDUC 177B

**CSRE 177G. Well-Being in Immigrant Children & Youth: A Service Learning Course. 1-3 Unit.**

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177C, EDUC 177C

**CSRE 177I. Workshop with Young Jean Lee. 2-4 Units.**

Instructor Young Jean Lee is a playwright and director who will have two plays premiering on Broadway in 2018-2019. In this workshop, students will help to collaboratively perform, direct, and rewrite the script of one of these plays, which is about the intersection of class and race. The class will involve acting for students who want to act, directing for students who want to direct, and writing for students who want to write. The current character breakdown is as follows: 2 black women, 1 Asian-American woman, 1 Colombian woman, 1 Mexican-American man, 2 black men, 2 white women, 2 white men.

Same as: TAPS 177W, TAPS 277W

**CSRE 178. Ethics and Politics of Public Service. 3-5 Units.**

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford.

Same as: ETHICSOC 133, HUMBIO 178, PHIL 175A, PHIL 275A, POLISCI 133, PUBLPOL 103D, URBANST 122

**CSRE 178B. Intensive Playwriting. 4 Units.**

Intermediate level study of fundamentals of playwriting through an intensive play development process. Course emphasizes visual scripting for the stage and play revision. Script analysis of works by contemporary playwrights may include: Suzan-Lori Parks, Tony Kushner, Adrienne Kennedy, Edward Albee, Maria Irene Fornes and others. Table readings of full length work required by quarter's end.

Same as: TAPS 178B, TAPS 278

**CSRE 178P. The Science and Practice of Effective Advocacy. 3-5 Units.**

How can purposeful collective action change government policy, business practices and cultural norms? This course will teach students about the components of successful change campaigns and help develop the practical skills to carry out such efforts. The concepts taught will be relevant to both issue advocacy and electoral campaigns, and be evidence-based, drawing on lessons from social psychology, political science, communications, community organizing and social movements. The course will meet twice-a-week for 90 minutes, and class time will combine engaged learning exercises, discussions and lectures. There will be a midterm and final. Students will be able to take the course for 3 or 5 units. Students who take the course for 5 units will participate in an advocacy project with an outside organization during the quarter, attend a related section meeting and write reflections. If you enroll in the course for 5 units, you also need to enroll in the section URBANST 178-section 02.

Same as: PUBLPOL 178, URBANST 178

**CSRE 179C. Chroniclers of Desire: Creative Non-Fiction Writing Workshop. 3-5 Units.**

This course emphasizes the study and practice of personal memoir writing and literary journalism. The class will explore those writings that contain a public and private story, navigating an intimate and institutional world. Student writers will serve as public chroniclers whose subjective point of view and experience attempt to provide a truth greater than what the facts can offer.

Same as: CSRE 279C, FEMGEN 179C, TAPS 279C

**CSRE 17N. Race and Politics: Perspectives on the 2016 Presidential Election. 3 Units.**

This course is intended as a seminar-based exploration of the complex ways that race has informed political behavior and attitudes during the 2016 Presidential election. The class is designed to introduce freshmen to sociological ways of understanding the social world, and the rigors of college thinking more broadly. As a group we will explore the mechanisms through which race informs political behavior, while also paying close attention to the ways that politics also informs our understanding of race. The course treats race as multifaceted construct, with multiple (and often times conflicting) influences on political behavior. The course stresses then constructed nature of both race and politics. The course will be split into 3 parts. In the first part we will explore the relationship between racial identity and political behavior at the individual level. The second part of the course will examine how ideas about racial groups shape political attitudes and behaviors, as well as policy outcomes. The third part of the course will explore how race is used to mobilize political and economic actors.

Same as: AFRICAAM 17N, SOC 17N

**CSRE 180A. Foundations of Social Research. 4 Units.**

Formulating a research question, developing hypotheses, probability and non-probability sampling, developing valid and reliable measures, qualitative and quantitative data, choosing research design and data collection methods, challenges of making causal inference, and criteria for evaluating the quality of social research. Emphasis is on how social research is done, rather than application of different methods. Limited enrollment; preference to Sociology and Urban Studies majors, and Sociology coterms.

Same as: SOC 180A, SOC 280A

**CSRE 180B. Introduction to Data Analysis. 4 Units.**

Methods for analyzing and evaluating quantitative data in sociological research. Students will be taught how to run and interpret multivariate regressions, how to test hypotheses, and how to read and critique published data analyses.

Same as: SOC 180B, SOC 280B

**CSRE 180E. Introduction to Chicana/Latina Studies. 5 Units.**

This course draws on intersectional and interdisciplinary approaches to introduce students to the range of issues, experiences, and methodologies that form the foundation of Latina/o/x studies. By considering the relationship between the creation of Latina and American identities, students will critically reconsider the borders that constitute the U.S. as a political and cultural formation. The course balances depth and breadth in its study of the variety of perspectives and experiences that come to be associated with U.S. Latinxs. Thus, we will analyze the histories of predominant U.S. Latinx sub-groups, such as Mexicans/Chicanxs and Puerto Ricans, while also incorporating considerations of the ways in which broader populations with ties to Central America, South America, and the Caribbean play crucial roles in constituting U.S. Latinx identities. Topics include the U.S./Mexico border and the borderlands; (im)migration and diaspora; literary and cultural traditions; music and expressive practices; labor and structural inequality; social movements; Latinx urbanism; gender and sexuality; political and economic shifts; and inter- and intra-group relations.

Sources include a range of social science and humanities scholarship. Same as: CHILATST 180E

**CSRE 181. Multicultural Issues in Higher Education. 4 Units.**

The primary social, educational, and political issues that have surfaced in American higher education due to the rapid demographic changes occurring since the early 80s. Research efforts and the policy debates include multicultural communities, the campus racial climate, and student development; affirmative action in college admissions; multiculturalism and the curriculum; and multiculturalism and scholarship.

Same as: EDUC 181, EDUC 381

**CSRE 183. Re-Imagining American Borders. 5 Units.**

How novelists, filmmakers, and poets perceive racial, ethnic, gender, sexual orientation, and class borders in the context of a current volatile national discussion about the place of Americans both here and in the world. How Anna Deavere Smith, Sherman Alexie, Shailja Patel or Ta-Nehisi Coates consider redrawing such lines so that center and margin, or self and other, do not remain fixed and divided. How linguistic borderlines within multilingual literature by Caribbean, Arab, and Asian Americans function. Can Anzaldúa's 1986 conception of borderlands be constructed through the matrix of language, dreams, music, and cultural memories in these recent American narratives? Course includes creatively examining one's own identity.

Same as: AMSTUD 183, FEMGEN 183

**CSRE 185B. Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility. 4-5 Units.**

(Same as HISTORY 85B.) This course explores the full expanse of Jewish life today and in the recent past. The inner workings of religious faith, the content of Jewish identity shorn of belief, the interplay between Jewish powerlessness and influence, the myth and reality of Jewish genius, the continued pertinence of antisemitism, the rhythms of Jewish economic life – all these will be examined in weekly lectures, classroom discussion, and with the use of a widely diverse range of readings, films, and other material. Explored in depth will the ideas and practices of Zionism, the content of contemporary secularism and religious Orthodoxy, the impact Holocaust, the continued crisis facing Israel and the Palestinians. Who is to be considered Jewish, in any event, especially since so many of the best known (Spinoza, Freud, Marx) have had little if anything to do with Jewish life with their relationships to it indifferent, even hostile?.

Same as: HISTORY 185B, HISTORY 385C, JEWISHST 185B, REES 185B

**CSRE 186. The Psychology of Racial Inequality. 3 Units.**

Our topic is the psychology of racial inequality - thinking, feeling, and behaving in ways that contribute to racial stereotyping, prejudice, and discrimination, and how these processes in turn maintain and perpetuate inequality between racial groups. We will examine how these processes unfold at both the individual and the institutional levels. Throughout this course, you will familiarize yourself with the psychological perspectives, methods, and findings that help explain racial inequality, and we will explore ways to promote racial equality. The course will be conducted as a seminar, but most of what you learn will be through the readings and discussions. That is, this course is minimally didactic; the goal is to have you engage thoughtfully with the issues and readings spurred in part by sharing perspectives, confusions, and insights through writing and discussion. Each student will facilitate at least one class session by providing an introductory framework for the readings (~10-minute presentation with handouts that overviews the concepts, issues, and controversies). Together, we will broaden our knowledge base on the subject and explain, from a psychological perspective, the pervasiveness of racial inequality. Prerequisites: PSYCH 1 and PSYCH 10. Same as: PSYCH 186, PSYCH 286

**CSRE 187A. The Anthropology of Race, Nature, and Animality. 5 Units.**

As recently as the 40s, the S. Africa government labeled indigenous San people part of the animal landscape. Using the San example as a starting point, course examines socially, culturally, and politically constructed ideas about race, animality, and nature in the cultural and geographic settings of N. America, Australia, and Africa. How connections between race and nature have served as terrains of power through which people and governments have claimed territories and justified violence. Classic texts by nature writers and philosophers and current social science works that focus on race and ethnicity. Concepts such as gender, sex, and nature; environmental tourism; natural resource development; and indigeneity and animality. How ideas about race and nature have come together around concepts such as the myth of wilderness and the violence of considering certain people to be less-than-human. Issues of environmental politics and activism. Same as: ANTHRO 187A

**CSRE 188Q. Imagining Women: Writers in Print and in Person. 4-5 Units.**

Gender roles, gender relations and sexual identity explored in contemporary literature and conversation with guest authors. Weekly meetings designated for book discussion and meeting with authors. Interest in writing and a curiosity about diverse women's lives would be helpful to students. Students will use such tools as close reading, research, analysis and imagination. Seminar requires strong voice of all participants. Oral presentations, discussion papers, final projects. Same as: FEMGEN 188Q

**CSRE 193. Jacob Lawrence's Twentieth Century: African American Art and Culture. 5 Units.**

This course explores African American art and culture through the lens of the Cantor Arts Center's rich holdings of work by Jacob Lawrence (1917-2000). Our approach will combine close looking with attention to Lawrence's cultural, political, and social contexts. Using Lawrence as starting point, we also will consider the work of African American artists such as Charles Alston, Norman Lewis, Aaron Douglas, Betye Saar, and Kara Walker in relation to historical events including the Harlem Renaissance, the Great Depression, World War II, and the Civil Rights Movement. Key themes include the interactions of art, music, and film; the history of radical black thought; as well as issues of curatorial display and conservation. Same as: ARTHIST 193

**CSRE 194KT. Topics in Writing & Rhetoric: The Last Hopi On Earth: The Rhetoric of Entertainment Inequity. 4 Units.**

While #OscarsSoWhite brought attention to the Academy's overwhelmingly White, male membership, the underbelly of the entertainment industry itself is rife with inequitable hiring of not only on-camera and on-stage performers but also directors, writers, and others behind the scenes. While there are several organizations from Racebending.com to the Geena Davis Institute on Gender in Media that seek to usher in more equitable representation, push back against the Industry's disparate employment practices has been documented for more than fifty years with what many argue is not proportionally positive movement. White males still garner almost half of all theatrical and television roles and represent more than 80% of episodic directors while entertainment hubs Los Angeles and New York City are more than 50% people of color and female. What will it take to attain equity in the entertainment industry? Why does it matter? In this course, students will examine rhetorical issues in promoting, defending, and opposing entertainment industry practices - writing and speaking across genres in persuasive response - and ultimately develop a collaborative 5-year strategic plan to usher in equity. This course is part of the PWR advanced elective track in Social and Racial Justice (SRJ). Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For video course description, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-courses/last-hopi-earth-rhetoric-entertainment-inequity>. Same as: PWR 194KT

**CSRE 194SS. Topics in Writing & Rhetoric: Making Rhetoric Matter: Human Rights at Home. 4 Units.**

'Human rights' often sounds like it needs defending in far-off places: in distant public squares where soldiers menace gatherings of citizens, in dark jails where prisoners are tortured for their politics, in unknown streets where gender inequality has brutal consequences. But Bryan Stevenson, a lawyer fighting for social and racial justice in the jails of Alabama, proposes that we try 'proximity': that we get close to the injustices that are already close to us. This class thus takes human rights as a local issue, focusing on how terms like 'human' and 'rights' are interpreted on our campus and in our neighborhoods, cities, and region. Instead of a traditional human rights policy framework, we'll use the lens of intersectional ethics to explore specific rhetorical issues in gender politics, citizenship, higher education, police brutality, and mass incarceration. We will write, speak, and move across genres, responding to the work of incarcerated artists, creating embodied workshops, 'translating' ideas into new media (does someone you know need an animated video about gender pronouns? Or maybe it's time for a podcast about #PrisonRenaissance?), doing collaborative research, and 'writing back' to our audiences. For course video and full description see: <https://undergrad.stanford.edu/programs/pwr/courses/advanced-courses/making-rhetoric-matter-human-rights-home>. This course is part of the PWR advanced elective track in Social and Racial Justice (SRJ). Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-pwr-courses>. Same as: PWR 194SS

**CSRE 196C. Introduction to Comparative Studies in Race and Ethnicity. 5 Units.**

How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. Includes an optional Haas Center for Public Service certified Community Engaged Learning section. Same as: ENGLISH 172D, PSYCH 155, SOC 146, TAPS 165

**CSRE 196D. Introduction to Comparative Studies in Race & Ethnicity: Continuing Community Engagement. 1-5 Unit.**

In this continuation of CSRE 196C, students will continue to develop an interactive map that explores race and community in the Bay Area, through the work of local musicians. In collaboration with the SF-based non-profit, PeaceTones, you will interview musicians and contribute to an online map. The working map can be found at [bayareamusicmap.weebly.com](http://bayareamusicmap.weebly.com). Students will complete readings to explore diversity in the arts, specifically focusing on policy and advocacy implications as we develop the map as a tool for this work. Students will also meet as a group every other week for 50 minutes to reflect and discuss the work (we will set a time that works for everyone) and submit bi-weekly reflections of 500 words.

**CSRE 198. Internship for Public Service. 1-5 Unit.**

Students should consult with CCSRE Director of Community Engaged Learning ([ddmurray@stanford.edu](mailto:ddmurray@stanford.edu)) to develop or gain approval for an internship that addresses race/ethnicity, public service, and social justice. Students will read a selection of short readings relevant to their placement, write bi-weekly reflections, and meet bi-weekly with the Director of Community Engaged Learning. Units are determined by the number of hours per week at the internship (2 hours/week = 1 unit; 5 hours/week = 2 units; 8 hours/week = 3 units; etc.) Group meetings may be required. May be repeated for credit.  
Same as: CHILATST 198

**CSRE 199. Preparation for Senior Thesis. 2-3 Units.**

This course is designed for juniors (majors, minors, and those seeking Interdisciplinary Honors in CSRE or FGSS) who intend to write a senior thesis in one of the CSRE Family of Programs or FGSS Interdisciplinary Honors. The course offers resources and strategies for putting together a significant and original senior thesis. Topics to be covered include: getting funding; finding an advisor; navigating the institutional review board; formulating an appropriate question; and finding the right data/medium/texts.

Same as: FEMGEN 199X

**CSRE 19N. Everyone Eats: Food, Religion and Culture. 3 Units.**

Food is one of the most essential aspects of the human experience. The decisions and choices we make about food define who we have been, who we are now, and who we want to become. In this seminar we will study how food habits have shaped religious traditions, and vice versa, how religious traditions have shaped food ways. Some traditions are centered around food regimens such as the dietary laws, derived from biblical law that shapes Jewish and Christian tradition very differently. Indeed, many religious and ethical thinkers, as well as anthropologists, have interpreted the meanings of the dietary laws very differently. Further, in many religious traditions the killing of animals and consumption of meat is deeply fraught. We will explore the history of food practices and their contemporary impact; the connections between food, religion, and identity; the meanings that religious thinkers and anthropologists have attributed to food habits; as well as the creative translations of religious traditions into contemporary food ethics by various social movements and groups, predominantly in the U.S.

Same as: JEWISHST 19N, RELIGST 19N

**CSRE 1A. My Journey: Conversations on Race and Ethnicity. 1 Unit.**

This course meets once a week for one hour, over lunch (provided). Students will meet with CSRE faculty who will share their work, their life stories, their reasons for believing that race and ethnicity are of central concern to all members of our society. Diverse fields will be represented: sociology, history, literature, psychology and others.

**CSRE 1V. A History of Race. 1 Unit.**

This course will survey the idea of race and its history. We will focus our attention on the construction of the idea of race, and we will trace the ways in which this concept has changed over time. The course will start with a panel discussion on definitions of race in history, and as presented in different academic disciplines today. This discussion will be followed by two lectures tracing histories of race from Antiquity until the twentieth century. The last session will be a roundtable on the continuing role of race in the United States today. Covered topics will include explicit and implicit bias, institutionalized racism, race and criminal justice, equal justice initiatives and protests, racial stratification. The roles of politics, economics, science, religion, and nationalism, as well as the relationships between race, gender, and class will also be discussed. This course meets 5 times: Attendance at a January 17 panel (<https://ccsre.stanford.edu/events/ccsre-faculty-seminar-series-panel-discussion>) and class on Feb 12, Feb 26, March 5 & March 12th.

**CSRE 200R. Directed Research. 1-5 Unit.**

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**CSRE 200W. Directed Reading. 1-5 Unit.**

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**CSRE 200X. CSRE Senior Seminar. 5 Units.**

Required for CSRE-related students, including those who opt to write honors theses in other departments and programs. Research and the writing of the senior honors thesis or senior paper under the supervision of a faculty project adviser. The process of research including conceptualization, development of prospectus, development of theses, research, analysis, and writing.

**CSRE 200Y. CSRE Senior Honors Research. 1-10 Unit.**

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**CSRE 200Z. CSRE Senior Honors Research. 1-10 Unit.**

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**CSRE 201. From Confederate Monuments to Wikipedia: The Politics of Remembering the Past. 5 Units.**

Gateway course for Public History/Public Service track. Examines various ways history is used outside of the classroom, and its role in political/cultural debates in the U.S. and abroad. Showcases issues and careers in public history with guest speakers.

Same as: AFRICAAM 102, HISTORY 201

**CSRE 201B. Making Meaning: Art, Culture & Social Change. 3 Units.**

Are you an artist seeking a greater purpose for your art? Would you like to gain a sense of history and best practices for engaging your community in creative work? Practice of and an awareness of the concerns relevant to public art did not begin with Serra's Tilted Arc in 1980s. In contrast to the concerns of public art projects in the western practice of public art as extensions of the museum, this course explores the creative expression that emanates from community and cultural tradition. In communities around the world publicly engaged art making has flourished through creative tradition and collective engagements in social life. These traditions fostered creative works as collective practice, democratic participation, and interventionist impulses. From Agosto Boals's Theater of the Oppressed, to El Teatro Campesino's Farmworker actos, to the Free Southern Theater, from the Fandango's of southern Veracruz, to muralism of Los Tres Grandes, and the SNCC Freedom Singers, this course links the history of community cultural expression of peoples around the globe as a means to expand contemporary concerns of public and socially engaged art beyond a strictly postmodern art context.

Same as: CHILATST 201B



**CSRE 201D. Public Art Interventions in Social & Cultural Spaces. 4-5 Units.**

This team-taught course brings long-time artists, organizers, and researchers to present a range of strategies for creating public art and cultural productions in various social and cultural spaces. Our exploration of public art engages ideas about social space and public discourse. An approach that finds parallels in the art history lexicon of community-based; social sculpture, and place-making to name a few of the movements identified as other than the fine arts, ours is centered on work made collectively and in social and lived spaces through dialogue and conversation with others.

**CSRE 201X. Senior Seminar: For students with a second CSRE Family major. 5 Units.**

Required for students working to fulfill WIM requirements for a second CSRE Family of Programs major; including those who opt to write honors theses in other departments and programs. Research and the writing of the senior honors thesis or senior paper under the supervision of a faculty project adviser. The process of research including conceptualization, development of prospectus, development of theses, research, analysis, and writing.

**CSRE 203H. Trauma and History. 2 Units.**

This course will examine trauma as a historical process, following the intergenerational impacts of history's darker dramas, analyzing collective strategies for coping and healing after trauma, and asking whether we can speak of "traumatized societies." Short readings and weekly discussions.

Same as: HISTORY 203K

**CSRE 20N. What counts as "race," and why?. 4 Units.**

Preference to freshmen. Seminar discussion of how various institutions in U.S. society employ racial categories, and how race is studied and conceptualized across disciplines. Course introduces perspectives from demography, history, law, genetics, sociology, psychology, and medicine. Students will read original social science research, learn to collect and analyze data from in-depth interviews, and use library resources to conduct legal/archival case studies.

Same as: SOC 20N

**CSRE 21. African American Vernacular English. 3-5 Units.**

Vocabulary, pronunciation and grammatical features of the systematic and vibrant vernacular English [AAVE] spoken by African Americans in the US, its historical relation to British dialects, and to English creoles spoken on the S. Carolina Sea Islands (Gullah), in the Caribbean, and in W. Africa. The course will also explore the role of AAVE in the Living Arts of African Americans, as exemplified by writers, preachers, comedians and actors, singers, toasters and rappers, and its connections with challenges that AAVE speakers face in the classroom and courtroom. Service Learning Course (certified by Haas Center). UNITS: 3-5 units. Most students should register for 4 units. Students willing and able to tutor an AAVE speaking child in East Palo Alto and write an additional paper about the experience may register for 5 units, but should consult the instructor first. Students who, for exceptional reasons, need a reduced course load, may request a reduction to 3 units, but more of their course grade will come from exams, and they will be excluded from group participation in the popular AAVE Happenin at the end of the course.

Same as: AFRICAAM 21, LINGUIST 65, LINGUIST 265

**CSRE 216X. Education, Race, and Inequality in African American History, 1880-1990. 3-5 Units.**

Seminar. The relationship among race, power, inequality, and education from the 1880s to the 1990s. How schools have constructed race, the politics of school desegregation, and ties between education and the late 20th-century urban crisis.

Same as: AFRICAAM 116, AMSTUD 216, EDUC 216, HISTORY 255E

**CSRE 217. Expanding Engineering Limits: Culture, Diversity, and Gender. 2-3 Units.**

This course investigates how culture, and diversity, including gender, shape who becomes an engineer, what problems get solved, and the quality of designs, technology, and products. We first examine the characteristics of engineering cultures – what are the interactions, symbols and ideas, and practices that define engineering? We then investigate how gender and other markers of diverse identities are interdependent and culturally constructed, how gender and other kinds of diversity are experienced in engineering cultures, and how these experiences have consequence for engineering innovation and the engineering profession. Finally, we analyze examples of cultural change in engineering and implications for engineering knowledge and practice. The course involves weekly presentations by distinguished scholars and engineers, readings, short writing assignments, small-group discussion, and exercises around one's own experiences in and related to engineering. Those taking the course for 3 units will also complete a research-based project, and must take the course for a letter grade to meet the undergraduate WAY-ED requirement.

Same as: CSRE 117, ENGR 117, FEMGEN 117, FEMGEN 217

**CSRE 218. Islam, Race and Revolution: A Pan-American Approach. 3-5 Units.**

Taking a pan-American approach to the study of religious traditions, this upper-level course traces the history of the critical intersection between race, religion and revolution among Muslims from the turn of the nineteenth century until the present day. Moving from the Atlantic Revolutions of the late eighteenth and early nineteenth centuries, to the United States, to the decolonizing Third World, and then finally to the contemporary Middle East, this class will emphasize that Islam and race together have been used by many groups in order to challenge existing power structures, agitate for change, and more than occasionally, transform the social, cultural and governmental structures comprising their worlds. Moreover, although this class is concentrated upon religious formations in the Americas, students will explore global events throughout the Muslim world in order to examine how global politics contribute to religious formations, solidarities and identities. At the conclusion of this course, students will be expected to write a 10-15 page research paper, and a topic will be chosen in consultation with the instructor. Students will also be expected to write weekly reflection papers, which will serve to facilitate class discussion. Undergraduates register for 200-level for 5 units. Graduate students register for 300-level for 3-5 units.

Same as: AMSTUD 218, RELIGST 218, RELIGST 318

**CSRE 21N. How to Make a Racist. 3 Units.**

How do children, with no innate beliefs or expectations about race, grow up to be racist? To address this complex question, this seminar will introduce students to the cognitive, social, and cultural factors that contribute to the development of racial stereotyping, prejudice, and discrimination. We will begin by defining key concepts (e.g., 'What is race and what is racism?'), and will then take a developmental approach to examine racist thought from early childhood until adulthood. The seminar will include lectures that will provide an introduction to each topic. These lectures will be supplemented by readings and discussion. Students will engage thoughtfully and critically with the topics and readings by sharing experiences, perspectives, confusions, and insights through discussion and in writing. Students with diverse experiences and perspectives will be welcomed and encouraged to participate.

Same as: AFRICAAM 121N, PSYCH 21N

**CSRE 220. Public Policy Institute. 1-2 Unit.**

\*\* This course meets and concludes prior to Autumn Quarter. If you were not a student in this year's PPI, please DO NOT ENROLL. \*\*  
Public Policy Institute serves to: provide students with information and perspectives on important public policy issues that have particular relevancy to matters of race and ethnicity in American society, past and present; expose students to faculty and other professionals working on public policy-related issues; and provide insight into the legislative process of public policy making at the state and local levels. Students are expected to conduct research necessary to write a policy brief on a particular issue, and make a presentation based on the policy brief. A field trip to Sacramento introduces students to policymakers and current policy matters of importance to marginalized communities in California.

**CSRE 221. Sentencing, Corrections, and Criminal Justice Policy. 3 Units.**

This introductory course will familiarize students with the history, structure, and performance of America's sentencing and corrections system. Sentencing is the process by which criminal sanctions are imposed in individual cases following criminal convictions. Corrections deals with the implementation and evaluation of criminal sentences after they are handed down. In fact, the two subject areas are inseparable. The course will examine sentencing and corrections from global and historical views, from theoretical and policy perspectives, and with close attention to many problem-specific areas. We will explore sentencing theories and their application, the nature, scope and function of corrections, the impact of mass incarceration on crime and communities, the effectiveness of rehabilitation, the relationship between sanctions and crime, and the consequences of prisoner reentry. These topics will be considered as they play out in current political and policy debates. Guest lectures may include presentations by legal professionals, victims, offenders, and correctional leaders. We also plan to visit a correctional facility. This course is open to 1Ls, 2Ls, and 3Ls in the Law School. Special Instructions: Grades will be based on class participation, and either: (1) three reflection papers of 5 to 7 pages each, or (2) a longer research paper. After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the research (R) requirement, with consent of the instructor. Elements used in grading: Class participation, reflection papers or research paper. Cross-listed with Comparative Studies in Race & Ethnicity (CSRE 221) and open to Juniors and Seniors, Law (LAW 621), Public Policy (PUBLPOL 221). Same as: PUBLPOL 221

**CSRE 221D. Peacemaking Circles: Crafting Challenging Conversations in a Conflicted World. 3 Units.**

Explore indigenous cultural methods of navigating and resolving conflict while developing and designing new tools to promote peace across Native America. Peacemaking is a form of conflict resolution that has been traditionally used by indigenous communities and continues to have a strong presence in many tribal judicial systems today. Throughout this interactive, skills-based course students will practice and design for the art of Peacemaking and conflict-resolution. Students can expect to unpack the components of strong listening, leadership, and effective cultural competency-- abilities that are crucial in any conflict situation. By exposing students to Peacemaking, the psychology behind decision making, and design thinking, we challenge students to rethink the structures currently in place to handle conflict.   
The only background skills necessary for this course are a dedication to participate and interact with the class and a willingness to embrace diverse perspectives.   
Course meets 9:30am-5:00pm in d.School room 160 on the following dates: Jan 11-12, Jan 25-26, Feb 9, Mar 8-9. Same as: NATIVEAM 221

**CSRE 222. The Political Psychology of Intolerance. 5 Units.**

This seminar explores the political psychology of intolerance. It focuses on two problems in particular: race in America and the challenge of Muslim inclusion in Western Europe. It concentrates on primary research. The readings consist of both classic and contemporary (including on-going) studies of prejudice and politics. Same as: POLISCI 222

**CSRE 223. Building Creative Cultures in Organizations. 4-5 Units.**

\*\*We will be visiting partner organizations off campus on Wednesdays during class. Therefore, we would strongly encourage students to plan their schedules including extra travel time to and from Stanford. All organizations should be within a 30 minute drive to campus.   
\*\*To apply for the class, submit an application: [https://docs.google.com/forms/d/e/1FAIpQLSeGrrVae\\_2PkTXhYRrIhv0AXK8KsITFsvZeMcTImMgix6LrxA/viewform](https://docs.google.com/forms/d/e/1FAIpQLSeGrrVae_2PkTXhYRrIhv0AXK8KsITFsvZeMcTImMgix6LrxA/viewform)   
\*\*For more information, check out the course website: <https://dschool.stanford.edu/classes/building-creative-culture-in-organizations>   
Students will spend half of their class time at the d.school and half of their class time at organizations across Silicon Valley, ranging from startups to large enterprises. Through empathy interviews with employees you will learn to identify facilitators and barriers that organizations face when they transition to human-centered and design thinking culture. You will design and test interventions that will help them enhance their creative culture. The course is highly experiential and interdisciplinary. Come ready to unpack the biggest challenges of creative teams, explore interesting companies, connect with engaging thought leaders, and reflect on the future of work.

**CSRE 226. Race and Racism in American Politics. 5 Units.**

Topics include the historical conceptualization of race; whether and how racial animus reveals itself and the forms it might take; its role in the creation and maintenance of economic stratification; its effect on contemporary U.S. partisan and electoral politics; and policy making consequences.

Same as: AMSTUD 226, POLISCI 226, POLISCI 326

**CSRE 226X. Curating Experience: Representation in and beyond Museums. 2-4 Units.**

In an age when some 50% of museum visitors only "visit" museums online and when digital technologies have broken open archival access, anyone can be a curator, a critic, an historian, an archivist. In this context, how do museums create experiences that teach visitors about who they are and about the world around them? What are the politics of representation that shape learning in these environments? Using an experimental instructional approach, students will reconsider and redefine what it means to curate experience. (This course must be taken for a minimum of 3 units to satisfy a Ways requirement.)

Same as: AMSTUD 226X, EDUC 226

**CSRE 227. Juvenile Crime, Juvenile Justice. 3 Units.**

Juveniles are accorded special status under the American legal system. This introductory course will examine the historical precedents and philosophical reasons for treating juveniles differently from adults, and review empirical evidence about child development that can illuminate the reasons for their special status within the court system. Students will learn about the distribution of juvenile delinquency and the impact of significant social and institutional influences on delinquency: family, school, peers, and drugs. The course will also provide a detailed overview of the juvenile system, from its beginning to the current state of the institution, which will include a review of police work with juveniles, pretrial procedures, and the juvenile court and corrections systems. Major court rulings that have shaped contemporary juvenile justice will be presented. Finally, the course will consider dispositional options available to Courts, and will identify the most effective in reducing delinquency. By the conclusion of this course, students should have an understanding of the juvenile justice system and how it compares with the adult justice system, what programs work to reduce recidivism, and be cognizant of some of the major legal and policy issues confronting that system today. The course format will combine lecture, group discussions, and guest presentations. Students may also have the opportunity to observe the juvenile justice system first hand by attending a juvenile court session, visiting a correctional facility for adjudicated delinquents, and hearing directly from those who work with high-risk youth on probation or in the community. Written Work. Each student will write four reflection papers, 5-7 pages each (about 1,700 words) over the quarter. Due dates will be listed in the class syllabus. Elements used in grading: Final grades will be based on the four reflection papers (20% each) and class participation (20%). This course is open to 2Ls, and 3Ls in the Law School. Cross-listed with Comparative Studies in Race & Ethnicity (CSRE 227); open to Juniors and Seniors.

**CSRE 229. Racial Justice Through Law. 3 Units.**

Racial inequality pervades American life. Race related controversies arise with depressing regularity. This, more than half a century after the Supreme Court's landmark decision in *Brown v Board of Education*, after landmark federal civil rights legislation, and at a time when many Americans profess to be colorblind. This course will examine why and how racial injustice persists, and the role of law in furthering or impeding the cause of racial justice. These questions will be explored across a variety of settings, including criminal justice, college admissions, political participation, primary/secondary education, employment, housing, hate speech, and the formation of family relationships. The class will employ a discussion based approach in which student participation is essential. Elements used in grading: Exam, class participation. Open to Junior and Senior undergraduates. Meets along with LAW 229.

**CSRE 230. Law, Order & Algorithms. 3 Units.**

Data and algorithms are transforming law enforcement and criminal justice, a shift that is ripe for rigorous empirical and narrative exploration. This class is centered around several data-driven projects in criminal justice, with the goal of fostering greater understanding, transparency, and public accountability. Students work in interdisciplinary teams, using a combination of statistical and journalistic methods. Some of the work may be published by news organizations or may be used to advance data journalism investigations. Students with a background in statistics, computer science, law, public policy or journalism are encouraged to participate. Enrollment is limited, and project teams will be selected during the first week of class.

Same as: MS&E 330, SOC 279

**CSRE 233A. Counseling Theories and Interventions from a Multicultural Perspective. 3-5 Units.**

In an era of globalization characterized by widespread migration and cultural contacts, professionals face a unique challenge: How does one practice successfully when working with clients/students from so many different backgrounds? This course focuses upon the need to examine, conceptualize, and work with individuals according to the multiple ways in which they identify themselves. It will systematically examine multicultural counseling concepts, issues, and research. Literature on counselor and client characteristics such as social status or race/ethnicity and their effects on the counseling process and outcome will be reviewed. Issues in consultation with culturally and linguistically diverse parents and students and work with migrant children and their families are but a few of the topics covered in this course.

Same as: AFRICAAM 233A, EDUC 233A

**CSRE 243. Writing Across Languages and Cultures: Research in Writing and Writing Instruction. 3-5 Units.**

Theoretical perspectives that have dominated the literature on writing research. Reports, articles, and chapters on writing research, theory, and instruction; current and historical perspectives in writing research and research findings relating to teaching and learning in this area.

Same as: EDUC 145, EDUC 243

**CSRE 245. Understanding Racial and Ethnic Identity Development. 3-5 Units.**

This seminar will explore the impact and relative salience of racial/ethnic identity on select issues including: discrimination, social justice, mental health and academic performance. Theoretical perspectives on identity development will be reviewed, along with research on other social identity variables, such as social class, gender and regional identifications. New areas within this field such as the complexity of multiracial identity status and intersectional invisibility will also be discussed. Though the class will be rooted in psychology and psychological models of identity formation, no prior exposure to psychology is assumed and other disciplines-including cultural studies, feminist studies, and literature-will be incorporated into the course materials.

Same as: AFRICAAM 245, EDUC 245

**CSRE 246. Constructing Race and Religion in America. 4-5 Units.**

This seminar focuses on the interrelationships between social constructions of race, and social interpretations of religion in America. How have assumptions about race shaped religious worldviews? How have religious beliefs shaped racial attitudes? How have ideas about religion and race contributed to notions of what it means to be "American"? We will look at primary and secondary sources, and at the historical development of ideas and practices over time.

Same as: AFRICAAM 236, AMSTUD 246, HISTORY 256G, HISTORY 356G, RELIGST 246, RELIGST 346

**CSRE 249. The Algerian Wars. 3-5 Units.**

From Algiers the White to Algiers the Red, Algiers, the Mecca of the Revolutionaries in the words of Amilcar Cabral, this course offers to study the Algerian Wars since the French conquest of Algeria (1830-) to the Algerian civil war of the 1990s. We will revisit the ways in which the war has been narrated in literature and cinema, popular culture, and political discourse. A special focus will be given to the Algerian War of Independence (1954-1962). The course considers the racial representations of the war in the media, the continuing legacies surrounding the conflict in France, Africa, and the United States, from Che Guevara to the Black Panthers. A key focus will be the transmission of collective memory through transnational lenses, and analyses of commemorative events and movies. nReadings from James Baldwin, Assia Djebar, Albert Camus, Frantz Fanon, Mouloud Feraoun. Movies include "The Battle of Algiers," "Days of Glory," and "Viva Laldjérie." nTaught in English.

Same as: FRENCH 249, HISTORY 239G, JEWISHST 249

**CSRE 252C. The Old South: Culture, Society, and Slavery. 5 Units.**

This course explores the political, social, and cultural history of the antebellum American South, with an emphasis on the history of African-American slavery. Topics include race and race making, slave community and resistance, gender and reproduction, class and immigration, commodity capitalism, technology, disease and climate, indigenous Southerners, white southern honor culture, the Civil War, and the region's place in national mythmaking and memory.

Same as: AFRICAAM 252C, HISTORY 252C

**CSRE 255D. Racial Identity in the American Imagination. 4-5 Units.**

From Sally Hemings to Barack Obama, this course explores the ways that racial identity has been experienced, represented, and contested throughout American history. Engaging historical, legal, and literary texts and films, this course examines major historical transformations that have shaped our understanding of racial identity. This course also draws on other imaginative modes including autobiography, memoir, photography, and music to consider the ways that racial identity has been represented in American society. Most broadly, this course interrogates the problem of American identity and examines the interplay between racial identity and American identity.

Same as: AFRICAAM 255, AMSTUD 255D, HISTORY 255D, HISTORY 355D

**CSRE 256SI. Race, Class and Global Health. 2 Units.**

This course's goal is to critically engage students in the socioeconomic and racial disparities in healthcare outcomes and encourage students to think broadly about the complex relationship between institutions, healthcare providers, socioeconomic status, and race/ethnicity. The topics will center on conceptual issues important for understanding how socioeconomic and minority status can lead to poor health outcomes examining how conscious and unconscious institutional biases affect treatment, care, and access, and addressing proposals for how to reduce disparities in health care. The focus of the course is broad. The first three weeks will center on public health issues due to global healthcare trends, including the results of disparities in the United States. These discussions will frame our sessions in the latter six weeks, which will each consist of a case study of specific cases of disparities and response to such inequities worldwide, from India to Rwanda. Each class's discussion will be guided by case studies. The readings will come from a variety of sources, including academic journals, more popular journals and magazines, books and government documents. Student will be expected to complete the readings and a reflection in advance of class each week. Each week will additionally include optional readings that will guide additional discussion.

Same as: MED 256SI

**CSRE 258. Black Feminist Theater and Theory. 4 Units.**

From the rave reviews garnered by Angelina Weld Grimke's lynching play, Rachel to recent work by Lynn Nottage on Rwanda, black women playwrights have addressed key issues in modern culture and politics. We will analyze and perform work written by black women in the U.S., Britain and the Caribbean in the 20th and 21st centuries. Topics include: sexuality, surrealism, colonialism, freedom, violence, colorism, love, history, community and more. Playwrights include: Angelina Grimke, Lorriane Hansberry, Winsome Pinnock, Adrienne Kennedy, Suzan-Lori Parks, Ntozake Shange, Pearl Cleage, Sarah Jones, Anna DeVeare Smith, Alice Childress, Lydia Diamond and Zora Neale Hurston.).

Same as: AFRICAAM 258, FEMGEN 258X, TAPS 258

**CSRE 260. California's Minority-Majority Cities. 4-5 Units.**

Historical development and the social, cultural, and political issues that characterize large cities and suburbs where communities of color make up majority populations. Case studies include cities in Los Angeles, Santa Clara, and Monterey counties. Comparisons to minority-majority cities elsewhere in the U.S. Service Learning Course (certified by Haas Center).

Same as: HISTORY 260, URBANST 169

**CSRE 262C. African American Literature and the Retreat of Jim Crow. 5 Units.**

After the unprecedented carnage of WWII, the postwar era witnessed the slow decline of the segregated Jim Crow order and the onset of landmark civil rights legislation. What role did African American literature and culture play in this historical process? What does this shift in racial theory and praxis mean for black literary production, a tradition constituted by the experience of slavery and racial oppression? Focus on these questions against the backdrop of contemporaneous developments: the onset of the Cold War, decolonization and the formation of the Third World, and the emergence of the "new liberalism."

Same as: AFRICAAM 262C, AMSTUD 262C

**CSRE 268C. Poverty in America. 4-5 Units.**

During the twentieth century, Americans launched numerous bold efforts to reduce poverty in the United States. Federal welfare policy, community-based programs, academic research, philanthropic charity, and grassroots activism committed time and resources to the cause, but poverty—and inequality—have persisted. Why? This seminar considers the origins, implementation, and consequences of these remedies, noting in particular how race, gender, citizenship, family composition, and geography have shaped the lives of those in poverty and the public and private responses to it.

Same as: AMSTUD 268C, HISTORY 268C, HISTORY 368C

**CSRE 272A. Teaching Mexican American History in High School. 5 Units.**

The purpose of the course is two fold: 1) to expose students to salient historical themes and topics in Mexican American history, and 2) to establish a mentoring project with students currently enrolled in Mexican American history courses at Luis Valdez Leadership Academy (LVLA) high school in San Jose. Students will gain a broad understanding of Mexican American history, especially since the early twentieth century, with a particular focus on the Chicano Movement of the 1960s and 1970s. Students must also commit to enrollment in Hist 272F in spring quarter.

Same as: CHILATST 272A, HISTORY 272D

**CSRE 272B. Teaching Mexican American History in High School, Part II. 5 Units.**

Prerequisite: HISTORY 272D. This course is the second part of a continuing course about teaching Mexican American history in high school. In addition to continuing the mentoring work with students at Luis Valdez Leadership Academy, the spring quarter course will focus on the conceptualization, design, and development of a website that will provide resources for U.S. history teachers who seek information about Mexican American history. Students will identify primary sources, bibliographies, lesson plans, and other materials for use by high school teachers.

Same as: CHILATST 272B, HISTORY 272F

**CSRE 273. Caribbean Migration to the United States. 4-5 Units.**

The course will explore the history of Caribbean migration to the United States.

Same as: AFRICAAM 273C, HISTORY 273C, HISTORY 373C

**CSRE 275B. History of Modern Mexico. 4-5 Units.**

Surveys the history of governance, resistance, and identity formation in Mexico from the nineteenth century to the present. Explores Mexico's historical struggles to achieve political stability, economic prosperity, and social justice and examines how regional, class, ethnic, and gender differences have figured prominently in the shaping of Mexican affairs. Topics include Mexico's wars and their legacies, the power of the state, violence and protest, debates over the meaning of "Mexicanness," youth culture, and the politics of indigenismo.

Same as: AMSTUD 275B, CHILATST 275B, HISTORY 275B, HISTORY 375C

**CSRE 279C. Chroniclers of Desire: Creative Non-Fiction Writing Workshop. 3-5 Units.**

This course emphasizes the study and practice of personal memoir writing and literary journalism. The class will explore those writings that contain a public and private story, navigating an intimate and institutional world. Student writers will serve as public chroniclers whose subjective point of view and experience attempt to provide a truth greater than what the facts can offer.

Same as: CSRE 179C, FEMGEN 179C, TAPS 279C

**CSRE 27SI. Revolution and the Pilipinx Diaspora: Exploring Global Activism in Local Communities. 1-2 Unit.**

This course aims to provide students with an opportunity to not only learn about current issues in the local Filipino American community, but also develop their own plans to take action on social justice issues. Through mediums of art and reflection, we will explore themes of diaspora and liberation by focusing on the Filipino experience and the local and vocal histories of activism in the Bay Area. We will be connecting local histories to the current global narrative while also connecting our past to our own identity formation as activists and community leaders. In doing so, we hope to explore the implications of local activism within the greater context of global organizing. The course will expose students to local community leaders and ways in which they can support and plug in to local initiatives.

**CSRE 28SI. What is Whiteness? Historical and Contemporary Definitions of White Racial Identity in the U.S.. 1-2 Unit.**

This course will explore one central question: What does it mean to be White, and how has that changed over time and place? From Abigail Fisher to Kreyshaw to the Tsarnaev brothers, we will use narratives and experiences of Whiteness to illuminate historical and contemporary understandings of what it means to be White in 2013. Through this class, students will share their own encounters with Whiteness, and will develop tools and strategies for navigating privileged identities and engaging within Stanford's diverse student community.

**CSRE 295F. Race and Ethnicity in East Asia. 4-5 Units.**

Intensive exploration of major issues in the history of race and ethnicity in China, Japan, and Korea from the early modern period to the present day.

Same as: ASNAMST 295F, HISTORY 295F, HISTORY 395F

**CSRE 29SI. Migration is Beautiful: Histories, Realities, and Policies of Immigrant Justice. 1 Unit.**

In the current political landscape, many political stakeholders have endorsed anti-immigrant policies using inflammatory rhetoric that has disturbed American attitudes toward immigration. This course challenges the underlying assumptions of this discourse. We will begin by analyzing the history of immigration policy and politics in the United States. We will discuss specific issues related to border control, detention, and law enforcement and then delve into the intersections of immigration, criminal justice, health, and education policies. Throughout, we will emphasize the importance of using empirical data and personal narratives when analyzing and participating in the contemporary discourse on immigration-related issues.

**CSRE 30N. The Science of Diverse Communities. 3 Units.**

This course is an exploration. Most generally, its aim is to identify distinguishing features of good diverse communities and articulate them well enough to offer principles or guidelines for how to design and manage such communities - all with a particular focus on educational communities like schools, universities, academic disciplines, etc., but with the hope that such principles might generalize to other kinds of organizations and the broader society. The readings range from those on the origins of human communities and social identities to those on intergroup trust building. They also aim to embed our discussions in the major diversity issues of the day, or example, what's in the news about campus life. Thus the course has a practical purpose: to develop testable ideas for improving the comfort level, fairness and goodness-for-all of identity diverse communities—especially in educational settings. The course also has a basic science purpose: to explore the psychological significance of community. Is there a psychological need for community? Is there something about a need for community that can't be reduced to other needs, for example, for a gender, racial or sexual-orientation identity? How strong is the need for community against other needs? What kinds of human groupings can satisfy it? In meeting this need, can membership in one community substitute for membership in others? What do people need from communities in order to thrive in them? Do strong diverse communities dampen intergroup biases? Can strong community loyalty mitigate identity tensions within communities? Such questions, the hope is, will help us develop a more systematic understanding of the challenges and opportunities inherent in diverse human communities.

Same as: EDUC 30N, PSYCH 30N, SOC 179N

**CSRE 30Q. The Big Shift. 4 Units.**

Is the middle class shrinking? How do people who live at the extremes of American society- the super rich, the working poor and those who live on the margins, imagine and experience "the good life"? How do we understand phenomena such as gang cultures, addiction and the realignment of white consciousness? This class uses the methods and modes of ethnographic study in an examination of American culture. Ethnographic materials range from an examination of the new American wealth boom of the last 20 years (Richistan by Robert Frank) to the extreme and deadly world of the invisible underclass of homeless addicts on the streets of San Francisco (Righteous Dopefiend by Phillippe Bourgois and Jeff Schonberg). The experiences of Hispanic immigrants and the struggle to escape gang life in Los Angeles are highlighted in the story of Homeboy Industries a job creation program initiated by a priest working in LA's most deadly neighborhoods (G-Dog and the Homeboys by Celeste Fremon). Finally in Searching for Whitopia: an improbable journey into the heart of White America, Rich Benjamin explores the creation of ethnic enclaves (whitopias) as fear over immigration and the shrinking white majority redefine race consciousness in the 21st century. Each of these narratives provides a window into the various ways in which Americans approach the subjects of wealth and the good life, poverty and the underclass, and the construction of class, race, and gender in American society. Students will not be required to have any previous knowledge, just curiosity and an open mind.

Same as: ANTHRO 30Q

**CSRE 30SI. Housing Justice and Stratification in the Bay Area. 1 Unit.**

This is a survey course on relevant topics to local housing justice concerns, including current debates in housing policy and the role of various sectors in shaping the local housing market. This course will prepare participants to both personally engage in service learning and critically engage with actors in housing policy over spring break. To begin, we will explore paradigms of critical community engagement and develop a decolonized framework about the history of the local land. With these underlying philosophies in mind, we will dive into the politics behind ongoing gentrification, the rise of the city and the decline of suburbs in the Bay Area. From there, we will analyze housing policies which have strongly influenced the local housing situation, including national policies such as the Fair Housing Act and East Palo Alto affordability measures. To close, the course will focus on the role of different actors and sectors in affecting change. We will examine possible obligations local technology companies and real estate developers might have in shaping the region's housing market. Finally, we will study the notion of housing as a human right and ask whether achieving housing justice would require a formally declared right to affordable and fair housing.

**CSRE 31SI. Food + Race. 1 Unit.**

If we are what we eat, Food + Race is a class that explores what we eat and how we talk about it. In this student-initiated course, we will look at popular culture and discourse as a gateway to issues like just labour practices and equitable access, cultural authenticity, family histories of immigration, appropriation and consumerism, and global colonial domination. From The Great British Bake Off to Korean tacos in L.A., we'll ask "What does food really mean?" and "What does food really mean to us?"

**CSRE 32. Theories in Race and Ethnicity: A Comparative Perspective. 5 Units.**

This undergraduate course employs an anthropological and historical perspective to introduce students to ideas and concepts of race and ethnicity that emerged primarily in Europe and the United States in the eighteenth and nineteenth centuries and that continue to shape contemporary racial attitudes, interactions, and inequalities. Ideas about race and ethnicity forged outside the U.S. and case studies from other nations are presented to broaden students' understanding and to overcome the limitations of an exclusive focus on the U.S. This course is geared to sophomores and juniors who have already taken at least one course on race and ethnicity, anthropology, African American Studies, Asian American Studies, Chicana/o Studies, Jewish Studies or Native American Studies.

Same as: ANTHRO 32

**CSRE 32A. The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice. 1-5 Unit.**

This course-series brings together leading scholars with critically-acclaimed artists, local teachers, youth, and community organizations to consider the complex relationships between culture, knowledge, pedagogy and social justice. Participants will examine the cultural meaning of knowledge as "the 5th element" of Hip Hop Culture (in addition to MCing, DJing, graffiti, and dance) and how educators and cultural workers have leveraged this knowledge for social justice. Overall, participants will gain a strong theoretical knowledge of culturally relevant and culturally sustaining pedagogies and learn to apply this knowledge by engaging with guest artists, teachers, youth, and community youth arts organizations.

Same as: AFRICAAM 32, AMSTUD 32, EDUC 32, EDUC 432, TAPS 32

**CSRE 32SI. Whiteness. 1-2 Unit.**

This course provides an introduction to the concept of Whiteness. We will investigate the historical origin of "Whiteness" and "White people," examine some of the institutional and interpersonal privileges associated with Whiteness, and explore contemporary debates about White entitlement, White culture, and White charity. As we are articulating the problem of Whiteness, we will also be exploring strategies and models of "White allyship," and asking the surprisingly difficult questions of: How can White people work for racial justice, and how can people of all races work to disrupt Whiteness and White Supremacy? This class is intended for students of all majors and backgrounds interested in learning about Whiteness.

**CSRE 33SI. Examining Access for FLI Students in Higher Education. 1 Unit.**

Stanford's past two presidents have steadfastly declared Stanford as a vehicle of upwards mobility and to correct inequalities. Essentially, this means providing sufficient access to students who often are most in need: first-generation and/or low-income (FLI) students. However, what exactly is access? How can we understand different kinds of access in order to improve the holistic quality of education students receive? To answer these questions, we will define access and the forces which shape it, such as economic systems, intersectionality, and the educational pipeline. Next, to better prepare ourselves as advocates for educational improvement, we will examine the historical trend of access at colleges as case studies (Stanford, Berkeley, Foothills, and Brown). Finally, we will ask how accessibility influences how students fare after leaving the educational system. Ultimately, we will gain analytical and heuristic techniques to pinpoint and advocate for improvements to educational access for FLI students.

**CSRE 34SI. The Chicago Gap: Bridging Latinx Youth Education. 1 Unit.**

By the year 2050, Latinos will make up a quarter of the United States population, doubling in its current size. Without a doubt, this increase in population is sure to affect American economy and policy. Unfortunately, Latinos seem to be on the slow path to social mobility in the United States, and face many setbacks as a community. More specifically, the Latinx pupil dropout rate is the highest amongst all ethnic groups. While Latinos are enrolling in college at higher rates than ever before they are not graduating with four-year degrees as often as other students. Our course will cover the dynamic linguistic, cultural, and economic themes involved in this discourse. We will reimagine citizenship as it pertains to accessing higher education and discuss tracks and pipelines that have lead Latinx students to different outlets. More specifically, we will cover the impact that location and environment have on a pupil's perception of themselves and their capabilities, while also reflecting on Chicago's history of education and racial segregation.

**CSRE 36. REPRESENT! Covering Race, Culture, and Identity In The Arts through Writing, Media, and Transmedia.. 5 Units.**

Probably since the first audience formed for the first chalk scrawls in a cave, there have been storytellers to narrate that caveperson's art and life, and critics to troll that caveperson's choice and usage of color. And so it goes. This course is an exploration into how to cover race, culture, and identity in the arts in journalism, such as print, web, video, radio, and podcasting. It is also an arts journalism practicum. During the quarter, we will be working toward creating work that is publishable in various venues and outlets. In this course, we will be discussing exemplary arts writers and their works and interrogating critical questions around race, identity, representation, and ethics. Experienced journalists, editors, and experts from different platforms and backgrounds will also be imparting important skills and training that will help you to navigate today's working media and transmedia environments. Those who enroll in the class will be expected to produce quality content (e.g. articles, blog posts, video reports, podcasts) for media outlets. Some travel outside of class may be required for additional reporting and training. This seminar class will be By Instructor Approval Only. Please submit an application by February 22 at 11:59pm. Starred items are required. The app is available at: <http://bit.ly/RepresentClass36> Those selected for this class will be informed by March 2nd so that they may enroll in the course. Please do not apply for the course if you are unsure about completing it. If you have any questions, you may email the instructor at: [jeffc410@stanford.edu](mailto:jeffc410@stanford.edu). Same as: AFRICAAM 36

**CSRE 38. Deliberative Democracy Practicum: Applying Deliberative Polling. 3-5 Units.**

In this course, students will work directly on a real-world deliberative democracy project using the method of Deliberative Polling. Students in this course will work in partnership with the Center for Deliberative Democracy at Stanford, a research center devoted to the research in democracy and public opinion around the world. This unique practicum will allow students to work on an actual Deliberative Polling project on campus. In just one quarter, the students will prepare for, implement, and analyze the results for an Deliberative Polling project. This is a unique opportunity that allows students to take part in the entire process of a deliberative democracy project. Through this practicum, students will apply quantitative and qualitative research methods in a local community or local high school and subsequently, analyze the relevant quantitative and qualitative data. Students will explore the underlying challenges and complexities of what it means to actually do community-engaged research in the real world. As such, this course will provide students with skills and experience in research design in deliberative democracy, community and stakeholder engagement, and the practical aspects of working in local communities. This practicum is a collaboration between the Center for Deliberative Democracy, the Bill Lane Center for the American West and the Haas Center for Public Service. nnCDD website: <http://cdd.stanford.edu> Bill Lane Center website: <http://west.stanford.edu> Haas Center website: <https://haas.stanford.edu>. Same as: COMM 138, COMM 238

**CSRE 385. Race, Ethnicity, and Language: Pedagogical Possibilities. 3-4 Units.**

This seminar explores the intersections of language and race/racism/ racialization in the public schooling experiences of students of color. We will briefly trace the historical emergence of the related fields of sociolinguistics and linguistic anthropology, explore how each of these scholarly traditions approaches the study of language, and identify key points of overlap and tension between the two fields before considering recent examples of inter-disciplinary scholarship on language and race in urban schools. Issues to be addressed include language variation and change, language and identity, bilingualism and multilingualism, language ideologies, and classroom discourse. We will pay particular attention to the implications of relevant literature for teaching and learning in urban classrooms. Same as: EDUC 389C

**CSRE 389A. Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations. 3-5 Units.**

Language, as a cultural resource for shaping our identities, is central to the concepts of race and ethnicity. This seminar explores the linguistic construction of race and ethnicity across a wide variety of contexts and communities. We begin with an examination of the concepts of race and ethnicity and what it means to be "doing race," both as scholarship and as part of our everyday lives. Throughout the course, we will take a comparative perspective and highlight how different racial/ethnic formations (Asian, Black, Latino, Native American, White, etc.) participate in similar, yet different, ways of drawing racial and ethnic distinctions. The seminar will draw heavily on scholarship in (linguistic) anthropology, sociolinguistics and education. We will explore how we talk and don't talk about race, how we both position ourselves and are positioned by others, how the way we talk can have real consequences on the trajectory of our lives, and how, despite this, we all participate in maintaining racial and ethnic hierarchies and inequality more generally, particularly in schools. Same as: ANTHRO 320A, EDUC 389A, LINGUIST 253

**CSRE 3E. Michelle Obama in American Culture. 1 Unit.**

Never before has the United States had a First Lady like Michelle Obama. During her eight years in the White House, Michelle Obama transformed traditional meanings of womanhood, marriage, motherhood, and style and created new possibilities for what it means to be strong and what it means to be beautiful. No First Lady has ever been so scrutinized but also so beloved: from her J. Crew dresses to her Let's Move campaign, from her vegetable gardens to her chiseled arms, and from her powerful speeches to her casual and always authentic personality. This class examines the impact on American culture of the most popular First Lady in American history. Same as: AFRICAAM 3E, AMSTUD 3E, FEMGEN 3E, HISTORY 3E

**CSRE 41. Black & White Race Relations in American Fiction & Film. 3-5 Units.**

Movies and the fiction that inspires them; power dynamics behind production including historical events, artistic vision, politics, and racial stereotypes. What images of black and white does Hollywood produce to forge a national identity? How do films promote equality between the races? What is lost or gained in film adaptations of books? NOTE: Students must attend the first day; admission to the class will be determined based on an in class essay. Same as: AFRICAAM 101, AMSTUD 101

**CSRE 41A. Genes and Identity. 3 Units.**

In recent decades genes have increasingly become endowed with the cultural power to explain many aspects of human life: physical traits, diseases, behaviors, ancestral histories, and identity. In this course we will explore a deepening societal intrigue with genetic accounts of personal identity and political meaning. Students will engage with varied interdisciplinary sources that range from legal cases to scientific articles, medical ethics guidelines, films, and anthropological works (ethnographies). We will explore several case studies where the use of DNA markers (as proof of heritage, disease risk, or legal standing) has spawned cultural movements that are biosocial in nature. Throughout we will look at how new social movements are organized around gene-based definitions of personhood, health, and legal truth. Several examples include political analyses of citizenship and belonging. On this count we will discuss issues of African ancestry testing as evidence in slavery reparations cases, revisit debates on whether Black Freedman should be allowed into the Cherokee and Seminole Nations, and hear arguments on whether people with genetic links to Jewish groups should have a right of return to Israel. We will also examine the ways genetic knowledge may shape different health politics at the individual and societal level. On this count we will do close readings of how personal genomics testing companies operate, we will investigate how health disparities funding as well as orphan disease research take on new valences when re-framed in genetic terms, and we will see how new articulations of global health priorities are emerging through genetic research in places like Africa. Finally we will explore social implications of forensic uses of DNA. Here we will examine civil liberties concerns about genetic familial searching in forensic databases that disproportionately target specific minority groups as criminal suspects, and inquire into the use of DNA to generate digital mugshots of suspects that re-introduce genetic concepts of race. Same as: AFRICAAM 41, ANTHRO 41

**CSRE 44. Living Free: Embodying Healing and Creativity in The Era of Racial Justice Movements. 1-4 Unit.**

What does it mean to live free? It is often said that the one demand for the Movement for Black Lives is to "stop killing us." This demand has led Black artists, thinkers, organizers, and healers to envision work and embody practices that resist the subjugation and erasure of their bodies. This surge of creativity has impacted and intersected with work happening in queer and trans communities and in many other communities of color, including indigenous movements for safe and clean water, student protests against campus racism, the undocumented movement, prison abolition among others. This justice based work urges us to interrupt systems of violence with systems of healing that recover traditions, invent new modalities, and connect to survival practices developed by many generations of people in community. In this course we will bring together leading artists, thinkers, organizers, and healers to envision work and embody practices that resist the subjugation and erasure of their bodies, land, and natural resources. In this course we ask: what does it mean to embody health? How can we shift frameworks of pathology into frameworks of wholeness? What practices can we develop, recover, and share that help us create systems that support and value equity, healing and creativity for communities most at risk? And finally, how can we all live free? Same as: AFRICAAM 144

**CSRE 45Q. Understanding Race and Ethnicity in American Society. 4 Units.**

Preference to sophomores. Historical overview of race in America, race and violence, race and socioeconomic well-being, and the future of race relations in America. Enrollment limited to 16. Same as: SOC 45Q

**CSRE 47Q. Heartfulness: Mindfulness, Compassion, and Responsibility. 3 Units.**

We practice mindfulness as a way of enhancing well-being, interacting compassionately with others, and engaging in socially responsible actions as global citizens. Contemplation is integrated with social justice through embodied practice, experiential learning, and creative expression. Class activities and assignments include journaling, mindfulness practices, and expressive arts. We build a sense of community through appreciative intelligence, connected knowing, deep listening and storytelling.

**CSRE 50Q. Life and Death of Words. 4 Units.**

In this course, we explore the world of words: their creation, evolution, borrowing, change, and death. Words are the key to understanding the culture and ideas of a people, and by tracing the biographies of words we are able to discern how the world was, is, and might be perceived and described. We trace how words are formed, and how they change in pronunciation, spelling, meaning, and usage over time. How does a word get into the dictionary? What do words reveal about status, class, region, and race? How is the language of men and women critiqued differently within our society? How does slang evolve? How do languages become endangered or die, and what is lost when they do? We will visit the Facebook Content Strategy Team and learn more about the role words play in shaping our online experiences. Together, the class will collect Stanford language and redesign the digital dictionary of the future. Trigger Warning: Some of the subject matter of this course is sensitive and may cause offense. Please consider this prior to enrolling in the course.

Same as: ENGLISH 50Q, FEMGEN 50Q, LINGUIST 50Q, NATIVEAM 50Q

**CSRE 50S. Nineteenth Century America. 3 Units.**

(Same as HISTORY 150B. History majors and others taking 5 units, register in 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture.

Same as: AFRICAAM 50B, HISTORY 50B

**CSRE 51K. Election 2016. 1 Unit.**

The 2016 Presidential Election season has been anything but ordinary. So much in the Democratic and Republican primaries consistently defied conventional wisdom and upended the predictions of experts. This course will attempt, with the help of distinguished guests, to make sense of an election that defies all historical precedent and to take stock of the health of American democracy. Class is jointly offered for Continuing Studies students and Stanford students. As a 1 unit, online course for Stanford students, enrollment is unlimited. Registration for the course offers online access to a livestream of each class session, participation in online discussions, access to course website and materials, and admission to a lottery for attending each class in person.

Same as: HISTORY 51K, POLISCI 51K

**CSRE 51Q. Comparative Fictions of Ethnicity. 4 Units.**

We may "know" "who" we "are," but we are, after all, social creatures. How does our sense of self interact with those around us? How does literature provide a particular medium for not only self expression, but also for meditations on what goes into the construction of "the Self"? After all, don't we tell stories in response to the question, "who are you"? Besides a list of nouns and names and attributes, we give our lives flesh and blood in telling how we process the world. Our course focuses in particular on this question—Does this universal issue ("who am I") become skewed differently when we add a qualifier before it, like "ethnic"? Note: To be eligible for WAYS credit, you must take course for a Letter Grade. Same as: AMSTUD 51Q, COMPLIT 51Q



**CSRE 51S. American Travel, Tourism and Empire in the Pacific, 1880s-1970s. 5 Units.**

What does it mean to be a traveler or a tourist? Is travel a form of empire or exploitation? Can it ever be an innocent form of economic and cultural exchange? This class will examine how cultures of travel and tourism helped everyday Americans understand and shape the country's political, social, and economic challenges from the 1880s to 1970s, as the U.S. evolved from a continental empire, into an overseas empire, and finally into an informal empire.

Same as: AMSTUD 51S, HISTORY 51S

**CSRE 52D. Asian American Human Development: Cultural Perspectives on Psychology, Education and Critical Issues. 3 Units.**

In this course, we will examine the critical issues in Asian American growth and development with particular attention given to current theoretical and research perspectives within a diverse society. We will consider topics related to their cultural identity, cognitive, and socio-emotional development, engaging in the ethnic discourse on Confucian history and culture, Eastern and Western thought and learning, tiger parenting, gender roles, the model minority stereotype, acculturation and bicultural identity, and mental health. This course uniquely integrates the fields of history, education, psychology, human biology, and ethnic studies as we seek to understand the underlying processes of the Asian American person as an individual and as an effective member of the larger society.

Same as: ASNAMST 52D

**CSRE 52H. I, Biologist: Diversity Improves the Science of Biology. 1 Unit.**

Disciplinary priorities, research agendas, and innovations are determined by the diversity of participants and problem-solving is more successful with a broad range of approaches. Using case studies in biological research, we propose to use these insights to help our students learn why a diverse scientific community leads to better discovery and improves the relevance of science to society. Our premise is that a diverse set of perspectives will impact not only how we learn science, but how we do science.

Same as: BIO 52

**CSRE 54N. African American Women's Lives. 3 Units.**

This course encourages students to think critically about historical sources and to use creative and rigorous historical methods to recover African American women's experiences, which often have been placed on the periphery of American history and American life.

Same as: AFRICAAM 54N, AMSTUD 54N, FEMGEN 54N, HISTORY 54N

**CSRE 55M. MMUF Seminar. 1 Unit.**

This seminar is designed to help MMUF honor students in the following ways: (1) developing and refining research paper topics, (2) learning about the various approaches to research and writing, and (3) connecting to Stanford University resources such as the library and faculty. May be repeat for credit.

**CSRE 55N. Batman, Hamilton, Díaz, and Other Wondrous Lives. 3-5 Units.**

This seminar concerns the design and analysis of imaginary (or constructed) worlds for narratives and media such as films, comics, and literary texts. The seminar's primary goal is to help participants understand the creation of better imaginary worlds - ultimately all our efforts should serve that higher purpose. Some of the things we will consider when taking on the analysis of a new world include: What are its primary features - spatial, cultural, biological, fantastic, cosmological? What is the world's ethos (the guiding beliefs or ideals that characterize the world)? What are the precise strategies that are used by the artist to convey the world to us and us to the world? How are our characters connected to the world? And how are we - the viewer or reader or player - connected to the world? Note: This course must be taken for a letter grade to be eligible for WAYS credit.

Same as: COMPLIT 55N

**CSRE 5I. Hamilton: An American Musical. 1 Unit.**

"Hamilton" is one the most popular and most celebrated musicals in American history. It has received 11 Tony Awards, including best musical, and 16 Tony nominations, the most nominations in Broadway history. It won the Pulitzer Prize and a Grammy Award. The musical draws on the language and rhythms of hip-hop and R & B, genres that are underrepresented in the musical theater tradition. "Hamilton" has redefined the American musical, particularly in terms of sound, casting, and storytelling. What explains the deep cultural impact and acclaim for this play? This interdisciplinary course examines Alexander Hamilton and his world as well as Hamilton: An American Musical through a series of lectures from faculty in History, Theater and Performance Studies, English, Music, and Writing and Rhetoric.

Same as: AFRICAAM 5I, AMSTUD 5I, HISTORY 3G

**CSRE 61. Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders. 3-4 Units.**

This introduction to dance studies course explores dance practice and performance as means for producing cultural meaning. Through theoretical and historical texts and viewing live and recorded dance, we will develop tools for analyzing dance and understanding its place in social, cultural, and political structures. This uses dance and choreography as a lens to more deeply understand a wide range of identity and cultural formations, such as gender, race, sexuality, (dis)ability, (trans)nationality, and empire. We will analyze dancing bodies that move across stages, dance clubs, film screens, and border zones. We will examine dance from diverse locales and time periods including ballet, modern and contemporary dance, contact improvisation, folkloric dance, burlesque, street dance, queer club dance, drag performance, music videos, TV dance competitions, and intermedia/new media performance. In addition to providing theoretical and methodological grounding in dance studies, this course develops performance analysis skills and hones the ability to write critically and skillfully about dance. No previous experience in dance is necessary to successfully complete the course.

Same as: DANCE 161D, FEMGEN 161D, TAPS 161D

**CSRE 63N. The Feminist Critique: The History and Politics of Gender Equality. 3-4 Units.**

This course explores the long history of ideas about gender and equality. Each week we read, dissect, compare, and critique a set of primary historical documents (political and literary) from around the world, moving from the 15th century to the present. We tease out changing arguments about education, the body, sexuality, violence, labor, politics, and the very meaning of gender, and we place feminist critics within national and global political contexts.

Same as: AMSTUD 63N, FEMGEN 63N, HISTORY 63N

**CSRE 64. Racial and Ethnic Diversity in Modern America. 4-5 Units.**

How ethnicity influenced the American experience and how prevailing attitudes about racial and ethnic groups over time have affected the historical and contemporary reality of the nation's major minority populations. Focus is on the past two centuries.

Same as: HISTORY 64

**CSRE 66. Spectacular Trials: Sex, Race and Violence in Modern American Culture. 5 Units.**

This course will use the phenomenon of the spectacular trial as a framework for exploring the intersections of sex, race, and violence in the formation of modern American culture. Beginning in the late nineteenth century and continuing through the 1990s, we will focus our inquiry on a number of notorious cases, some associated with familiar names—the Scottsboro Boys, Emmett Till, O.J. Simpson—others involving once-infamous actors—like Joan Little and Inez Garcia—whose ordeals have receded into historical memory, considering a range of questions arising from this thematic nexus. For instance, in what ways are sexual transgressions racialized and gendered? What are the practical and theoretical ramifications of the seemingly inextricable conjunction of sex and violence in legal and popular discourse? And what insights might such spectacles afford when broached as an arena in which sexual meanings, identities, and practices are refracted and ultimately constructed? We will also examine the role of the pertinent professions in the evolution of these events, in particular how the interplay of law, medicine, psychiatry, and forensic science helped define the shifting boundaries of legality, and how print, radio, and television journalism operated not only in sensationalizing, but also in reflecting, modeling, and shaping prevailing attitudes and behaviors. Our study of this vital facet of our society of the spectacle will draw on a series of compelling secondary readings complemented by a diverse array of primary sources—from contemporaneous pamphlets and newspaper accounts to photographs, letters, trial testimony, and psychological commentary—that will enable class members to evaluate the strengths and weaknesses of different textual genres, experiment with alternative methods of fashioning historical interpretations, and contemplate the ways history might be employed to illuminate the persistent problems of racial bias, reflexive sexualization, and the packaging of trials as mass entertainment in the present day.

Same as: AMSTUD 106

**CSRE 68. Martin Luther King, Jr.: The Inner Life and Global Vision. 3-5 Units.**

Martin Luther King, Jr., was the 20th-century's best-known African-American leader, but the religious roots of his charismatic leadership are far less widely known. The documents assembled and published by Stanford's King Research and Education Institute provide the source materials for this exploration of King's swift rise to international prominence as an articulate advocate of global peace and justice.

Same as: AFRICAAM 68D, AMSTUD 168D, HISTORY 68D, HISTORY 168D

**CSRE 74. History of South Africa. 3 Units.**

(Same as HISTORY 147. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis.

Same as: AFRICAAM 47, HISTORY 47

**CSRE 78. Art + Community: Division, Resilience & Reconciliation. 1-5 Unit.**

Violence and trauma isolates and segregates us. Part of the healing process must be about coming back into community. Freedom is meaningful only insofar as it lifts all, especially those who have been done the most harm. In times of violence and polarization, art can heal and brings people together. In this course, we will explore how we make and sustain community, especially in the face of threats from within and without. We will do this especially through examining how artists and culture workers of color develop and advance practices that build mutuality, criticality, renewal, trust, and joy in the face of ongoing racial injustice and cultural inequity.

Same as: AFRICAAM 78

**CSRE 81. Race and the Law: Historical and Contemporary Perspectives. 5 Units.**

When Obama began his presidential tenure in 2009, many commentators declared the U.S. a truly colorblind society, a place where race (read: non-whiteness) no longer served as an impediment to individual and group aspirations, indeed had become so insignificant as to be practically invisible. In late fall 2014, in the aftermath of the police-involved killings of Eric Garner, Michael Brown, and Tamir Rice, society is confronted with a radically different social and political landscape. Yet events like these, while doubtless underscoring the fallaciousness of the equalitarian narrative, are regrettably commonplace. What, if anything, occurred during the intervening years that might explain the apparent displacement of hope by despair? With the advent of the Black Lives Matter movement, the persistence of bias and discrimination against people of color, particularly at the interface of African American males and law enforcement authorities, has attained a place of prominence on the public agenda, presenting a significant opportunity for citizen-activists, legislators, and policymakers to combine forces to effectuate meaningful change. To take advantage of this moment, it is imperative to understand the origins and development of the entrenched structural inequalities manifest in contemporary America. What role have law and legal institutions played in hindering and facilitating the promise of equality for all citizens? How far are we from realizing that vaunted democratic aspiration? This course offers participants an opportunity to systematically engage with recent events in Baltimore, Ferguson, and elsewhere in an historically informed manner that foregrounds questions of race, citizenship, and law. Against the backdrop of the achievements of the Civil Rights Movement, it considers such topics as the rise of urban ghettos and the use of segregationist practices like redlining and steering in helping to sustain them; resegregation in the late 20th-early 21st century; differential arrest and sentencing patterns; and, crucially, the extraordinary growth of the American carceral state.

Same as: AMSTUD 108

**CSRE 82G. Making Palestine Visible. 3-5 Units.**

Israel-Palestine is one of the most difficult subjects to talk about, in large part because we in the United States do not have much exposure to Palestinian history, culture, and politics in their own terms. This course aims to humanize Palestinians and asks why Palestinian claims to rights are illegible for much of the American public. We begin to answer this question by examining a broad sampling of history, structures of power and law, culture, and contemporary political issues.

Same as: COMPLIT 82, COMPLIT 182, HISTORY 82G, HISTORY 182G

**CSRE 85B. Jews in the Contemporary World: Faith and Ethnicity, Visibility and Vulnerability. 3 Units.**

(Same as HISTORY 185B. History majors and others taking 5 units, register for 185B.) This course explores the full expanse of Jewish life today and in the recent past. The inner workings of religious faith, the content of Jewish identity shorn of belief, the interplay between Jewish powerlessness and influence, the myth and reality of Jewish genius, the continued pertinence of antisemitism, the rhythms of Jewish economic life—all these will be examined in weekly lectures, classroom discussion, and with the use of a widely diverse range of readings, films, and other material. Explored in depth will the ideas and practices of Zionism, the content of contemporary secularism and religious Orthodoxy, the impact Holocaust, the continued crisis facing Israel and the Palestinians. Who is to be considered Jewish, in any event, especially since so many of the best known (Spinoza, Freud, Marx) have had little if anything to do with Jewish life with their relationships to it indifferent, even hostile?.

Same as: HISTORY 85B, JEWISHST 85B, REES 85B

**CSRE 88. Who We Be: Art, Images & Race in Post-Civil Rights America. 2-4 Units.**

Over the past half-century, the U.S. has seen profound demographic and cultural change. But racial progress still seems distant. After the faith of the civil rights movement, the fervor of multiculturalism, and even the brief euphoria of a post-racial moment, we remain a nation divided. Resegregation is the norm. The culture wars flare as hot as ever. This course takes a close examination of visual culture, particularly images, works, and ideas in the contemporary arts, justice movements, and popular culture to discuss North American demographic and cultural change and cultural politics over the past half-century. From the Watts uprising to the #BlackLivesMatter movement, from multiculturalism through hip-hop to post-identity art, we will deeply explore the questions: How do Americans see race now? Do we see each other any more clearly than before?

Same as: AFRICAAM 188, ARTHIST 154B

**CSRE 89. Race, Ethnicity, and Electoral Politics. 4 Units.**

This course explores the role that racial and ethnic politics play in American political campaigns and elections. This will include readings that explore the power of ethnoracial voting blocs (e.g. the Black vote and the Latino vote), as well as the challenges and advantages of candidates that are people of color. We will discuss how changing demographics are changing the political landscape, and how candidates and political parties are responding to those changes. This will include, of course, significant attention to ongoing battles at the national (e.g. Trump v. Clinton), state (e.g. Kamala Harris v. Loretta Sanchez), and local levels, most often in California but in other geographic areas as well. We will also explore historic candidacies and elections (e.g. Jesse Jackson) and political parties (e.g. La Raza Unida party) that help put the 2016 races into perspective.

Same as: AMSTUD 89

**CSRE 91. Exploring American Religious History. 4 Units.**

This course will trace how contemporary beliefs and practices connect to historical trends in the American religious landscape.

Same as: AMSTUD 91, HISTORY 260K, RELIGST 91

**CSRE 94. Topics in Writing and Rhetoric: Empathy, Ethics, and Compassion Meditation. 4 Units.**

Does not fulfill NSC requirement. In this course, we'll extend this discussion by expanding our thinking about rhetoric as a means of persuasion to consider its relation to empathy-as a mode of listening to and understanding audiences and communities we identify with as well as those whose beliefs and actions can be lethal. We'll also practice compassion meditation and empathetic rhetoric to see how these ethical stances affect us individually and investigate the ways they may and may not be scaled to address social justice more broadly. Finally, with the course readings and discussions in mind, you will explore a social justice issue and create an essay, a workshop, campaign or movement strategy, podcast, vlog, infographic, Facebook group, syllabus, etc. to help move us closer to positive change. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-pwr-courses>. Same as: PWR 194DH

**CSRE 95. Liberation Through Land: Organic Gardening and Racial Justice. 2 Units.**

Through field trips, practical work and readings, this course provides students with the tools to begin cultivating a relationship to land that focuses on direct engagement with sustainable gardening, from seed to harvest. The course will take place on the O'Donohue Family Stanford Educational Farm, where students will be given the opportunity to learn how to sow seeds, prepare garden beds, amend soils, build compost, and take care of plants. The history of forced farm labor in the U.S., from slavery to low-wage migrant labor, means that many people of color encounter agricultural spaces as sites of trauma and oppression. In this course we will explore the potential for revisiting a narrative of peaceful relation to land and crop that existed long before the trauma occurred, acknowledging the beautiful history of POC coexistence with land. Since this is a practical course, there will be a strong emphasis on participation. Application available at [https://docs.google.com/forms/d/e/1FAIpQLScdKKp7mtTNzS0-qc-La97LPj9w8SsWNZ5xrAYVjikTR86F6Q/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLScdKKp7mtTNzS0-qc-La97LPj9w8SsWNZ5xrAYVjikTR86F6Q/viewform?usp=sf_link); deadline to apply is September 19, 2017, at midnight. The course is co-sponsored by the Institute for Diversity in the Arts (IDA) and the Earth Systems Program.

Same as: EARTH SYS 95

**CSRE 95I. Revolutionary Practices: Space and Public Discourse in Iran. 4 Units.**

Description: This course examines the mediums of public art that have been voices of social change, protest and expressions of community desire in Iran. It will offer a unique glimpse into Iran's contemporary art and visual culture through the investigation of public art practices such as graffiti and street art, as well as older traditions of Naghali and Iranian Coffeehouse Painting.

Same as: GLOBAL 145

**CSRE 99. Housing Justice Research Lab. 1-3 Unit.**

In this course, students will contribute to ongoing community-based research projects focused on housing justice in the Bay Area. Students will work directly with local community organizations working in advocacy, legal aid, and community research. Projects may include interviews, historical research, surveys, case studies, participant observation, media analysis, and writing op-eds. Students will have the opportunity to select from research projects developed by the community partners and instructors. Students that want to engage in an alternative project should consult with the instructors. Students are encouraged to enroll for multiple quarters to develop more substantial projects and deeper relationships with community partners.

Same as: URBANST 187

## Comparative Literature (COMPLIT)

**COMPLIT 100. CAPITALS: How Cities Shape Cultures, States, and People. 3-5 Units.**

This course takes students on a trip to eight capital cities, at different moments in time: Renaissance Florence, Golden Age Madrid, Colonial Mexico City, Enlightenment and Romantic Paris, Existential and Revolutionary St. Petersburg, Roaring Berlin, Modernist Vienna, and bustling Buenos Aires. While exploring each place in a particular historical moment, we will also consider the relations between culture, power, and social life. How does the cultural life of a country intersect with the political activity of a capital? How do large cities shape our everyday experience, our aesthetic preferences, and our sense of history? Why do some cities become cultural capitals? Primary materials for this course will consist of literary, visual, sociological, and historical documents (in translation); authors we will read include Boccaccio, Lope de Vega, Sor Juana, Montesquieu, Baudelaire, Dostoyevsky, Irmgard Keun, Freud, and Borges. Note: To be eligible for WAYS credit, you must take the course for a minimum of 3 Units and a Letter Grade.

Same as: DLCL 100, FRENCH 175, GERMAN 175, HISTORY 206E, ILAC 175, ITALIAN 175, URBANST 153

**COMPLIT 101. What Is Comparative Literature?. 5 Units.**

The course, open to all undergraduates, is for anyone serious about literature. After first asking what "literature" is and what cultural roles it may fulfill, the course continues by exploring what, then, may be the cultural, political, historical and institutional needs to which "comparative literature" responds. A short story by Jorge Luis Borges and an accompanying essay serve as an introduction to both sets of questions. We will then look at a few texts of the western tradition from Aristotle through the Middle Ages to the Renaissance, taken as standard for later ideas and practices of literature, eventually, too, at one or two that clearly acknowledge possibilities of quite different traditions for the role played by what may be called the "fictive imagination." A series of texts, two plays, two (possibly three) novels, some poems, some critical writings, will then show other traditions interacting transculturally with and/or against western ones. Students will be able to choose their readings among several.

**COMPLIT 102. Film Series: Understanding Turkey Through Film. 1 Unit.**

Join us in our quest to understand the recent developments in Turkey and their impact on its people through cinematic production. Set against the backdrop of Turkey's cultural, political and social transformation in the last decade, the movies in this series tell the uneasy stories of individuals whose lives are affected by this disruptive change. By examining the link between individual troubles and public issues, the films confront issues such as globalization, gender and racial hierarchy, neo-liberal urban transformation, male domination, state oppression, and women's oppression in Turkey. Each screening will be followed by a discussion lead by invited scholars of Turkey or film directors. At each screening we will look closely at a film and discuss how the directors and script writers responded to larger scale cultural and social dynamics to present them as personal stories. All screenings are free and open to the public. All attendees are encouraged to participate in the post-screening discussions. All films are in Turkish with English subtitles.  
Same as: COMPLIT 302

**COMPLIT 106. Public Writing for Human Rights. 1-3 Unit.**

One of the most important aspects of human rights work is of course advocacy. Thanks in large part to the development of the Internet, more and more people now have the ability to study, analyze, and write on human rights issues and disseminate their ideas widely. The course will involve learning how to write effectively about human rights for the wider public. We will study and learn from successful examples of such writing from around the world. Students are strongly encouraged to explore this genre of writing in different languages. The course will both study contemporary human rights issues and use the TeachingHumanRights.org website as a platform for our blogs.

**COMPLIT 108. Contemporary Hebrew and English Poetry in Translation. 2-4 Units.**

A workshop in literary translation, focusing on Hebrew and English poetry and/or short prose. Together the class will engage in creating a bilingual anthology of contemporary works and discussing problems of literary translation such as preserving ambiguities, translating cultural context, literary conventions and poetic forms. Special focus on issues related to understanding and transferring the concept of "The Contemporary" between cultures. With guest translators. Advanced knowledge of Hebrew and English is required. Readings include: (Hebrew) Avot Yeshurun, Natan Zach, David Avidan, Haim Gouri, Sigal Ben-Yair, Almog Behar, Aharon Shabtai; (English) Marilyn Hacker, Annie Finch, Charles Bernstein, Ann Carson, Derek Walcott, David Whyte, Lyn Hejinian, Billy Collins, Mary Oliver, Kay Ryan. NOTE: Taught in Hebrew and English. At least some knowledge of Hebrew required. "This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit."

**COMPLIT 10N. Shakespeare and Performance in a Global Context. 3 Units.**

Preference to freshmen. The problem of performance including the performance of gender through the plays of Shakespeare. In-class performances by students of scenes from plays. The history of theatrical performance. Sources include filmed versions of plays, and readings on the history of gender, gender performance, and transvestite theater. Note: To be eligible for WAYS credit, you must take the course for a Letter Grade.

**COMPLIT 110. Introduction to Comparative Queer Literary Studies. 3-5 Units.**

Introduction to the comparative literary study of important gay, lesbian, queer, bisexual, and transgender writers and their changing social, political, and cultural contexts from the 1880s to today: Oscar Wilde, Rachilde, Radclyffe Hall, Djuna Barnes, James Baldwin, Jean Genet, Audre Lorde, Cherrie Moraga, Jeanette Winterson, Alison Bechdel and others, discussed in the context of 20th-century feminist and queer literary and social theories of gender and sexuality.  
Same as: COMPLIT 310, FEMGEN 110X, FEMGEN 310X

**COMPLIT 113. Feminist Poetry in the U.S., 1973-2017. 3-5 Units.**

Traces the development of feminist poetry in the United States from second wave feminists like Adrienne Rich, Audre Lorde, and Alicia Ostriker to contemporary poetry of Anne Boyer, Steph Burt, and Eileen Myles, among others. We will think broadly about the relationship between politics and poetry, and focus specifically on the influences of second- and third- wave feminism on poetry produced by women in the U.S. from the 1970s until today.  
Same as: FEMGEN 113X

**COMPLIT 114. Masterpieces: Kafka. 3-5 Units.**

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers.  
Same as: COMPLIT 350, GERMAN 150, GERMAN 350, JEWISHST 145

**COMPLIT 115. Vladimir Nabokov: Displacement and the Liberated Eye. 1-5 Unit.**

How did the triumphant author of "the great American novel" *Lolita* evolve from the young author writing at white heat for the tiny sad Russian emigration in Berlin? We will read his short stories and the novels *The Luzhin Defense*, *Invitation to a Beheading*, *Lolita*, *Lolita* the film, and *Pale Fire*, to see how Nabokov generated his sinister-playful forms as a buoyant answer to the "hypermodern" visual and film culture of pre-WWII Berlin, and then to America's all-pervading postwar "normalcy" in his pathological comic masterpieces *Lolita* and *Pale Fire*. Buy texts in translation at the Bookstore; Slavic grad students will supplement with reading and extra sessions in original Russian.  
Same as: COMPLIT 315, SLAVIC 156, SLAVIC 356

**COMPLIT 119. The Turkish Novel. 1-5 Unit.**

Designed as a survey, this course will examine the modern Turkish novel from the early days of the Republic to the present day. We will examine the aesthetic, political, and social aspects of the Turkish novel by reading major samples of national, historical, philosophical, village, and modernist novels. Discussions will be conducted in English. Students will have an option to read the primary sources in Turkish or in English. Contact Burcu Karahan for meeting time and place.  
Same as: COMPLIT 319

**COMPLIT 11Q. Shakespeare, Playing, Gender. 3 Units.**

Preference to sophomores. Focus is on several of the best and lesser known plays of Shakespeare, on theatrical and other kinds of playing, and on ambiguities of both gender and playing gender. Note: This course must be taken for a letter grade to be eligible for WAYS credit.

**COMPLIT 121. Poems, Poetry, Worlds. 5 Units.**

What is poetry? How does it speak in many voices to questions of history, society, and personal experience? Why does it matter? The reading and interpretation of poetry in crosscultural comparison as experience, invention, form, sound, knowledge, and part of the world. The readings address poetry of several cultures (Brazil, Chile, France, Germany, Greece, Italy, Occitania, Peru) in comparative relation to that of the English-speaking world, and in light of classic and recent theories of poetry. Same as: DLCL 141

**COMPLIT 122. Literature as Performance. 5 Units.**

Theater as performance and as literature. Historical tension between text and spectacle, thought and embodiment in western and other traditions since Greek antiquity. Dramas read in tandem with theory, live performances, and audiovisuals. Same as: DLCL 142

**COMPLIT 123. The Novel and the World. 5 Units.**

<b>Before the Digital Era: the European Design of the Novel</b> The course will trace the development of the modern literary genre par excellence through some of its great milestones from the 17th century to the present. Works by Austen, Flaubert, Dostoevsky, Queirós, Mann, Roth, Woolf, Lampedusa and Rodoreda. <em>Lazarillo de Tormes</em>, Jane Austen: <em>Pride and Prejudice</em>, Flaubert: <em>Madame Bovary</em>, Dostoevsky: <em>Crime and Punishment</em>, Eça de Queirós: <em>The City and the Mountains</em>, Thomas Mann: <em>Death in Venice</em>, Joseph Roth: <em>Radietskymarsh</em>, Virginia Woolf: <em>Mrs. Dalloway</em>, Giuseppe Tomasi di Lampedusa, <em>The Leopard</em>, Mercé Rodoreda: <em>The Time of the Doves</em>. Same as: DLCL 143

**COMPLIT 124. The (Un)American Renaissance. 3-5 Units.**

The period between the 1820s and the 1860s has traditionally been called the "American Renaissance": a time when the U.S. nation, and its literature, flourished. The nineteenth century witnessed the publication of a number of important American texts that gave rise to a new national literary tradition, including familiar titles like *The Scarlet Letter*, *Moby-Dick*, and *Leaves of Grass*. Yet, as the nation stretched its geographical coordinates, writers from outside of this predominantly white, male literary heritage issued their own responses to the vision of a "New World Democracy." This course surveys and contextualizes these responses. Reading authors from Native American, Latino/a, African American, and French creole cultures, we'll expand our study of American literature to include writers who interrogate the project of American Democracy from both within and outside of the nation. While analyzing autobiographies, poems, short stories, and speeches we will also learn to read paintings, Native American sign systems, and newspaper sketches, in an exploration of what it meant to be "American" and what counted as "Literature" in the golden era of American Letters. Same as: ENGLISH 120

**COMPLIT 125. The Art of Authoritarianism. 3-5 Units.**

Hitler. Stalin. Che Guevara. Eva Perón. Darth Vader. Whether they make you tremble with fear or with excitement, some leaders lead by charisma as much as by their policies. This course explores representations of authority and authoritarianism to interrogate the charms and dangers of charismatic leadership. Focusing on single-leader societies, primarily from the twentieth century, we consider examples from visual culture, literature, film, and propaganda, along with readings from political science. In analyzing power through aesthetic and political frames, students will develop a critical understanding of the intersections between governments, rulers, and art in recent history and today.

**COMPLIT 127B. The Hebrew and Jewish Short Story. 3-5 Units.**

Short stories from Israel, the US and Europe including works by Agnon, Kafka, Keret, Castel-Bloom, Kashua, Singer, Benjamin, Freud, biblical myths and more. The class will engage with questions related to the short story as a literary form and the history of the short story. Reading and discussion in English. Optional: special section with readings and discussions in Hebrew. Note: To be eligible for WAYS credit, you must take the course for a Letter Grade. Same as: JEWISHST 147B

**COMPLIT 130. Fin-de-siècle Literature and Culture. 3-5 Units.**

Literature and culture of the 1860's to 1900's in Paris, London, Berlin, and Vienna. Aestheticism, Symbolism, Decadence; the new social drama; art nouveau; the dandy and the New Woman; sexology; degeneration. Works by Mallarmé, Baudelaire, Wilde, Huysmans, Hofmannsthal, Ibsen, Shaw, and various New Woman writers; historical and social contexts.

**COMPLIT 132. The Grandeur of Epic: Poetry, Narrative, and World from Homer to Evolutionary Biology. 3-5 Units.**

Explores the mystery and power of epic. This ancient word, which at its root means "what is spoken," first classified certain traditions of archaic Greek poetry, especially Homer's *Iliad* and *Odyssey*. It now appears everywhere from slang to contemporary scientific discourse. Though some might dismiss its proliferation as an accident of everyday speech, the course will take the phenomenon of "epic" seriously, asking what it is about this oldest of genres that continues to inspire our collective imagination.

**COMPLIT 136. Refugees, Politics and Culture in Contemporary Germany. 1-5 Unit.**

Responses to refugees and immigration to Germany against the backdrop of German history and in the context of domestic and European politics. Topics include: cultural difference and integration processes, gender roles, religious traditions, populism and neo-nationalism. Reading knowledge of German, another European language, or an immigrant language will be useful for research projects, but not required. NOTE: This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: COMPLIT 336A, GERMAN 136, GERMAN 336

**COMPLIT 145. Reflection on the Other: The Jew and the Arab in Literature. 3-5 Units.**

How literary works outside the realm of Western culture struggle with questions such as identity, minority, and the issue of the Other. How the Arab is viewed in Hebrew literature, film and music and how the Jew is viewed in Palestinian works in Hebrew or Arabic (in translation to English). Historical, political, and sociological forces that have contributed to the shaping of these writers' views. Guest lectures about the Jew in Palestinian literature and music. Note: To be eligible for WAYS credit, you must take course for a Letter Grade.

Same as: AMELANG 126, JEWISHST 106

**COMPLIT 145B. The African Atlantic. 3-5 Units.**

This course explores the central place Africa holds in prose writing emerging during early and modern periods of globalization across the Atlantic, including the middle passage, exploration and colonialism, black internationalism, decolonization, immigration, and diasporic return. We will begin with Equiano's *Interesting Narrative* (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of self-making or new citizenship, to evoke histories of racial unity or examine psychic and social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Conrad, Condé, Olinto), epic and prose poetry (Césaire, Walcott), theoretical reflection (Gilroy, Glissant, Mudimbe, Benitez-Rojo), and literary autobiography (Barack Obama, Saidiya Hartman). Note: To be eligible for WAYS credit, you must take COMPLIT 145B for a minimum of 3 Units and a Letter Grade.

Same as: AFRICAAM 148, AFRICAST 145B, COMPLIT 345B, CSRE 145B, FRENCH 145B, FRENCH 345B

**COMPLIT 149. The Laboring of Diaspora & Border Literary Cultures. 3-5 Units.**

Focus is given to emergent theories of culture and on comparative literary and cultural studies. How do we treat culture as a social force? How do we go about reading the presence of social contexts within cultural texts? How do ethno-racial writers re-imagine the nation as a site with many "cognitive maps" in which the nation-state is not congruent with cultural identity? How do diaspora and border narratives/texts strive for comparative theoretical scope while remaining rooted in specific local histories. Note: This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: CSRE 149, ILAC 149

**COMPLIT 170. Theodor W. Adorno: History, Aesthetics, Catastrophe. 3-5 Units.**

Theodor W. Adorno (1903-1969) was one of the most influential German thinkers of the 20th century. This seminar aims to introduce students to Adorno's varied oeuvre, from his contributions to the critique of culture, his theory of history, his re-thinking of Hegelianism and Marxism, to his contributions to aesthetics. We will also consider Adorno's various intellectual forebears, collaborators and interlocutors (Hegel, Marx, Lukács, Horkheimer, Habermas). All texts and discussions are in English. Undergraduates welcome.

Same as: COMPLIT 370, GERMAN 170, GERMAN 370

**COMPLIT 181. Philosophy and Literature. 5 Units.**

Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track. Majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature, with particular focus on the question of value: what, if anything, does engagement with literary works do for our lives? Issues include aesthetic self-fashioning, the paradox of tragedy, the paradox of caring, the truth-value of fiction, metaphor, authorship, irony, make-believe, expression, edification, clarification, and training. Readings are drawn from literature and film, philosophical theories of art, and stylistically interesting works of philosophy. Authors may include Sophocles, Chaucer, Dickinson, Proust, Woolf, Borges, Beckett, Kundera, Charlie Kaufman; Barthes, Foucault, Nussbaum, Walton, Nehamas; Plato, Montaigne, Schopenhauer, Nietzsche, and Sartre. Taught in English.

Same as: CLASSICS 42, ENGLISH 81, FRENCH 181, GERMAN 181, ITALIAN 181, PHIL 81, SLAVIC 181

**COMPLIT 182. Making Palestine Visible. 3-5 Units.**

Israel-Palestine is one of the most difficult subjects to talk about, in large part because we in the United States do not have much exposure to Palestinian history, culture, and politics in their own terms. This course aims to humanize Palestinians and asks why Palestinian claims to rights are illegible for much of the American public. We begin to answer this question by examining a broad sampling of history, structures of power and law, culture, and contemporary political issues.

Same as: COMPLIT 82, CSRE 82G, HISTORY 82G, HISTORY 182G

**COMPLIT 183. Self-Impersonation: Fiction, Autobiography, Memoir. 5 Units.**

Course will examine the intersecting genres of fiction, autobiography, and memoir. Topics will include the literary construction of selfhood and its constituent categories (gender, race, ethnicity, religion, etc.); the role of language in the development of the self; the relational nature of the self (vis-à-vis the family, "society," God); the cultural status of "individuality"; the concept of childhood; and the role of individual testimony in our understanding of family, religious and national history. In addition to short theoretical works, authors will include Knausgaard, Nabokov, Hoffman, Winterson, Said, Levi, Barthes, and Duras.

Same as: ENGLISH 183E

**COMPLIT 194. Independent Research. 1-5 Unit.**

(Staff).

**COMPLIT 199. Senior Seminar. 5 Units.**

What is criticism? When we interpret literature today, are we fulfilling the critical vocation? What are the alternatives? We consider the origins of the idea of the critic in nineteenth-century culture, its development in the twentieth century, and its current exponents, revisionists, and dissenters. Senior seminar for Comparative Literature Senior majors only.

**COMPLIT 200. War and the Modern Novel. 3-5 Units.**

From the turn of the 19th century to well into the 20th century, novelists developed the theme of alienation and the decline of civilization. Along with the fall of centuries-old empires, World War I brought about the collapse of traditional European values and the dissociation of the subject. The aestheticizing of violence and the ensuing insecurity inaugurated the society of totally administered life, based on universal suspicion and pervasive guilt. The seminar will study narrative responses to these developments in some of the foremost authors of the 20th century from several European literatures: Knut Hamsun, Joseph Roth, Ernst Jünger, Virginia Woolf, Franz Kafka, Curzio Malaparte, Thomas Mann, Mercè Rodoreda, Antonio Lobo Antunes, and Jaime Cabré. Taught in English.

Same as: ILAC 200E

**COMPLIT 204. Indigenous Poetics and the Politics of Resistance. 3 Units.**

In 1969 a group of university students and Native activists calling themselves the Indians of All Tribes gathered on Alcatraz Island in an act of political protest that would turn out to be the longest occupation of U.S. lands in the nation's history. Claiming title to the territory under a nineteenth-century treaty, the Indians of All Tribes broadcasted their protest through an independent radio show and newsletter that included important political and poetic writings by the activists. This course builds outward from the Occupation of Alcatraz to understand the deep historical relationship between political resistance and poetic expression in Indigenous communities. We will read broadly on poetics and Indigenous political theory, beginning with non-alphabetic writings and Indigenous understandings of communal and political life, and concluding with formally innovative collections by Indigenous poets working on issues like climate justice and language revitalization.

Same as: NATIVEAM 204

**COMPLIT 208. The Cosmopolitan Introvert: Modern Greek Poetry and its Itinerants. 3 Units.**

Overview of the last century of Greek poetry with emphasis on modernism. Approximately 20 modern Greek poets (starting with Cavafy and Nobel laureates Seferis and Elytis and moving to more modern writers) are read and compared to other major European and American writers. The themes of the cosmopolitan itinerant and of the introvert, often co-existing in the same poet, connect these idiosyncratic voices. The course uses translations and requires no knowledge of Greek but original texts can also be shared with interested students. Note: The course is open to both undergraduate and graduate students.

**COMPLIT 215. Literature and Bliss. 1-5 Unit.**

In his final on-campus seminar at Stanford, the Instructor proposes to think through from a historical and systematic angle, the capacity of literary texts to make us imagine ecstatic situations of intensity and happiness rather than focusing on the description of such moments, we will try to understand how literary forms, under certain conditions, can temporarily transform the relation of our minds to the material world and to other human beings. \*\*Grading: Seminar Participation and 10-15 page final paper\*\*.

**COMPLIT 216. Jazz and Literature. 3-5 Units.**

This course explores the special connection between jazz and literature. In texts that range from American novels to the poetry of African independence movements, jazz emerges at once as a structuring principle (as in Toni Morrison's *Jazz* and James Baldwin's *The Amen Corner*) and a unifying theme (for example, Noémia de Sousa's "A Billie Holiday, Cantora"). It is also part of a larger philosophical discussion on rhythm that connects to deep questions of selfhood, ethics, democracy, listening, and vital force. If you love jazz and want to dig deeper into its possibilities or want to find new ways to express literature's power, this class provides the venue. The rest is, as Sonny Rollins put it, "creation and surprise."

Same as: AFRICAAM 216

**COMPLIT 222A. Myth and Modernity. 1-5 Unit.**

Masters of German 20th- and 21st-Century literature and philosophy as they present aesthetic innovation and confront the challenges of modern technology, social alienation, manmade catastrophes, and imagine the future. Readings include Nietzsche, Freud, Rilke, Musil, Brecht, Kafka, Döblin, Benjamin, Juenger, Arendt, Musil, Mann, Adorno, Celan, Grass, Bachmann, Bernhardt, Wolf, and Kluge. Taught in English. Note: To be eligible for WAYS credit, you must take GERMAN 222 or COMPLIT 222A for a minimum of 3 Units and a letter grade.

Same as: GERMAN 222, GERMAN 322

**COMPLIT 223. Literature and Human Experimentation. 3-5 Units.**

This course introduces students to the ways literature has been used to think through the ethics of human subjects research and experimental medicine. We will focus primarily on readings that imaginatively revisit experiments conducted on vulnerable populations: namely groups placed at risk by their classification according to perceived human and cultural differences. We will begin with Mary Shelley's *Frankenstein* (1818), and continue our study via later works of fiction, drama and literary journalism, including Toni Morrison's *Beloved*, David Feldshuh's *Miss Evers Boys*, Hannah Arendt's *Eichmann* and Vivien Spitz's *Doctors from Hell*, Rebecca Skloot's *Immortal Life of Henrietta Lacks*, and Kazuo Ishiguro's *Never Let Me Go*. Each literary reading will be paired with medical, philosophical and policy writings of the period; and our ultimate goal will be to understand modes of ethics deliberation that are possible via creative uses of the imagination, and literature's place in a history of ethical thinking about humane research and care. Note: This course must be taken for a letter grade to be eligible for WAYS credit.

Same as: AFRICAAM 223, CSRE 123B, HUMBIO 175H, MED 220

**COMPLIT 228D. Literature and Technology: An Introduction to Digital Humanities. 1-5 Unit.**

What do computers have to do with the study of literature? Can programming help us learn more about texts? Students in this course will explore these and similar questions through project-based learning. By developing their own digital research project, either in collaboration or solo, students will gain an understanding of the methods and challenges of the field known as "digital humanities". Students will also read and discuss scholarship about the use of computers for the study of literature using Lacuna, an online reading and annotation environment developed at Stanford. Class time will be divided between theory and practice: we will discuss readings that contextualize and question the tools and methods commonly used, then we will use those tools and methods in project work.

Same as: COMPLIT 338D, DLCL 228

**COMPLIT 229. Literature and Global Health. 3-5 Units.**

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with a call made by the editor-in-chief of *The Lancet* for a literature of global health, namely fiction modeled on the social reform novels of the nineteenth century, understood to have helped readers develop a conscience for public health as the field emerged as a modern medical specialty. We will then spend the quarter understanding how colonial, postcolonial, and world literatures have answered and complicated this call. Readings will include prose fiction by Albert Camus, Joseph Conrad, Tsitsi Dangaremba, Amitav Ghosh, Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese, Paul Farmer. And each literary reading will be paired with medical, philosophical, and policy writings that deeply inform the field of global health. Note: To be eligible for WAYS credit, you must take the course for a Letter Grade.

Same as: AFRICAAM 229, AFRICAST 229, CSRE 129B, FRENCH 229, HUMBIO 175L, MED 234

**COMPLIT 235E. Dante's "Inferno". 3-5 Units.**

Intensive reading of Dante's "Inferno" (the first canticle of his three canticle poem *The Divine Comedy*). Main objective: to learn how to read the *Inferno* in detail and in depth, which entails both close textual analysis as well as a systematic reconstruction of the Christian doctrines that subtend the poem. The other main objective is to understand how Dante's civic and political identity as a Florentine, and especially his exile from Florence, determined his literary career and turned him into the author of the poem. Special emphasis on Dante's moral world view and his representation of character. Taught in English. nNOTE: Enrollment requires Professor Harrison's approval. Please contact him directly at [harrison@stanford.edu](mailto:harrison@stanford.edu).

Same as: ITALIAN 235E

**COMPLIT 236E. Dante's "Purgatorio" and "Paradiso". 4-5 Units.**

Reading the second and third canticles of Dante's *Divine Comedy*. Prerequisite: students must have read Dante's *Inferno* in a course or on their own. Taught in English. Recommended: reading knowledge of Italian.

Same as: ITALIAN 236E

**COMPLIT 245. Introductory Ottoman Turkish. 1-3 Unit.**

This course is an introduction to basic orthographic conventions and grammatical characteristics of Ottoman Turkish through readings in printed material from the 19th and 20th centuries. Selected readings will range from poetry to prose, from state documents, newspaper and journal articles to reference works. Course is open to both undergraduate and graduate students. Prior knowledge of modern Turkish is required (Completion of COMPLIT 248A, COMPLIT 248B Reading Turkish I&II and COMPLIT 248C Advanced Turkish OR AMELANG 184 & 185 First & Second Year Turkish OR a solid knowledge of Turkish grammar.) Please contact the instructor for more information.

**COMPLIT 247. Bollywood and Beyond: An Introduction to Indian Film. 3-5 Units.**

A broad engagement with Indian cinema: its relationship with Indian politics, history, and economics; its key thematic concerns and forms; and its adaptation of and response to global cinematic themes, genres, and audiences. Locating the films within key critical and theoretical debates and scholarship on Indian and world cinemas. Goal is to open up what is often seen as a dauntingly complex region, especially for those who are interested in but unfamiliar with its histories and cultural forms. Same as: GLOBAL 250

**COMPLIT 248A. Reading Turkish I. 2-4 Units.**

Reading Turkish I is an introduction to the structures of the Turkish language necessary for reading. It is designed to develop reading competence in Turkish for graduate students. Undergraduates should consult the instructor before enrolling for the course. Essential grammar, syntax points, vocabulary, and reading skills will be emphasized. This is not a traditional language course that takes an integrated four-skill approach; since the goal is advanced reading level, the focus is mainly on grammar, reading comprehension, and translation. With full concentration on reading, we will be able to cover advanced material in a short amount of time. The course is conducted in English, but students will be exposed to the sounds of Turkish, and will have the opportunity to practice pronunciation in class. nnCOMPLIT 248A Reading Turkish I is followed by COMPLIT 248B Reading Turkish II in the Winter and COMPLIT 248C Advanced Turkish for Research in the Spring."

**COMPLIT 248B. Reading Turkish II. 2-4 Units.**

This course is the continuation of COMPLIT 248A Reading Turkish I, which served as an introduction to the structures of the Turkish language necessary for reading. It is designed to develop reading competence in Turkish for graduate students. Undergraduates should consult the instructor before enrolling for the course. Essential grammar, syntax points, vocabulary, and reading skills will be emphasized. This is not a traditional language course that takes an integrated four-skill approach; it focuses only on reading, and as a result we will be able to cover advanced material in a short amount of time. This course is conducted in English, but students will be exposed to the sounds of Turkish, and will have the opportunity to practice pronunciation in class. COMPLIT 248B is followed by COMPLIT 248C Advanced Turkish for Research in the Spring.

**COMPLIT 248C. Advanced Turkish-English Translation. 2-4 Units.**

This course is the continuation of COMPLIT 248A Reading Turkish I and COMPLIT 248B Reading Turkish II. Refining advanced grammar, reading, and translation skills in modern Turkish through intensive reading and translation from a variety of source texts. Emphasis on Turkish cultural, historical, literary, and political texts depending on students' academic interests. Prerequisites COMPLIT 248A & B or prior knowledge of Turkish and consultation with the instructor is necessary.

**COMPLIT 249A. The Iranian Cinema: Image and Meaning. 1-3 Unit.**

This course will focus on the analysis of ten Iranian films with the view of placing them in discourse on the semiotics of Iranian art and culture. The course will also look at the influence of a wide array of cinematic traditions from European, American, and Asian masters on Iranian cinema. Note: This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit. Same as: GLOBAL 249A

**COMPLIT 249B. Iranian Cinema in Diaspora. 1-3 Unit.**

Despite enormous obstacles, immigrant Iranian filmmakers, within a few decades (after the Iranian Revolution), have created a slow but steady stream of films outside Iran. They were originally started by individual spontaneous attempts from different corners of the world and by now we can identify common lines of interest amongst them. There are also major differences between them. These films have never been allowed to be screened inside Iran, and without any support from the global system of production and distribution, as independent and individual attempts, they have enjoyed little attention. Despite all this, Iranian cinema in exile is in no sense any less important than Iranian cinema inside Iran. In this course we will view one such film, made outside Iran, in each class meeting and expect to reach a common consensus in identifying the general patterns within these works and this movement. Questions such as the ones listed below will be addressed in our meetings each week: What changes in aesthetics and point of view of the filmmaker are caused by the change in his or her work environment? Though unwantedly these films are made outside Iran, how related are they to the known (recognized) cinema within Iran? And in fact, to what extent do these films express things that are left unsaid by the cinema within Iran? NOTE: This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: GLOBAL 249B

**COMPLIT 249C. Contemporary Iranian Theater. 1-3 Unit.**

Today, Iranian plays both in traditional and contemporary styles are staged in theater festivals throughout the world and play their role in forming a universal language of theater which combine the heritages from countries in all five continents. Despite many obstacles, some Iranian plays have been translated into English and some prominent Iranian figures are successful stage directors outside Iran. Forty-six years ago when "Theater in Iran" (a monograph on the history of Iranian plays) by Bahram Beyzaie was first published, it put the then contemporary Iranian theater movement "which was altogether westernizing itself blindly" face to face with a new kind of self-awareness. Hence, today's generation of playwrights and stage directors in Iran, all know something of their theatrical heritage. In this course we will spend some class sessions on the history of the theater in Iran and some class meetings will be concentrating on contemporary movements and present day playwrights. Given the dearth of visual documents, an attempt will be made to present a picture of Iranian theater to the student. Students are expected to read the recommended available translated plays of the contemporary Iranian playwrights and participate in classroom discussions. Note: This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: GLOBAL 249C

**COMPLIT 252A. Great Arabic Poetry. 3-5 Units.**

Introduction to the canon of Arabic poetry from the sixth to the twenty-first century. Imru' al-Qays, al-Mutanabbi, Mahmud Darwish, and more. Readings in Arabic. Two years of Arabic at Stanford or equivalent required. Counts for the Arabic Track in the MELLAC Minor.

**COMPLIT 252B. Great Arabic Prose. 3-5 Units.**

Introduction to the best Arabic Literature from the 790s to 2016. Al-Jahiz, Naguib Mahfouz, and much more. Readings in Arabic. Two years of Arabic at Stanford or equivalent required. Counts for the Arabic Track in the MELLAC Minor. Note: This course must be taken for a minimum of 3 units and a letter grade to be eligible for WAYS credit.



**COMPLIT 301. Baroque and Neobaroque. 3-5 Units.**

The literary, cultural, and political implications of the 17th-century phenomenon formed in response to the conditions of the 16th century including humanism, absolutism, and early capitalism, and dispersed through Europe, the Americas, and Asia. If the Baroque is a universal code of this period, how do its vehicles, such as tragic drama, Ciceronian prose, and metaphysical poetry, converse with one another? The neobaroque as a complex reaction to the remains of the baroque in Latin American cultures, with attention to the mode in recent Brazilian literary theory and Mexican poetry.

Same as: ENGLISH 233, ILAC 293E

**COMPLIT 302. Film Series: Understanding Turkey Through Film. 1 Unit.**

Join us in our quest to understand the recent developments in Turkey and their impact on its people through cinematic production. Set against the backdrop of Turkey's cultural, political and social transformation in the last decade, the movies in this series tell the uneasy stories of individuals whose lives are affected by this disruptive change. By examining the link between individual troubles and public issues, the films confront issues such as globalization, gender and racial hierarchy, neo-liberal urban transformation, male domination, state oppression, and women's oppression in Turkey. Each screening will be followed by a discussion lead by invited scholars of Turkey or film directors. At each screening we will look closely at a film and discuss how the directors and script writers responded to larger scale cultural and social dynamics to present them as personal stories. All screenings are free and open to the public. All attendees are encouraged to participate in the post-screening discussions. All films are in Turkish with English subtitles.

Same as: COMPLIT 102

**COMPLIT 303. Early Modern Prose Fictions. 3-5 Units.**

The course considers the English and European prose fictions of the sixteenth and seventeenth centuries—romances, picaresques, pastorals, narratives of social class, and other genres—in the context of Renaissance and present-day theories of fiction. How is narrative form conditioned by social reality, and in turn how does it provide a zone for reflection on that reality in terms different from those of the more codified genres of drama and poetry?

Same as: ENGLISH 302

**COMPLIT 310. Introduction to Comparative Queer Literary Studies. 3-5 Units.**

Introduction to the comparative literary study of important gay, lesbian, queer, bisexual, and transgender writers and their changing social, political, and cultural contexts from the 1880s to today: Oscar Wilde, Rachilde, Radclyffe Hall, Djuna Barnes, James Baldwin, Jean Genet, Audre Lorde, Cherrie Moraga, Jeanette Winterson, Alison Bechdel and others, discussed in the context of 20th-century feminist and queer literary and social theories of gender and sexuality.

Same as: COMPLIT 110, FEMGEN 110X, FEMGEN 310X

**COMPLIT 315. Vladimir Nabokov: Displacement and the Liberated Eye. 1-5 Unit.**

How did the triumphant author of "the great American novel" *Lolita* evolve from the young author writing at white heat for the tiny sad Russian emigration in Berlin? We will read his short stories and the novels *The Luzhin Defense*, *Invitation to a Beheading*, *Lolita*, *Lolita* the film, and *Pale Fire*, to see how Nabokov generated his sinister-playful forms as a buoyant answer to the "hypermodern" visual and film culture of pre-WWII Berlin, and then to America's all-pervading postwar "normalcy" in his pathological comic masterpieces *Lolita* and *Pale Fire*. Buy texts in translation at the Bookstore; Slavic grad students will supplement with reading and extra sessions in original Russian.

Same as: COMPLIT 115, SLAVIC 156, SLAVIC 356

**COMPLIT 319. The Turkish Novel. 1-5 Unit.**

Designed as a survey, this course will examine the modern Turkish novel from the early days of the Republic to the present day. We will examine the aesthetic, political, and social aspects of the Turkish novel by reading major samples of national, historical, philosophical, village, and modernist novels. Discussions will be conducted in English. Students will have an option to read the primary sources in Turkish or in English. Contact Burcu Karahan for meeting time and place.

Same as: COMPLIT 119

**COMPLIT 320A. Epic and Empire. 5 Units.**

Focus is on Virgil's *Aeneid* and its influence, tracing the European epic tradition (Ariosto, Tasso, Camoes, Spenser, and Milton) to New World discovery and mercantile expansion in the early modern period.

Same as: ENGLISH 314

**COMPLIT 323. The Renaissance Atlantic. 3-5 Units.**

The seminar questions common ideas about early-modern Europe and the "modernity" then established. It looks at Africa, the Americas and Europe as equal partners in making what is now called the Renaissance. Among these ideas are those of the "subject" and the "other," of "history," fiction, "science," "literature," etc. We will discuss issues of cultural exchange; colonialism and postcolonialism; history and orature; the "fictive imagination" and the politics of "literature"; formations of "methodical" knowledge; and the very idea of Renaissance and all it entails for people's still-normative understanding of Euro-modernity. We will do this chiefly through texts from Africa and the Americas, as well as Spanish, English and French Europe. We look at invasion, cultural imposition, indigenous cultures and back-formation of European culture, and the aforementioned concepts and issues as they set certain kinds of cultural creations in place whose continuing dominance and supposed "universality" needs querying.

**COMPLIT 334A. Concepts of Modernity I: Philosophical Foundations. 5 Units.**

In the late eighteenth century Immanuel Kant proclaimed his age to be "the genuine age of criticism." He went on to develop the critique of reason, which set the stage for many of the themes and problems that have preoccupied Western thinkers for the last two centuries. This fall quarter course is intended as an introduction to these themes and problems. We begin this course with an examination of Kant's philosophy before approaching a number of texts that extend and further interrogate the critique of reason. In addition to Kant, we will read texts by Hegel, Marx, Nietzsche, Weber, Freud, Lukács, and Heidegger. This course is the first of a two-course sequence. Priority to graduate students in MTL and English. The course will be capped at 12 students.

Same as: MTL 334A

**COMPLIT 336A. Refugees, Politics and Culture in Contemporary Germany. 1-5 Unit.**

Responses to refugees and immigration to Germany against the backdrop of German history and in the context of domestic and European politics. Topics include: cultural difference and integration processes, gender roles, religious traditions, populism and neo-nationalism. Reading knowledge of German, another European language, or an immigrant language will be useful for research projects, but not required. NOTE: This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: COMPLIT 136, GERMAN 136, GERMAN 336

**COMPLIT 338D. Literature and Technology: An Introduction to Digital Humanities. 1-5 Unit.**

What do computers have to do with the study of literature? Can programming help us learn more about texts? Students in this course will explore these and similar questions through project-based learning. By developing their own digital research project, either in collaboration or solo, students will gain an understanding of the methods and challenges of the field known as "digital humanities". Students will also read and discuss scholarship about the use of computers for the study of literature using Lacuna, an online reading and annotation environment developed at Stanford. Class time will be divided between theory and practice: we will discuss readings that contextualize and question the tools and methods commonly used, then we will use those tools and methods in project work.

Same as: COMPLIT 228D, DLCL 228

**COMPLIT 345B. The African Atlantic. 3-5 Units.**

This course explores the central place Africa holds in prose writing emerging during early and modern periods of globalization across the Atlantic, including the middle passage, exploration and colonialism, black internationalism, decolonization, immigration, and diasporic return. We will begin with Equiano's *Interesting Narrative* (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of self-making or new citizenship, to evoke histories of racial unity or examine psychic and social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Conrad, Condé, Olinto), epic and prose poetry (Césaire, Walcott), theoretical reflection (Gilroy, Glissant, Mudimbe, Benitez-Rojo), and literary autobiography (Barack Obama, Saidiya Hartman). Note: To be eligible for WAYS credit, you must take COMPLIT 145B for a minimum of 3 Units and a Letter Grade.

Same as: AFRICAAM 148, AFRICAST 145B, COMPLIT 145B, CSRE 145B, FRENCH 145B, FRENCH 345B

**COMPLIT 348. US-Mexico Border Fictions: Writing La Frontera, Tearing Down the Wall. 3-5 Units.**

A border is a force of containment that inspires dreams of being overcome, crossed, and cursed; motivates bodies to climb over walls; and threatens physical harm. This graduate seminar places into comparative dialogue a variety of perspectives from Chicana/o and Mexican/Latin American literary studies. Our seminar will examine fiction and cultural productions that range widely, from celebrated Mexican and Chicano/a authors such as Carlos Fuentes (*La frontera de cristal*), Yuri Herrera (*Señales que precederan al fin del mundo*), Willivaldo Delgado (*La Virgen del Barrio Árabe*), Américo Paredes (*George Washington Gómez: A Mexico-Texan Novel*), Gloria Anzaldúa (*Borderlands/La Frontera: The New Mestiza*), and Sandra Cisneros (*Carmelo: Puro Cuento*), among others, to musicians whose contributions to border thinking and culture have not yet been fully appreciated such as Herb Albert, Ely Guerra, Los Tigres del Norte, and Café Tacvba. Last but not least, we will screen and analyze Orson Welles' iconic border films *Touch of Evil* and Rodrigo Dorfman's *Los Sueños de Angélica*. Proposing a diverse and geographically expansive view of the US-Mexico border literary and cultural studies, this seminar links the work of these authors and musicians to struggles for land and border-crossing rights, anti-imperialist forms of trans-nationalism, and to the decolonial turn in border thinking or *pensamiento fronterizo*. It forces us to take into account the ways in which shifts in the nature of global relations affect literary production and negative aesthetics especially in our age of (late) post-industrial capitalism.

Same as: ILAC 348

**COMPLIT 350. Masterpieces: Kafka. 3-5 Units.**

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers.

Same as: COMPLIT 114, GERMAN 150, GERMAN 350, JEWISHST 145

**COMPLIT 352A. The Novel in Africa. 3-5 Units.**

A study of the novel as generic form and site of theorization for African writers and scholars of literature, via close reading of key works of fiction and critical analysis. We will consider the place of historical and cultural context in creative and artistic production, publication, and reception within the continent and beyond it. We will certainly pay close attention to innovation at the level of form, theme, plot, characterization, style or poetics. But we will also attend to questions that arise with the formation of African literature as an autonomous corpus and field, including those critical questions that concern uses of orality, performance, and tradition as indices of authenticity; the challenges and possibilities of language; and the common presumption of the nation as realist or allegorical frame, as well as its complex relationship to class, gender, and ethnic minoritization.

Same as: AFRICAAM 352

**COMPLIT 359A. Philosophical Reading Group. 1 Unit.**

Discussion of one contemporary or historical text from the Western philosophical tradition per quarter in a group of faculty and graduate students. For admission of new participants, a conversation with H. U. Gumbrecht is required. May be repeated for credit. Taught in English.

Same as: FRENCH 395, ITALIAN 395

**COMPLIT 369. Introduction to the Profession of Literary Studies. 1-2 Unit.**

A survey of how literary theory and other methods have been made institutional since the nineteenth century. The readings and conversation are designed for entering Ph.D. students in the national literature departments and comparative literature.

Same as: DLCL 369, FRENCH 369, GERMAN 369, ITALIAN 369

**COMPLIT 36A. Dangerous Ideas. 1 Unit.**

Ideas matter. Concepts such as race, progress, and evil have inspired social movements, shaped political systems, and dramatically influenced the lives of individuals. Others, like religious tolerance, voting rights, and wilderness preservation play an important role in contemporary debates in the United States. All of these ideas are contested, and they have a real power to change lives, for better and for worse. In this one-unit class we will examine these dangerous ideas. Each week, a faculty member from a different department in the humanities and arts will explore a concept that has shaped human experience across time and space. Some weeks will have short reading assignments, but you are not required to purchase any materials.

Same as: ARTHIST 36, EALC 36, ENGLISH 71, FRENCH 36, HISTORY 3D, MUSIC 36H, PHIL 36, POLISCI 70, RELIGST 21X, SLAVIC 36

**COMPLIT 370. Theodor W. Adorno: History, Aesthetics, Catastrophe. 3-5 Units.**

Theodor W. Adorno (1903-1969) was one of the most influential German thinkers of the 20th century. This seminar aims to introduce students to Adorno's varied oeuvre, from his contributions to the critique of culture, his theory of history, his re-thinking of Hegelianism and Marxism, to his contributions to aesthetics. We will also consider Adorno's various intellectual forebears, collaborators and interlocutors (Hegel, Marx, Lukács, Horkheimer, Habermas). All texts and discussions are in English. Undergraduates welcome.

Same as: COMPLIT 170, GERMAN 170, GERMAN 370

**COMPLIT 371. Aesthetics, Politics, and Modernity: Critical Theory and China. 2-5 Units.**

Environmental degradation and ecological crises have given rise to critiques and cultural reflection. This class will bring together issues of aesthetics, politics, and artworks around environmental concerns. We will study Marxist (Marx, David Harvey, and Eagleton) and Frankfurt School (Adorno and Benjamin) critiques of capitalist production as the source of environment degradation, the alienation of humans from nature, human domination over nature, the colonization and plunder of nature in the third world, and elite domination of working classes. We will study and critique the notion of anthropocentrism as a key ideology for scientific and technological advances at the expense of communities, the environment, and the planet. We will review romantic, feminist and other ecological critiques of industrial modernity and the endless pursuit of economic growth and profit. Taking a global and comparative perspective, we will study Chinese eco-critical literature and films, which include short SF fiction, films *Sanxia haoren* (Still Life) directed by Jia Zhangke and *Kekexili* (Mountain patrol) by Lu Chuan. Chinese is not required. PhD students are required to write a term paper of 20-25 pages. MA and undergraduate students will write two short essays of 10 pages in response to the questions from readings and discussion. Same as: CHINA 371

**COMPLIT 37Q. Zionism and the Novel. 3 Units.**

At the end of the nineteenth century, Zionism emerged as a political movement to establish a national homeland for the Jews, eventually leading to the establishment of the State of Israel in 1948. This seminar uses novels to explore the changes in Zionism, the roots of the conflict in the Middle East, and the potentials for the future. We will take a close look at novels by Israelis, both Jewish and Arab, in order to understand multiple perspectives, and we will also consider works by authors from the North America and from Europe. Note: This course must be taken for a letter grade to be eligible for WAYS credit. Same as: JEWISHST 37Q

**COMPLIT 398L. Literary Lab. 2-5 Units.**

Gathering and analyzing data, constructing hypotheses and designing experiments to test them, writing programs [if needed], preparing visuals and texts for articles or conferences. Requires a year-long participation in the activities of the Lab. Same as: ENGLISH 398L

**COMPLIT 399. Individual Work. 1-15 Unit.****COMPLIT 51Q. Comparative Fictions of Ethnicity. 4 Units.**

We may "know" "who" we "are," but we are, after all, social creatures. How does our sense of self interact with those around us? How does literature provide a particular medium for not only self expression, but also for meditations on what goes into the construction of "the Self"? After all, don't we tell stories in response to the question, "who are you"? Besides a list of nouns and names and attributes, we give our lives flesh and blood in telling how we process the world. Our course focuses in particular on this question—Does this universal issue ("who am I") become skewed differently when we add a qualifier before it, like "ethnic"? Note: To be eligible for WAYS credit, you must take course for a Letter Grade. Same as: AMSTUD 51Q, CSRE 51Q

**COMPLIT 55N. Batman, Hamilton, Díaz, and Other Wondrous Lives. 3-5 Units.**

This seminar concerns the design and analysis of imaginary (or constructed) worlds for narratives and media such as films, comics, and literary texts. The seminar's primary goal is to help participants understand the creation of better imaginary worlds - ultimately all our efforts should serve that higher purpose. Some of the things we will consider when taking on the analysis of a new world include: What are its primary features - spatial, cultural, biological, fantastic, cosmological? What is the world's ethos (the guiding beliefs or ideals that characterize the world)? What are the precise strategies that are used by the artist to convey the world to us and us to the world? How are our characters connected to the world? And how are we - the viewer or reader or player - connected to the world? Note: This course must be taken for a letter grade to be eligible for WAYS credit. Same as: CSRE 55N

**COMPLIT 57. Human Rights and World Literature. 5 Units.**

Human rights may be universal, but each appeal comes from a specific location with its own historical, social, and cultural context. This summer we will turn to literary narratives and films from a wide number of global locations to help us understand human rights; each story taps into fundamental beliefs about justice and ethics, from an eminently human and personal point of view. What does it mean not to have access to water, education, free speech, for example? This course has two components. The first will be a set of readings on the history and ethos of modern human rights. These readings will come from philosophy, history, political theory. The second, and major component is comprised of novels and films that come from different locations in the world, each telling a compelling story. We will come away from this class with a good introduction to human rights history and philosophy and a set of insights into a variety of imaginative perspectives on human rights issues from different global locations. Readings include: Amnesty International, *Freedom: Stories Celebrating the Universal Declaration of Human Rights* Andrew Clapman, *Human Rights: A Very Short Introduction* James Dawes, *That the World May Know* Walter Echo-Hawk, *In the Light of Justice* Amitav Ghosh, *The Hungry Tide* Bessie Head, *Maru* Ursula LeGuin, *The Word for World is Forest*.

**COMPLIT 680. Curricular Practical Training. 1-3 Unit.**

CPT course required for international students completing degree. Prerequisite: Comparative Literature Ph.D. candidate.

**COMPLIT 70N. Animal Planet and the Romance of the Species. 3-4 Units.**

Preference to freshmen. This course considers a variety of animal characters in Chinese and Western literatures as potent symbols of cultural values and dynamic sites of ethical reasoning. What does pervasive animal imagery tell us about how we relate to the world and our neighbors? How do animals define the frontiers of humanity and mediate notions of civilization and culture? How do culture, institutions, and political economy shape concepts of human rights and animal welfare? And, above all, what does it mean to be human in the pluralistic and planetary 21st century? Note: To be eligible for WAYS credit, you must take course for a Letter Grade. Same as: CHINA 70N

**COMPLIT 71N. Islamic Identities. 3 Units.**

What is Islamic identity? Who decides? This course looks at four moments in time: Arabic judges and politicians in Golden Age Iraq; activists in modern Indonesia; Black Americans in the early twenty-first century; the Stanford community in Fall Quarter 2017. This course will include an introduction to Islam, questions about the Quran and violence, and some literature.

**COMPLIT 802. TGR Dissertation. 0 Units.**

**COMPLIT 82. Making Palestine Visible. 3-5 Units.**

Israel-Palestine is one of the most difficult subjects to talk about, in large part because we in the United States do not have much exposure to Palestinian history, culture, and politics in their own terms. This course aims to humanize Palestinians and asks why Palestinian claims to rights are illegible for much of the American public. We begin to answer this question by examining a broad sampling of history, structures of power and law, culture, and contemporary political issues.

Same as: COMPLIT 182, CSRE 82G, HISTORY 82G, HISTORY 182G

## Comparative Medicine (COMP MED)

**COMP MED 107. Comparative Brain Evolution. 4 Units.**

Functional organization and evolution of the vertebrate nervous system. Topics include paleoneurology, cladistic analysis, allometry, mosaic versus concerted evolution, and evolution of brain region structure, connectivity, and neurons. Comparisons between structure and function of vertebrate forebrains including hippocampi. Evolution of the primate visual and sensorimotor central nervous system as related to vocalization, socialization, and intelligence.

Same as: COMP MED 207

**COMP MED 110. Pre-Vet Advisory. 1 Unit.**

For students interested in a career in veterinary medicine. How to meet the academic and practical experience prerequisites for admission to veterinary school. Networking with other pre-vet students. Periodic group meetings with guest speakers presenting career options in veterinary medicine. Prerequisite: consent of instructor.

**COMP MED 115C. Life in the Zoo: Behavior, Welfare and Enrichment. 2 Units.**

What makes for a good life in a zoo? For that matter, what makes a good zoo? The psychological and physical wellbeing of the animals? The contribution to research, conservation, and education? The guest experience? Students will learn first-hand how animal welfare science provides an evidence-based approach to optimize and balance each of these demands so that "good welfare is good business." Through a unique experience at San Francisco Zoo students will learn how to apply principles of animal behavior to design environmental enrichments which benefit both the animals and the complex mission of a zoo. Students will be guided through the process of assessing an exhibit from the point of view of the animal's behavior and wellbeing, educational opportunities, and guest experience; developing an enrichment plan; designing and building enrichments for the animals; interacting with the public as docents; and assessing the overall effectiveness of a new enrichment; before finally presenting their work at a "mini-conference." The course will be taught with an emphasis on self-guided learning, student-led class time, hands-on experience, and service-learning. Most days will begin with students presenting what they have learned the previous day to the class, followed by student-led discussion, preparation time for the day's activities, and then time out in the zoo. The course will be taught by Dr. Garner (whose introductory seminar in Animal Behavior is strongly recommended, though not required) and Dr. Watters (Vice President of Animal Wellness and Animal Behavior, San Francisco Zoological Society).

**COMP MED 198. Undergraduate Directed Reading in Comparative Medicine. 1-3 Unit.**

May be taken as a prelude to research and may also involve participation in a lab or research group seminar and/or library research.

**COMP MED 199. Undergraduate Research. 1-3 Unit.**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

**COMP MED 200. One Health Journal Club. 1 Unit.**

Participants report on and review scientific articles published in peer reviewed journals. Focus is on manuscripts which report basic and mechanistic discoveries, animal modeling and translational research. The objective is to introduce MLAS students to critical scientific review of hypothesis-based research and experimental design, data analysis and interpretation. Enrollment limited to undergraduate and graduate students currently matriculated or planning to enroll in the MS in Laboratory Animal Science degree program.

**COMP MED 201. Neuro-Cellular Core. 2 Units.**

Focuses on fundamental aspects of cellular neurophysiology. Topics include exploration of electrophysiological properties of neurons, synaptic structure and function and synaptic plasticity. The course consists of didactic lectures and student-led discussions of classical papers. Incorporates simulation program Neuron. Enrollment restricted to students enrolled in Neurosciences Graduate Program.

Same as: NEPR 201

**COMP MED 202. Research Biomethodology for Laboratory Animal Science. 2 Units.**

Emphasis is on providing introductory training and practical, hands-on research animal biomethodology. Topics include basic care and principals guiding the use of research animals, animal health and welfare, enrichment, basic mouse handling, rodent breeding, and the principals of rodent aseptic surgery and anesthesia. The objective of this course is to teach basic skills in animal handling, animal care and biomethodological research techniques. Content delivered online and in-person.

**COMP MED 205. Animal Use in Biomedical Research. 3 Units.**

How and why animals are used in biomedical science. Addresses human and animal disease entities and how animal research has contributed to the treatment and cure of disease. Significant portions of this course are devoted to documenting the humane care and treatment of laboratory animals in research, including, but not limited to such topics as law and ethics, animal behavior, animal modeling, and the animal activist movement. Course topics will also include: What advances have been made as a result of the use of animals in research? Who conducts animal research? Predominant animal species used in biomedical research, facts and myths; the regulation of biomedical research; housing and care of laboratory animals; why new drugs must be tested; animal use in stem cell research, cancer research and genetically engineered mice; career choices in biomedical research.

**COMP MED 207. Comparative Brain Evolution. 4 Units.**

Functional organization and evolution of the vertebrate nervous system. Topics include paleoneurology, cladistic analysis, allometry, mosaic versus concerted evolution, and evolution of brain region structure, connectivity, and neurons. Comparisons between structure and function of vertebrate forebrains including hippocampi. Evolution of the primate visual and sensorimotor central nervous system as related to vocalization, socialization, and intelligence.

Same as: COMP MED 107

**COMP MED 209. Laboratory Animal Medicine Seminar. 2 Units.**

Focuses on husbandry, care and diseases of major laboratory animal species (rodents, fish and amphibians, swine, sheep, rabbits, monkeys); regulatory and compliance, applied principals of animal modeling, and factors that influence animal research, animal behavior and research reproducibility. The objective of this course is to provide students with an overview of the history of laboratory animal science, current industry standards and practices, and the fundamentals of laboratory animal diseases. Department consent required for enrollment. May be repeated for credit.

**COMP MED 210. Introduction to Mouse Histopathology. 3 Units.**

Focus is on anatomy and histology (microscopic anatomy) of the entire mouse, proper instrument handling and dissection technique, proper tissue fixation, trimming and orientation in cassettes, identification of normal organ histology on H & E-stained slides using a light microscope, use of special stains, and digital image acquisition. Basic pathological processes (inflammation, necrosis, apoptosis, hyperplasia, cancer) and how these manifest in different organs comprises the pathology aspect of this course. Participants present the pathology of their lab's mouse models. Preference to graduate students working with mouse models. Dissection labs. Comfort with mouse handling and previous participation in VSC mouse handling and euthanasia workshops recommended.

**COMP MED 211. Biostatistics for the Life Sciences. 2 Units.**

Emphasis is on real-world experimental design and analysis in the life sciences, with particular focus on modern techniques that maximize power and minimize sample size, and avoiding common errors contributing to false discovery and the reproducibility crisis. This is a flipped-classroom. Class time is devoted to discussion of assigned reading (primarily Grafen & Hails 2002 "Modern statistics for the life sciences"), critique of papers, working through example data sets, and developing analyses for the students' own research data. The objective is to provide MLAS students with a fundamental understanding of basic statistics, particularly as applied to the design and planning of animal-based research projects. Enrollment is limited to MLAS students, unless student has course director consent.

**COMP MED 215. Synaptic Properties and Neuronal Circuits. 2-3 Units.**

Focus is on synapses and circuits in the central nervous system. Objective is to demonstrate how the specific properties of different synapses play a role in the function of neuronal circuits. The main types of synapses are covered, including both ionotropic and metabotropic-receptor-dependent synapses and their related circuits in the CNS. Lectures and student presentations. If taken for 3 units qualifies as a Core Course satisfying requirements in Cellular, Molecular & Developmental Neuroscience in the Neurosciences Graduate Program. Students enrolling for 3 units write an NIH-style proposal on a selected synapse, proposing a study of its properties and related function and presenting the proposal to the class for critique and discussion.

**COMP MED 260. Masters Laboratory Animal Science Practicum/ Laboratory Research. 1-15 Unit.**

Research laboratory and clinical service (pathology, diagnostic laboratory, surgery, husbandry, anesthesiology, aquatics, facility business and management, etc.), quarterly rotations for students enrolled in the Master's of Laboratory Animal Science program. The objective of this course is to provide students with hands on experience in research laboratories using animal models and to provide experience working in the daily operations of a large, veterinary service center. Fulfills the practicum and research requirements of MLAS students.

**COMP MED 290. MLAS Career Development. 1-6 Unit.**

Focus is on career development for graduate students and trainees enrolled in a trainee program in the Department of Comparative Medicine. Seminar topics include career pathways in laboratory animal science, resume preparation, manuscript preparation and authorship, life in academics, life in industry and biopharma, regulatory agencies, veterinary and medical school. Speakers include faculty, speakers from industry and pharmaceutical companies, veterinary school and medical school graduates, regulatory and compliance professionals, research scientists, and animal research program/laboratory managers. Students may choose to shadow veterinary clinical faculty or rotate through basic science laboratory, by special arrangement. The objective is to introduce students to the multiple career pathways available to individuals with advanced training in laboratory animal science. May be taken up to six quarters.

**COMP MED 299. Directed Reading in Comparative Medicine. 1-18 Unit.**

Prerequisite: consent of instructor. (Staff).

**COMP MED 370. Medical Scholars Research. 4-18 Units.**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

**COMP MED 399. Graduate Research. 1-18 Unit.**

Investigations sponsored by individual faculty members. Opportunities are available in comparative medicine and pathology, immunohistochemistry, electron microscopy, molecular genetics, quantitative morphometry, neuroanatomy and neurophysiology of the hippocampus, pathogenesis of intestinal infections, immunopathology, biology of laboratory rodents, anesthesiology of laboratory animals, gene therapy of animal models of neurodegenerative diseases, and development and characterization of transgenic animal models. Prerequisite: consent of instructor.

**COMP MED 801. TGR Project. 0 Units.****COMP MED 80N. Animal behavior: sex, death, and sometimes food!. 3 Units.**

Preference to freshman. Behavior is what makes animals special (thirsty plants don't walk to water), but why do animals behave the way they do? What does their behavior tell us about their inner lives, and about ourselves? What do lipstick and cuckoos and fireflies have in common? Why would nobody want to be a penguin? What do mice say to each other in their pee-mail? Learning how to think about questions like these gives us a unique perspective on the natural world. Format: Discussion and criticism of video examples, documentaries, and research papers. Topics: History and approaches to animal behavior; development of behavior, from genetics to learning; mechanisms of behavior, from neurons to motivation; function of behavior, from honest signals to selfish genes; the phylogeny of behavior, from domestication to speciation; and modern applications of behavior, from abnormal behavior, to conservation, to animal welfare, and animal consciousness.

**COMP MED 81N. Comparative Anatomy and Physiology of Mammals. 3 Units.**

Preference to freshmen. Emphasis is on a comparative approach to anatomy and physiology of a wide range of mammals, the unique adaptations of each species in terms of its anatomical, and behavioral characteristics, and how these species interact with human beings and other animals. Dissection required. Class size is limited to 16.

**COMP MED 83. Horse Medicine. 2 Units.**

The course will explore most common equine diseases, ranging from colic to lameness are reviewed using problem-oriented approach. Topics include: equine infectious diseases, care of the newborn foal, medical emergencies, and neurological disorders. The course includes a 2 hour lab on the physical and neurological examination of the horse at the Stanford Red Barn. Students will also have the opportunity to ride polo ponies and learn the basics of polo during a trip to the Stanford Polo Team Fields.

**COMP MED 84Q. Globally Emerging Zoonotic Diseases. 3 Units.**

Preference to sophomores. Infectious diseases impacting veterinary and human health around the world today. Mechanisms of disease, epidemiology, and underlying diagnostic, treatment and control principles associated with these pathogens.

**COMPMED 85N. Animal Use in Biomedical Research. 3 Units.**

Preference to freshmen. How and why animals are used in biomedical science. Addresses human and animal disease entities and how animal research has contributed to the treatment and cure of disease. Significant portions of this course are devoted to documenting the humane care and treatment of laboratory animals in research, including, but not limited to such topics as laws and ethics, animal behavior, animal modeling, and the animal activist movement. Course topics will also include: What advances have been made as a result of the use of animals in research? Who conducts animal research? Predominant animal species used in biomedical research, facts and myths; the regulation of biomedical research; housing and care of laboratory animals; why new drugs must be tested; animal use in stem cell research, cancer research and genetically engineered mice; career choices in biomedical research.

**COMPMED 87Q. Laboratory Mouse in Biomedical Research. 3 Units.**

Preference to sophomores. Focus is on the laboratory mouse, a widely used and important research model. Topics include the ethics of animal use in research; the natural history, origin and husbandry of the mouse; characteristics of key mouse strains; its anatomy and physiology; common diseases and their effects on research; coat color genetics relative to human diseases; immunodeficient mouse models; and genetic engineering of mice. The laboratory includes necropsy, handling, introduction to anesthesia and surgery, identification methods, and common research techniques using live and dead mice. Enrollment limited to 14 students.

**COMPMED 89Q. Ouch it Hurts! The Comparative Neurobiology of Pain. 3 Units.**

Preference to sophomores. Focus is on understanding the basic neurobiology of pain pathways. Topics include the physiology, pharmacology, and clinical aspects of effective pain management. In both humans and animals pain is part of the protective mechanisms that prevent further injury to the body. However, if the pain process continues unchecked, it can become extremely detrimental.

## Comput & Math Engr (CME)

**CME 10. How to learn Mathematics - New ideas from the science of learning. 1 Unit.**

This course will help provide the transition from high school to college learning and encourage the positive ideas and mindsets that shape productive learning. We will consider what learning theories have to tell us about mathematics learning, the nature of good teaching and the reasons for ongoing inequities in mathematics learning and participation. This seminar is for those who would like a more positive relationship with mathematics, and are interested in learning about ways to tackle education inequalities. Learning goals: First, it introduces students to theories of learning and in particular the learning of mathematics. Mathematics plays a key role in many students' learning identities and is often the cause of low self-esteem and anxiety. Research tells us that this is because mathematics in the US is taught in highly ineffective ways. Indeed there is a large gap between what we know works from research and what happens in most mathematics classrooms. This seminar will give participants an understanding of ways to relate positively to mathematics, to learn mathematics most productively and some of the learning barriers that often deny students the opportunity to engage with mathematics in productive ways. Second, the course will teach students about the inequalities that pervade the education system in the United States. We will examine the barriers to the participation of women and students of color and we will consider why social class and race are both strong predictors of mathematics achievement. It is hoped that students will leave the course with greater knowledge of why mathematics is important - to themselves and to the future of society. Course participants will be given the opportunity to take part in a mathematics camp, designed to change the pathways of middle school students, similar to this previous camp: <https://www.youcubed.org/solving-math-problem/> and to take part in the work of youcubed.org. if they wish.

Same as: EDUC 105

**CME 100. Vector Calculus for Engineers. 5 Units.**

Computation and visualization using MATLAB. Differential vector calculus: analytic geometry in space, functions of several variables, partial derivatives, gradient, unconstrained maxima and minima, Lagrange multipliers. Introduction to linear algebra: matrix operations, systems of algebraic equations, methods of solution and applications. Integral vector calculus: multiple integrals in Cartesian, cylindrical, and spherical coordinates, line integrals, scalar potential, surface integrals, Green's, divergence, and Stokes' theorems. Examples and applications drawn from various engineering fields. Prerequisites: 10 units of AP credit (Calc BC with 5, or Calc AB with 5 or placing out of the single variable math placement test: <https://exploreddegrees-nextyear.stanford.edu/undergraduatedegreesandprograms/#aptextt>), or Math 19-21.

Same as: ENGR 154

**CME 100A. Vector Calculus for Engineers, ACE. 6 Units.**

Students attend CME100/ENGR154 lectures with additional recitation sessions; two to four hours per week, emphasizing engineering mathematical applications and collaboration methods. Enrollment by department permission only. Prerequisite: must be enrolled in the regular CME100-01 or 02. Application at: <https://engineering.stanford.edu/students/programs/engineering-diversity-programs/additional-calculus-engineers>.

**CME 102. Ordinary Differential Equations for Engineers. 5 Units.**

Analytical and numerical methods for solving ordinary differential equations arising in engineering applications: Solution of initial and boundary value problems, series solutions, Laplace transforms, and nonlinear equations; numerical methods for solving ordinary differential equations, accuracy of numerical methods, linear stability theory, finite differences. Introduction to MATLAB programming as a basic tool kit for computations. Problems from various engineering fields. Prerequisite: 10 units of AP credit (Calc BC with 5, or Calc AB with 5 or placing out of the single variable math placement test: <https://exploreddegreesnextyear.stanford.edu/undergraduatedegreesandprograms/#aptxtt>), or Math 19-21. Recommended: CME100. Same as: ENGR 155A

**CME 102A. Ordinary Differential Equations for Engineers, ACE. 6 Units.**

Students attend CME102/ENGR155A lectures with additional recitation sessions; two to four hours per week, emphasizing engineering mathematical applications and collaboration methods. Prerequisite: students must be enrolled in the regular section (CME102) prior to submitting application at: <https://engineering.stanford.edu/students/programs/engineering-diversity-programs/additional-calculus-engineers>.

**CME 103. Introduction to Matrix Methods. 3-5 Units.**

Introduction to applied linear algebra with emphasis on applications. Vectors, norm, and angle; linear independence and orthonormal sets; applications to document analysis. Clustering and the k-means algorithm. Matrices, left and right inverses, QR factorization. Least-squares and model fitting, regularization and cross-validation. Constrained and nonlinear least-squares. Applications include time-series prediction, tomography, optimal control, and portfolio optimization. Undergraduate students should enroll for 5 units, and graduate students should enroll for 3 units. Prerequisites: MATH 51 or CME 100, and basic knowledge of computing (CS 106A is more than enough, and can be taken concurrently). EE103/CME103 and Math 104 cover complementary topics in applied linear algebra. The focus of EE103 is on a few linear algebra concepts, and many applications; the focus of Math 104 is on algorithms and concepts. Same as: EE 103

**CME 104. Linear Algebra and Partial Differential Equations for Engineers. 5 Units.**

Linear algebra: matrix operations, systems of algebraic equations, Gaussian elimination, undetermined and overdetermined systems, coupled systems of ordinary differential equations, eigensystem analysis, normal modes. Fourier series with applications, partial differential equations arising in science and engineering, analytical solutions of partial differential equations. Numerical methods for solution of partial differential equations: iterative techniques, stability and convergence, time advancement, implicit methods, von Neumann stability analysis. Examples and applications from various engineering fields. Prerequisite: CME 102/ENGR 155A. Same as: ENGR 155B

**CME 104A. Linear Algebra and Partial Differential Equations for Engineers, ACE. 6 Units.**

Students attend CME104/ENGR155B lectures with additional recitation sessions; two to four hours per week, emphasizing engineering mathematical applications and collaboration methods. Prerequisite: students must be enrolled in the regular section (CME104) prior to submitting application at: <https://engineering.stanford.edu/students/programs/engineering-diversity-programs/additional-calculus-engineers>.

**CME 106. Introduction to Probability and Statistics for Engineers. 4 Units.**

Probability: random variables, independence, and conditional probability; discrete and continuous distributions, moments, distributions of several random variables. Topics in mathematical statistics: random sampling, point estimation, confidence intervals, hypothesis testing, non-parametric tests, regression and correlation analyses; applications in engineering, industrial manufacturing, medicine, biology, and other fields. Prerequisite: CME 100/ENGR154 or MATH 51 or 52. Same as: ENGR 155C

**CME 108. Introduction to Scientific Computing. 3 Units.**

Introduction to Scientific Computing Numerical computation for mathematical, computational, physical sciences and engineering: error analysis, floating-point arithmetic, nonlinear equations, numerical solution of systems of algebraic equations, banded matrices, least squares, unconstrained optimization, polynomial interpolation, numerical differentiation and integration, numerical solution of ordinary differential equations, truncation error, numerical stability for time dependent problems and stiffness. Implementation of numerical methods in MATLAB programming assignments. Prerequisites: MATH 51, 52, 53; prior programming experience (MATLAB or other language at level of CS 106A or higher). Same as: MATH 114

**CME 151A. Interactive Data Visualization in D3. 1 Unit.**

This four-week short course introduces D3, a powerful tool for creating interactive data visualizations on the web ([d3js.org](http://d3js.org)). The class is geared toward scientists and engineers who want to better communicate their personal projects and research through visualizations on the web. The class will cover the basics of D3: inputting data, creating scales and axes, and adding transitions and interactivity, as well as some of the most used libraries: stack, cluster and force layouts. The class will be based on short workshops and a final project. A background in programming methodology at the level of CS106A is assumed. The course will make use of Javascript, experience is recommended but not necessary.

**CME 181. Projects in Applied and Computational Mathematics. 3 Units.**

Teams of students use techniques in applied and computational mathematics to tackle problems of their choosing. Students will have the opportunity to pursue open-ended projects in a variety of areas: economics, physics, political science, operations research, etc. Projects can cover (but are not limited to!) topics such as mathematical modeling of real-world phenomena (population dynamics), data-driven applications (movie recommendations) or complex systems in engineering (optimal control). Each team will be paired with a graduate student mentor working in applied and computational mathematics. Limited enrollment. Prerequisites: CME 100/102/104 or equivalents, or instructor consent. Recommended: CME 106/108 and familiarity with programming at the level of CME 192/193.

**CME 192. Introduction to MATLAB. 1 Unit.**

This short course runs for the first four weeks/eight lectures of the quarter and is offered each quarter during the academic year. It is highly recommended for students with no prior programming experience who are expected to use MATLAB in math, science, or engineering courses. It will consist of interactive lectures and application-based assignments. The goal of the short course is to make students fluent in MATLAB and to provide familiarity with its wide array of features. The course covers an introduction of basic programming concepts, data structures, and control/flow; and an introduction to scientific computing in MATLAB, scripts, functions, visualization, simulation, efficient algorithm implementation, toolboxes, and more.

**CME 193. Introduction to Scientific Python. 1 Unit.**

This short course runs for the first four weeks of the quarter. It is recommended for students who are familiar with programming at least at the level of CS106A and want to translate their programming knowledge to Python with the goal of becoming proficient in the scientific computing and data science stack. Lectures will be interactive with a focus on real world applications of scientific computing. Technologies covered include Numpy, SciPy, Pandas, Scikit-learn, and others. Topics will be chosen from Linear Algebra, Optimization, Machine Learning, and Data Science. Prior knowledge of programming will be assumed, and some familiarity with Python is helpful, but not mandatory.

**CME 195. Introduction to R. 1 Unit.**

This short course runs for four weeks beginning in the second week of the quarter and is offered in fall and spring. It is recommended for students who want to use R in statistics, science, or engineering courses and for students who want to learn the basics of R programming. The goal of the short course is to familiarize students with R's tools for scientific computing. Lectures will be interactive with a focus on learning by example, and assignments will be application-driven. No prior programming experience is needed. Topics covered include basic data structures, File I/O, graphs, control structures, etc, and some useful packages in R.

Same as: STATS 195

**CME 200. Linear Algebra with Application to Engineering Computations. 3 Units.**

Computer based solution of systems of algebraic equations obtained from engineering problems and eigen-system analysis, Gaussian elimination, effect of round-off error, operation counts, banded matrices arising from discretization of differential equations, ill-conditioned matrices, matrix theory, least square solution of unsolvable systems, solution of non-linear algebraic equations, eigenvalues and eigenvectors, similar matrices, unitary and Hermitian matrices, positive definiteness, Cayley-Hamilton theory and function of a matrix and iterative methods. Prerequisite: familiarity with computer programming, and MATH51.

Same as: ME 300A

**CME 204. Partial Differential Equations in Engineering. 3 Units.**

Geometric interpretation of partial differential equation (PDE) characteristics; solution of first order PDEs and classification of second-order PDEs; self-similarity; separation of variables as applied to parabolic, hyperbolic, and elliptic PDEs; special functions; eigenfunction expansions; the method of characteristics. If time permits, Fourier integrals and transforms, Laplace transforms. Prerequisite: CME 200/ME 300A, equivalent, or consent of instructor.

Same as: ME 300B

**CME 206. Introduction to Numerical Methods for Engineering. 3 Units.**

Numerical methods from a user's point of view. Lagrange interpolation, splines. Integration: trapezoid, Romberg, Gauss, adaptive quadrature; numerical solution of ordinary differential equations: explicit and implicit methods, multistep methods, Runge-Kutta and predictor-corrector methods, boundary value problems, eigenvalue problems; systems of differential equations, stiffness. Emphasis is on analysis of numerical methods for accuracy, stability, and convergence. Introduction to numerical solutions of partial differential equations; Von Neumann stability analysis; alternating direction implicit methods and nonlinear equations. Prerequisites: CME 200/ME 300A, CME 204/ME 300B.

Same as: ME 300C

**CME 207. Numerical Methods in Engineering and Applied Sciences. 3 Units.**

Scientific computing and numerical analysis for physical sciences and engineering. Advanced version of CME206 that, apart from CME206 material, includes nonlinear PDEs, multidimensional interpolation and integration and an extended discussion of stability for initial boundary value problems. Recommended for students who have some prior numerical analysis experience. Topics include: 1D and multi-D interpolation, numerical integration in 1D and multi-D including adaptive quadrature, numerical solutions of ordinary differential equations (ODEs) including stability, numerical solutions of 1D and multi-D linear and nonlinear partial differential equations (PDEs) including concepts of stability and accuracy. Prerequisites: linear algebra, introductory numerical analysis (CME 108 or equivalent).

Same as: AA 214A, GEOPHYS 217

**CME 211. Software Development for Scientists and Engineers. 3 Units.**

Basic usage of the Python and C/C++ programming languages are introduced and used to solve representative computational problems from various science and engineering disciplines. Software design principles including time and space complexity analysis, data structures, object-oriented design, decomposition, encapsulation, and modularity are emphasized. Usage of campus wide Linux compute resources: login, file system navigation, editing files, compiling and linking, file transfer, etc. Versioning and revision control, software build utilities, and the LaTeX typesetting software are introduced and used to help complete programming assignments. Prerequisite: introductory programming course equivalent to CS 106A or instructor consent.

Same as: EARTH 211

**CME 212. Advanced Software Development for Scientists and Engineers. 3 Units.**

Advanced topics in software development, debugging, and performance optimization are covered. The capabilities and usage of common libraries and frameworks such as BLAS, LAPACK, FFT, PETSc, and MKL/ACML are reviewed. Computer representation of integer and floating point numbers, and interoperability between C/C++ and Fortran is described. More advanced software engineering topics including: representing data in files, signals, unit and regression testing, and build automation. The use of debugging tools including static analysis, gdb, and Valgrind are introduced. An introduction to computer architecture covering processors, memory hierarchy, storage, and networking provides a foundation for understanding software performance. Profiles generated using gprof and perf are used to help guide the performance optimization process. Computational problems from various science and engineering disciplines will be used in assignments. Prerequisites: CME 200 / ME 300A and CME 211.

**CME 213. Introduction to parallel computing using MPI, openMP, and CUDA. 3 Units.**

This class will give hands on experience with programming multicore processors, graphics processing units (GPU), and parallel computers. Focus will be on the message passing interface (MPI, parallel clusters) and the compute unified device architecture (CUDA, GPU). Topics will include: network topologies, modeling communication times, collective communication operations, parallel efficiency, MPI, dense linear algebra using MPI. Symmetric multiprocessing (SMP), pthreads, openMP. CUDA, combining MPI and CUDA, dense linear algebra using CUDA, sort, reduce and scan using CUDA. Pre-requisites include: C programming language and numerical algorithms (solution of differential equations, linear algebra, Fourier transforms).

Same as: ME 339



**CME 214. Software Design in Modern Fortran for Scientists and Engineers. 3 Units.**

This course introduces software design and development in modern Fortran. Course covers the functional, object-oriented-, and parallel programming features introduced in the Fortran 95, 2003, and 2008 standards, respectively, in the context of numerical approximations to ordinary and partial differential equations; introduces object-oriented design and design schematics based on the Unified Modeling Language (UML) structure, behavior, and interaction diagrams; cover the basic use of several open-source tools for software building, testing, documentation generation, and revision control. Recommended: Familiarity with programming in Fortran 90, basic numerical analysis and linear algebra, or instructor approval.

Same as: EARTH 214

**CME 215A. Advanced Computational Fluid Dynamics. 3 Units.**

High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.

Same as: AA 215A

**CME 215B. Advanced Computational Fluid Dynamics. 3 Units.**

High resolution schemes for capturing shock waves and contact discontinuities; upwinding and artificial diffusion; LED and TVD concepts; alternative flow splittings; numerical shock structure. Discretization of Euler and Navier Stokes equations on unstructured meshes; the relationship between finite volume and finite element methods. Time discretization; explicit and implicit schemes; acceleration of steady state calculations; residual averaging; math grid preconditioning. Automatic design; inverse problems and aerodynamic shape optimization via adjoint methods. Pre- or corequisite: 214B or equivalent.

Same as: AA 215B

**CME 232. Introduction to Computational Mechanics. 3 Units.**

Provides an introductory overview of modern computational methods for problems arising primarily in mechanics of solids and is intended for students from various engineering disciplines. The course reviews the basic theory of linear solid mechanics and introduces students to the important concept of variational forms, including the principle of minimum potential energy and the principles of virtual work. Specific model problems that will be considered include deformation of bars, beams and membranes, plates, and problems in plane elasticity (plane stress, plane strain, axisymmetric elasticity). The variational forms of these problems are used as the starting point for developing the finite element method (FEM) and boundary element method (BEM) approaches providing an important connection between mechanics and computational methods.

Same as: ME 332

**CME 237. Networks, Markets, and Crowds. 3 Units.**

The course explores the underlying network structure of our social, economic, and technological worlds and uses techniques from graph theory and economics to examine the structure & evolution of information networks, social contagion, the spread of social power and popularity, and information cascades. Prerequisites: basic graph and probability theory.

Same as: MS&E 237

**CME 242. Mathematical and Computational Finance Seminar. 1 Unit.**

May be repeat for credit.

Same as: MS&E 446A, STATS 239

**CME 243. Risk Analytics and Management in Finance and Insurance. 3 Units.**

Market risk and credit risk, credit markets. Back testing, stress testing and Monte Carlo methods. Logistic regression, generalized linear models and generalized mixed models. Loan prepayment and default as competing risks. Survival and hazard functions, correlated default intensities, frailty and contagion. Risk surveillance, early warning and adaptive control methodologies. Banking and bank regulation, asset and liability management. Prerequisite: STATS 240 or equivalent.

Same as: STATS 243

**CME 244. Project Course in Mathematical and Computational Finance. 1-6 Unit.**

For graduate students in the MCF track; students will work individually or in groups on research projects.

**CME 245. Topics in Mathematical and Computational Finance. 1 Unit.**

Description: Current topics for enrolled students in the MCF program: This course is an introduction to computational, statistical, and optimizations methods and their application to financial markets. Class will consist of lectures and real-time problem solving. Topics: Python & R programming, interest rates, Black-Scholes model, financial time series, capital asset pricing model (CAPM), options, optimization methods, and machine learning algorithms. Appropriate for anyone with a technical and solid applied math background interested in honing skills in quantitative finance. Prerequisite: basic statistics and exposure to programming. Can be repeated up to three times.

**CME 249. Using Design for Effective Data Analysis. 1 Unit.**

Teams of students use techniques in applied and computational mathematics to tackle problems with real world data sets. Application of design methodology adapted for data analysis will be emphasized; leverage design thinking to come up with efficient and effective data driven insights; explore design thinking methodology in small group setting; apply design thinking to a specific data centric problem and make professional group presentation of the results. Limited enrollment. Prerequisites: CME100/102/104 or equivalents, or instructor consent. Recommended: CME106/108 and familiarity with programming at the level of CME 192/193.

**CME 249A. Statistical Arbitrage. 1 Unit.**

Course will cover trading strategies that are bottom up, market neutral, with trading driven by statistical or econometric models and strategies such as pair trading and index arbitrage. Models may focus on tendency of short term returns to revert, leads/lags among correlated instruments, volume momentum, or behavioral effects. nTopics include: (a) a taxonomy of market participants and what motivates trading, (b) methods of exploring relationships between instruments, (c) portfolio construction across a large number of instruments, (d) risks inherent in statistical arbitrage (e) nonstationarity of relationships due to changes in market regulations, fluctuations in market volatility and other factors and (f) frictions such as costs of trading and constraints. Students will team to analyze the provided data sets which cover distinct dynamic market regimes.

**CME 250. Introduction to Machine Learning. 1 Unit.**

A Short course presenting the principles behind when, why, and how to apply modern machine learning algorithms. We will discuss a framework for reasoning about when to apply various machine learning techniques, emphasizing questions of over-fitting/under-fitting, regularization, interpretability, supervised/unsupervised methods, and handling of missing data. The principles behind various algorithms—the why and how of using them—will be discussed, while some mathematical detail underlying the algorithms—including proofs—will not be discussed. Unsupervised machine learning algorithms presented will include k-means clustering, principal component analysis (PCA), and independent component analysis (ICA). Supervised machine learning algorithms presented will include support vector machines (SVM), classification and regression trees (CART), boosting, bagging, and random forests. Imputation, the lasso, and cross-validation concepts will also be covered. The R programming language will be used for examples, though students need not have prior exposure to R. Prerequisite: undergraduate-level linear algebra and statistics; basic programming experience (R/Matlab/Python).

**CME 250A. Machine Learning on Big Data. 1 Unit.**

A short course presenting the application of machine learning methods to large datasets. Topics include: brief review of the common issues of machine learning, such as, memorizing/overfitting vs learning, test/train splits, feature engineering, domain knowledge, fast/simple/dumb learners vs slow/complex/smart learners; moving your model from your laptop into a production environment using Python (scikit) or R on small data (laptop sized) at first; building math clusters using the open source H2O product to tackle Big Data, and finally to some model building on terabyte sized datasets. Prerequisites: basic knowledge of statistics, matrix algebra, and unix-like operating systems; basic file and text manipulation skills with unix tools: pipes, cut, paste, grep, awk, sed, sort, zip; programming skill at the level of CME211 or CS106A.

**CME 251. Geometric and Topological Data Analysis. 3 Units.**

Mathematical computational tools for the analysis of data with geometric content, such images, videos, 3D scans, GPS traces – as well as for other data embedded into geometric spaces. Global and local geometry descriptors allowing for various kinds of invariances. The rudiments of computational topology and persistent homology on sampled spaces. Clustering and other unsupervised techniques. Spectral methods for geometric data analysis. Non-linear dimensionality reduction. Alignment, matching, and map computation between geometric data sets. Function spaces and functional maps. Networks of data sets and joint analysis for segmentation and labeling. The emergence of abstractions or concepts from data. Prerequisites: discrete algorithms at the level of 161; linear algebra at the level of CME103.

Same as: CS 233

**CME 253. Introduction to GPU Computing and CUDA. 1 Unit.**

Covers the fundamentals of accelerating applications with GPUs (Graphics Processing Units); GPU programming with CUDA and OpenACC, debugging, thrust/CUB, profiling, optimization, debugging, and other CUDA tools. Libraries to easily accelerate compute code will be presented and deployment on larger systems will be addressed, including multi-GPU environments. Several practical examples will be detailed, including deep learning. Pre-requisite: knowledge of C/C++ at the level of CME211 or CS106b.

**CME 257. Advanced Topics in Scientific Computing with Julia. 1 Unit.**

This course will rapidly introduce students to the Julia programming language, with the goal of giving students the knowledge and experience necessary to navigate the language and package ecosystem while using Julia for their own scientific computing needs. The course will begin with learning the basics of Julia, and then introduce students to git version control and package development. Additional topics include: common packages, parallelism, interfacing with shared object libraries, and aspects of Julia's implementation (e.g. core numerical linear algebra). Lectures will be interactive, with an emphasis on collaboration and learning by example. Prerequisites: Data structures at the level of CS106B, experience with one or more scientific computing languages (e.g. Python, Matlab, or R), and some familiarity with the Unix shell. No prior experience with Julia or git is required.

**CME 258. Libraries for Numerical Linear Algebra and Optimization. 1 Unit.**

This course will cover standard libraries commonly used for numerical linear algebra and optimization, with an emphasis on giving students experience with using the libraries on real examples. The course will cover software for direct methods (BLAS, Atlas, LAPACK, Eigen), iterative methods (ARPACK, Krylov Methods), and linear/nonlinear optimization (MINOS, SNOPT). Prerequisites: at least one course in numerical linear algebra (preferably at the level of CME 200 or CME 302), and one course in numerical optimization, as well as experience with at least one compiled language such as C/C++/Fortran.

**CME 262. Imaging with Incomplete Information. 3-4 Units.**

Statistical and computational methods for inferring images from incomplete data. Bayesian inference methods are used to combine data and quantify uncertainty in the estimate. Fast linear algebra tools are used to solve problems with many pixels and many observations. Applications from several fields but mainly in earth sciences. Prerequisites: Linear algebra and probability theory.

Same as: CEE 362G

**CME 263. Introduction to Linear Dynamical Systems. 3 Units.**

Applied linear algebra and linear dynamical systems with applications to circuits, signal processing, communications, and control systems. Topics: least-squares approximations of over-determined equations, and least-norm solutions of underdetermined equations. Symmetric matrices, matrix norm, and singular-value decomposition. Eigenvalues, left and right eigenvectors, with dynamical interpretation. Matrix exponential, stability, and asymptotic behavior. Multi-input/multi-output systems, impulse and step matrices; convolution and transfer-matrix descriptions. Control, reachability, and state transfer; observability and least-squares state estimation. Prerequisites: Linear algebra and matrices as in EE103 or MATH104; ordinary differential equations and Laplace transforms as in EE102B or CME 102.

Same as: EE 263

**CME 279. Computational Biology: Structure and Organization of Biomolecules and Cells. 3 Units.**

Computational techniques for investigating and designing the three-dimensional structure and dynamics of biomolecules and cells. These computational methods play an increasingly important role in drug discovery, medicine, bioengineering, and molecular biology. Course topics include protein structure prediction, protein design, drug screening, molecular simulation, cellular-level simulation, image analysis for microscopy, and methods for solving structures from crystallography and electron microscopy data. Prerequisites: elementary programming background (CS 106A or equivalent) and an introductory course in biology or biochemistry.

Same as: BIOE 279, BIOMEDIN 279, BIOPHYS 279, CS 279

**CME 285. Computational Modeling in the Cardiovascular System. 3 Units.**

This course introduces computational modeling methods for cardiovascular blood flow and physiology. Topics in this course include analytical and computational methods for solutions of flow in deformable vessels, one-dimensional equations of blood flow, cardiovascular anatomy, lumped parameter models, vascular trees, scaling laws, biomechanics of the circulatory system, and 3D patient specific modeling with finite elements; course will provide an overview of the diagnosis and treatment of adult and congenital cardiovascular diseases and review recent research in the literature in a journal club format. Students will use SimVascular software to do clinically-oriented projects in patient specific blood flow simulations.

Same as: BIOE 285, ME 285

**CME 291. Master's Research. 1-6 Unit.**

Students require faculty sponsor. (Staff).

**CME 292. Advanced MATLAB for Scientific Computing. 1 Unit.**

Short course running first four weeks of the quarter (8 lectures) with interactive online lectures and application based assignment. Students will access the lectures and assignments on <https://suclass.stanford.edu>. Students will be introduced to advanced MATLAB features, syntaxes, and toolboxes not traditionally found in introductory courses. Material will be reinforced with in-class examples, demos, and homework assignment involving topics from scientific computing. MATLAB topics will be drawn from: advanced graphics (2D/3D plotting, graphics handles, publication quality graphics, animation), MATLAB tools (debugger, profiler), code optimization (vectorization, memory management), object-oriented programming, compiled MATLAB (MEX files and MATLAB coder), interfacing with external programs, toolboxes (optimization, parallel computing, symbolic math, PDEs). Scientific computing topics will include: numerical linear algebra, numerical optimization, ODEs, and PDEs.

**CME 298. Basic Probability and Stochastic Processes with Engineering Applications. 3 Units.**

Calculus of random variables and their distributions with applications. Review of limit theorems of probability and their application to statistical estimation and basic Monte Carlo methods. Introduction to Markov chains, random walks, Brownian motion and basic stochastic differential equations with emphasis on applications from economics, physics and engineering, such as filtering and control. Prerequisites: exposure to basic probability.

Same as: MATH 158

**CME 300. First Year Seminar Series. 1 Unit.**

Required for first-year ICME Ph.D. students; recommended for first-year ICME M.S. students. Presentations about research at Stanford by faculty and researchers from Engineering, H&S, and organizations external to Stanford. May be repeated for credit.

**CME 302. Numerical Linear Algebra. 3 Units.**

Solution of linear systems, accuracy, stability, LU, Cholesky, QR, least squares problems, singular value decomposition, eigenvalue computation, iterative methods, Krylov subspace, Lanczos and Arnoldi processes, conjugate gradient, GMRES, direct methods for sparse matrices. Prerequisites: CME 108, MATH 114, MATH 104.

**CME 303. Partial Differential Equations of Applied Mathematics. 3 Units.**

First-order partial differential equations; method of characteristics; weak solutions; elliptic, parabolic, and hyperbolic equations; Fourier transform; Fourier series; and eigenvalue problems. Prerequisite: Basic coursework in multivariable calculus and ordinary differential equations, and some prior experience with a proof-based treatment of the material as in Math 171 or Math 61CM (formerly Math 51H).

Same as: MATH 220

**CME 305. Discrete Mathematics and Algorithms. 3 Units.**

Topics: Basic Algebraic Graph Theory, Matroids and Minimum Spanning Trees, Submodularity and Maximum Flow, NP-Hardness, Approximation Algorithms, Randomized Algorithms, The Probabilistic Method, and Spectral Sparsification using Effective Resistances. Topics will be illustrated with applications from Distributed Computing, Machine Learning, and large-scale Optimization. Prerequisites: CS 261 is highly recommended, although not required.

Same as: MS&E 316

**CME 306. Numerical Solution of Partial Differential Equations. 3 Units.**

Hyperbolic partial differential equations: stability, convergence and qualitative properties; nonlinear hyperbolic equations and systems; combined solution methods from elliptic, parabolic, and hyperbolic problems. Examples include: Burger's equation, Euler equations for compressible flow, Navier-Stokes equations for incompressible flow. Prerequisites: MATH 220A or CME 302.

Same as: MATH 226

**CME 307. Optimization. 3 Units.**

Applications, theories, and algorithms for finite-dimensional linear and nonlinear optimization problems with continuous variables. Elements of convex analysis, first- and second-order optimality conditions, sensitivity and duality. Algorithms for unconstrained optimization, and linearly and nonlinearly constrained problems. Modern applications in communication, game theory, auction, and economics. Prerequisites: MATH 113, 115, or equivalent.

Same as: MS&E 311

**CME 308. Stochastic Methods in Engineering. 3 Units.**

The basic limit theorems of probability theory and their application to maximum likelihood estimation. Basic Monte Carlo methods and importance sampling. Markov chains and processes, random walks, basic ergodic theory and its application to parameter estimation. Discrete time stochastic control and Bayesian filtering. Diffusion approximations, Brownian motion and an introduction to stochastic differential equations. Examples and problems from various applied areas. Prerequisites: exposure to probability and background in analysis.

Same as: MATH 228, MS&E 324

**CME 309. Randomized Algorithms and Probabilistic Analysis. 3 Units.**

Randomness pervades the natural processes around us, from the formation of networks, to genetic recombination, to quantum physics. Randomness is also a powerful tool that can be leveraged to create algorithms and data structures which, in many cases, are more efficient and simpler than their deterministic counterparts. This course covers the key tools of probabilistic analysis, and application of these tools to understand the behaviors of random processes and algorithms. Emphasis is on theoretical foundations, though we will apply this theory broadly, discussing applications in machine learning and data analysis, networking, and systems. Topics include tail bounds, the probabilistic method, Markov chains, and martingales, with applications to analyzing random graphs, metric embeddings, random walks, and a host of powerful and elegant randomized algorithms. Prerequisites: CS 161 and STAT 116, or equivalents and instructor consent.

Same as: CS 265

**CME 321A. Mathematical Methods of Imaging. 3 Units.**

Image denoising and deblurring with optimization and partial differential equations methods. Imaging functionals based on total variation and l-1 minimization. Fast algorithms and their implementation.

Same as: MATH 221A

**CME 321B. Mathematical Methods of Imaging. 3 Units.**

Array imaging using Kirchhoff migration and beamforming, resolution theory for broad and narrow band array imaging in homogeneous media, topics in high-frequency, variable background imaging with velocity estimation, interferometric imaging methods, the role of noise and inhomogeneities, and variational problems that arise in optimizing the performance of array imaging algorithms.

Same as: MATH 221B

**CME 322. Spectral Methods in Computational Physics. 3 Units.**

Data analysis, spectra and correlations, sampling theorem, nonperiodic data, and windowing; spectral methods for numerical solution of partial differential equations; accuracy and computational cost; fast Fourier transform, Galerkin, collocation, and Tau methods; spectral and pseudospectral methods based on Fourier series and eigenfunctions of singular Sturm-Liouville problems; Chebyshev, Legendre, and Laguerre representations; convergence of eigenfunction expansions; discontinuities and Gibbs phenomenon; aliasing errors and control; efficient implementation of spectral methods; spectral methods for complicated domains; time differencing and numerical stability. Same as: ME 408

**CME 323. Distributed Algorithms and Optimization. 3 Units.**

The emergence of clusters of commodity machines with parallel processing units has brought with it a slew of new algorithms and tools. Many fields such as Machine Learning and Optimization have adapted their algorithms to handle such clusters. Topics include distributed and parallel algorithms for: Optimization, Numerical Linear Algebra, Machine Learning, Graph analysis, Streaming algorithms, and other problems that are challenging to scale on a commodity cluster. The class will focus on analyzing parallel and distributed programs, with some implementation using Apache Spark and TensorFlow.

**CME 325. Numerical Approximations of Partial Differential Equations in Theory and Practice. 1-2 Unit.**

Finite volume and finite difference methods for initial boundary value problems in multiple space dimensions. Emphasis is on formulation of boundary conditions for the continuous and the discrete problems. Analysis of numerical methods with respect to stability, accuracy, and error behavior. Techniques of treating non-rectangular domains, and effects of non-regular grids.

**CME 326. Numerical Methods for Initial Boundary Value Problems. 3 Units.**

Initial boundary value problems model many phenomena in engineering and science such as, fluid flow problems, wave propagation, fluid-structure interaction, conjugate heat transfer and financial mathematics. We discuss numerical techniques for such simulations and focus on the underlying principles and theoretical understanding. Emphasis is on stability, convergence and efficiency for methods applied to hyperbolic and parabolic initial boundary value problems.

**CME 327. Numerical Methods for Stiff Problems. 3 Units.**

Focus is on analysis of numerical techniques for stiff ordinary differential equations, including those resulting from spatial discretization of partial differential equations. Topics include stiffness, convergence, stability, adaptive time stepping, implicit time-stepping methods (SDIRK, Rosenbrock), linear and nonlinear system solvers (Fixed Point, Newton, Multigrid, Krylov subspace methods) and preconditioning. Pre-requisites: CME200/ME300A or equivalent; or consent of instructor.

**CME 328. Advanced Topics in Partial Differential Equations. 3 Units.**

Contents change each time and is taught as a topics course, most likely by a faculty member visiting from another institution. May be repeated for credit. Topic in 2012-13: numerical solution of time-dependent partial differential equations is a fundamental tool for modeling and prediction in many areas of science and engineering. In this course we explore the stability, accuracy, efficiency, and appropriateness of specialized temporal integration strategies for different classes of partial differential equations including stiff problems and fully implicit methods, operator splitting and semi-implicit methods, extrapolation methods, multirate time integration, multi-physics problems, symplectic integration, and temporal parallelism. Prerequisites: recommended CME303 and 306 or with instructor's consent.

**CME 330. Applied Mathematics in the Chemical and Biological Sciences. 3 Units.**

Mathematical solution methods via applied problems including chemical reaction sequences, mass and heat transfer in chemical reactors, quantum mechanics, fluid mechanics of reacting systems, and chromatography. Topics include generalized vector space theory, linear operator theory with eigenvalue methods, phase plane methods, perturbation theory (regular and singular), solution of parabolic and elliptic partial differential equations, and transform methods (Laplace and Fourier). Prerequisites: CME 102/ENGR 155A and CME 104/ENGR 155B, or equivalents. Same as: CHEMENG 300

**CME 334. Advanced Methods in Numerical Optimization. 3 Units.**

Topics include interior-point methods, relaxation methods for nonlinear discrete optimization, sequential quadratic programming methods, optimal control and decomposition methods. Topic chosen in first class; different topics for individuals or groups possible. Individual or team projects. May be repeated for credit. Same as: MS&E 312

**CME 335. Advanced Topics in Numerical Linear Algebra. 3 Units.**

Possible topics: Classical and modern (e.g., focused on provable communication minimization) algorithms for executing dense and sparse-direct factorizations in high-performance, distributed-memory environments; distributed dense eigensolvers, dense and sparse-direct triangular solvers, and sparse matrix-vector multiplication; unified analysis of distributed Interior Point Methods for symmetric cones via algorithms for distributing Jordan algebras over products of second-order cones and Hermitian matrices. May be repeated for credit. Prerequisites: CME 302 and CME 304 (or equivalents).

**CME 336. Linear and Conic Optimization with Applications. 3 Units.**

Linear, semidefinite, conic, and convex nonlinear optimization problems as generalizations of classical linear programming. Algorithms include the interior-point, barrier function, and cutting plane methods. Related convex analysis, including the separating hyperplane theorem, Farkas lemma, dual cones, optimality conditions, and conic inequalities. Complexity and/or computation efficiency analysis. Applications to combinatorial optimization, sensor network localization, support vector machine, and graph realization. Prerequisite: MS&E 211 or equivalent. Same as: MS&E 314

**CME 338. Large-Scale Numerical Optimization. 3 Units.**

The main algorithms and software for constrained optimization emphasizing the sparse-matrix methods needed for their implementation. Iterative methods for linear equations and least squares. The simplex method. Basis factorization and updates. Interior methods. The reduced-gradient method, augmented Lagrangian methods, and SQP methods. Prerequisites: Basic numerical linear algebra, including LU, QR, and SVD factorizations, and an interest in MATLAB, sparse-matrix methods, and gradient-based algorithms for constrained optimization. Recommended: MS&E 310, 311, 312, 314, or 315; CME 108, 200, 302, 304, 334, or 335. Same as: MS&E 318

**CME 342. Parallel Methods in Numerical Analysis. 3 Units.**

Emphasis is on techniques for obtaining maximum parallelism in numerical algorithms, especially those occurring when solving matrix problems, partial differential equations, and the subsequent mapping onto the computer. Implementation issues on parallel computers. Topics: parallel architecture, programming models (MPI, GPU Computing with CUDA & quick review), matrix computations, FFT, fast multiple methods, domain decomposition, graph partitioning, discrete algorithms. Prerequisites: 302 or 200 (ME 300A), 213 or equivalent, or consent of instructor. Recommended: differential equations and knowledge of a high-level programming language such as C or C++ (F90/95 also allowable).

**CME 345. Model Reduction. 3 Units.**

Model reduction is an indispensable tool for computational-based design and optimization, statistical analysis, embedded computing, and real-time optimal control. This course presents the basic mathematical theory for projection-based model reduction. Topics include: notions of linear dynamical systems and projection; projection-based model reduction; error analysis; proper orthogonal decomposition; Hankel operator and balancing of a linear dynamical system; balanced truncation method; modal truncation and other reduction methods for linear oscillators; model reduction via moment matching methods based on Krylov subspaces; introduction to model reduction of parametric systems and notions of nonlinear model reduction. Course material is complemented by a balanced set of theoretical, algorithmic and Matlab computer programming assignments. Prerequisites: CME 200 or equivalent, CME 263 or equivalent and basic numerical methods for ODEs.

**CME 356. Engineering Functional Analysis and Finite Elements. 3 Units.**

Concepts in functional analysis to understand models and methods used in simulation and design. Topology, measure, and integration theory to introduce Sobolev spaces. Convergence analysis of finite elements for the generalized Poisson problem. Extensions to convection-diffusion-reaction equations and elasticity. Upwinding. Mixed methods and LBB conditions. Analysis of nonlinear and evolution problems. Prerequisites: 335A,B, CME 200, CME 204, or consent of instructor. Recommended: 333, MATH 171.

Same as: ME 412

**CME 358. Finite Element Method for Fluid Mechanics. 3 Units.**

Mathematical theory of the finite element method for incompressible flows; related computational algorithms and implementation details. Poisson equation; finite element method for simple elliptic problems; notions of mathematical analysis of non-coercive partial differential equations; the inf-sup or Babushka-Brezzi condition and its applications to the Stokes and Darcy problems; presentation of stable mixed finite element methods and corresponding algebraic solvers; stabilization approaches in the context of advection-diffusion equation; numerical solution of the incompressible Navier-Stokes equations by finite element method. Theoretical, computational, and MATLAB computer programming assignments. Prerequisites: foundation in multivariate calculus and ME 335A or equivalent.

**CME 362. An Introduction to Compressed Sensing. 3 Units.**

Compressed sensing is a new data acquisition theory asserting that one can design nonadaptive sampling techniques that condense the information in a compressible signal into a small amount of data. This revelation may change the way engineers think about signal acquisition. Course covers fundamental theoretical ideas, numerical methods in large-scale convex optimization, hardware implementations, connections with statistical estimation in high dimensions, and extensions such as recovery of data matrices from few entries (famous Netflix Prize).

Same as: STATS 330

**CME 364A. Convex Optimization I. 3 Units.**

Convex sets, functions, and optimization problems. The basics of convex analysis and theory of convex programming: optimality conditions, duality theory, theorems of alternative, and applications. Least-squares, linear and quadratic programs, semidefinite programming, and geometric programming. Numerical algorithms for smooth and equality constrained problems; interior-point methods for inequality constrained problems. Applications to signal processing, communications, control, analog and digital circuit design, computational geometry, statistics, machine learning, and mechanical engineering. Prerequisite: linear algebra such as EE263, basic probability.

Same as: CS 334A, EE 364A

**CME 364B. Convex Optimization II. 3 Units.**

Continuation of 364A. Subgradient, cutting-plane, and ellipsoid methods. Decentralized convex optimization via primal and dual decomposition. Monotone operators and proximal methods; alternating direction method of multipliers. Exploiting problem structure in implementation. Convex relaxations of hard problems. Global optimization via branch and bound. Robust and stochastic optimization. Applications in areas such as control, circuit design, signal processing, and communications. Course requirements include project. Prerequisite: 364A. Same as: EE 364B

**CME 371. Computational Biology in Four Dimensions. 3 Units.**

Cutting-edge research on computational techniques for investigating and designing the three-dimensional structure and dynamics of biomolecules, cells, and everything in between. These techniques, which draw on approaches ranging from physics-based simulation to machine learning, play an increasingly important role in drug discovery, medicine, bioengineering, and molecular biology. Course is devoted primarily to reading, presentation, discussion, and critique of papers describing important recent research developments. Prerequisite: CS 106A or equivalent, and an introductory course in biology or biochemistry. Recommended: some experience in mathematical modeling (does not need to be a formal course).

Same as: BIOMEDIN 371, BIOPHYS 371, CS 371

**CME 372. Applied Fourier Analysis and Elements of Modern Signal Processing. 3 Units.**

Introduction to the mathematics of the Fourier transform and how it arises in a number of imaging problems. Mathematical topics include the Fourier transform, the Plancherel theorem, Fourier series, the Shannon sampling theorem, the discrete Fourier transform, and the spectral representation of stationary stochastic processes. Computational topics include fast Fourier transforms (FFT) and nonuniform FFTs. Applications include Fourier imaging (the theory of diffraction, computed tomography, and magnetic resonance imaging) and the theory of compressive sensing.

Same as: MATH 262

**CME 375. Advanced Topics in Convex Optimization. 3 Units.**

Modern developments in convex optimization: semidefinite programming; novel and efficient first-order algorithms for smooth and nonsmooth convex optimization. Emphasis on numerical methods suitable for large scale problems arising in science and engineering. Prerequisites: convex optimization (EE 364), linear algebra (Math 104), numerical linear algebra (CME 302); background in probability, statistics, real analysis and numerical optimization.

Same as: MATH 301

**CME 390. Curricular Practical Training. 1 Unit.**

Educational opportunities in high technology research and development labs in applied mathematics. Qualified ICME students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. May be repeated three times for credit.

**CME 399. Special Research Topics in Computational and Mathematical Engineering. 1-15 Unit.**

Graduate-level research work not related to report, thesis, or dissertation. May be repeated for credit.

**CME 400. Ph.D. Research. 1-15 Unit.**

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**CME 444. Computational Consulting. 1-3 Unit.**

Advice by graduate students under supervision of ICME faculty. Weekly briefings with faculty adviser and associated faculty to discuss ongoing consultancy projects and evaluate solutions. May be repeated for credit.

**CME 500. Departmental Seminar. 1 Unit.**

Weekly research lectures by doctoral students, experts from academia, national laboratories, and industry. May be repeated for credit.

**CME 510. Linear Algebra and Optimization Seminar. 1 Unit.**

Recent developments in numerical linear algebra and numerical optimization. Guest speakers from other institutions and local industry. Goal is to bring together scientists from different theoretical and application fields to solve complex scientific computing problems. May be repeated for credit.

**CME 520. Topics in Simulation of Human Physiology & Anatomical Systems. 1 Unit.**

Biweekly interdisciplinary lecture series on the development of computational tools for modeling and simulation of human physiological and anatomical systems. Lectures by instructors and guest speakers on topics such as surgical simulation, anatomical & surgical Modeling, neurological Systems, and biomedical models of human movement. Group discussions, team based assignments, and project work. Prerequisite: Medical students, residents or fellows from school of medicine, and computationally oriented students with a strong interest to explore computational and mathematical methods related to the health sciences.

Same as: SURG 253

**CME 801. TGR Project. 0 Units.****CME 802. TGR Dissertation. 0 Units.**

## Computer Science (CS)

**CS 101. Introduction to Computing Principles. 3-5 Units.**

Introduces the essential ideas of computing: data representation, algorithms, programming "code", computer hardware, networking, security, and social issues. Students learn how computers work and what they can do through hands-on exercises. In particular, students will see the capabilities and weaknesses of computer systems so they are not mysterious or intimidating. Course features many small programming exercises, although no prior programming experience is assumed or required. CS101 is not a complete programming course such as CS106A. CS101 is effectively an alternative to CS105. A laptop computer is recommended for the in-class exercises.

**CS 102. Big Data: Tools and Techniques, Discoveries and Pitfalls. 3-4 Units.**

Aimed at non-CS undergraduate and graduate students who want to learn the basics of big data tools and techniques and apply that knowledge in their areas of study. Many of the world's biggest discoveries and decisions in science, technology, business, medicine, politics, and society as a whole, are now being made on the basis of analyzing massive data sets. At the same time, it is surprisingly easy to make errors or come to false conclusions from data analysis alone. This course provides a broad and practical introduction to big data: data analysis techniques including databases, data mining, and machine learning; data analysis tools including spreadsheets, relational databases and SQL, Python, and R; data visualization techniques and tools; pitfalls in data collection and analysis; historical context, privacy, and other ethical issues. Tools and techniques are hands-on but at a cursory level, providing a basis for future exploration and application. Prerequisites: comfort with basic logic and mathematical concepts, along with high school AP computer science, CS106A, or other equivalent programming experience.

**CS 103. Mathematical Foundations of Computing. 3-5 Units.**

Mathematical foundations required for computer science, including propositional predicate logic, induction, sets, functions, and relations. Formal language theory, including regular expressions, grammars, finite automata, Turing machines, and NP-completeness. Mathematical rigor, proof techniques, and applications. Prerequisite: CS106B or equivalent. CS106B may be taken concurrently with CS103.

**CS 103A. Mathematical Problem-solving Strategies. 1 Unit.**

Problem solving strategies and techniques in discrete mathematics and computer science. Additional problem solving practice for CS103. In-class participation required. Prerequisite: consent of instructor. Co-requisite: CS103.

**CS 105. Introduction to Computers. 3-5 Units.**

For non-technical majors. What computers are and how they work. Practical experience in programming. Construction of computer programs and basic design techniques. A survey of Internet technology and the basics of computer hardware. Students in technical fields and students looking to acquire programming skills should take 106A or 106X. Students with prior computer science experience at the level of 106 or above require consent of instructor. Prerequisite: minimal math skills.

**CS 106A. Programming Methodology. 3-5 Units.**

Introduction to the engineering of computer applications emphasizing modern software engineering principles: object-oriented design, decomposition, encapsulation, abstraction, and testing. Emphasis is on good programming style and the built-in facilities of respective languages. No prior programming experience required. Summer quarter enrollment is limited. Alternative versions of CS106A are available which cover most of the same material but in different programming languages: Java [Fall, Win, Spr, or Sum qtr enroll in CS106A Section 1] Javascript [Fall qtr enroll in CS 106A Section 2] Python [Winter or Spring qtr enroll in CS 106A Section 3]. Same as: ENGR 70A

**CS 106AJ. Programming Methodology in JavaScript. 3-5 Units.**

Introduction to the engineering of computer applications emphasizing modern software engineering principles: object-oriented design, decomposition, encapsulation, abstraction, and testing. Uses the JavaScript programming language. Emphasis is on good programming style and the built-in facilities of the JavaScript language. No prior programming experience required. This course covers most of the same material as CS106A Section 1 in Java and CS 106A Section 3 in Python, but this course uses the JavaScript programming language. To enroll in this class, enroll in CS 106A Section 2 for Fall Qtr. May be taken for 3 units by grad students.

**CS 106AP. Programming Methodology in Python. 3-5 Units.**

Introduction to the engineering of computer applications in Python, emphasizing modern software engineering principles: decomposition, abstraction, and testing. Emphasis is on good programming style. This course covers most of the same material as CS106A Section 1 in Java and CS 106A Section 2 in JavaScript, but this course uses the Python programming language which is popular for general engineering and web development. Required readings will all be available for free on the web. Students are encouraged to bring a laptop to lecture to do the live exercises which are integrated with lecture. No prior programming experience required. To enroll in this class, enroll in CS 106A Section 3. May be taken for 3 units by grad students. Enrollment is limited for winter quarter 2017-18 but from spring quarter 2017-18 enrollment will be unlimited.

**CS 106B. Programming Abstractions. 3-5 Units.**

Abstraction and its relation to programming. Software engineering principles of data abstraction and modularity. Object-oriented programming, fundamental data structures (such as stacks, queues, sets) and data-directed design. Recursion and recursive data structures (linked lists, trees, graphs). Introduction to time and space complexity analysis. Uses the programming language C++ covering its basic facilities. Prerequisite: 106A or equivalent. Summer quarter enrollment is limited.

Same as: ENGR 70B

**CS 106E. Practical Exploration of Computing. 3-4 Units.**

A follow up class to CS106A for non-majors which will both provide practical web programming skills and cover essential computing topics including computer security and privacy. Additional topics will include digital representation of images and music, an exploration of how the Internet works, and a look at the internals of the computer. Students taking the course for 4 units will be required to carry out supplementary programming assignments in addition to the course's regular assignments. Prerequisite: 106A or equivalent.

**CS 106L. Standard C++ Programming Laboratory. 1 Unit.**

Supplemental lab to 106B and 106X. Additional features of standard C++ programming practice. Possible topics include advanced C++ language features, standard libraries, STL containers and algorithms, object memory management, operator overloading, and inheritance. Prerequisite: consent of instructor. Corequisite: 106B or 106X.

**CS 106S. Programming Abstractions and Social Good. 1 Unit.**

Supplemental lab to CS 106B and CS 106X. Students will apply fundamental computer science concepts learned in 106B/X to problems in the social good space (such as health, government, education, and environment). Course consists of in-class activities designed by local tech companies and nonprofits. Corequisite: 106B or 106X.

**CS 106X. Programming Abstractions (Accelerated). 3-5 Units.**

Intensive version of 106B for students with a strong programming background interested in a rigorous treatment of the topics at an accelerated pace. Additional advanced material and more challenging projects. Winter quarter assignments will be based in CS department research. Prerequisite: excellence in 106A or equivalent, or consent of instructor. Winter quarter enrollment limited to 30. Same as: ENGR 70X

**CS 107. Computer Organization and Systems. 3-5 Units.**

Introduction to the fundamental concepts of computer systems. Explores how computer systems execute programs and manipulate data, working from the C programming language down to the microprocessor. Topics covered include: the C programming language, data representation, machine-level code, computer arithmetic, elements of code compilation, memory organization and management, and performance evaluation and optimization. Prerequisites: 106B or X, or consent of instructor.

**CS 107E. Computer Systems from the Ground Up. 3-5 Units.**

Introduction to the fundamental concepts of computer systems through bare metal programming on the Raspberry Pi. Explores how five concepts come together in computer systems: hardware, architecture, assembly code, the C language, and software development tools. Students do all programming with a Raspberry Pi kit and several add-ons (LEDs, buttons). Topics covered include: the C programming language, data representation, machine-level code, computer arithmetic, compilation, memory organization and management, debugging, hardware, and I/O. Prerequisite: 106B or X, and consent of instructor. There is a \$50 required lab fee.

**CS 108. Object-Oriented Systems Design. 3-4 Units.**

Software design and construction in the context of large OOP libraries. Taught in Java. Topics: OOP design, design patterns, testing, graphical user interface (GUI) OOP libraries, software engineering strategies, approaches to programming in teams. Prerequisite: 107.

**CS 109. Introduction to Probability for Computer Scientists. 3-5 Units.**

Topics include: counting and combinatorics, random variables, conditional probability, independence, distributions, expectation, point estimation, and limit theorems. Applications of probability in computer science including machine learning and the use of probability in the analysis of algorithms. Prerequisites: 103, 106B or X, multivariate calculus at the level of MATH 51 or CME 100 or equivalent.

**CS 109L. Statistical Computing with R Laboratory. 1 Unit.**

Supplemental lab to CS109. Introduces the R programming language for statistical computing. Topics include basic facilities of R including mathematical, graphical, and probability functions, building simulations, introductory data fitting and machine learning. Provides exposure to the functional programming paradigm. Corequisite: CS109.

**CS 110. Principles of Computer Systems. 3-5 Units.**

Principles and practice of engineering of computer software and hardware systems. Topics include: techniques for controlling complexity; strong modularity using client-server design, virtual memory, and threads; networks; atomicity and coordination of parallel activities; security, and encryption; and performance optimizations. Prerequisite: 107.

**CS 124. From Languages to Information. 3-4 Units.**

Extracting meaning, information, and structure from human language text, speech, web pages, social networks. Methods include: string algorithms, edit distance, language modeling, the noisy channel, naive Bayes, inverted indices, collaborative filtering, PageRank. Applications such as question answering, sentiment analysis, information retrieval, text classification, social network models, chatbots, sequence alignment, spell checking, speech processing, recommender systems. Prerequisites: CS103, CS107, CS109. Same as: LINGUIST 180, LINGUIST 280

**CS 131. Computer Vision: Foundations and Applications. 3-4 Units.**

Robots that can navigate space and perform duties, search engines that can index billions of images and videos, algorithms that can diagnose medical images for diseases, or smart cars that can see and drive safely: Lying in the heart of these modern AI applications are computer vision technologies that can perceive, understand and reconstruct the complex visual world. This course is designed for students who are interested in learning about the fundamental principles and important applications of computer vision. Course will introduce a number of fundamental concepts in computer vision and expose students to a number of real-world applications, plus guide students through a series of projects such that they will get to implement cutting-edge computer vision algorithms. Prerequisites: Students should be familiar with Python (i.e. have programmed in Python before) and Linux; plus Calculus & Linear Algebra.

**CS 140. Operating Systems and Systems Programming. 3-4 Units.**

Operating systems design and implementation. Basic structure; synchronization and communication mechanisms; implementation of processes, process management, scheduling, and protection; memory organization and management, including virtual memory; I/O device management, secondary storage, and file systems. Prerequisite: CS 110.

**CS 140E. Operating systems design and implementation. 3-4 Units.**

This is an experimental course offering. Students will implement a simple, clean operating system (virtual memory, processes, file system) on a raspberry pi computer and use the result to run a variety of devices. Enrollment is limited, and students should expect the course to have rough edges since it is the first offering.

**CS 142. Web Applications. 3 Units.**

Concepts and techniques used in constructing interactive web applications. Browser-side web facilities such as HTML, cascading stylesheets, the document object model, and JavaScript frameworks and Server-side technologies such as server-side JavaScript, sessions, and object-oriented databases. Issues in web security and application scalability. New models of web application deployment. Prerequisites: CS 107 and CS 108.

**CS 143. Compilers. 3-4 Units.**

Principles and practices for design and implementation of compilers and interpreters. Topics: lexical analysis; parsing theory; symbol tables; type systems; scope; semantic analysis; intermediate representations; runtime environments; code generation; and basic program analysis and optimization. Students construct a compiler for a simple object-oriented language during course programming projects. Prerequisites: 103 or 103B, and 107.

**CS 144. Introduction to Computer Networking. 3-4 Units.**

Principles and practice. Structure and components of computer networks, packet switching, layered architectures. Applications: web/http, voice-over-IP, p2p file sharing and socket programming. Reliable transport: TCP/IP, reliable transfer, flow control, and congestion control. The network layer: names and addresses, routing. Local area networks: ethernet and switches. Wireless networks and network security. Prerequisite: CS 110.

**CS 145. Introduction to Databases. 3-4 Units.**

The course covers database design and the use of database management systems for applications. It includes extensive coverage of the relational model, relational algebra, and SQL. The course includes database design and relational design principles based on dependencies and normal forms. Many additional key database topics from the design and application-building perspective are also covered: indexes, views, transactions, authorization, integrity constraints, triggers, on-line analytical processing (OLAP), JSON, and emerging NoSQL systems. Class time will include guest speakers from industry and additional advanced topics as time and class interest permits. Prerequisites: 103 and 107 (or equivalent).

**CS 146. Introduction to Game Design and Development. 3 Units.**

This project-based course provides an introduction to game design covering topics like 2D/3D Art, Audio, User Interfaces, Production, Narrative Design, Marketing, and Publishing. Speakers from the profession will provide relevant context during a weekly seminar. Weekly assignments include in-depth materials and require students to independently create small video games. Classroom meetings will be used to foster student project discussions, and deepen understanding of material. The course culminates with students forming project teams to create a final video game. Assignments will be completed within the Unity game development engine; prior Unity experience is not required. Given class size limitations, an online survey will be distributed before class starts and students will be selected so to achieve a diverse class composition. Prerequisite: CS 106A or equivalent programming experience.

**CS 147. Introduction to Human-Computer Interaction Design. 3-5 Units.**

Introduces fundamental methods and principles for designing, implementing, and evaluating user interfaces. Topics: user-centered design, rapid prototyping, experimentation, direct manipulation, cognitive principles, visual design, social software, software tools. Learn by doing: work with a team on a quarter-long design project, supported by lectures, readings, and studios. Prerequisite: 106B or X or equivalent programming experience. Recommended that CS Majors have also taken one of 142, 193P, or 193A.

**CS 148. Introduction to Computer Graphics and Imaging. 3-4 Units.**

Introductory prerequisite course in the computer graphics sequence introducing students to the technical concepts behind creating synthetic computer generated images. Focuses on using OpenGL to create visual imagery, as well as an understanding of the underlying mathematical concepts including triangles, normals, interpolation, texture mapping, bump mapping, etc. Course will cover fundamental understanding of light and color, as well as how it impacts computer displays and printers. Class will discuss more thoroughly how light interacts with the environment, constructing engineering models such as the BRDF, plus various simplifications into more basic lighting and shading models. Also covers ray tracing technology for creating virtual images, while drawing parallels between ray tracers and real world cameras to illustrate various concepts. Anti-aliasing and acceleration structures are also discussed. The final class mini-project consists of building out a ray tracer to create visually compelling images. Starter codes and code bits will be provided to aid in development, but this class focuses on what you can do with the code as opposed to what the code itself looks like. Therefore grading is weighted toward in person "demos" of the code in action - creativity and the production of impressive visual imagery are highly encouraged. Prerequisites: CS 107, MATH 51.

**CS 149. Parallel Computing. 3-4 Units.**

This course is an introduction to parallelism and parallel programming. Most new computer architectures are parallel; programming these machines requires knowledge of the basic issues of and techniques for writing parallel software. Topics: varieties of parallelism in current hardware (e.g., fast networks, multicore, accelerators such as GPUs, vector instruction sets), importance of locality, implicit vs. explicit parallelism, shared vs. non-shared memory, synchronization mechanisms (locking, atomicity, transactions, barriers), and parallel programming models (threads, data parallel/streaming, MapReduce, Apache Spark, SPMD, message passing, SIMT, transactions, and nested parallelism). Significant parallel programming assignments will be given as homework. The course is open to students who have completed the introductory CS course sequence through 110 and have taken CS 143.

**CS 154. Introduction to Automata and Complexity Theory. 3-4 Units.**

This course provides a mathematical introduction to the following questions: What is computation? Given a computational model, what problems can we hope to solve in principle with this model? Besides those solvable in principle, what problems can we hope to efficiently solve? In many cases we can give completely rigorous answers; in other cases, these questions have become major open problems in computer science and mathematics. By the end of this course, students will be able to classify computational problems in terms of their computational complexity (Is the problem regular? Not regular? Decidable? Recognizable? Neither? Solvable in P? NP-complete? PSPACE-complete?, etc.). Students will gain a deeper appreciation for some of the fundamental issues in computing that are independent of trends of technology, such as the Church-Turing Thesis and the P versus NP problem. Prerequisites: CS 103 or 103B.

**CS 155. Computer and Network Security. 3 Units.**

For seniors and first-year graduate students. Principles of computer systems security. Attack techniques and how to defend against them. Topics include: network attacks and defenses, operating system security, application security (web, apps, databases), malware, privacy, and security for mobile devices. Course projects focus on building reliable code. Prerequisite: 110. Recommended: basic Unix.

**CS 157. Logic and Automated Reasoning. 3 Units.**

An elementary exposition from a computational point of view of propositional and predicate logic, axiomatic theories, and theories with equality and induction. Interpretations, models, validity, proof, strategies, and applications. Automated deduction: polarity, skolemization, unification, resolution, equality. Prerequisite: 103 or 103B.

**CS 161. Design and Analysis of Algorithms. 3-5 Units.**

Worst and average case analysis. Recurrences and asymptotics. Efficient algorithms for sorting, searching, and selection. Data structures: binary search trees, heaps, hash tables. Algorithm design techniques: divide-and-conquer, dynamic programming, greedy algorithms, amortized analysis, randomization. Algorithms for fundamental graph problems: minimum-cost spanning tree, connected components, topological sort, and shortest paths. Possible additional topics: network flow, string searching. Prerequisite: 103 or 103B; 109 or STATS 116.

**CS 166. Data Structures. 3-4 Units.**

Techniques in the design, analysis, and implementation of data structures. Isometries between data structures (including red/black trees and 2-3-4 trees), amortized analysis (including Fibonacci heaps and splay trees), and randomization (including count-min sketches and dynamic perfect hash tables). Data structures for integers and strings (including van Emde Boas trees and suffix trees). Possible additional topics include functional data structures, concurrent data structures, and spatial data structures. Prerequisites: CS107 and CS161.



**CS 168. The Modern Algorithmic Toolbox. 3-4 Units.**

This course will provide a rigorous and hands-on introduction to the central ideas and algorithms that constitute the core of the modern algorithms toolkit. Emphasis will be on understanding the high-level theoretical intuitions and principles underlying the algorithms we discuss, as well as developing a concrete understanding of when and how to implement and apply the algorithms. The course will be structured as a sequence of one-week investigations; each week will introduce one algorithmic idea, and discuss the motivation, theoretical underpinning, and practical applications of that algorithmic idea. Each topic will be accompanied by a mini-project in which students will be guided through a practical application of the ideas of the week. Topics include hashing, dimension reduction and LSH, boosting, linear programming, gradient descent, sampling and estimation, and an introduction to spectral techniques. Prerequisites: CS107 and CS161, or permission from the instructor.

**CS 170. Stanford Laptop Orchestra: Composition, Coding, and Performance. 1-5 Unit.**

Classroom instantiation of the Stanford Laptop Orchestra (SLOrk) which includes public performances. An ensemble of more than 20 humans, laptops, controllers, and special speaker arrays designed to provide each computer-mediated instrument with its sonic identity and presence. Topics and activities include issues of composing for laptop orchestras, instrument design, sound synthesis, programming, and live performance. May be repeated four times for credit. Space is limited; see <https://ccrma.stanford.edu/courses/128> for information about the application and enrollment process. May be repeat for credit. Same as: MUSIC 128

**CS 173. A Computational Tour of the Human Genome. 3 Units.**

(Only one of 173 or 273A counts toward any CS degree program.) Introduction to computational biology through an informatic exploration of the human genome. Topics include: genome sequencing; functional landscape of the human genome (genes, gene regulation, repeats, RNA genes, epigenetics); genome evolution (comparative genomics, ultraconservation, co-option). Additional topics may include population genetics, personalized genomics, and ancient DNA. Course includes primers on molecular biology, the UCSC Genome Browser, and text processing languages. Guest lectures on current genomic research topics. Class will be similar in spirit to CS273A, which will not be offered this year. Prerequisites: CS107 or equivalent background in programming.

**CS 181. Computers, Ethics, and Public Policy. 4 Units.**

Primarily for majors entering computer-related fields. Ethical and social issues related to the development and use of computer technology. Ethical theory, and social, political, and legal considerations. Scenarios in problem areas: privacy, reliability and risks of complex systems, and responsibility of professionals for applications and consequences of their work. Prerequisite: 106B or X. To take this course, students need permission of instructor and may need to complete an assignment due at the first day of class.

**CS 181W. Computers, Ethics, and Public Policy. 4 Units.**

Writing-intensive version of CS181. Satisfies the WIM requirement for Computer Science, Engineering Physics, STS, and Math/Comp Sci undergraduates. To take this course, students need permission of instructor and may need to complete an assignment due at the first day of class.

Same as: WIM

**CS 183E. Effective Leadership in High-Tech. 1 Unit.**

You will undoubtedly leave Stanford with the technical skills to excel in your first few jobs. But non-technical skills are just as critical to making a difference. This seminar is taught by two industry veterans in engineering leadership and product management. In a small group setting, we will explore how you can be a great individual contributor (communicating with clarity, getting traction for your ideas, resolving conflict, and delivering your best work) and how you can transition into leadership roles (finding leadership opportunities, creating a great team culture, hiring and onboarding new team members). We will end by turning back to your career (picking your first job and negotiating your offer, managing your career changes, building a great network, and succeeding with mentors). Prerequisites: Preference given to seniors and co-terms in Computer Science and related majors. Enrollment limited and application required for admittance.

**CS 183F. Startup School: The First 100 Days. 2 Units.**

Starting a company is hard. Starting a company and building it into a successful, lasting business is even more so. This course aims to teach the fundamentals of starting a startup through a 10-week interactive class, with the goal of decreasing the barrier to entry for new entrepreneurs. Instruction will focus primarily on the first 100 days, from ideation to execution, covering the minutiae of company structure, product design, core metric evaluation, ethics and so on. Lectures will be taught by experts in the startup space, accompanied by small group learning sessions with active entrepreneurs.

**CS 190. Software Design Studio. 3 Units.**

This course will teach the art of software design: how to decompose large complex systems into classes that can be implemented and maintained easily. Topics include information hiding, thick classes, API design, managing complexity, and how to write in-code documentation. The class will involve significant system software implementation and will use an iterative approach consisting of implementation, review, and revision. The course will be taught in a studio format with in-class discussions and code reviews in addition to lectures. Prerequisites: CS 140. Application and consent of instructor required. Apply at: <https://web.stanford.edu/class/cs190>.

**CS 191. Senior Project. 1-6 Unit.**

Restricted to Computer Science and Computer Systems Engineering students. Group or individual projects under faculty direction. Register using instructor's section number. A project can be either a significant software application or publishable research. Software application projects include substantial programming and modern user-interface technologies and are comparable in scale to shareware programs or commercial applications. Research projects may result in a paper publishable in an academic journal or presentable at a conference. Required public presentation of final application or research results. Prerequisite: Completion of at least 135 units.

**CS 191W. Writing Intensive Senior Project. 3-6 Units.**

Restricted to Computer Science and Computer Systems Engineering students. Writing-intensive version of CS191. Register using the section number of an Academic Council member. Prerequisite: Completion of at least 135 units.

Same as: WIM

**CS 192. Programming Service Project. 1-4 Unit.**

Restricted to Computer Science students. Appropriate academic credit (without financial support) is given for volunteer computer programming work of public benefit and educational value.

**CS 193A. Android Programming. 3 Units.**

Introduction to building applications for Android platform. Examines key concepts of Android programming: tool chain, application life-cycle, views, controls, intents, designing mobile UIs, networking, threading, and more. Features weekly lectures and a series of small programming projects. Phone not required, but a phone makes the projects more engaging. Prerequisites: 106B or Java experience at 106B level. Enrollment limited and application required.

**CS 193C. Client-Side Internet Technologies. 3 Units.**

Client-side technologies used to create web sites such as Google maps or Gmail. Includes HTML5, CSS, JavaScript, the Document Object Model (DOM), and Ajax. Prerequisite: programming experience at the level of CS106A.

**CS 193P. iOS Application Development. 3 Units.**

Tools and APIs required to build applications for the iPhone and iPad platforms using the iOS SDK. User interface design for mobile devices and unique user interactions using multi-touch technologies. Object-oriented design using model-view-controller paradigm, memory management, Swift programming language. Other topics include: object-oriented database API, animation, multi-threading, networking and performance considerations. Prerequisites: C language and object-oriented programming experience exceeding 106B or X level. Previous completion of any one of the following is required: CS 107<<https://explorecourses.stanford.edu/search?view=catalog&filter=coursestatus-Active=on&page=0&q=CS107>>, 108 (preferred) or 110. Recommended: UNIX, graphics, databases.

**CS 193S. Scalability Engineering. 3 Units.**

Learn to solve real world engineering challenges in this programming project course. Scale projects not just from the coding and engineering perspective, but use those same techniques to increase usability, popularity, development velocity and maintainability. Discover how engineering applies to project ideation, self and team development, customer acquisition, user experience. As we build applications, we will cover tools and practices for scalable programming including: the javascript ecosystem, containers and cloud platforms, agile development, growth hacking. We focus on rapid feedback loops to build better systems faster. In one quarter, develop scalable habits to build apps designed to grow. Application required. Prerequisites: one or more of CS 140, 142, 145, 147.

**CS 193X. Web Programming Fundamentals. 3-5 Units.**

Introduction to full-stack web development with an emphasis on fundamentals. Client-side topics include layout and rendering through HTML and CSS, event-driven programming through JavaScript, and single-threaded asynchronous programming techniques including Promises. Focus on modern standardized APIs and best practices. Server-side topics include the development of RESTful APIs, JSON services, and basic server-side storage techniques. Covers desktop and mobile web development. Enrollment is limited. Application required. Apply at <https://goo.gl/forms/nlQte0QVpU6maRq2byn11:59pm> Tuesday, March 28. Prerequisite: 106B or equivalent.

**CS 194. Software Project. 3 Units.**

Design, specification, coding, and testing of a significant team programming project under faculty supervision. Documentation includes a detailed proposal. Public demonstration of the project at the end of the quarter. Preference given to seniors. May be repeat for credit. Prerequisites: CS 110 and CS 161.

**CS 194H. User Interface Design Project. 3-4 Units.**

Advanced methods for designing, prototyping, and evaluating user interfaces to computing applications. Novel interface technology, advanced interface design methods, and prototyping tools. Substantial, quarter-long course project that will be presented in a public presentation. Prerequisites: CS 147, or permission of instructor.

**CS 194W. Software Project. 3 Units.**

Restricted to Computer Science and Electrical Engineering undergraduates. Writing-intensive version of CS194. Preference given to seniors.

Same as: WIM

**CS 195. Supervised Undergraduate Research. 3-4 Units.**

Directed research under faculty supervision. Students are required to submit a written report and give a public presentation on their work.

**CS 196. Computer Consulting. 2 Units.**

Focus is on Macintosh and Windows operating system maintenance and troubleshooting through hardware and software foundation and concepts. Topics include operating systems, networking, security, troubleshooting methodology with emphasis on Stanford's computing environment. Not a programming course. Prerequisite: 1C or equivalent.

**CS 198. Teaching Computer Science. 3-4 Units.**

Students lead a discussion section of 106A while learning how to teach a programming language at the introductory level. Focus is on teaching skills, techniques, and course specifics. Application and interview required; see <http://cs198.stanford.edu>.

**CS 198B. Additional Topics in Teaching Computer Science. 1 Unit.**

Students build on the teaching skills developed in CS198. Focus is on techniques used to teach topics covered in CS106B. Prerequisite: successful completion of CS198.

**CS 199. Independent Work. 1-6 Unit.**

Special study under faculty direction, usually leading to a written report. Letter grade; if not appropriate, enroll in 199P.

**CS 199P. Independent Work. 1-6 Unit.**

(Staff).

**CS 1C. Introduction to Computing at Stanford. 1 Unit.**

For those with limited experience with computers or who want to learn more about Stanford's computing environment. Topics include: computer maintenance and security, computing resources, Internet privacy, and copyright law. One-hour lecture/demonstration in dormitory clusters prepared and administered weekly by the Resident Computer Consultant (RCC). Final project. Not a programming course.

**CS 1U. Practical Unix. 1 Unit.**

A practical introduction to using the Unix operating system with a focus on Linux command line skills. Class will consist of video tutorials and weekly hands-on lab sections. Topics include: grep and regular expressions, ZSH, Vim and Emacs, basic and advanced GDB features, permissions, working with the file system, revision control, Unix utilities, environment customization, and using Python for shell scripts. Topics may be added, given sufficient interest. Course website: <http://cs1u.stanford.edu>.

**CS 20. Tensorflow for Deep Learning Research. 2 Units.**

This course will cover the fundamentals and contemporary usage of the Tensorflow library for deep learning research. Through the course, students will use Tensorflow to build models of different complexity, from simple linear/logistic regression to convolutional neural network and recurrent neural networks with LSTM to solve tasks such as word embeddings, translation, optical character recognition. Students will also learn best practices to structure a model and manage research experiments. Prerequisites: CS229 or CS224D/N.

**CS 202. Law for Computer Science Professionals. 1 Unit.**

Intellectual property law as it relates to computer science including copyright registration, patents, and trade secrets; contract issues such as non-disclosure/non-compete agreements, license agreements, and works-made-for-hire; dispute resolution; and principles of business formation and ownership. Emphasis is on topics of current interest such as open source and the free software movement, peer-to-peer sharing, encryption, data mining, and spam.

**CS 203. Cybersecurity: A Legal and Technical Perspective. 2 Units.**

This class will use the case method to teach basic computer, network, and information security from technology, law, policy, and business perspectives. Using real world topics, we will study the technical, legal, policy, and business aspects of an incident or issue and its potential solutions. The case studies will be organized around the following topics: vulnerability disclosure, state sponsored sabotage, corporate and government espionage, credit card theft, theft of embarrassing personal data, phishing and social engineering attacks, denial of service attacks, attacks on weak session management and URLs, security risks and benefits of cloud data storage, wiretapping on the Internet, and digital forensics. Students taking the class will learn about the techniques attackers use, applicable legal prohibitions, rights, and remedies, the policy context, and strategies in law, policy and business for managing risk. Grades will be based on class participation, two reflection papers, and a final exam. Special Instructions: This class is limited to 65 students, with an effort made to have students from Stanford Law School (30 students will be selected by lottery) and students from Computer Science (30 students) and International Policy Studies (5 students). Elements used in grading: Class Participation (20%), Written Assignments (40%), Final Exam (40%). Cross-listed with the Law School (Law 4004) and International Policy Studies (IPS course number TBD). Same as: IPS 251

**CS 204. Legal Informatics. 2-3 Units.**

Legal informatics based on representation of regulations in computable form. Encoding regulations facilitate creation of legal information systems with significant practical value. Convergence of technological trends, growth of the Internet, advent of semantic web technology, and progress in computational logic make computational law prospects better. Topics: current state of computational law, prospects and problems, philosophical and legal implications. This course is \*Cross\* listed with LAW 4019. Prerequisite: basic concepts of programming.

**CS 205A. Mathematical Methods for Robotics, Vision, and Graphics. 3 Units.**

Continuous mathematics background necessary for research in robotics, vision, and graphics. Possible topics: linear algebra; the conjugate gradient method; ordinary and partial differential equations; vector and tensor calculus. Prerequisites: 106B or X; MATH 51; or equivalents.

**CS 205B. Mathematical Methods for Fluids, Solids, and Interfaces. 3 Units.**

Numerical methods for simulation of problems involving solid mechanics and fluid dynamics. Focus is on practical tools needed for simulation, and continuous mathematics involving nonlinear hyperbolic partial differential equations. Possible topics: finite element method, highly deformable elastic bodies, plasticity, fracture, level set method, Burgers' equation, compressible and incompressible Navier-Stokes equations, smoke, water, fire, and solid-fluid coupling. Prerequisite: 205A or equivalent.

**CS 206. Exploring Computational Journalism. 3 Units.**

This course will explore the evolving field of computational journalism. Students will research and discuss the state of the field, and do projects in areas such as understanding the media ecosystem, stimulating media creation, and assessing media impact. Admission by application; please email James Hamilton at jayth@stanford.edu to request application. Same as: COMM 281

**CS 208E. Great Ideas in Computer Science. 3 Units.**

Great Ideas in Computer Science Covers the intellectual tradition of computer science emphasizing ideas that reflect the most important milestones in the history of the discipline. Topics include programming and problem solving; implementing computation in hardware; algorithmic efficiency; the theoretical limits of computation; cryptography and security; computer networks; machine learning; and the philosophy behind artificial intelligence. Readings will include classic papers along with additional explanatory material. Enrollment limited to students in the Master's program in Computer Science Education.

**CS 210A. Software Project Experience with Corporate Partners. 3-4 Units.**

Two-quarter project course. Focus is on real-world software development. Corporate partners seed projects with loosely defined challenges from their R&D labs; students innovate to build their own compelling software solutions. Student teams are treated as start-up companies with a budget and a technical advisory board comprised of instructional staff and corporate liaisons. Teams will typically travel to the corporate headquarters of their collaborating partner, meaning some teams will travel internationally. Open loft classroom format such as found in Silicon Valley software companies. Exposure to: current practices in software engineering; techniques for stimulating innovation; significant development experience with creative freedoms; working in groups; real-world software engineering challenges; public presentation of technical work; creating written descriptions of technical work. Prerequisites: CS 109 and 110.

**CS 210B. Software Project Experience with Corporate Partners. 3-4 Units.**

Continuation of CS210A. Focus is on real-world software development. Corporate partners seed projects with loosely defined challenges from their R&D labs; students innovate to build their own compelling software solutions. Student teams are treated as start-up companies with a budget and a technical advisory board comprised of the instructional staff and corporate liaisons. Teams will typically travel to the corporate headquarters of their collaborating partner, meaning some teams will travel internationally. Open loft classroom format such as found in Silicon Valley software companies. Exposure to: current practices in software engineering; techniques for stimulating innovation; significant development experience with creative freedoms; working in groups; real world software engineering challenges; public presentation of technical work; creating written descriptions of technical work. Prerequisites: CS 210A.

**CS 213. Creating Great VR: From Ideation to Monetization. 1 Unit.**

Covering everything from VR fundamentals to futurecasting to launch management, this course will expose you to best practices and guidance from VR leaders that helps positions you to build great VR experiences.

**CS 21SI. AI for Social Good. 2 Units.**

Students will learn about and apply cutting-edge artificial intelligence techniques to real-world social good spaces (such as healthcare, government, education, and environment). Taught jointly by CS+Social Good and the Stanford AI Group, the aim of the class is to empower students to apply these techniques outside of the classroom. The class will focus on techniques from machine learning and deep learning, including regression, support vector machines (SVMs), neural networks, convolutional neural networks (CNNs), and recurrent neural networks (RNNs). The course alternates between lectures on machine learning theory and discussions with invited speakers, who will challenge students to apply techniques in their social good domains. Students complete weekly coding assignments reinforcing machine learning concepts and applications. Prerequisites: programming experience at the level of CS107, mathematical fluency at the level of CS103, comfort with probability at the level of CS109 (or equivalent). Application required for enrollment.

**CS 221. Artificial Intelligence: Principles and Techniques. 3-4 Units.**

Artificial intelligence (AI) has had a huge impact in many areas, including medical diagnosis, speech recognition, robotics, web search, advertising, and scheduling. This course focuses on the foundational concepts that drive these applications. In short, AI is the mathematics of making good decisions given incomplete information (hence the need for probability) and limited computation (hence the need for algorithms). Specific topics include search, constraint satisfaction, game playing, Markov decision processes, graphical models, machine learning, and logic. Prerequisites: CS 103 or CS 103B/X, CS 106B or CS 106X, CS 107, and CS 109 (algorithms, probability, and programming experience).

**CS 223A. Introduction to Robotics. 3 Units.**

Robotics foundations in modeling, design, planning, and control. Class covers relevant results from geometry, kinematics, statics, dynamics, motion planning, and control, providing the basic methodologies and tools in robotics research and applications. Concepts and models are illustrated through physical robot platforms, interactive robot simulations, and video segments relevant to historical research developments or to emerging application areas in the field. Recommended: matrix algebra. Same as: ME 320

**CS 224N. Natural Language Processing with Deep Learning. 3-4 Units.**

Methods for processing human language information and the underlying computational properties of natural languages. Focus on deep learning approaches: understanding, implementing, training, debugging, visualizing, and extending neural network models for a variety of language understanding tasks. Exploration of natural language tasks ranging from simple word level and syntactic processing to coreference, question answering, and machine translation. Examination of representative papers and systems and completion of a final project applying a complex neural network model to a large-scale NLP problem. Prerequisites: calculus and linear algebra; CS124 or CS121/221. Same as: LINGUIST 284

**CS 224S. Spoken Language Processing. 2-4 Units.**

Introduction to spoken language technology with an emphasis on dialogue and conversational systems. Automatic speech recognition, speech synthesis, dialogue management, and applications to digital assistants, search, and spoken language understanding systems. Covers state-of-the-art approaches based on deep learning as well as traditional methods. Prerequisites: CS 124, 221, 224N, or 229. Same as: LINGUIST 285

**CS 224U. Natural Language Understanding. 3-4 Units.**

Project-oriented class focused on developing systems and algorithms for robust machine understanding of human language. Draws on theoretical concepts from linguistics, natural language processing, and machine learning. Topics include lexical semantics, distributed representations of meaning, relation extraction, semantic parsing, sentiment analysis, and dialogue agents, with special lectures on developing projects, presenting research results, and making connections with industry. Prerequisites: one of LINGUIST 180, CS 124, CS 224N, CS224S, or CS221; and logical/ semantics such as LINGUIST 130A or B, CS 157, or PHIL150. Same as: LINGUIST 188, LINGUIST 288

**CS 224W. Analysis of Networks. 3-4 Units.**

Networks are a fundamental tool for modeling complex social, technological, and biological systems. Coupled with emergence of online social networks and large-scale data availability in biological sciences, this course focuses on the analysis of massive networks which provide many computational, algorithmic, and modeling challenges. This course develops computational tools that reveal how the social, technological, and natural worlds are connected, and how the study of networks sheds light on these connections. Topics include: how information spreads through society; robustness and fragility of food webs and financial markets; algorithms for the World Wide Web; friend prediction in online social networks; identification of functional modules in biological networks; disease outbreak detection.

**CS 225A. Experimental Robotics. 3 Units.**

Hands-on laboratory course experience in robotic manipulation. Topics include robot kinematics, dynamics, control, compliance, sensor-based collision avoidance, and human-robot interfaces. Second half of class is devoted to final projects using various robotic platforms to build and demonstrate new robot task capabilities. Previous projects include the development of autonomous robot behaviors of drawing, painting, playing air hockey, yoyo, basketball, ping-pong or xylophone. Prerequisites: 223A or equivalent.

**CS 225B. Robot Programming Laboratory. 3-4 Units.**

For robotics and non-robotics students. Students program mobile robots to exhibit increasingly complex behavior (simple dead reckoning and reactivity, goal-directed motion, localization, complex tasks). Topics: motor control and sensor characteristics; sensor fusion, model construction, and robust estimation; control regimes (subsumption, potential fields); probabilistic methods, including Markov localization and particle filters. Student programmed robot contest. Programming is in C++ on Unix machines, done in teams. Prerequisite: programming at the level of 106B, 106X, 205, or equivalent.

**CS 227B. General Game Playing. 3 Units.**

A general game playing system accepts a formal description of a game to play it without human intervention or algorithms designed for specific games. Hands-on introduction to these systems and artificial intelligence techniques such as knowledge representation, reasoning, learning, and rational behavior. Students create GGP systems to compete with each other and in external competitions. Prerequisite: programming experience. Recommended: 103 or equivalent.

**CS 228. Probabilistic Graphical Models: Principles and Techniques. 3-4 Units.**

Probabilistic graphical modeling languages for representing complex domains, algorithms for reasoning using these representations, and learning these representations from data. Topics include: Bayesian and Markov networks, extensions to temporal modeling such as hidden Markov models and dynamic Bayesian networks, exact and approximate probabilistic inference algorithms, and methods for learning models from data. Also included are sample applications to various domains including speech recognition, biological modeling and discovery, medical diagnosis, message encoding, vision, and robot motion planning. Prerequisites: basic probability theory and algorithm design and analysis.

**CS 229. Machine Learning. 3-4 Units.**

Topics: statistical pattern recognition, linear and non-linear regression, non-parametric methods, exponential family, GLMs, support vector machines, kernel methods, model/feature selection, learning theory, VC dimension, clustering, density estimation, EM, dimensionality reduction, ICA, PCA, reinforcement learning and adaptive control, Markov decision processes, approximate dynamic programming, and policy search. Prerequisites: linear algebra, and basic probability and statistics. Same as: STATS 229

**CS 229A. Applied Machine Learning. 3-4 Units.**

You will learn to implement and apply machine learning algorithms. This course emphasizes practical skills, and focuses on giving you skills to make these algorithms work. You will learn about commonly used learning techniques including supervised learning algorithms (logistic regression, linear regression, SVM, neural networks/deep learning), unsupervised learning algorithms (k-means), as well as learn about specific applications such as anomaly detection and building recommender systems. This class is taught in the flipped-classroom format. You will watch videos and complete in-depth programming assignments and online quizzes at home, then come to class for discussion sections. This class will culminate in an open-ended final project, which the teaching team will help you on. Prerequisites: Programming at the level of CS106B or 106X, and basic linear algebra such as Math 51.

**CS 229T. Statistical Learning Theory. 3 Units.**

How do we formalize what it means for an algorithm to learn from data? This course focuses on developing mathematical tools for answering this question. We will present various common learning algorithms and prove theoretical guarantees about them. Topics include classical asymptotics, method of moments, generalization bounds via uniform convergence, kernel methods, online learning, and multi-armed bandits. Prerequisites: A solid background in linear algebra and probability theory, statistics and machine learning (STATS 315A or CS 229). Convex optimization (EE 364A) is helpful but not required. Same as: STATS 231

**CS 22A. The Social & Economic Impact of Artificial Intelligence. 1 Unit.**

Recent advances in computing may place us at the threshold of a unique turning point in human history. Soon we are likely to entrust management of our environment, economy, security, infrastructure, food production, healthcare, and to a large degree even our personal activities, to artificially intelligent computer systems. The prospect of "turning over the keys" to increasingly autonomous systems raises many complex and troubling questions. How will society respond as versatile robots and machine-learning systems displace an ever-expanding spectrum of blue- and white-collar workers? Will the benefits of this technological revolution be broadly distributed or accrue to a lucky few? How can we ensure that these systems respect our ethical principles when they make decisions at speeds and for rationales that exceed our ability to comprehend? What, if any, legal rights and responsibilities should we grant them? And should we regard them merely as sophisticated tools or as a newly emerging form of life? The goal of CS22 is to equip students with the intellectual tools, ethical foundation, and psychological framework to successfully navigate the coming age of intelligent machines.

Same as: IPS 200

**CS 230. Deep Learning. 3-4 Units.**

Deep Learning is one of the most highly sought after skills in AI. We will help you become good at Deep Learning. In this course, you will learn the foundations of Deep Learning, understand how to build neural networks, and learn how to lead successful machine learning projects. You will learn about Convolutional networks, RNNs, LSTM, Adam, Dropout, BatchNorm, Xavier/He initialization, and more. You will work on case studies from healthcare, autonomous driving, sign language reading, music generation, and natural language processing. You will master not only the theory, but also see how it is applied in industry. You will practice all these ideas in Python and in TensorFlow, which we will teach. AI is transforming multiple industries. After this course, you will likely find creative ways to apply it to your work. This class is taught in the flipped-classroom format. You will watch videos and complete in-depth programming assignments and online quizzes at home, then come in to class for advanced discussions and work on projects. This class will culminate in an open-ended final project, which the teaching team will help you on. Prerequisites: Familiarity with programming in Python and Linear Algebra (matrix / vector multiplications). CS 229 may be taken concurrently.

**CS 231A. Computer Vision: From 3D Reconstruction to Recognition. 3-4 Units.**

(Formerly 223B) An introduction to the concepts and applications in computer vision. Topics include: cameras and projection models, low-level image processing methods such as filtering and edge detection; mid-level vision topics such as segmentation and clustering; shape reconstruction from stereo, as well as high-level vision tasks such as object recognition, scene recognition, face detection and human motion categorization. Prerequisites: linear algebra, basic probability and statistics.

**CS 231N. Convolutional Neural Networks for Visual Recognition. 3-4 Units.**

Computer Vision has become ubiquitous in our society, with applications in search, image understanding, apps, mapping, medicine, drones, and self-driving cars. Core to many of these applications are the tasks of image classification, localization and detection. This course is a deep dive into details of neural network architectures with a focus on learning end-to-end models for these tasks, particularly image classification. During the 10-week course, students will learn to implement, train and debug their own neural networks and gain a detailed understanding of cutting-edge research in computer vision. The final assignment will involve training a multi-million parameter convolutional neural network and applying it on the largest image classification dataset (ImageNet). We will focus on teaching how to set up the problem of image recognition, the learning algorithms (e.g. backpropagation), practical engineering tricks for training and fine-tuning the networks and guide the students through hands-on assignments and a final course project. Much of the background and materials of this course will be drawn from the ImageNet Challenge: <http://image-net.org/challenges/LSVRC/2014/index>. Prerequisites: Proficiency in Python; familiarity with C/C++; CS 131 and CS 229 or equivalents; Math 21 or equivalent, linear algebra.

**CS 232. Digital Image Processing. 3 Units.**

Image sampling and quantization color, point operations, segmentation, morphological image processing, linear image filtering and correlation, image transforms, eigenimages, multiresolution image processing, noise reduction and restoration, feature extraction and recognition tasks, image registration. Emphasis is on the general principles of image processing. Students learn to apply material by implementing and investigating image processing algorithms in Matlab and optionally on Android mobile devices. Term project. Recommended: EE261, EE278. Same as: EE 368

**CS 233. Geometric and Topological Data Analysis. 3 Units.**

Mathematical computational tools for the analysis of data with geometric content, such images, videos, 3D scans, GPS traces – as well as for other data embedded into geometric spaces. Global and local geometry descriptors allowing for various kinds of invariances. The rudiments of computational topology and persistent homology on sampled spaces. Clustering and other unsupervised techniques. Spectral methods for geometric data analysis. Non-linear dimensionality reduction. Alignment, matching, and map computation between geometric data sets. Function spaces and functional maps. Networks of data sets and joint analysis for segmentation and labeling. The emergence of abstractions or concepts from data. Prerequisites: discrete algorithms at the level of 161; linear algebra at the level of CME103. Same as: CME 251

**CS 234. Reinforcement Learning. 3 Units.**

To realize the dreams and impact of AI requires autonomous systems that learn to make good decisions. Reinforcement learning is one powerful paradigm for doing so, and it is relevant to an enormous range of tasks, including robotics, game playing, consumer modeling and healthcare. This class will briefly cover background on Markov decision processes and reinforcement learning, before focusing on some of the central problems, including scaling up to large domains and the exploration challenge. One key tool for tackling complex RL domains is deep learning and this class will include at least one homework on deep reinforcement learning. Prerequisites: proficiency in python, CS 229 or equivalents or permission of the instructor; linear algebra, basic probability.

**CS 238. Decision Making under Uncertainty. 3-4 Units.**

This course is designed to increase awareness and appreciation for why uncertainty matters, particularly for aerospace applications. Introduces decision making under uncertainty from a computational perspective and provides an overview of the necessary tools for building autonomous and decision-support systems. Following an introduction to probabilistic models and decision theory, the course will cover computational methods for solving decision problems with stochastic dynamics, model uncertainty, and imperfect state information. Topics include: Bayesian networks, influence diagrams, dynamic programming, reinforcement learning, and partially observable Markov decision processes. Applications cover: air traffic control, aviation surveillance systems, autonomous vehicles, and robotic planetary exploration. Prerequisites: basic probability and fluency in a high-level programming language.

Same as: AA 228

**CS 239. Advanced Topics in Sequential Decision Making. 3-4 Units.**

Survey of recent research advances in intelligent decision making for dynamic environments from a computational perspective. Efficient algorithms for single and multiagent planning in situations where a model of the environment may or may not be known. Partially observable Markov decision processes, approximate dynamic programming, and reinforcement learning. New approaches for overcoming challenges in generalization from experience, exploration of the environment, and model representation so that these methods can scale to real problems in a variety of domains including aerospace, air traffic control, and robotics. Students are expected to produce an original research paper on a relevant topic. Prerequisites: AA 228/CS 238 or CS 221.

Same as: AA 229

**CS 240. Advanced Topics in Operating Systems. 3 Units.**

Recent research. Classic and new papers. Topics: virtual memory management, synchronization and communication, file systems, protection and security, operating system extension techniques, fault tolerance, and the history and experience of systems programming. Prerequisite: 140 or equivalent.

**CS 241. Embedded Systems Workshop. 2 Units.**

Project-centric building hardware and software for embedded computing systems. Students work on an existing project of their own or join one of these projects. Syllabus topics will be determined by the needs of the enrolled students and projects. Examples of topics include: interrupts and concurrent programming, deterministic timing and synchronization, state-based programming models, filters, frequency response, and high-frequency signals, low power operation, system and PCB design, security, and networked communication. Prerequisite: CS107 (or equivalent).

Same as: EE 285

**CS 242. Programming Languages. 3 Units.**

Central concepts in modern programming languages, impact on software development, language design trade-offs, and implementation considerations. Functional, imperative, and object-oriented paradigms. Formal semantic methods and program analysis. Modern type systems, higher order functions and closures, exceptions and continuations. Modularity, object-oriented languages, and concurrency. Runtime support for language features, interoperability, and security issues. Prerequisite: 107, or experience with Lisp, C, and an object-oriented language.

**CS 243. Program Analysis and Optimizations. 3-4 Units.**

Program analysis techniques used in compilers and software development tools to improve productivity, reliability, and security. The methodology of applying mathematical abstractions such as graphs, fixpoint computations, binary decision diagrams in writing complex software, using compilers as an example. Topics include data flow analysis, instruction scheduling, register allocation, parallelism, data locality, interprocedural analysis, and garbage collection. Prerequisites: 103 or 103B, and 107.

**CS 244. Advanced Topics in Networking. 3-4 Units.**

Classic papers, new ideas, and research papers in networking. Architectural principles: why the Internet was designed this way? Congestion control. Wireless and mobility; software-defined networks (SDN) and network virtualization; content distribution networks; packet switching; data-center networks. Prerequisite: 144 or equivalent.

**CS 244B. Distributed Systems. 3 Units.**

Distributed operating systems and applications issues, emphasizing high-level protocols and distributed state sharing as the key technologies. Topics: distributed shared memory, object-oriented distributed system design, distributed directory services, atomic transactions and time synchronization, application-sufficient consistency, file access, process scheduling, process migration, and storage/communication abstractions on distribution, scale, robustness in the face of failure, and security. Prerequisites: CS 144.

**CS 244C. Readings and Projects in Distributed Systems. 3-6 Units.**

Companion project option for 244B. Corequisite: 244B.

**CS 245. Database Systems Principles. 3 Units.**

File organization and access, buffer management, performance analysis, and storage management. Database system architecture, query optimization, transaction management, recovery, concurrency control. Reliability, protection, and integrity. Design and management issues. Prerequisites: 145, 161.

**CS 246. Mining Massive Data Sets. 3-4 Units.**

Availability of massive datasets is revolutionizing science and industry. This course discusses data mining and machine learning algorithms for analyzing very large amounts of data. The focus is on algorithms and systems for mining big data. Topics include: Big data systems (Hadoop, Spark, Hive); Link Analysis (PageRank, spam detection, hubs-and-authorities); Similarity search (locality-sensitive hashing, shingling, minhashing, random hyperplanes); Stream data processing; Analysis of social-network graphs; Association rules; Dimensionality reduction (UV, SVD, and CUR decompositions); Algorithms for very-large-scale mining (clustering, nearest-neighbor search); Large-scale machine learning (gradient descent, support-vector machines, classification, and regression); Submodular function optimization; Computational advertising. Prerequisites: At least one of CS107 or CS145.

**CS 246H. Mining Massive Data Sets Hadoop Lab. 1 Unit.**

Supplement to CS 246 providing additional material on Hadoop. Students will learn how to implement data mining algorithms using Hadoop, how to implement and debug complex MapReduce jobs in Hadoop, and how to use some of the tools in the Hadoop ecosystem for data mining and machine learning. Topics: Hadoop, MapReduce, HDFS, combiners, secondary sort, distributed cache, SQL on Hadoop, Hive, Cloudera ML/Oryx, Mahout, Hadoop streaming, implementing Hadoop jobs, debugging Hadoop jobs, TF-IDF, Pig, Sqoop, Oozie, HBase, Impala. Prerequisite: CS 107 or equivalent.

**CS 247. Human-Computer Interaction Design Studio. 3-4 Units.**

Project-based focus on interaction design process, especially early-stage design and rapid prototyping. Methods used in interaction design including needs analysis, user observation, sketching, concept generation, scenario building, and evaluation. Prerequisites: 147 or equivalent background in design thinking; 106B or equivalent background in programming. Recommended: CS 142 or equivalent background in web programming.

**CS 247L. Human Computer Interaction Technology Laboratory. 1 Unit.**

Hands-on introduction to contemporary HCI technologies. Interaction design with Adobe Flash, mobile development, physical computing, and web applications. Corequisite: 247.

**CS 248. Interactive Computer Graphics. 3-4 Units.**

This is the second course in the computer graphics sequence, and as such it assumes familiarity with rendering and image creation. The course has a strong focus on sampling methods, computational geometry, animation, and simulation. Topics include sampling theory, texture mapping, transformations, splines, implicit surfaces, geometric modeling, animation curves, inverse kinematics, character animation, motion capture and editing, image compression and virtual reality. Students will perform programming assignments and a self-selected final project that explores concepts covered in the class. Prerequisite: CS 107, MATH 51.

**CS 250. Algebraic Error Correcting Codes. 3 Units.**

Introduction to the theory of error correcting codes, emphasizing algebraic constructions, and diverse applications throughout computer science and engineering. Topics include basic bounds on error correcting codes; Reed-Solomon and Reed-Muller codes; list-decoding, list-recovery and locality. Applications may include communication, storage, complexity theory, pseudorandomness, cryptography, streaming algorithms, group testing, and compressed sensing. Prerequisites: Linear algebra, basic probability (at the level of, say, CS109, CME106 or EE178) and "mathematical maturity" (students will be asked to write proofs). Familiarity with finite fields will be helpful but not required. Same as: EE 387

**CS 251. Bitcoin and Crypto Currencies. 3 Units.**

For advanced undergraduates and for graduate students. The potential applications for Bitcoin-like technologies is enormous. The course will cover the technical aspects of crypto-currencies, blockchain technologies, and distributed consensus. Students will learn how these systems work and how to engineer secure software that interacts with the Bitcoin network and other crypto currencies. Prerequisite: CS110. Recommended: CS255.

**CS 254. Computational Complexity. 3 Units.**

An introduction to computational complexity theory. Topics include the P versus NP problem; diagonalization; space complexity: PSPACE, Savitch's theorem, and NL=coNL; counting problems and #P-completeness; circuit complexity; pseudorandomness and derandomization; complexity of approximation; quantum computing; complexity barriers. Prerequisites: 154 or equivalent; mathematical maturity.

**CS 255. Introduction to Cryptography. 3 Units.**

For advanced undergraduates and graduate students. Theory and practice of cryptographic techniques used in computer security. Topics: encryption (symmetric and public key), digital signatures, data integrity, authentication, key management, PKI, zero-knowledge protocols, and real-world applications. Prerequisite: basic probability theory.

**CS 257. Logic and Artificial Intelligence. 2-4 Units.**

This is a course at the intersection of philosophical logic and artificial intelligence. After reviewing recent work in AI that has leveraged ideas from logic, we will slow down and study in more detail various components of high-level intelligence and the tools that have been designed to capture those components. Specific areas will include: reasoning about belief and action, causality and counterfactuals, legal and normative reasoning, natural language inference, and Turing-complete logical formalisms including (probabilistic) logic programming and lambda calculus. Our main concern will be understanding the logical tools themselves, including their formal properties and how they relate to other tools such as probability and statistics. At the end, students should expect to have learned a lot more about logic, and also to have a sense for how logic has been and can be used in AI applications. Prerequisites: A background in logic, at least at the level of Phil 151, will be expected. In case a student is willing to put in the extra work to catch up, it may be possible to take the course with background equivalent to Phil 150 or CS 157. A background in AI, at the level of CS 221, would also be very helpful and will at times be expected. 2 unit option only for PhD students past the second year. Course website: <http://web.stanford.edu/class/cs257/>. Same as: PHIL 356C

**CS 261. Optimization and Algorithmic Paradigms. 3 Units.**

Algorithms for network optimization: max-flow, min-cost flow, matching, assignment, and min-cut problems. Introduction to linear programming. Use of LP duality for design and analysis of algorithms. Approximation algorithms for NP-complete problems such as Steiner Trees, Traveling Salesman, and scheduling problems. Randomized algorithms. Introduction to online algorithms. Prerequisite: 161 or equivalent.

**CS 263. Algorithms for Modern Data Models. 3 Units.**

We traditionally think of algorithms as running on data available in a single location, typically main memory. In many modern applications including web analytics, search and data mining, computational biology, finance, and scientific computing, the data is often too large to reside in a single location, is arriving incrementally over time, is noisy/uncertain, or all of the above. Paradigms such as map-reduce, streaming, sketching, Distributed Hash Tables, Bulk Synchronous Processing, and random walks have proved useful for these applications. This course will provide an introduction to the design and analysis of algorithms for these modern data models. Prerequisite: Algorithms at the level of CS 261. Same as: MS&E 317

**CS 264. Beyond Worst-Case Analysis. 3 Units.**

This course is motivated by problems for which the traditional worst-case analysis of algorithms fails to differentiate meaningfully between different solutions, or recommends an intuitively "wrong" solution over the "right" one. This course studies systematically alternatives to traditional worst-case analysis that nevertheless enable rigorous and robust guarantees on the performance of an algorithm. Topics include: instance optimality; smoothed analysis; parameterized analysis and condition numbers; models of data (pseudorandomness, locality, diffuse adversaries, etc.); average-case analysis; robust distributional analysis; resource augmentation; planted and semi-random graph models. Motivating problems will be drawn from online algorithms, online learning, constraint satisfaction problems, graph partitioning, scheduling, linear programming, hashing, machine learning, and auction theory. Prerequisites: CS161 (required). CS261 is recommended but not required.

**CS 265. Randomized Algorithms and Probabilistic Analysis. 3 Units.**

Randomness pervades the natural processes around us, from the formation of networks, to genetic recombination, to quantum physics. Randomness is also a powerful tool that can be leveraged to create algorithms and data structures which, in many cases, are more efficient and simpler than their deterministic counterparts. This course covers the key tools of probabilistic analysis, and application of these tools to understand the behaviors of random processes and algorithms. Emphasis is on theoretical foundations, though we will apply this theory broadly, discussing applications in machine learning and data analysis, networking, and systems. Topics include tail bounds, the probabilistic method, Markov chains, and martingales, with applications to analyzing random graphs, metric embeddings, random walks, and a host of powerful and elegant randomized algorithms. Prerequisites: CS 161 and STAT 116, or equivalents and instructor consent. Same as: CME 309

**CS 267. Graph Algorithms. 3 Units.**

An introduction to advanced topics in graph algorithms. Focusing on a variety of graph problems, the course will explore topics such as small space graph data structures, approximation algorithms, dynamic algorithms, and algorithms for special graph classes. Topics include: approximation algorithms for shortest paths and graph matching, distance oracles, graph spanners, cliques and graph patterns, dynamic algorithms, graph coloring, algorithms for planar graphs. Prerequisites: 161 or the equivalent mathematical maturity.

**CS 268. Geometric Algorithms. 3 Units.**

Techniques for design and analysis of efficient geometric algorithms for objects in 2-, 3-, and higher dimensions. Topics: convexity, triangulations and simplicial complexes, sweeping, partitioning, and point location. Voronoi/Delaunay diagrams and their properties. Arrangements of curves and surfaces. Intersection and visibility problems. Geometric searching and optimization. Random sampling methods. Range searching. Impact of numerical issues in geometric computation. Example applications to robotic motion planning, visibility preprocessing and rendering in graphics, and model-based recognition in computer vision. Prerequisite: discrete algorithms at the level of 161. Recommended: 164.

**CS 269G. Almost Linear Time Graph Algorithms. 3 Units.**

Over the past decade there has been an explosion in activity in designing new provably efficient fast graph algorithms. Leveraging techniques from disparate areas of computer science and optimization researchers have made great strides on improving upon the best known running times for fundamental optimization problems on graphs, in many cases breaking long-standing barriers to efficient algorithm design. In this course we will survey these results and cover the key algorithmic tools they leverage to achieve these breakthroughs. Possible topics include but are not limited to, spectral graph theory, sparsification, oblivious routing, local partitioning, Laplacian system solving, and maximum flow. Prerequisites: calculus and linear algebra.

Same as: MS&E 313

**CS 269I. Incentives in Computer Science. 3 Units.**

Many 21st-century computer science applications require the design of software or systems that interact with multiple self-interested participants. This course will provide students with the vocabulary and modeling tools to reason about such design problems. Emphasis will be on understanding basic economic and game theoretic concepts that are relevant across many application domains, and on case studies that demonstrate how to apply these concepts to real-world design problems. Topics include auction and contest design, equilibrium analysis, cryptocurrencies, design of networks and network protocols, reputation systems, social choice, and social network analysis. Case studies include BGP routing, Bitcoin, eBay's reputation system, Facebook's advertising mechanism, Mechanical Turk, and dynamic pricing in Uber/Lyft. Prerequisites: CS106B/X and CS161, or permission from the instructor.

**CS 269O. Introduction to Optimization Theory. 3 Units.**

Introduction of core algorithmic techniques and proof strategies that underlie the best known provable guarantees for minimizing high dimensional convex functions. Focus on broad canonical optimization problems and survey results for efficiently solving them, ultimately providing the theoretical foundation for further study in optimization. In particular, focus will be on first-order methods for both smooth and non-smooth convex function minimization as well as methods for structured convex function minimization, discussing algorithms such as gradient descent, accelerated gradient descent, mirror descent, Newton's method, interior point methods, and more. Prerequisite: multivariable calculus and linear algebra.

Same as: MS&E 213

**CS 270. Modeling Biomedical Systems: Ontology, Terminology, Problem Solving. 3 Units.**

Methods for modeling biomedical systems and for building model-based software systems. Emphasis is on intelligent systems for decision support and Semantic Web applications. Topics: knowledge representation, controlled terminologies, ontologies, reusable problem solvers, and knowledge acquisition. Students learn about current trends in the development of advanced biomedical software systems and acquire hands-on experience with several systems and tools. Prerequisites: CS106A, basic familiarity with biology.

Same as: BIOMEDIN 210

**CS 272. Introduction to Biomedical Informatics Research Methodology. 3-5 Units.**

Capstone Biomedical Informatics (BMI) experience. Hands-on software building. Student teams conceive, design, specify, implement, evaluate, and report on a software project in the domain of biomedicine. Creating written proposals, peer review, providing status reports, and preparing final reports. Issues related to research reproducibility. Guest lectures from professional biomedical informatics systems builders on issues related to the process of project management. Software engineering basics. Because the team projects start in the first week of class, attendance that week is strongly recommended. Prerequisites: BIOMEDIN 210 or 214 or 215 or 217 or 260. Preference to BMI graduate students. Consent of instructor required.

Same as: BIOE 212, BIOMEDIN 212, GENE 212

**CS 273A. The Human Genome Source Code. 3 Units.**

A computational introduction to the most amazing programming language on the planet: your genome. Topics include genome sequencing (assembling source code from code fragments); the human genome functional landscape: variable assignments (genes), control-flow logic (gene regulation) and run-time stack (epigenomics); human disease and personalized genomics (as a hunt for bugs in the human code); genome editing (code injection) to cure the incurable; and the source code behind amazing animal adaptations. Algorithmic approaches will introduce ideas from computational genomics, machine learning and natural language processing. Course includes primers on molecular biology, and text processing languages. No prerequisites.

Same as: BIOMEDIN 273A, DBIO 273A

**CS 273B. Deep Learning in Genomics and Biomedicine. 3 Units.**

Recent breakthroughs in high-throughput genomic and biomedical data are transforming biological sciences into "big data" disciplines. In parallel, progress in deep neural networks are revolutionizing fields such as image recognition, natural language processing and, more broadly, AI. This course explores the exciting intersection between these two advances. The course will start with an introduction to deep learning and overview the relevant background in genomics and high-throughput biotechnology, focusing on the available data and their relevance. It will then cover the ongoing developments in deep learning (supervised, unsupervised and generative models) with the focus on the applications of these methods to biomedical data, which are beginning to produced dramatic results. In addition to predictive modeling, the course emphasizes how to visualize and extract interpretable, biological insights from such models. Recent papers from the literature will be presented and discussed. Students will be introduced to and work with popular deep learning software frameworks. Students will work in groups on a final class project using real world datasets. Prerequisites: College calculus, linear algebra, basic probability and statistics such as CS109, and basic machine learning such as CS229. No prior knowledge of genomics is necessary.

Same as: BIODS 237, BIOMEDIN 273B, GENE 236

**CS 274. Representations and Algorithms for Computational Molecular Biology. 3-4 Units.**

Topics: introduction to bioinformatics and computational biology, algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of data sources, knowledge representation and controlled terminologies for molecular biology, microarray analysis, machine learning (clustering and classification), and natural language text processing. Prerequisite: CS 106B; recommended: CS161; consent of instructor for 3 units.

Same as: BIOE 214, BIOMEDIN 214, GENE 214



**CS 275. Translational Bioinformatics. 4 Units.**

Computational methods for the translation of biomedical data into diagnostic, prognostic, and therapeutic applications in medicine. Topics: multi-scale omics data generation and analysis, utility and limitations of public biomedical resources, machine learning and data mining, issues and opportunities in drug discovery, and mobile/digital health solutions. Case studies and course project. Prerequisites: programming ability at the level of CS 106A and familiarity with biology and statistics. Same as: BIOE 217, BIOMEDIN 217, GENE 217

**CS 275A. Symbolic Musical Information. 2-4 Units.**

Focus on symbolic data for music applications including advanced notation systems, optical music recognition, musical data conversion, and internal structure of MIDI files. Same as: MUSIC 253

**CS 275B. Music Query, Analysis, and Style Simulation. 2-4 Units.**

Leveraging off three synchronized sets of symbolic data resources for notation and analysis, the lab portion introduces students to the open-source Humdrum Toolkit for music representation and analysis. Issues of data content and quality as well as methods of information retrieval, visualization, and summarization are considered in class. Grading based primarily on student projects. Prerequisite: 253 or consent of instructor. Same as: MUSIC 254

**CS 276. Information Retrieval and Web Search. 3 Units.**

Text information retrieval systems; efficient text indexing; Boolean, vector space, and probabilistic retrieval models; ranking and rank aggregation; evaluating IR systems; text clustering and classification; Web search engines including crawling and indexing, link-based algorithms, web metadata, and question answering; distributed word representations. Prerequisites: CS 107, CS 109, CS 161. Same as: LINGUIST 286

**CS 279. Computational Biology: Structure and Organization of Biomolecules and Cells. 3 Units.**

Computational techniques for investigating and designing the three-dimensional structure and dynamics of biomolecules and cells. These computational methods play an increasingly important role in drug discovery, medicine, bioengineering, and molecular biology. Course topics include protein structure prediction, protein design, drug screening, molecular simulation, cellular-level simulation, image analysis for microscopy, and methods for solving structures from crystallography and electron microscopy data. Prerequisites: elementary programming background (CS 106A or equivalent) and an introductory course in biology or biochemistry. Same as: BIOE 279, BIOMEDIN 279, BIOPHYS 279, CME 279

**CS 28. Artificial Intelligence, Entrepreneurship and Society in the 21st Century and Beyond. 2 Units.**

Technical developments in artificial intelligence (AI) have opened up new opportunities for entrepreneurship, as well as raised profound longer term questions about how human societal and economic systems may be reorganized to accommodate the rise of intelligent machines. In this course, closely cotaught by a Stanford professor and a leading Silicon Valley venture capitalist, we will examine the current state of the art capabilities of existing artificial intelligence systems, as well as economic challenges and opportunities in early stage startups and large companies that could leverage AI. We will focus on gaps between business needs and current technical capabilities to identify high impact directions for the development of future AI technology. Simultaneously, we will explore the longer term societal impact of AI driven by inexorable trends in technology and entrepreneurship. The course includes guest lectures from leading technologists and entrepreneurs who employ AI in a variety of fields, including healthcare, education, selfdriving cars, computer security, natural language interfaces, computer vision systems, and hardware acceleration.

**CS 294A. Research Project in Artificial Intelligence. 3 Units.**

Student teams under faculty supervision work on research and implementation of a large project in AI. State-of-the-art methods related to the problem domain. Prerequisites: AI course from 220 series, and consent of instructor.

**CS 294H. Research Project in Human-Computer Interaction. 3 Units.**

Student teams under faculty supervision work on research and implementation of a large project in HCI. State-of-the-art methods related to the problem domain. Prerequisites CS 377, 147, 247, or permission from instructor.

**CS 294S. Research Project in Software Systems and Security. 3 Units.**

Topics vary. Focus is on emerging research themes such as programmable open mobile Internet that spans multiple system topics such as human-computer interaction, programming systems, operating systems, networking, and security. May be repeated for credit. Prerequisites: CS 103 and 107.

**CS 294W. Writing Intensive Research Project in Computer Science. 3 Units.**

Restricted to Computer Science and Computer Systems Engineering undergraduates. Students enroll in the CS 294W section attached to the CS 294 project they have chosen.

**CS 295. Software Engineering. 3 Units.**

Software specification, testing and verification. The emphasis is on automated tools for developing reliable software. The course covers material—drawn primarily from recent research papers—on the technology underlying these tools. Assignments supplement the lectures with hands-on experience in using these tools and customizing them for solving new problems. The course is appropriate for students intending to pursue research in program analysis and verification, as well as for those who wish to add the use of advanced software tools to their skill set. Prerequisites: 108. Recommended: a project course such as 140, 143 or 145.

**CS 298. Seminar on Teaching Introductory Computer Science. 1 Unit.**

Faculty, undergraduates, and graduate students interested in teaching discuss topics raised by teaching computer science at the introductory level. Prerequisite: consent of instructor. Same as: EDUC 298

**CS 300. Departmental Lecture Series. 1 Unit.**

Priority given to first-year Computer Science Ph.D. students. CS Masters students admitted if space is available. Presentations by members of the department faculty, each describing informally his or her current research interests and views of computer science as a whole.

**CS 309A. Cloud Computing Seminar. 1 Unit.**

For science, engineering, computer science, business, education, medicine, and law students. Cloud computing is bringing information systems out of the back office and making it core to the entire economy. Furthermore with the advent of smarter machines cloud computing will be integral to building a more precision planet. This class is intended for all students who want to begin to understand the implications of this technology. Guest industry experts are public company CEOs who are either delivering cloud services or using cloud services to transform their businesses.

**CS 315A. Parallel Computer Architecture and Programming. 3 Units.**

The principles and tradeoffs in the design of parallel architectures. Emphasis is on naming, latency, bandwidth, and synchronization in parallel machines. Case studies on shared memory, message passing, data flow, and data parallel machines illustrate techniques. Architectural studies and lectures on techniques for programming parallel computers. Programming assignments on one or more commercial multiprocessors. Prerequisites: EE 282, and reasonable programming experience.

**CS 315B. Parallel Computing Research Project. 3 Units.**

Advanced topics and new paradigms in parallel computing including parallel algorithms, programming languages, runtime environments, library debugging/tuning tools, and scalable architectures. Research project. Prerequisite: consent of instructor.

**CS 316. Advanced Multi-Core Systems. 3 Units.**

In-depth coverage of the architectural techniques used in modern, multi-core chips for mobile and server systems. Advanced processor design techniques (superscalar cores, VLIW cores, multi-threaded cores, energy-efficient cores), cache coherence, memory consistency, vector processors, graphics processors, heterogeneous processors, and hardware support for security and parallel programming. Students will become familiar with complex trade-offs between performance-power-complexity and hardware-software interactions. A central part of CS316 is a project on an open research question on multi-core technologies. Prerequisites: EE 180 (formerly 108B) and EE 282. Recommended: CS 149.

**CS 323. Automated Reasoning: Theory and Applications. 3-4 Units.**

Intelligent computer agents must reason about complex, uncertain, and dynamic environments. This course is a graduate level introduction to automated reasoning techniques and their applications, covering logical and probabilistic approaches. Topics include: logical and probabilistic foundations, backtracking strategies and algorithms behind modern SAT solvers, stochastic local search and Markov Chain Monte Carlo algorithms, variational techniques, classes of reasoning tasks and reductions, and applications.

**CS 325B. Data for Sustainable Development. 3-5 Units.**

The sustainable development goals (SDGs) encompass many important aspects of human and ecosystem well-being that are traditionally difficult to measure. This project-based course will focus on ways to use inexpensive, unconventional data streams to measure outcomes relevant to SDGs, including poverty, hunger, health, governance, and economic activity. Students will apply machine learning techniques to various projects outlined at the beginning of the quarter. The main learning goals are to gain experience conducting and communicating original research. Prior knowledge of machine learning techniques, such as from CS 221, CS 229, CS 231N, STATS 202, or STATS 216 is required. Open to both undergraduate and graduate students. Enrollment limited to 24. Students must apply for the class by filling out the form at <https://goo.gl/forms/9LSZF7IPkHadix5D3>. A permission code will be given to admitted students to register for the class.

Same as: EARTHSYS 162, EARTHSYS 262

**CS 326. Topics in Advanced Robotic Manipulation. 3-4 Units.**

This course provides a survey of the most important and influential concepts in autonomous robotic manipulation. It includes classical concepts that are still widely used and recent approaches that have changed the way we look at autonomous manipulation. We cover approaches towards motion planning and control using visual and tactile perception as well as machine learning. This course is especially concerned with new approaches for overcoming challenges in generalization from experience, exploration of the environment, and learning representation so that these methods can scale to real problems. Students are expected to present one paper in a tutorial, debate a paper once from the Pro and once from the Con side. They are also expected to propose an original research project and work on it towards a research paper. Recommended: CS 131, 223A, 229 or equivalents.

**CS 326A. Motion Planning. 3 Units.**

Computing object motions in computer graphics, geometrical computing, robotics, or artificial intelligence for applications such as design, manufacturing, robotics, animated graphics, surgical planning, drug design, assembly planning, graphic animation of human figures, humanoid robots, inspection and surveillance, simulation of crowds, and biology. Path planning methods to generate collision-free paths among static obstacles. Extensions include uncertainty, mobile obstacles, manipulating moveable objects, maneuvering with kinematic constraints, and making and breaking contacts. Configuration space, geometric arrangements, and random sampling. Theoretical methods.

**CS 327A. Advanced Robotic Manipulation. 3 Units.**

Advanced control methodologies and novel design techniques for complex human-like robotic and bio mechanical systems. Class covers the fundamentals in operational space dynamics and control, elastic planning, human motion synthesis. Topics include redundancy, inertial properties, haptics, simulation, robot cooperation, mobile manipulation, human-friendly robot design, humanoids and whole-body control. Additional topics in emerging areas are presented by groups of students at the end-of-quarter mini-symposium. Prerequisites: 223A or equivalent.

**CS 329. Topics in Artificial Intelligence. 3 Units.**

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

**CS 329M. Topics in Artificial Intelligence: Algorithms of Advanced Machine Learning. 3 Units.**

This advanced graduate course explores in depth several important classes of algorithms in modern machine learning. We will focus on understanding the mathematical properties of these algorithms in order to gain deeper insights on when and why they perform well. We will also study applications of each algorithm on interesting, real-world settings. Topics include: spectral clustering, tensor decomposition, Hamiltonian Monte Carlo, adversarial training, and variational approximation. Students will learn mathematical techniques for analyzing these algorithms and hands-on experience in using them. We will supplement the lectures with latest papers and there will be a significant research project component to the class. Prerequisites: Probability (CS 109), linear algebra (Math 113), machine learning (CS 229), and some coding experience.

**CS 331B. Representation Learning in Computer Vision. 3 Units.**

A representation performs the task of converting an observation in the real world (e.g. an image, a recorded speech signal, a word in a sentence) into a mathematical form (e.g. a vector). This mathematical form is then used by subsequent steps (e.g. a classifier) to produce the outcome, such as classifying an image or recognizing a spoken word. Forming the proper representation for a task is an essential problem in modern AI. In this course, we focus on 1) establishing why representations matter, 2) classical and modern methods of forming representations in Computer Vision, 3) methods of analyzing and probing representations, 4) portraying the future landscape of representations with generic and comprehensive AI/vision systems over the horizon, and finally 5) going beyond computer vision by talking about non-visual representations, such as the ones used in NLP or neuroscience. The course will heavily feature systems based on deep learning and convolutional neural networks. We will have several teaching lectures, a number of prominent external guest speakers, as well as presentations by the students on recent papers and their projects. Prerequisites: CS131A, CS231A, CS231B, or CS231N. If you do not have the required prerequisites, please contact a member of the course staff before enrolling in this course.

**CS 332. Advanced Survey of Reinforcement Learning. 3 Units.**

This class will provide a core overview of essential topics and new research frontiers in reinforcement learning. Planned topics include: model free and model based reinforcement learning, policy search, Monte Carlo Tree Search planning methods, off policy evaluation, exploration, imitation learning, temporal abstraction/hierarchical approaches, safety and risk sensitivity, human-in-the-loop RL, inverse reinforcement learning, learning to communicate, and insights from human learning. Students are expected to create an original research paper on a related topic. Prerequisites: CS221 or AA238/CS238 or CS234 or CS229 or similar experience.

**CS 333. Safe and Interactive Robotics. 3-4 Units.**

Once confined to the manufacturing floor, robots are quickly entering the public space at multiple levels: drones, surgical robots, service robots, and self-driving cars are becoming tangible technologies impacting the human experience. Our goal in this class is to learn about and design algorithms that enable robots to reason about their actions, interact with one another, the humans, and the environment they live in, as well as plan safe strategies that humans can trust and rely on. This is a project-based graduate course that studies algorithms in formal methods, control theory, and robotics, which can improve the state-of-the-art human-robot systems. We focus on designing new algorithms for enhancing safe and interactive autonomy. Recommended: Introductory course in AI and robotics.

**CS 334A. Convex Optimization I. 3 Units.**

Convex sets, functions, and optimization problems. The basics of convex analysis and theory of convex programming: optimality conditions, duality theory, theorems of alternative, and applications. Least-squares, linear and quadratic programs, semidefinite programming, and geometric programming. Numerical algorithms for smooth and equality constrained problems; interior-point methods for inequality constrained problems. Applications to signal processing, communications, control, analog and digital circuit design, computational geometry, statistics, machine learning, and mechanical engineering. Prerequisite: linear algebra such as EE263, basic probability. Same as: CME 364A, EE 364A

**CS 341. Project in Mining Massive Data Sets. 3 Units.**

Team project in data mining and machine learning of very large-scale data, including the problem statement, implementation, and evaluation of a solution. Students work on real problems on real-world data. The course provides access to large real-world data and access to big data cloud computing infrastructure (Amazon EC2, Google Cloud Platform). Some lectures on relevant materials will be given (Hadoop, Spark, Hive, Amazon EC2) as well as other topics of relevance to projects.

**CS 344. Topics in Computer Networks. 3 Units.**

High-performance network system design. Students will work in teams of two to build a fully functioning Internet router. Students will design the control plane in C on a Linux host and will design the data plane in the new P4 language on the NetFPGA 4 x 10GE switch. For the midterm milestone, teams must demonstrate that their routers can interoperate with the other teams by building a small scale datacenter topology. In the final 3-4 weeks of the class, teams will participate in an open-ended design challenge. Prerequisites: At least one student in each team must have taken CS144 at Stanford and completed Lab 3 (static router), Verilog experience for one member of each team is helpful but not required. Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

**CS 345S. Data-intensive Systems for the Next 1000x. 3-4 Units.**

The last decade saw enormous shifts in the design of large-scale data-intensive systems due to the rise of Internet services, cloud computing, and Big Data processing. Where will we see the next 1000x increases in scale and data volume, and how should data-intensive systems accordingly evolve? This course will critically examine a range of trends, including the Internet of Things, drones, smart cities, and emerging hardware capabilities, through the lens of software systems research and design. Students will perform a comparative analysis by reading and discussing cutting-edge research while performing their own original research. Prerequisites: Strong background in software systems, especially databases (CS 245) and distributed systems (CS 244B), and/or machine learning (CS 229). Undergraduates who have completed CS 245 are strongly encouraged to attend.

**CS 348A. Computer Graphics: Geometric Modeling & Processing. 3-4 Units.**

The mathematical tools needed for the geometrical aspects of computer graphics and especially for modeling smooth shapes. Fundamentals: homogeneous coordinates, transformations, and perspective. Theory of parametric and implicit curve and surface models: polar forms, Bézier arcs and de Casteljau subdivision, continuity constraints, B-splines, tensor product, and triangular patch surfaces. Subdivision surfaces and multi-resolution representations of geometry. Representations of solids and conversions among them. Surface reconstruction from scattered data points. Geometry processing on meshes, including simplification and parameterization. Prerequisite: linear algebra at the level of CME103. Recommended: 248.

**CS 348B. Computer Graphics: Image Synthesis Techniques. 3-4 Units.**

Intermediate level, emphasizing high-quality image synthesis algorithms and systems issues in rendering. Topics include: Reyes and advanced rasterization, including motion blur and depth of field; ray tracing and physically based rendering; Monte Carlo algorithms for rendering, including direct illumination and global illumination; path tracing and photon mapping; surface reflection and light source models; volume rendering and subsurface scattering; SIMD and multi-core parallelism for rendering. Written assignments and programming projects. Prerequisite: 248 or equivalent. Recommended: Fourier analysis or digital signal processing.

**CS 348C. Computer Graphics: Animation and Simulation. 3 Units.**

Core mathematics and methods for computer animation and motion simulation. Traditional animation techniques. Physics-based simulation methods for modeling shape and motion: particle systems, constraints, rigid bodies, deformable models, collisions and contact, fluids, and fracture. Animating natural phenomena. Methods for animating virtual characters and crowds. Additional topics selected from data-driven animation methods, realism and perception, animation systems, motion control, real-time and interactive methods, and multi-sensory feedback. Recommended: CS 148 and/or 205A. Prerequisite: linear algebra.

**CS 348V. Visual Computing Systems. 3-4 Units.**

Visual computing tasks such as computational photography, image/video analysis, 3D reconstruction, and real-time 3D graphics are key responsibilities of modern computer systems ranging from sensor-rich smart phones, autonomous robots, and large data centers. These workloads demand exceptional system efficiency and this course examines the key ideas, techniques, and challenges associated with the design of parallel (and heterogeneous) systems that execute and accelerate visual computing applications. This course is intended for graduate and advanced undergraduate-level systems students interested in architecting efficient graphics, image processing, and computer vision platforms (both new hardware architectures and domain-optimized programming frameworks) and for students in graphics, vision, and ML that seek to understand throughput computing principles so they can develop scalable algorithms that map efficiently these future platforms. Students will perform daily research paper readings, complete simple programming assignments, and compete a self-selected term project. Prerequisites: CS 107 or equivalent. Recommended: Parallel computing or computer architecture (CS 149, EE 282), some background in techniques in either deep learning (CS 230, CS 231N), computer vision (CS 231A), digital image processing (CS 232).

**CS 349. Topics in Programming Systems. 3 Units.**

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

**CS 349D. Cloud Computing Technology. 3 Units.**

The largest change in the computer industry over the past five years has arguably been the emergence of cloud computing: organizations are increasingly moving their workloads to managed public clouds and using new, global-scale services that were simply not possible in private datacenters. However, both building and using cloud systems remains a black art with many difficult research challenges. This research seminar will cover industry and academic work on cloud computing and survey challenges including programming interfaces, cloud native applications, resource management, pricing, availability and reliability, privacy and security. Students will also propose and develop an original research project. Prerequisites: For graduate students, background in computer systems (CS 240, 244, 244B or 245) is strongly recommended. Undergrads will need instructor's approval.

**CS 352. Pseudo-Randomness. 3-4 Units.**

Pseudorandomness is the widely applicable theory of efficiently generating objects that look random, despite being constructed using little or no randomness. Since pseudorandom objects can replace uniformly distributed ones (in a well-defined sense), one may view pseudorandomness as an extension of our understanding of randomness through the computational lens. We will study the basic tools pseudorandomness, such as limited independence, randomness extractors, expander graphs, and pseudorandom generators. We will also discuss the applications of pseudorandomness to derandomization, cryptography and more. We will cover classic result as well as cutting-edge techniques. Prerequisites: CS 154 and CS 161, or equivalents.

**CS 355. Advanced Topics in Cryptography. 3 Units.**

Topics: Pseudo randomness, multiparty computation, pairing-based and lattice-based cryptography, zero knowledge protocols, and new encryption and integrity paradigms. May be repeated for credit. Prerequisite: 255.

**CS 359. Topics in the Theory of Computation. 3 Units.**

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

**CS 359B. Designing Decentralized Applications on Blockchain. 3 Units.**

This project-based class focuses on understanding the elements of blockchain application development. Students will learn methods to design, implement and evaluate programs on fault tolerant cryptocurrency systems. Such systems could be viewed as a giant global slow distributed computer with public storage that can communicate to the real world through oracles. Alongside lectures, there will be a quarter-long project where students design, implement and evaluate a novel distributed application on a modern blockchain, such as the ones of the Ethereum or NEO cryptocurrencies. The Bitcoin blockchain will be also briefly discussed as background knowledge. Enrollment is competitive, so potential students must complete an application; see <http://cs359b.stanford.edu> for details. Recommended: CS 251 or 255. Prerequisites: CS 110, CS 142, or permission by the instructor.

**CS 359C. Topics in Theory of Computation: Classics of Cryptography. 3 Units.**

This course will review some of the greatest discoveries in modern cryptography: zero-knowledge proofs, factoring algorithms, elliptic-curve cryptography, post-quantum cryptography, and more. Some of the topics we will cover have immediate practical applications. Other topics we will study for their potential future applications. And yet others we will study for the theoretical insights they provide. The course readings will be a combination of the original "classic" papers and more modern treatments of the same topics. Prerequisite: CS 255, an equivalent course, or permission of instructors.

**CS 361. Engineering Design Optimization. 3-4 Units.**

Design of engineering systems within a formal optimization framework. This course covers the mathematical and algorithmic fundamentals of optimization, including derivative and derivative-free approaches for both linear and non-linear problems, with an emphasis on multidisciplinary design optimization. Topics will also include quantitative methodologies for addressing various challenges, such as accommodating multiple objectives, automating differentiation, handling uncertainty in evaluations, selecting design points for experimentation, and principled methods for optimization when evaluations are expensive. Applications range from the design of aircraft to automated vehicles. Prerequisites: some familiarity with probability, programming, and multivariable calculus.

Same as: AA 222

**CS 368. Algorithmic Techniques for Big Data. 3 Units.**

Designing algorithms for efficient processing of large data sets poses unique challenges. This course will discuss algorithmic paradigms that have been developed to efficiently process data sets that are much larger than available memory. We will cover streaming algorithms and sketching methods that produce compact data structures, dimension reduction methods that preserve geometric structure, efficient algorithms for numerical linear algebra, graph sparsification methods, as well as impossibility results for these techniques.

**CS 369. Topics in Analysis of Algorithms. 3 Units.**

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

**CS 369H. Hierarchies of Integer Programming Relaxations. 3 Units.**

Mathematical programming relaxations of integer programming formulations are a popular way to apply convex optimization techniques to hard combinatorial optimization problems. Such relaxations can be made closer to their integer programming counterparts by adding constraints; a systematic way to achieve this is via hierarchies of relaxations. Several such hierarchies are well-studied in the literature: Lovasz-Schrijver, Sherali-Adams and the Parrilo-Lasserre sum-of-squares (SoS) hierarchy. Recently, these hierarchies have received a lot of attention due to their potential to make progress on long standing algorithmic questions, and connections to various other areas such as computational complexity, combinatorial and polynomial optimization, quantum computing, proof complexity and so on. In this course we will cover recent research results in this area for problems arising from optimization, machine learning, computational complexity and more, discussing both lower and upper bounds. Prerequisites: Mathematical maturity (required), exposure to algorithms (strongly recommended), and optimization (recommended).

**CS 371. Computational Biology in Four Dimensions. 3 Units.**

Cutting-edge research on computational techniques for investigating and designing the three-dimensional structure and dynamics of biomolecules, cells, and everything in between. These techniques, which draw on approaches ranging from physics-based simulation to machine learning, play an increasingly important role in drug discovery, medicine, bioengineering, and molecular biology. Course is devoted primarily to reading, presentation, discussion, and critique of papers describing important recent research developments. Prerequisite: CS 106A or equivalent, and an introductory course in biology or biochemistry. Recommended: some experience in mathematical modeling (does not need to be a formal course).

Same as: BIOMEDIN 371, BIOPHYS 371, CME 371

**CS 373. Statistical and Machine Learning Methods for Genomics. 3 Units.**

Introduction to statistical and computational methods for genomics. Sample topics include: expectation maximization, hidden Markov model, Markov chain Monte Carlo, ensemble learning, probabilistic graphical models, kernel methods and other modern machine learning paradigms. Rationales and techniques illustrated with existing implementations used in population genetics, disease association, and functional regulatory genomics studies. Instruction includes lectures and discussion of readings from primary literature. Homework and projects require implementing some of the algorithms and using existing toolkits for analysis of genomic datasets.

Same as: BIO 268, BIOMEDIN 245, GENE 245, STATS 345

**CS 375. Large-Scale Neural Network Modeling for Neuroscience. 3 Units.**

Introduction to designing, building, and training neural networks for modeling brain and behavioral data, including: deep convolutional neural network models of sensory systems (vision, audition, somatosensation); recurrent neural networks for dynamics, memory and attention; integration of variational and generative methods for cognitive modeling; and methods and metrics for comparing such models to real-world neural data. Attention will be given both to established methods as well as cutting-edge techniques. Students will learn conceptual bases for deep neural network models, and will also implement learn to implement and train large-scale models in Tensorflow using GPUs. Requirements: Fluency in Unix shell and Python programming, familiarity with differential equations, linear algebra, and probability theory, and one or more courses in cognitive or systems neuroscience.

Same as: PSYCH 249

**CS 376. Human-Computer Interaction Research. 3-4 Units.**

Prepares students to conduct original HCI research by reading and discussing seminal and cutting-edge research papers. Main topics are ubiquitous computing, social computing, and design and creation; breadth topics include HCI methods, programming, visualization, and user modeling. Student pairs perform a quarter-long research project. Prerequisites: For CS and Symbolic Systems undergraduates/masters students, an A- or better in CS 147 or CS 247. No prerequisite for PhD students or students outside of CS and Symbolic Systems.

**CS 377C. Topics in HCI: Crowdsourcing and Social Computing. 3-4 Units.**

This project-based class focuses on the design of social computing and crowdsourcing systems. Students will learn how to engage large groups of people online, from microtask crowdsourcing to the design of online communities. The course will cover best practices for system design such as motivating participation, ethical guidelines, agreement measures, and gold standards. Advanced topics such as expert and team-based crowdsourcing, incentive design, and complex crowd workflows will also be discussed. Students will learn about the application of crowdsourcing to other areas of computer science, and how the field relates to social psychology and organizational behavior. Prerequisite: CS 147.

**CS 377D. Topics in Learning and Technology: d.compress - Designing Calm. 3 Units.**

Contents of the course change each year. The course can be repeated. Stress silently but steadily damages physical and emotional well-being, relationships, productivity, and our ability to learn and remember. This highly experiential and project-oriented class will focus on designing interactive technologies to enable calm states of cognition, emotion, and physiology for better human health, learning, creativity and productivity. Same as: EDUC 328A

**CS 377E. Designing Solutions to Global Grand Challenges. 3-4 Units.**

In this course we creatively apply information technologies to collectively attack Global Grand Challenges (e.g., global warming, rising healthcare costs and declining access, and ensuring quality education for all). Interdisciplinary student teams will carry out need-finding within a target domain, followed by brainstorming to propose a quarter long project. Teams will spend the rest of the quarter applying user-centered design methods to rapidly iterate through design, prototyping, and testing of their solutions. This course will interweave a weekly lecture with a weekly studio session where students apply the techniques hands-on in a small-scale, supportive environment.

**CS 377I. Designing Systems for Humans. 3-4 Units.**

Complex problems require sophisticated approaches. In this project-based hands-on course, students explore the design of systems, information and interface for human use. The design of systems is about modeling the flow of interactions, data and context, exploring the possible inputs and outputs and crafting a design response that is useful, appropriate and robust. Through the design of user scenarios, information flows, maps and models, students will also gain an understanding of the differences and synergies between design and the organization of information, and the ability to evaluate and analyze the success of a system to achieve the intended goals. We will also examine the ethical consequences of design decisions and explore current issues arising from unintended consequences. Prerequisite: CS 147 or equivalent. 247 recommended, but not required. Offered on an experimental basis in Spring 2018.

**CS 377U. Understanding Users. 3-4 Units.**

This project-based class focuses on understanding the use of technology in the world. Students will learn generative and evaluative research methods to explore how systems are appropriated into everyday life in a quarter-long project where they design, implement and evaluate a novel mobile application. Quantitative (e.g. A/B testing, instrumentation, analytics, surveys) and qualitative (e.g. diary studies, contextual inquiry, ethnography) methods and their combination will be covered along with practical experience applying these methods in their project. Prerequisites: CS 147, 193A/193P (or equivalent mobile programming experience).

**CS 379. Interdisciplinary Topics. 3 Units.**

Advanced material is often taught for the first time as a topics course, perhaps by a faculty member visiting from another institution. May be repeated for credit.

**CS 379C. Computational Models of the Neocortex. 3 Units.**

This course emphasizes approaches to scaling the technologies of computer science and systems neuroscience to take advantage of the exponential trend in computational power known as Moore's Law. Modern methods in signal processing and machine learning are combined with technologies for managing large datasets common in industry. Classes feature scientists presenting novel approaches for analyzing the structure and function of complex neural circuits. Grading is based on class participation (30%), a project proposal due at midterm (20%), and a final project demonstration and report due by the end of finals (50%). Team projects are encouraged, especially multi-disciplinary collaborations. Prerequisites are basic high-school biology, good math skills and familiarity with machine learning. Some background in computer vision and signal processing is important for projects in structural analysis. Familiarity with modern artificial neural network technologies is a plus for projects in functional analysis. For more detail, see <http://www.stanford.edu/class/cs379c/> with special attention to the CALENDAR and DISCUSSION tabs from past classes available by following the ARCHIVES link.

**CS 390A. Curricular Practical Training. 1 Unit.**

Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. 390 A, B, and C may each be taken once.

**CS 390B. Curricular Practical Training. 1 Unit.**

Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. 390A,B,C may each be taken once.

**CS 390C. Curricular Practical Training. 1 Unit.**

Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in internship work and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. 390A,B,C may each be taken once.

**CS 390D. Part-time Curricular Practical Training. 1 Unit.**

For qualified computer science PhD students only. Permission number required for enrollment; see the CS PhD program administrator in Gates room 196. May be taken just once; not repeatable. Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in research and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. Students on F1 visas should be aware that completing 12 or more months of full-time CPT will make them ineligible for Optional Practical Training (OPT).

**CS 390P. Part-time Curricular Practical Training. 1 Unit.**

For qualified computer science PhD students only. Permission number required for enrollment; see the CS PhD program administrator in Gates room 196. May be taken just once; not repeatable. Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in research and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. Students on F1 visas should be aware that completing 12 or more months of full-time CPT will make them ineligible for Optional Practical Training (OPT).

**CS 390Q. Part-Time Curricular Practical Training. 1 Unit.**

For qualified computer science PhD students only. Permission number required for enrollment; see the CS PhD program administrator in Gates room 196. May be taken just once; not repeatable. Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in research and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. Students on F1 visas should be aware that completing 12 or more months of full-time CPT will make them ineligible for Optional Practical Training (OPT).

**CS 390R. Part-Time Curricular Practical Training. 1 Unit.**

For qualified computer science PhD students only. Permission number required for enrollment; see the CS PhD program administrator in Gates room 196. May be taken just once; not repeatable. Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in research and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. Students on F1 visas should be aware that completing 12 or more months of full-time CPT will make them ineligible for Optional Practical Training (OPT).

**CS 390S. Part-Time CPT. 1 Unit.**

For qualified computer science PhD students only. Permission number required for enrollment; see the CS PhD program administrator in Gates room 196. May be taken just once; not repeatable. Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in research and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. Students on F1 visas should be aware that completing 12 or more months of full-time CPT will make them ineligible for Optional Practical Training (OPT).

**CS 390T. Part-Time CPT. 1 Unit.**

For qualified computer science PhD students only. Permission number required for enrollment; see the CS PhD program administrator in Gates room 196. May be taken just once; not repeatable. Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in research and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. Students on F1 visas should be aware that completing 12 or more months of full-time CPT will make them ineligible for Optional Practical Training (OPT).

**CS 390U. Part-Time Curricular Practical Training. 1 Unit.**

For qualified computer science PhD students only. Permission number required for enrollment; see the CS PhD program administrator in Gates room 196. May be taken just once; not repeatable. Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in research and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. Students on F1 visas should be aware that completing 12 or more months of full-time CPT will make them ineligible for Optional Practical Training (OPT).

**CS 390V. Part-time Curricular Practical Training. 1 Unit.**

For qualified computer science PhD students only. Permission number required for enrollment; see the CS PhD program administrator in Gates room 196. May be taken just once; not repeatable. Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in research and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. Students on F1 visas should be aware that completing 12 or more months of full-time CPT will make them ineligible for Optional Practical Training (OPT).

**CS 390W. Part-time Curricular Practical Training. 1 Unit.**

For qualified computer science PhD students only. Permission number required for enrollment; see the CS PhD program administrator in Gates room 196. May be taken just once; not repeatable. Educational opportunities in high technology research and development labs in the computing industry. Qualified computer science students engage in research and integrate that work into their academic program. Students register during the quarter they are employed and complete a research report outlining their work activity, problems investigated, results, and follow-on projects they expect to perform. Students on F1 visas should be aware that completing 12 or more months of full-time CPT will make them ineligible for Optional Practical Training (OPT).

**CS 393. Computer Laboratory. 1-9 Unit.**

For CS graduate students. A substantial computer program is designed and implemented; written report required. Recommended as a preparation for dissertation research. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

**CS 395. Independent Database Project. 1-6 Unit.**

For graduate students in Computer Science. Use of database management or file systems for a substantial application or implementation of components of database management system. Written analysis and evaluation required. Register using the section number associated with the instructor. Prerequisite: consent of instructor.

**CS 399. Independent Project. 1-9 Unit.**

Letter grade only. This course is for graduate students only. Undergraduate students should enroll in CS199.

**CS 399P. Independent Project. 1-9 Unit.**

Graded satisfactory/no credit. This course is for graduate students only. Undergraduate students should enroll in CS199P.

**CS 402. Beyond Bits and Atoms: Designing Technological Tools. 3-4 Units.**

Practicum in designing and building technology-enabled curricula and hands-on learning environments. Students use software toolkits and state-of-the-art fabrication machines to design educational software, educational toolkits, and tangible user interfaces. The course will focus on designing low-cost technologies, particularly for urban school in the US and abroad. We will explore theoretical and design frameworks from the constructionist learning perspective, critical pedagogy, interaction design for children. Interested students should complete the application at <https://web.stanford.edu/class/educ211> by January 5, and come to the first class at 9am in CERAS 101.

Same as: EDUC 236

**CS 402L. Beyond Bits and Atoms - Lab. 1-3 Unit.**

This course is a hands-on lab in the prototyping and fabrication of tangible technologies, with a special focus in learning and education. We will learn how to use state-of-the-art fabrication machines (3D printers, 3D scanners, laser cutters, routers) to design educational toolkits, educational toys, science kits, and tangible user interfaces. A special focus of the course will be to design low-cost technologies, particularly for urban school in the US and abroad. Interested students should complete the application at <https://web.stanford.edu/class/educ211> by January 5, and come to the first class at 9am in CERAS 101.

Same as: EDUC 211

**CS 41. Hap.py Code: The Python Programming Language. 2 Units.**

The fundamentals and contemporary usage of the Python programming language. Primary focus on developing best practices in writing Python and exploring the extensible and unique parts of Python that make it such a powerful language. Topics include: data structures (e.g. lists and dictionaries) and characteristic pythonic conventions such as anonymous functions, iterables, and powerful built-ins (e.g. map, filter, zip). We will also cover object-oriented design, the standard library, and common third-party packages (e.g. requests, pillow). Time permitting, we will explore modern Python-based web frameworks and project distribution. Prerequisite: 106B/X or equivalent. Application required.

**CS 42. Callback Me Maybe: Contemporary Javascript. 2 Units.**

Introduction to the JavaScript programming language with a focus on building contemporary applications. This course consists of in-class activities and programming assignments that challenge students to create functional web apps (e.g. Yelp, Piazza, Instagram). Topics include syntax/semantics, event-based programming, document object model (DOM), application programming interfaces (APIs), asynchronous JavaScript and XML (AJAX), Node.js, and MongoDB. Prerequisite: CS 107.

**CS 424M. Learning Analytics and Computational Modeling in Social Science. 3-4 Units.**

Computational modeling and data-mining are dramatically changing the physical sciences, and more recently also the social and behavioral sciences. Traditional analysis techniques are insufficient to investigate complex dynamic social phenomena as social networks, online gaming, diffusion of innovation, opinion dynamics, classroom behavior, and other complex adaptive systems. In this course, we will learn about how modeling, network theory, and basic data-mining can support research in cognitive, and social sciences, in particular around issues of learning, cognitive development, and educational policy.

Same as: EDUC 390

**CS 428. Computation and cognition: the probabilistic approach. 3 Units.**

This course will introduce the probabilistic approach to cognitive science, in which learning and reasoning are understood as inference in complex probabilistic models. Examples will be drawn from areas including concept learning, causal reasoning, social cognition, and language understanding. Formal modeling ideas and techniques will be discussed in concert with relevant empirical phenomena.

Same as: PSYCH 204

**CS 43. Functional Programming in Clojure. 2 Units.**

Clojure is a dialect of Lisp that runs on the JVM, CLR, or Javascript engine. This course explores the fundamentals and philosophy of Clojure, with emphasis on the benefits of immutability and functional programming that make it such a powerful and fun language. Topics include: immutability, functional programming (function composition, higher order functions), concurrency (atoms, promises, futures, actors, Software Transactional Memory, etc), LISP (REPL-driven development, homoiconicity, macros), and interop (between Clojure code and code native to the host VM). The course also explores design paradigms and looks at the differences between functional programming and object-oriented programming, as well as bottom-up versus top-down design.

**CS 431. High-level Vision: From Neurons to Deep Neural Networks. 3 Units.**

Interdisciplinary seminar focusing on understanding how computations in the brain enable rapid and efficient object perception. Covers topics from multiple perspectives drawing on recent research in Psychology, Neuroscience, Computer Science and Applied Statistics. Emphasis on discussing recent empirical findings, methods and theoretical debates in the field. Topics include: theories of object perception, neural computations underlying invariant object perception, how visual exemplars and categories are represented in the brain, what information is present in distributed activations across neural populations and how it relates to object perception, what modern statistical and analytical tools there are for multi-variate analysis of brain activations.

Same as: PSYCH 250

**CS 448. Topics in Computer Graphics. 3-4 Units.**

Topic changes each quarter. Recent topics: computational photography, data visualization, character animation, virtual worlds, graphics architectures, advanced rendering. See <http://graphics.stanford.edu/courses> for offerings and prerequisites. May be repeated for credit.

**CS 448B. Data Visualization. 3 Units.**

Techniques and algorithms for creating effective visualizations based on principles from graphic design, visual art, perceptual psychology, and cognitive science. Topics: graphical perception, data and image models, visual encoding, graph and tree layout, color, animation, interaction techniques, automated design. Lectures, reading, and project. Prerequisite: one of 147, 148, or equivalent.

**CS 448H. Topics in Computer Graphics: Agile Hardware Design. 3 Units.**

Topic changes each quarter. Recent topics: computational photography, data visualization, character animation, virtual worlds, graphics architectures, advanced rendering. See <http://graphics.stanford.edu/courses> for offerings and prerequisites. May be repeated for credit.

**CS 448I. Computational Imaging and Display. 3 Units.**

Spawned by rapid advances in optical fabrication and digital processing power, a new generation of imaging technology is emerging: computational cameras at the convergence of applied mathematics, optics, and high-performance computing. Similar trends are observed for modern displays pushing the boundaries of resolution, contrast, 3D capabilities, and immersive experiences through the co-design of optics, electronics, and computation. This course serves as an introduction to the emerging field of computational imaging and displays. Students will learn to master bits and photons.

Same as: EE 367

**CS 45N. Computers and Photography: From Capture to Sharing. 3-4 Units.**

Preference to freshmen with experience in photography and use of computers. Elements of photography, such as lighting, focus, depth of field, aperture, and composition. How a photographer makes photos available for computer viewing, reliably stores them, organizes them, tags them, searches them, and distributes them online. No programming experience required. Digital SLRs and editing software will be provided to those students who do not wish to use their own.

**CS 468. Topics in Geometric Algorithms: Machine Learning for 3D Data. 3 Units.**

Contents of this course change with each offering. Past offerings have included geometric matching, surface reconstruction, collision detection, computational topology. May be repeated for credit. Winter 2013/14 iteration will cover Computational Symmetry & Regularity and spring quarter 2013/14 will cover data-driven shape analysis. Prerequisites: Math 52 or equivalent, basic coding.

**CS 476A. Music, Computing, Design I: Art of Design for Computer Music. 3-4 Units.**

Creative design for computer music software. Programming, audiovisual design, as well as software design for musical tools, instruments, toys, and games. Provides paradigms and strategies for designing and building music software, with emphases on interactive systems, aesthetics, and artful product design. Course work includes several programming assignments and a "design+implement" final project. Prerequisite: experience in C/C++ and/or Java. See <https://ccrma.stanford.edu/courses/256a/>.

Same as: MUSIC 256A

**CS 476B. Music, Computing, Design II: Virtual and Augmented Reality for Music. 3-4 Units.**

Aesthetics, design, and exploration of creative musical applications of virtual reality (VR) and augmented reality (AR), centered around VR and mobile technologies. Comparison between AR, VR, and traditional software design paradigms for music. Topics include embodiment, interaction design, novel instruments, social experience, software design + prototyping. Prerequisite: MUSIC 256A / CS 476A.

Same as: MUSIC 256B

**CS 47SI. Cross-Platform Mobile Development. 2 Units.**

The fundamentals of cross-platform mobile application development using the React Native framework (RN). Primary focus on developing best practices in creating apps for both iOS and Android by using Javascript and existing web + mobile development paradigms. Students will explore the unique aspects that made RN a primary tool for mobile development within Facebook, Instagram, Airbnb, Walmart, Tesla, and UberEats. Skills developed over the course will be consolidated by the completion of a final project. Required Prerequisites: at least one of the following: CS142, CS193P, CS193A (Web/Mobile development or heavy project-based class experience). Apply here: <https://goo.gl/forms/sF3TDYd5mN7V8f1W2> by January 13th (Saturday of week one).

**CS 499. Advanced Reading and Research. 1-15 Unit.**

Letter grade only. Advanced reading and research for CS graduate students. Register using the section number associated with the instructor. Prerequisite: consent of instructor. This course is for graduate students only. Undergraduate students should enroll in CS199.

**CS 499P. Advanced Reading and Research. 1-15 Unit.**

Graded satisfactory/no credit. Advanced reading and research for CS graduate students. Register using the section number associated with the instructor. Prerequisite: consent of instructor. This course is for graduate students only. Undergraduate students should enroll in CS199P.



**CS 49N. Using Bits to Control Atoms. 3 Units.**

This is a crash course in how to use a stripped-down computer system about the size of a credit card (the raspberry pi computer) to control as many different sensors as we can implement in ten weeks, including LEDs, motion sensors, light controllers, and accelerometers. The ability to fearlessly grab a set of hardware devices, examine the data sheet to see how to use it, and stitch them together using simple code is a secret weapon that software-only people lack, and allows you to build many interesting gadgets. We will start with a "bare metal" system — no operating system, no support — and teach you how to read device data sheets describing sensors and write the minimal code needed to control them (including how to debug when things go wrong, as they always do). This course differs from most in that it is deliberately mostly about what and why rather than how — our hope is that the things you are able at the end will inspire you to follow the rest of the CS curriculum to understand better how things you've used work. Prerequisites: knowledge of the C programming language. A Linux or Mac laptop that you are comfortable coding on.

**CS 50. Using Tech for Good. 2 Units.**

Students in the class will work in small teams to implement high-impact projects for partner organizations. Taught by the CS+Social Good team, the aim of the class is to empower you to leverage technology for social good by inspiring action, facilitating collaboration, and forging pathways towards global change. Recommended: CS 106B, CS 42 or 142. Class is open to students of all years. May be repeated for credit. Cardinal Course certified by the Haas Center.

**CS 51. CS + Social Good Studio: Designing Social Impact Projects. 2 Units.**

Get real-world experience launching and developing your own social impact projects! Students work in small teams to develop high-impact projects around problem domains provided by partner organizations, under the guidance and support of design/technical coaches from industry and non-profit domain experts. Along with support, resources, and community discussion, the class provides an outlet for students to create social change through CS while providing students with experience engaging in the full product development cycle on real-world projects. Prerequisite: CS 147, equivalent experience, or consent of instructors.

**CS 52. CS + Social Good: Implementing Social Impact Projects. 2 Units.**

Continuation of CS51 (CS + Social Good Studio: Designing Social Impact Projects). Teams enter the quarter having completed and tested a minimal viable product (MVP) with a well-defined target user, and a community partner. Students will learn to apply scalable technical frameworks, methods to measure social impact, tools for deployment, user acquisition techniques and growth/exit strategies. The purpose of the class is to facilitate students to build a sustainable infrastructure around their product idea. CS52 will host mentors, guest speakers and industry experts for various workshops and coaching-sessions. The class culminates in a showcase where students share their projects with stakeholders and the public. Prerequisite: CS 51, or consent of instructor.

**CS 52I. Seminar on AI Safety. 1 Unit.**

In this seminar, we will focus on the challenges in the design of safe and verified AI-based systems. We will explore some of the major problems in this area from the viewpoint of industry and academia. We plan to have a weekly seminar speaker to discuss issues such as verification of AI systems, reward misalignment and hacking, secure and attack-resilient AI systems, diagnosis and repair, issues regarding policy and ethics, as well as the implications of AI safety in automotive industry. Prerequisites: There are no official prerequisites but an introductory course in artificial intelligence is recommended.

**CS 522. Seminar in Artificial Intelligence in Healthcare. 1 Unit.**

Artificial intelligence is poised to make radical changes in healthcare, transforming areas such as diagnosis, genomics, surgical robotics, and drug discovery. In the coming years, artificial intelligence has the potential to lower healthcare costs, identify more effective treatments, and facilitate prevention and early detection of diseases. This class is a seminar series featuring prominent researchers, physicians, entrepreneurs, and venture capitalists, all sharing their thoughts on the future of healthcare. We highly encourage students of all backgrounds to enroll (no AI/healthcare background necessary). Speakers and more at [shift.stanford.edu/healthai](http://shift.stanford.edu/healthai).

**CS 53SI. Discussion in Tech for Good. 1 Unit.**

This course introduces students to various intersections of social good and technology through a weekly discussion and speaker series. Students will be given a space to exchange ideas and experiences regarding a certain social issue. Invited speakers come from industry, academia, and non-profit organizations. They will share their career paths, what drove them to these fields, and advice for students. The topics examined will span a broad variety of social issues — from race and class to education and sustainability — and help students better understand how to kick off their journey in using computer science for social good.

**CS 547. Human-Computer Interaction Seminar. 1 Unit.**

Weekly speakers on human-computer interaction topics. May be repeated for credit.

**CS 54N. Great Ideas in Computer Science. 3 Units.**

Stanford Introductory Seminar. Preference to freshmen. Covers the intellectual tradition of computer science emphasizing ideas that reflect the most important milestones in the history of the discipline. No prior experience with programming is assumed. Topics include programming and problem solving; implementing computation in hardware; algorithmic efficiency; the theoretical limits of computation; cryptography and security; and the philosophy behind artificial intelligence.

**CS 56N. Great Discoveries and Inventions in Computing. 3 Units.**

This seminar will explore some of both the great discoveries that underlie computer science and the inventions that have produced the remarkable advances in computing technology. Key questions we will explore include: What is computable? How can information be securely communicated? How do computers fundamentally work? What makes computers fast? Our exploration will look both at the principles behind the discoveries and inventions, as well as the history and the people involved in those events. Some exposure to programming will be helpful, but it not strictly necessary.

**CS 57I. Surgical Robotics Seminar. 1 Unit.**

Surgical robots developed and implemented clinically on varying scales. Seminar goal is to expose students from engineering, medicine, and business to guest lecturers from academia and industry. Engineering and clinical aspects connected to design and use of surgical robots, varying in degree of complexity and procedural role. May be repeated for credit. Same as: ME 57I

**CS 58I. Media Innovation. 1 Unit.**

This course will introduce students interested in computer science, engineering, and media to what's possible and probable when it comes to media innovation. Speakers from multiple disciplines and industry will discuss a range of topics in the context of evolving media with a focus on the technical trends, opportunities and challenges surfacing in the unfolding media ecosystem. Speakers will underscore the need to innovate to survive in the media and information industries. Open to both undergraduates and graduate students.

**CS 62N. Let There Be Computations. 3 Units.**

The class will discuss the Theory of Computing as an ambitious intellectual endeavor with impact beyond Computer Science. What are computations? How can their study capture important aspects of the evolution of species, the structure of social networks, and the working of your smart phone? What are the laws of efficiency and complexity that govern computations? We will see surprising algorithms for very familiar problems as well as simple problems no one knows how to solve efficiently. We will encounter logic paradoxes that expose the limitations of computations and explore the different worlds we may be living in, depending on the answers to some of the central problems on computations.

The class is intended for students with a wide range of interests. The course will not involve programming. While our class will not rely on any deep mathematics (beyond basic high-school math) we will deal with mathematical formalization of concepts and with mathematical problem-solving. Therefore, some mathematical maturity and interest would be useful.

**CS 7. Personal Finance for Engineers. 1 Unit.**

Introduction to the fundamentals and analysis specifically needed by engineers to make informed and intelligent financial decisions. Course will focus on actual industry-based financial information from technology companies and realistic financial issues. Topics include: behavioral finance, budgeting, debt, compensation, stock options, investing and real estate. No prior finance or economics experience required.

**CS 801. TGR Project. 0 Units.****CS 802. TGR Dissertation. 0 Units.****CS 82. Social Impacts of Media Innovation. 1 Unit.**

Media innovation merges technical and cultural development and benefits diverse social groups in different ways. Considering historic media innovations such as cinema, hip-hop, and the works of innovator in residence Paul D. Miller aka DJ Spooky, the course focuses on what ideas benefit whom. Lectures and workshops underscore the need to innovate to survive and get heard, and offer know-how for radical innovation in the arts and entertainment industry. Course projects will be considered for inclusion in the Stanford Humanities Showcase. Open to both undergraduate and graduate students.

**CS 83. Playback Theater For Research. 3 Units.**

Playback combines elements of theater, community work and storytelling. In a playback show, a group of actors and musicians create an improvised performance based on the audience's personal stories. A playback show brings about a powerful listening and sharing experience. During the course, we will tell, listen, play together, and train in playback techniques. We will write diaries to process our experience in the context of education and research. The course is aimed to strengthen listening abilities, creativity and the collaborative spirit, all integral parts of doing great science. In playback, as in research, we are always moving together, from the known, to the unknown, and back.

There is limited enrollment for this class. Application is required. Apply here: [https://docs.google.com/forms/d/1gR4bGkFZh\\_ycMBGMz1Alluyv7WyQfX5xTjanGlclK-A/prefill](https://docs.google.com/forms/d/1gR4bGkFZh_ycMBGMz1Alluyv7WyQfX5xTjanGlclK-A/prefill).

**CS 9. Problem-Solving for the CS Technical Interview. 1 Unit.**

This course will prepare students to interview for software engineering and related internships and full-time positions in industry. Drawing on multiple sources of actual interview questions, students will learn key problem-solving strategies specific to the technical/coding interview. Students will be encouraged to synthesize information they have learned across different courses in the major. Emphasis will be on the oral and combination written-oral modes of communication common in coding interviews, but which are unfamiliar settings for problem solving for many students. Prerequisites: CS 106B or X.

**CS 96SI. Mobilizing Healthcare - iOS Development for Mobile Health. 2 Units.**

How can mobile technology can be leveraged to tackle pressing problems in healthcare? Our class will feature guest lecturers from Verily (formerly Google Life Sciences), Apple Health, and mobile health companies in developing countries and in the Bay Area. This class will give an overview of the fundamentals and contemporary usage of iOS development with a Mobile Health focus. Primary focus on developing best practices for Apple HealthKit and ResearchKit among other tools for iOS application development. Students will complete a project in the mobile health space sponsored and advised by professionals and student TAs. Recommended: CS193P or iOS development at a similar level. Apply at <https://enrollcs96si.typeform.com/to/FGGHVI> by Sept 30.

**Dance (DANCE)****DANCE 1. Introduction to Contemporary Dance & Movement: Liquid Flow. 1 Unit.**

Students in Liquid Flow will participate in a dance and movement class that 1) teaches the fundamentals of dance technique, and 2) addresses the way that you already dance in the world. Through discovering your own DIY movement signature and being aware of one another's dance, motion, and energy in space, we will transform the way that we move and connect to one another to inhabit flow states from the dance studio, into everyday life, and ultimately onto the stage.

Accompanied by contemporary and live music, Students will develop articulation, flexibility and "grace", learn contemporary and classic dance vocabulary, gain freedom dancing with others and mine dance's potential for social transformation and connection. Designed for beginners, we welcome student movers from diverse dance traditions, non-dancers, athletes, and more advanced dancers, who desire fluidity in their daily life, from thought to action.

**DANCE 100. Dance, Movement and Medicine: Immersion in Dance for PD. 1-2 Unit.**

Combining actual dancing with medical research, this Cardinal Course investigates the dynamic complementary relationship between two practices, medicine and dance, through the lens of Parkinson's disease (PD), a progressive neurological disease that manifests a range of movement disorders. "Dance for PD" is an innovative approach to dancing –and to teaching dance –for those challenged by PD. Course format consists of: 1. Weekly Lecture/Seminar Presentation: Partial list of instructors include Ms. Frank, Dr. Bronte-Stewart and other Stanford medical experts & research scientists, David Leventhal (Director, "Dance for PD") and Bay Area "Dance for PD" certified master teachers, filmmaker Dave Iverson, Damara Ganley, and acclaimed choreographers Joe Goode, Alex Ketley, Judith Smith (AXIS Dance). 2. Weekly Dance Class: Stanford students will fully participate as dancers, and creative partners, in the Stanford Neuroscience Health Center's ongoing "Dance for Parkinson's" community dance class for people with PD. This Community Engaged Learning component provides opportunity to engage meaningfully with people in the PD community. Dancing together weekly, students will experience firsthand the embodied signature values of "Dance for PD" classes: full inclusion, embodied presence, aesthetic and expressive opportunity for creative engagement, and community-building in action. A weekly debriefing session within Friday's class time will allow students to integrate seminar material with their movement experiences.

NO PRE-REQUISITES: No prior dance experience required. Beginners are welcome. Same as: NENS 222

**DANCE 102. Musical Theater Dance Styles. 1 Unit.**

Students will be able to demonstrate period specificity, character of style through learning different musical theater dances from the early 20th C. to the present. ALL students will participate in an end of quarter showing of the choreography developed and composed in class. nClass will be supplemented with the occasional guest, DJ accompaniment and video viewing.

Same as: MUSIC 184E

**DANCE 106. Choreography Project: Dancing, Recollected. 1 Unit.**

Collaboratively directed by Ketley and Frank, students will create dance material prompted by weekly interactions with residents of Lytton Gardens Assisted Living Residence. Students will meet twice weekly: once in studio on-campus, and once on-site with Lytton residents.

Drawing from interviews and interactions with Lytton residents, students will engage in an evolving rehearsal process including movement score creation, aesthetic discussion, revision with active involvement of the residents, and performance. The course culminates in performance(s) of the dance work for Lytton residents, staff, and families on-site at the end of the quarter.

**DANCE 106I. Stanford Dance Community: Inter-Style Choreography Workshop. 1-2 Unit.**

Designed for adventurous dancers, choreographers and student dance team leaders across Stanford campus. Students will explore a multiplicity of dance styles presented both by peer choreographers, as well as professionals in the field, to create a community of dancers who want to experiment and innovate within their form. The emphasis of the class is on individual growth as a dancer and dance maker through exposure to new and unfamiliar styles. Student dance team leaders and dancers with a strong interest in both choreography and learning different forms are highly encouraged to attend. Interested participants encouraged but not required to contact instructor, Aleta Hayes: ahayes1@stanford.edu. Course will consist of weekly choreography master classes taught by peers, composition intensives facilitated by the instructor, and guest professional master classes, not represented by the class participants.

**DANCE 107. Disruptive Choreography: Student Choreographers Creating Innovative Work. 1 Unit.**

Collaboratively taught by choreographers and Stanford dance faculty Alex Ketley and Diane Frank, this is a body-based investigation and studio class. As a class we will take a conspiratorial approach toward choreographic processes that insure breakthrough moments of innovation as students investigate, create, and eventually perform their own dance works. Both instructors have a wide range of choreographic experience which they will use to guide students through a myriad of approaches they can deploy when devising new dance and physical performance. Pre-requisite: A curiosity about making your own work and diversifying your understanding of movement generation and the infinite possible forms dances can take. Dancers of all genres, training backgrounds, and levels of experience are strongly encouraged to enroll. The quarter of studio exploration work will culminate in a public performance of the created works during the last week of class.

**DANCE 108. Hip Hop Meets Broadway. 1 Unit.**

What happens when Hip Hop meets "Fosse", "Aida", "Dream Girls" and "In the Heights"?nThe most amazing collaboration of Hip Hop styles adapted to some of the most memorable Broadway Productions.nThis class will explore the realm between Hip Hop Dance and the Broadway Stage. Infusing Acting thru dance movement and exploring the Art of Lip Sync thru Hip Hop Dance styles.

**DANCE 123. Hot Mess: Deliberate Failure as Practice. 2 Units.**

A dance class in how we become the worst dancer possible. The foundation of this class has many parts. One is that, in almost every respect the way we gain insight into anything is to understand more clearly its polarity. As a class we purposely explore chaos, failure, and "bad" dancing, with the hope that then we will have a greater chance to understand and refine our personal notions around beauty. The class also acknowledges that creativity is at times born from the loss of control. Instead of looking at this idea obliquely, Hot Mess looks at this directly by having dancers confront a number of movement and vocal prompts that are literally impossible to execute in any good way. This class embraces and celebrates destabilization, with all the exuberance, fear, and learning that can happen when we accept and practice being lost.

**DANCE 128. Roots Modern Experience - Mixed Level. 1 Unit.**

In this course students will be introduced to a series of Afro-contemporary dance warm ups and dance combinations that are drawn from a broad range of modern dance techniques, somatic practices and dance traditions of the African diaspora with a particular focus on Afro Brazilian, Afro Cuban and Haitian dance forms. Our study of these dance disciplines will inform the movement vocabulary, technical training, class discussions, and choreography we experience in this course. Students will learn more about the dances and rhythms for the Orishas of Brazil and Cuba, and the Loa of Haiti with an additional focus on other African diaspora dance forms such as, Cuban Haitian, Palo, Samba and Samba-Reggae. Dance combinations will consist of dynamic movement patterns that condition the body for strength, flexibility, endurance, musicality and coordination. Through this approach to our warm ups and class choreography, we will deepen our analysis and understanding of how African diaspora movement traditions are inherently embedded in many expressions of the broadly termed form known as contemporary dance. Same as: AFRICAAM 128

**DANCE 131. Beginning/Intermediate Ballet. 1 Unit.**

Structured studio practice reviewing the basics of ballet technique including posture, placement, the foundation steps and ballet terms, and progressing to more complex positions and combination of steps. Emphasis is placed on improving forms, developing coordination and connectivity, securing balance, increasing strength, flexibility, sense of lines, and sensitivity to rhythm and music.

**DANCE 132. Ballet Technique & Classical Variations. 1 Unit.**

For Intermediate/Advanced Students. Structured studio practice reviewing the basics of ballet technique including posture, placement, the foundation steps and ballet terms, and progressing to more complex positions and combination of steps. Emphasis is placed on improving forms, developing coordination and connectivity, securing balance, increasing strength, flexibility, sense of lines, and sensitivity to rhythm and music and as well as learning the variations from existing ballets: Sleeping Beauty, Swan Lake, Paquita(just to name a few).

**DANCE 141. Advanced Contemporary Modern Technique. 2 Units.**

This advanced dance technique class is grounded in the technical training, aesthetics, and choreographic processes of Merce Cunningham, American dancer and master choreographer. Practice will increase strength, speed, articulation, amplitude and clarity of dancing. Class will provide a solid technical base applicable to other forms of dancing. Dancers must be ready to work at a high intermediate/advanced level to enroll. Short readings and concert attendance will supplement studio work. Cunningham-based technique is particularly well-suited to dancers with prior training in ballet; dancers with prior training in any form are welcome. nMay be repeated for credit.

**DANCE 142. Intermediate/Advanced Contemporary Dance Technique. 1 Unit.**

This intermediate/advanced dance technique class is grounded in the technical training, aesthetic sensibilities, and choreographic processes of Merce Cunningham, American dancer/master choreographer. This studio work at an intermediate/advanced level will build technical strength, speed, line, and rhythmic acuity/musicality and amplitude in dancing. The class will provide solid technical training useful and applicable to other forms of dancing. Dancers must be ready to work at an intermediate/advanced level to enroll. Studio practice will be supplemented by readings, video viewing, concert attendance, and participation in special workshops with guest artists. Though Cunningham-based dance technique is particularly well-suited to dancers with prior training in ballet, dancers with prior training in all forms of dance are welcome and strongly encouraged to enroll. May be repeated for credit.

**DANCE 146. Social Dance II. 1 Unit.**

Intermediate non-competitive social ballroom dance. The partner dances found in today's popular culture include Lindy hop, Viennese waltz, hustle, traveling foxtrot, plus intermediate/advanced levels of cross-step waltz and nightclub two-step. The course continues further tips for great partnering, enhancing creativity, developing personal style, stress reduction, musicality, and the ability to adapt to changing situations. Prerequisite: Dance 46.

**DANCE 147. Living Traditions of Swing. 1 Unit.**

Swing dancing: the early Lindy of the 1920s; 6- and 8-count Lindy hop, Shag, Big Apple, 1950s Rock 'n' Roll swing, disco Hustle and West Coast Swing. Partnering and improvisation. Swing's crosscultural influences and personal creativity. May be repeated for credit.

**DANCE 148. Intermediate Ballet. 1 Unit.**

Intermediate Ballet at Stanford is designed for students who have done ballet in their past, but maybe have stepped away from the form for awhile. The class focuses on technique, musicality, vocabulary, coordination and artistic choice. The class looks at ballet as an enduring and vibrant movement system that can be used for classical purposes or as a way to strengthen and diversify the movement vocabulary inherent in other dance forms like modern, hip-hop, or social dancing. Any questions can be directed to Lecturer Alex Ketley at [aketley@stanford.edu](mailto:aketley@stanford.edu).

**DANCE 149. Advanced Ballet. 2 Units.**

Advanced Ballet at Stanford is offered for students who are interested in rigorous, complex, and artistically compelling ballet training. The class focuses on technique, but in the broad sense of how ballet as a movement system can be used for a wide range of dance disciplines. The class honors the historical training legacy that defines classical ballet, but is in no way shackled to that history in an antiquated fashion. The students are encouraged to explore the form as artists, to question its foundations, and find their own sense of agency within classical dance. Students with a strong background in ballet are encouraged to come, but also students with less ballet training are welcome as long as they have an email dialog with the lecturer beforehand. Any questions can be directed to Lecturer Alex Ketley at [aketley@stanford.edu](mailto:aketley@stanford.edu).

**DANCE 156. Social Dance III. 1 Unit.**

Intermediate non-competitive social ballroom dance: intermediate/advanced waltz, redowa, Bohemian National Polka, intermediate/advanced tango, cha-cha, and salsa. The course continues further tips for great partnering, enhancing creativity, developing personal style, stress reduction, musicality, and the ability to adapt to changing situations. Prerequisite: Dance 46. Dance 156 may immediately follow Dance 46.

**DANCE 160. Performance and History: Rethinking the Ballerina. 4 Units.**

The ballerina occupies a unique place in popular imagination as an object of over-determined femininity as well as an emblem of extreme physical accomplishment for the female dancer. This seminar is designed as an investigation into histories of the ballerina as an iconographic symbol and cultural reference point for challenges to political and gender ideals. Through readings, videos, discussions and viewings of live performances this class investigates pivotal works, artists and eras in the global histories of ballet from its origins as a symbol of patronage and power in the 15th century through to its radical experiments as a site of cultural obedience and disobedience in the 20th and 21st centuries. Same as: FEMGEN 160, TAPS 160, TAPS 260

**DANCE 160J. Conjure Art 101: Performances of Ritual, Spirituality and Decolonial Black Feminist Magic. 2 Units.**

Conjure Art is a movement and embodied practice course looking at the work and techniques of artists of color who utilize spirituality and ritual practices in their art making and performance work to evoke social change. In this course we will discuss the work of artists who bring spiritual ritual in their art making while addressing issues of spiritual accountability and cultural appropriation. Throughout the quarter we will welcome guest artists who make work along these lines, while exploring movement, writing, singing and visual art making. This class will culminate in a performance ritual co-created by students and instructor.

Same as: AFRICAAM 160J, CSRE 160J

**DANCE 160M. Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture. 3-4 Units.**

This course will introduce students to the ways in which the Middle East has been represented and performed by/in the 'West' through dance, performance, and popular culture in both historical and contemporary contexts. A brief look through today's media sources exposes a wide range of racialized and gendered representations of the Middle East that shape the way the world imagines the Middle East to be. As postcolonial theorist Edward Said explains, the framework we call Orientalism establishes the ontological character of the Orient and the Oriental as inherently 'Other'. Starting with 19th century colonialism and continuing into the post-9/11 era, this course will trace the Western production, circulation, and consumption of representations of the Middle East as 'Other' in relation to global geopolitics. We will further examine dance forms produced in mid-twentieth century Iran and Egypt, with particular attention to nation-state building and constructions of gender. Finally, we will examine artistic productions and practices from the Middle East and Middle Eastern diasporic communities that respond to colonialism, war, displacement, secularism, and Euro-American Empire. Using dance studies, postcolonial feminist, and critical race theoretical frameworks, we will consider the gender, racial, political, and cultural implications of selected performance works and practices in order to analyze how bodies produce meaning in dance, performance art, theater, film, photography, and new media. Students will engage in multiple modes of learning; the course will include lectures, engaged group discussions, viewing of live and recorded performance, embodied participation in dance practice, student oral presentations, and a variety of writing exercises. Course assignments will culminate in a final research project related to class themes and methods.

Same as: CSRE 160M, FEMGEN 160M, TAPS 160M

**DANCE 161D. Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders. 3-4 Units.**

This introduction to dance studies course explores dance practice and performance as means for producing cultural meaning. Through theoretical and historical texts and viewing live and recorded dance, we will develop tools for analyzing dance and understanding its place in social, cultural, and political structures. This uses dance and choreography as a lens to more deeply understand a wide range of identity and cultural formations, such as gender, race, sexuality, (dis)ability, (trans)nationality, and empire. We will analyze dancing bodies that move across stages, dance clubs, film screens, and border zones. We will examine dance from diverse locales and time periods including ballet, modern and contemporary dance, contact improvisation, folkloric dance, burlesque, street dance, queer club dance, drag performance, music videos, TV dance competitions, and intermedia/new media performance. In addition to providing theoretical and methodological grounding in dance studies, this course develops performance analysis skills and hones the ability to write critically and skillfully about dance. No previous experience in dance is necessary to successfully complete the course. Same as: CSRE 61, FEMGEN 161D, TAPS 161D

**DANCE 161H. Dance, History and Conflict. 4 Units.**

This seminar investigates how moving bodies are compelling agents of social, cultural, and political change. Through readings, videos, discussions and viewings of live performances this class questions the impact of social conflict and war on selected 20th and 21st century dances and dance practices. This class asks to what extent dance, in its history as well as contemporary development, is linked to concepts of the political and conflict. Same as: TAPS 161H

**DANCE 162H. Baroque Modernities: Dance, Theater, Film, Political Theory. 4 Units.**

What do seventeenth-century choreography and dramaturgy contribute to (mean to) choreographic and theatrical modernity? How can we explain the recurrent baroque phenomenon across the twentieth century – becoming particularly prominent in the 1980s – beyond the historicist accounts of theatrical reconstruction? How does the baroque locate itself within cultural modernity? This seminar asks this question of choreography at several junctures: The analysis of seventeenth century baroque spectacle that fashioned dance and theatre into political tools of monarchical sovereignty; Twentieth-century literature on the Baroque that destabilizes received notions of subjectivity and political sovereignty; Twentieth-century choreography and film that deploys baroque figures and techniques. Thus, our material shall range from seventeenth-century dance and theater to contemporary dance, film and literature. Same as: TAPS 162H

**DANCE 162V. Advanced Research in Black Performing Arts. 1 Unit.**

What is the history of Committee for Black Performing Arts (CBPA)? How did it come into being and how do we carry/re-member the legacy forward and into the future? In this course students will engage in the research and archiving process as we dig into the history of CBPA on the eve of its 50th anniversary. Activities will include, digitizing and cataloguing film, video and documents, conducting interviews with former students and professors of CBPA, and guest lecturers with professional archivists. Same as: CSRE 162V

**DANCE 190. Special Research. 1-5 Unit.**

Topics related to the discipline of dance. May be repeated for credit.

**DANCE 191. Independent Research. 1-18 Unit.**

Individual supervision of off-campus internship. Prerequisite: consent of instructor.

**DANCE 2. Introduction to Dance & Movement: Afro Flows. 1 Unit.**

Students in Afro Flows will focus on fundamentals of contemporary dance, gain fluid movement in everyday life and develop a rhythmic sensibility. This class invites participants to be more expressive and spontaneous in their movement choices. In addition to set movement warm ups, students will also learn footwork from different traditions, including tap and current social dance styles to expand their dance vocabulary. Through this approach and live percussion, students will discover their own natural rhythmic capability, as well as learn to attune with the environment and with others. No previous experience required. Questions? Contact: Aleta Hayes (ahayes1@stanford.edu).

**DANCE 25. Studio to Stage: Student Choreography Projects. 1 Unit.**

Make your own dance! In Studio-to-Stage, student choreographers propose, develop, rehearse, and perform their own dances under the close guidance of a faculty mentor. Together, mentor and dance maker discover rehearsal processes that will support and realize the proposed work, including movement investigation, music/sound choices, costuming, and lighting. The course culminates in a group concert showing. Dance is broadly defined as any intentional movement, including fusion forms and innovation. Dance makers of all levels, styles, and training backgrounds are strongly encouraged to enroll. Concert format, logistics, and level of theatrical production will be determined by the collective ambition and imagination of the participants. TAPS will provide some technical support towards the culminating showing of works.

**DANCE 27. Faculty Choreography. 1 Unit.**

Creation, rehearsal, performance of faculty choreography. Casting by audition/invitation, first week of the quarter. For detailed project descriptions and full rehearsal/performance schedules, contact choreographers directly. New Work by Diane Frank. Rehearsals Mon / Wed, 6-8:30 pm. This group work investigates literal and imaginative tools – objects, memories, movement fragments, gestures, advice – used to find or create the extraordinary within the ordinary tasks and times of our lives. Rehearsals culminate in 3 TAPS Main Stage performances on shared dance faculty concert, end of week 9.

**DANCE 290. Special Research. 1-18 Unit.**

Individual project on the work of any choreographer, period, genre, or dance-related topic. May be repeated for credit.

**DANCE 30. Chocolate Heads Performance Project: Dance & Intercultural Performance Creation. 2 Units.**

Students from diverse dance styles (ballet to hip-hop to contemporary) participate in the dance-making/remix process and collaborate with musicians, visual artists, designers and spoken word artists, to co-create a multidisciplinary finished production and installation. Students of all dance or athletic backgrounds are welcome to audition on Wednesday, September 28th and Monday, October 4th during class time. Visual artists, musicians and dancers may also contact the instructor for further information at ahayes1@stanford.edu. Same as: AFRICAAM 37

**DANCE 3SI. Bollywood Balle Balle. 1 Unit.**

This is a survey course of Bollywood dance styles throughout history, with particular focus on the modern filmi dance. Throughout the course, students will learn the history and context of particular dance styles through discussions of integration with popular Indian cinema.

**DANCE 45. Dance Improv StratLab: Freestyle Improvisation from Contemporary to Hip Hop & Beyond. 1-2 Unit.**

This class is an arena for physical and artistic exploration to fire the imagination of dance improvisers, cultivate sensation and perception within and without studio practice and to promote interactive intelligence. Students will learn to harness and transform habitual movement patterns and dance trainings as resources for new ways of moving: expand their awareness of being a part of a bigger picture, while being attentive to everything all at once: and to use visual, aural and kinesthetic responses to convert those impulses into artistic material. Class will be accompanied by live and recorded music and include weekly jam sessions. Open to students from all dance, movement, athletic backgrounds and skill levels. Beginners welcome.  
Same as: AFRICAAM 45

**DANCE 46. Social Dance I. 1 Unit.**

Introduction to non-competitive social ballroom dance. The partner dances found in today's popular culture include 3 kinds of swing, 3 forms of waltz, tango, salsa, cha-cha and nightclub two-step. The course also includes tips for great partnering, enhancing creativity, developing personal style, stress reduction, musicality, and the ability to adapt to changing situations. The emphasis on comfort, partnering and flexibility enables students to dance with partners whose experience comes from any dance tradition.

**DANCE 48. Beginning Ballet. 1 Unit.**

Fundamentals of ballet technique including posture, placement, the foundation steps, and ballet terms; emphasis on the development of coordination, balance, flexibility, sense of lines, and sensitivity to rhythm and music. May be repeated for credit.

**DANCE 50. Contemporary Choreography. 1 Unit.**

Each day Ketley will develop a new phrase of choreography with the students and use this as the platform for investigation. Consistent lines of inquiry include; sculpting with the body as an emotional, instinctual, and graphic landscape, how the fracturing and the complication of strands of information can feel generative of new ways of moving, discussions around how our use of time is directly correlated to our sense of presence, and the multitude of physical colors available to each of us as artists as we expand our curiosity about movement. Classes will be very physical, trusting that much of our knowledge is contained in the body. For questions please e-mail [aketley@stanford.edu](mailto:aketley@stanford.edu).

**DANCE 58. Beginning Hip Hop. 1 Unit.**

Steps and styling in one of America's 21st-century vernacular dance forms. May be repeated for credit.

**DANCE 59. Intermediate-Advanced Hip-Hop. 1 Unit.**

Steps and styling in one of America's 21st-century vernacular dance forms. May be repeated for credit.

**DANCE 63. Beginning Dance and Dance Making. 1 Unit.**

This Choreography course is designed to expose students to fundamental techniques and approaches used in the creation of dance. All of the basic elements of dance composition will be creatively touched upon including: style, form, theme and variation, narrative versus abstract methods of expression, elements of time, quality and use of space, motif and repetition. These different tools will be illustrated and the options and restrictions of each will be explored. Practical assignments will culminate in a performance of work generated and arranged by the instructor and students. The course is recommended for all students interested in the artistic process in a creative situation.

**DANCE 71. Introduction to Capoeira: An African Brazilian Art Form. 1 Unit.**

Capoeira is an African Brazilian art form that incorporates, dance, music, self-defense and acrobatics. Created by enslaved Africans in Brazil who used this form as a tool for liberation and survival, it has since become a popular art form practiced around the world. In this course students will learn basic movements for both Capoeira Angola and Capoeira Regional, and the history of this rich and physically rigorous art form. Students will learn basic acrobatic skills, be introduced to Capoeira songs, and learn to play rhythms on the drum, pandeiro (tambourine), and the Berimbau – a single stringed bow instrument. This course will be physically rigorous and fun! No previous experience necessary.  
Same as: AFRICAAM 71

## Developmental Biology (DBIO)

**DBIO 199. Undergraduate Research. 1-18 Unit.**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

**DBIO 200. Genetics and Developmental Biology Training Camp. 1 Unit.**

Open to first year Department of Genetics and Developmental Biology students, to others with consent of instructors. Introduction to basic manipulations, both experimental and conceptual, in genetics and developmental biology.  
Same as: GENE 200

**DBIO 201. Cells and Signaling in Regenerative Medicine.. 2 Units.**

Mechanisms that direct human development from conception to birth. Conserved molecular and cellular pathways regulate tissue and organ development; errors in these pathways result in congenital anomalies and human diseases. Topics: molecules regulating development, cell induction, developmental gene regulation, cell migration, programmed cell death, pattern formation, stem cells, cell lineage, and development of major organ systems. Emphasis on links between development and clinically significant topics including infertility, assisted reproductive technologies, contraception, prenatal diagnosis, teratogenesis, inherited birth defects, fetal therapy, adolescence, cancer, and aging. Limit enrollment only to Medical Student and Masters in Genetics students.

**DBIO 210. Developmental Biology. 4 Units.**

Current areas of research in developmental biology. How organismic complexity is generated during embryonic and post-embryonic development. The roles of genetic networks, gene regulation, organogenesis, tissue patterning, cell lineage, maternal inheritance, cell-cell communication, signaling, and regeneration in developmental processes in well-studied organisms such as vertebrates, insects, and nematodes. Team-taught. Students meet with faculty to discuss current papers from the literature. Prerequisite: graduate standing, consent of instructor. Recommended: familiarity with basic techniques and experimental rationales of molecular biology, biochemistry, and genetics.

**DBIO 211. Biophysics of Multi-cellular Systems and Amorphous Computing. 2-3 Units.**

Provides an interdisciplinary perspective on the design, emergent behavior, and functionality of multi-cellular biological systems such as embryos, biofilms, and artificial tissues and their conceptual relationship to amorphous computers. Students discuss relevant literature and introduced to and apply pertinent mathematical and biophysical modeling approaches to various aspect multi-cellular systems, furthermore carry out real biology experiments over the web. Specific topics include: (Morphogen) gradients; reaction-diffusion systems (Turing patterns); visco-elastic aspects and forces in tissues; morphogenesis; coordinated gene expression, genetic oscillators and synchrony; genetic networks; self-organization, noise, robustness, and evolvability; game theory; emergent behavior; criticality; symmetries; scaling; fractals; agent based modeling. The course is geared towards a broadly interested graduate and advanced undergraduates audience such as from bio / applied physics, computer science, developmental and systems biology, and bio / tissue / mechanical / electrical engineering. Prerequisites: Previous knowledge in one programming language - ideally Matlab - is recommended; undergraduate students benefit from BIOE 42, or equivalent.

Same as: BIOE 211, BIOE 311, BIOPHYS 311

**DBIO 215. Frontiers in Biological Research. 1 Unit.**

Students analyze cutting edge science, develop a logical framework for evaluating evidence and models, and enhance their ability to design original research through exposure to experimental tools and strategies. The class runs in parallel with the Frontiers in Biological Research seminar series. Students and faculty meet on the Tuesday preceding each seminar to discuss a landmark paper in the speaker's field of research. Following the Wednesday seminar, students meet briefly with the speaker for a free-range discussion which can include insights into the speakers' paths into science and how they pick scientific problems. Same as: BIOC 215, GENE 215

**DBIO 219. Special Topics in Development and Cancer: Evolutionary and Quantitative Perspectives. 3 Units.**

The course will serve as a literature-based introductory guide for synthesis of ideas in developmental biology and cancer, with an emphasis on evolutionary analysis and quantitative thinking. The goal for this course is for students to understand how we know what we know about fundamental questions in the field of developmental biology and cancer, and how we ask good questions for the future. We will discuss how studying model organisms has provided the critical breakthroughs that have helped us understand developmental and disease mechanisms in higher organisms. The students are expected to be able to read the primary literature and think critically about experiments to understand what is actually known and what questions still remain unanswered. Students will develop skills in the educated guesswork to apply order-of-magnitude methodology to questions in development and cancer.

Same as: BIOE 219

**DBIO 220. Genomics and Personalized Medicine. 3 Units.**

Principles of genetics underlying associations between genetic variants and disease susceptibility and drug response. Topics include: genetic and environmental risk factors for complex genetic disorders; design and interpretation of genome-wide association studies; pharmacogenetics; full genome sequencing for disease gene discovery; population structure and genetic ancestry; use of personal genetic information in clinical medicine; ethical, legal, and social issues with personal genetic testing. Hands-on workshop making use of personal or publicly available genetic data. Prerequisite: GENE 202, Gene 205 or BIOS 200.

Same as: GENE 210

**DBIO 273A. The Human Genome Source Code. 3 Units.**

A computational introduction to the most amazing programming language on the planet: your genome. Topics include genome sequencing (assembling source code from code fragments); the human genome functional landscape: variable assignments (genes), control-flow logic (gene regulation) and run-time stack (epigenomics); human disease and personalized genomics (as a hunt for bugs in the human code); genome editing (code injection) to cure the incurable; and the source code behind amazing animal adaptations. Algorithmic approaches will introduce ideas from computational genomics, machine learning and natural language processing. Course includes primers on molecular biology, and text processing languages. No prerequisites.

Same as: BIOMEDIN 273A, CS 273A

**DBIO 299. Directed Reading in Developmental Biology. 1-18 Unit.**

Prerequisite: consent of instructor.

**DBIO 299C. CURRICULAR PRACTICAL TRAINING. 1 Unit.**

CPT Course required for international students completing degree requirements.

**DBIO 370. Medical Scholars Research. 4-18 Units.**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

**DBIO 399. Graduate Research. 1-18 Unit.**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

**DBIO 802. TGR Dissertation. 0 Units.**

## Earth Systems (EARTHSYS)

**EARTHSYS 10. Introduction to Earth Systems. 4 Units.**

For non-majors and prospective Earth Systems majors. Multidisciplinary approach using the principles of geology, biology, engineering, and economics to describe how the Earth operates as an interconnected, integrated system. Goal is to understand global change on all time scales. Focus is on sciences, technological principles, and sociopolitical approaches applied to solid earth, oceans, water, energy, and food and population. Case studies: environmental degradation, loss of biodiversity, and resource sustainability.

**EARTHSYS 100. Environmental and Geological Field Studies in the Rocky Mountains. 3 Units.**

Three-week, field-based program in the Greater Yellowstone/Teton and Wind River Mountains of Wyoming. Field-based exercises covering topics including: basics of structural geology and petrology; glacial geology; western cordillera geology; paleoclimatology; chemical weathering; aqueous geochemistry; and environmental issues such as acid mine drainage and changing land-use patterns.

Same as: ESS 101

**EARTHSYS 101. Energy and the Environment. 3 Units.**

Energy use in modern society and the consequences of current and future energy use patterns. Case studies illustrate resource estimation, engineering analysis of energy systems, and options for managing carbon emissions. Focus is on energy definitions, use patterns, resource estimation, pollution. Recommended: MATH 21 or 42.

Same as: ENERGY 101

**EARTHSYS 102. Fundamentals of Renewable Power. 3 Units.**

Do you want a much better understanding of renewable power technologies? Did you know that wind and solar are the fastest growing forms of electricity generation? Are you interested in hearing about the most recent, and future, designs for green power? Do you want to understand what limits power extraction from renewable resources and how current designs could be improved? This course dives deep into these and related issues for wind, solar, biomass, geothermal, tidal and wave power technologies. We welcome all student, from non-majors to MBAs and grad students. If you are potentially interested in an energy or environmental related major, this course is particularly useful. Recommended: Math 21 or 42.  
Same as: ENERGY 102

**EARTHSYS 103. Understanding Energy. 3-5 Units.**

Energy is a fundamental driver of human development and opportunity. At the same time, our energy system has significant consequences for our society, political system, economy, and environment. For example, energy production and use is the number one source of greenhouse gas emissions. In taking this course, students will not only understand the fundamentals of each energy resource – including significance and potential, conversion processes and technologies, drivers and barriers, policy and regulation, and social, economic, and environmental impacts – students will also be able to put this in the context of the broader energy system and think critically about how and why society has chosen particular energy resources. Both depletable and renewable energy resources are covered, including oil, natural gas, coal, nuclear, biomass and biofuel, hydroelectric, wind, solar thermal and photovoltaics (PV), geothermal, and ocean energy, with cross-cutting topics including electricity, storage, climate change, sustainability, green buildings, energy efficiency, transportation, and the developing world. The course is 4 units, which includes lecture and in-class discussion, readings and videos, assignments, and two off-site field trips. Enroll for 5 units to also attend the Workshop, an interactive discussion section on cross-cutting topics that meets once per week for 80 minutes (timing TBD based on student schedules). The 3-unit option requires instructor approval - please contact Diana Ginnebaugh. Website: <http://web.stanford.edu/class/cee207a/> Course was formerly called Energy Resources. Prerequisites: Algebra. May not be taken for credit by students who have completed CEE 107S.

Same as: CEE 107A, CEE 207A

**EARTHSYS 104. The Water Course. 3 Units.**

The Central Valley of California provides a third of the produce grown in the U.S., but has a desert climate, thus raising concerns about both food and water security. The pathway that water takes rainfall to the irrigation of fields (the water course) determines the quantity and quality of the available water. Working with various data sources (remote sensing, gauges, wells) allows us to model the water budget in the valley and explore the way in which recent droughts and increasing demand are impacting freshwater supplies.

Same as: GEOPHYS 70

**EARTHSYS 105. Food and Community: Food Security, Resilience and Equity. 2-3 Units.**

What can communities do to bolster food security, resiliency, and equity in the face of climate change? This course aims to respond to this question, in three parts. In Part I, we will explore the most current scientific findings on trends in anthropogenic climate forcing and the anticipated impacts on global and regional food systems. Specifically, Part I will review the anticipated impact of climate change on severe weather events, crop losses, and food price volatility and the influence of these impacts on global and regional food insecurity and hunger. In Part II, we will consider what communities can do to promote food security and equity in the face of these changes, by reviewing the emerging literature on food system resiliency. Finally, we will facilitate a conference in which multi-disciplinary teams from around the country will gather to initiate regional planning projects designed to enhance food system resilience and equity. Cardinal Course (certified by Haas Center). Limited enrollment. May be repeated for credit.

Same as: EARTHSYS 205

**EARTHSYS 105A. Ecology and Natural History of Jasper Ridge Biological Preserve. 4 Units.**

Formerly 96A - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology, land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRBP community after the course.

Same as: BIO 105A

**EARTHSYS 105B. Ecology and Natural History of Jasper Ridge Biological Preserve. 4 Units.**

Formerly 96B - Jasper Ridge Docent Training. First of two-quarter sequence training program to join the Jasper Ridge education/docent program. The scientific basis of ecological research in the context of a field station, hands-on field research, field ecology and the natural history of plants and animals, species interactions, archaeology, geology, hydrology, land management, multidisciplinary environmental education; and research projects, as well as management challenges of the preserve presented by faculty, local experts, and staff. Participants lead research-focused educational tours, assist with classes and research, and attend continuing education classes available to members of the JRBP community after the course.

Same as: BIO 105B

**EARTHSYS 106. World Food Economy. 5 Units.**

The economics of food production, consumption, and trade. The micro- and macro- determinants of food supply and demand, including the interrelationship among food, income, population, and public-sector decision making. Emphasis on the role of agriculture in poverty alleviation, economic development, and environmental outcomes. (graduate students enroll in 206).

Same as: EARTHSYS 206, ECON 106, ECON 206, ESS 106, ESS 206



**EARTHSYS 106C. CROP GENETIC IMPROVEMENT: Scientific Facts vs. Fiction. 2 Units.**

This lecture and discussion course will review the scientific evidence on the use and impacts of genetic engineering in global food and agricultural systems. The class will cover the history and details of crop genetic improvement, ranging from primitive domestication to CRISPR technologies. We will examine the risks and benefits of crop genetic technologies in agriculture with regards to productivity, farm incomes, food safety, human health and nutrition, and environmental impacts. We will also discuss the current and future use of genetic engineering techniques for enhancing climate resilience and nutritional outcomes in agricultural systems worldwide. Finally, we will discuss the ethics of using modern genetic approaches for crop improvement, and the policy environment surrounding the use of these genetic techniques. Our expectation is that students enrolled in the course will attend all class sections and participate actively in the discussions. Students will be asked to identify peer-reviewed, scientific papers on the impacts of specific crop genetic improvements. Depending on the class size, students will also be asked to help lead class discussions. At the end of the course, students will work in groups to debate a selected topic on the use of genetic engineering in agriculture, to be announced during the course. Prerequisites: One course in biology and one course in economics are suggested. Completion of "Feeding Nine Billion" and "The World Food Economy" classes would also be helpful, as would a class in genetics, but there are no strict course requirements.

**EARTHSYS 107. Control of Nature. 3 Units.**

Think controlling the earth's climate is science fiction? It is when you watch *Snowpiercer* or *Dune*, but scientists are already devising geoengineering schemes to slow climate change. Will we ever resurrect the woolly mammoth or even a T. Rex (think Jurassic Park)? Based on current research, that day will come in your lifetime. Who gets to decide what species to save? And more generally, what scientific and ethical principles should guide our decisions to control nature? In this course, we will examine the science behind ways that people alter and engineer the earth, critically examining the positive and negative consequences. We'll explore these issues first through popular movies and books and then, more substantively, in scientific research.

Same as: ESS 107

**EARTHSYS 11. Introduction to Geology. 5 Units.**

Why are earthquakes, volcanoes, and natural resources located at specific spots on the Earth surface? Why are there rolling hills to the west behind Stanford, and soaring granite walls to the east in Yosemite? What was the Earth like in the past, and what will it be like in the future? Lectures, hands-on laboratories, in-class activities, and one field trip will help you see the Earth through the eyes of a geologist. Topics include plate tectonics, the cycling and formation of different types of rocks, and how geologists use rocks to understand Earth's history.

Same as: GS 1

**EARTHSYS 110. Introduction to the foundations of contemporary geophysics. 3 Units.**

Introduction to the foundations of contemporary geophysics. Topics drawn from broad themes in: whole Earth geodynamics, geohazards, natural resources, and environment. In each case the focus is on how the interpretation of a variety of geophysical measurements (e.g., gravity, seismology, heat flow, electromagnetics, and remote sensing) can be used to provide fundamental insight into the behavior of the Earth.

Prerequisite: CME 100 or MA TH 51, or co-registration in either.

Same as: GEOPHYS 110

**EARTHSYS 111. Biology and Global Change. 4 Units.**

The biological causes and consequences of anthropogenic and natural changes in the atmosphere, oceans, and terrestrial and freshwater ecosystems. Topics: glacial cycles and marine circulation, greenhouse gases and climate change, tropical deforestation and species extinctions, and human population growth and resource use. Prerequisite: Biology or Human Biology core or graduate standing.

Same as: BIO 117, ESS 111

**EARTHSYS 112. Human Society and Environmental Change. 4 Units.**

Interdisciplinary approaches to understanding human-environment interactions with a focus on economics, policy, culture, history, and the role of the state. Prerequisite: ECON 1.

Same as: EARTHSYS 212, ESS 112, HISTORY 103D

**EARTHSYS 113. Earthquakes and Volcanoes. 3 Units.**

Is the "Big One" overdue in California? What kind of damage would that cause? What can we do to reduce the impact of such hazards in urban environments? Does "fracking" cause earthquakes and are we at risk? Is the United States vulnerable to a giant tsunami? The geologic record contains evidence of volcanic super eruptions throughout Earth's history. What causes these gigantic explosive eruptions, and can they be predicted in the future? This course will address these and related issues. For non-majors and potential Earth scientists. No prerequisites. More information at: <https://stanford.box.com/s/zr8ar28efmuo5wtlj6gj2jbxle76r4lu>.

Same as: GEOPHYS 90

**EARTHSYS 114. Environmental Change and Emerging Infectious Diseases. 4-5 Units.**

The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV.

Same as: ANTHRO 177, ANTHRO 277, EARTHSYS 214, HUMBIO 114

**EARTHSYS 115. Wetlands Ecology of the Pantanal Prefield Seminar. 2-3 Units.**

This seminar will prepare students for their overseas field experience in the Pantanal, Brazil, the largest wetland in the world, studying wetlands ecology and conservation in situ. Students will give presentations on specific aspects of the Pantanal and lay the groundwork for the presentations they will be giving during the field seminar where access to the internet and to other scholarly resources will be quite limited. Additional topics include: logistics, health and safety, cultural sensitivity, geography and politics, and basic language skills; also, post-field issues such as reverse culture shock, and ways in which participants can consolidate and build up their abroad experiences after they return to campus. Students will have the opportunity to participate in a pilot study aimed at developing a series of innovative online curriculum based upon their field experience.

**EARTHSYS 115N. Desert Biogeography of Namibia Prefield Seminar. 3 Units.**

Desert environments make up a third of the land areas on Earth, ranging from the hottest to the coldest environments. Aridity leads to the development of unique adaptations among the organisms that inhabit them. Climate change and other processes of desertification as well as increasing human demand for habitable and cultivatable areas have resulting in increasing need to better understand these systems. Namibia is a model system for studying these processes and includes the Sossuvlei (Sand Sea) World Heritable Site. This seminar will prepare students for their overseas field experience in Namibia. The seminar will provide an introduction to desert biogeography and culture, using Namibia as a case study. During the seminar, students will each give two presentations on aspects of desert biogeography and ecology, specific organisms and their adaptations to arid environments, cultural adaptations of indigenous peoples and immigrants, ecological threats and conservation efforts, and/or national and international policy towards deserts. Additional assignments include a comprehensive dossier and a final exam. Students will also carry out background research for the presentations they will be giving during the field seminar where access to the internet and to other scholarly resources will be limited. In addition, we will cover logistics, health and safety, cultural sensitivity, geography, and politics. We will deal with post-field issues such as reverse culture shock, and ways in which participants can consolidate and build up their abroad experiences after they return to campus.

Same as: AFRICAST 114N

**EARTHSYS 115T. Island Biogeography of Tasmania Prefield Seminar. 3 Units.**

Islands are natural laboratories for studying a wide variety of subjects including biological diversity, cultural diversity, epidemiology, geology, climate change, conservation, and evolution. This field seminar focuses on Island Biogeography in one of the most extraordinary and well-preserved ecosystems in the world: Tasmania. Tasmanian devils, wombats, and wallabies – the names conjure up images of an exotic faraway place, a place to appreciate the incredibly diversity of life and how such striking forms of life came to be. This course will prepare students for their overseas seminar in Tasmania. Students will give presentations on specific aspects of the Tasmania and will lay the groundwork for the presentations they will be giving during the field seminar where access to the internet and to other scholarly resources will be quite limited. Additional topics to be addressed include: logistics, health and safety, group dynamics, cultural sensitivity, history, and politics. We will also address post-field issues such as reverse culture shock, and ways to consolidate and build up abroad experiences after students return to campus.

**EARTHSYS 116. Ecology of the Hawaiian Islands. 4 Units.**

Terrestrial and marine ecology and conservation biology of the Hawaiian Archipelago. Taught in the field in Hawaii as part of quarter-long sequence of courses including Earth Sciences and Anthropology. Topics include ecological succession, plant-soil interactions, conservation biology, biological invasions and ecosystem consequences, and coral reef ecology. Restricted to students accepted into the Earth Systems of Hawaii Program.

Same as: BIO 116

**EARTHSYS 117. Earth Sciences of the Hawaiian Islands. 4 Units.**

Progression from volcanic processes through rock weathering and soil-ecosystem development to landscape evolution. The course starts with an investigation of volcanic processes, including the volcano structure, origin of magmas, physical-chemical factors of eruptions. Factors controlling rock weathering and soil development, including depth and nutrient levels impacting plant ecosystems, are explored next. Geomorphic processes of landscape evolution including erosion rates, tectonic/volcanic activity, and hillslope stability conclude the course. Methods for monitoring and predicting eruptions, defining spatial changes in landform, landform stability, soil production rates, and measuring biogeochemical processes are covered throughout the course. This course is restricted to students accepted into the Earth Systems of Hawaii Program.

Same as: EARTH 117, ESS 117

**EARTHSYS 118. Heritage, Environment, and Sovereignty in Hawaii. 4 Units.**

This course explores the cultural, political economic, and environmental status of contemporary Hawaiians. What sorts of sustainable economic and environmental systems did Hawaiians use in prehistory? How was colonization of the Hawaiian Islands informed and shaped by American economic interests and the nascent imperialism of the early 20th century? How was sovereignty and Native Hawaiian identity been shaped by these forces? How has tourism and the leisure industry affected the natural environment? This course uses archaeological methods, ethnohistorical sources, and historical analysis in an exploration of contemporary Hawaiian social economic and political life.

Same as: ANTHRO 118

**EARTHSYS 119. Will Work for Food. 1 Unit.**

This is a speaker series class featuring highly successful innovators in the food system. Featured speakers will talk in an intimate, conversational manner about their current work, as well as about their successes, failures, and learnings along the way. Additional information can be found here: <http://feedcollaborative.org/speaker-series/>.

Same as: EARTHSYS 219

**EARTHSYS 120. Social Science Field Research Methods and Applications. 5 Units.**

Fundamentals of the design, implementation and interpretation of social science field research. Building on a basic knowledge of statistical methods and economics, the course introduces observational field research and compares it with experimental field research. Significant attention devoted to explaining the details of research design as well as what can and cannot be learned through each type of field research. Emphasis placed on the theory of the design and analysis of statistical experiments. Topics include: sample size selection, power and size of statistical hypothesis tests, partial compliance, sample selection bias and methods for accounting for it. Development of critical reading skills emphasized through class discussions of academic journal articles and popular media accounts of field research. Examples of best practice field research studies presented as well as examples of commonly committed errors; students are expected to articulate and challenge or defend underlying assumptions and the extent to which real-world research matches up with concepts covered in lecture. Practical aspects of field work, including efficient and cost-effective data collection, teamwork, field team supervision, budget management, and common ethical considerations. Grading based on weekly problem sets that focus on developing data analysis skills using statistical software, a midterm examination, and a final project in which students write a detailed research proposal. Students can also apply to participate in a course project designing a field research project and implementing it in a developing country context during four weeks of the summer. Prerequisites: either ECON 1 and either STATS 60 or Econ 102A or equivalent.

Same as: ECON 121, PUBLPOL 120, PUBLPOL 220

**EARTHSYS 121. Building a Sustainable Society: New Approaches for Integrating Human and Environmental Priorities. 3 Units.**

"Building a Sustainable Society: New approaches for integrating human and environmental priorities" draws on economics, natural resources management, sociology and leadership science to examine theoretical frameworks and diverse case studies that illustrate challenges as well as effective strategies in building a sustainable society where human beings and the natural environment thrive. Themes include collaborative consumption, the sharing economy, worker-owned cooperatives, community-corporate partnerships, cradle to cradle design, social entrepreneurship, impact investing, "beyond GDP", and transformative leadership. Critical perspectives, lectures and student-led discussions guide analysis of innovations within public, private and civic sectors globally. Students explore their personal values and motivations and develop their potential to become transformative leaders.

**EARTHSYS 122. Evolution of Marine Ecosystems. 3-4 Units.**

Life originally evolved in the ocean. When, why, and how did the major transitions occur in the history of marine life? What triggered the rapid evolution and diversification of animals in the Cambrian, after more than 3.5 billion years of Earth's history? What caused Earth's major mass extinction events? How do ancient extinction events compare to current threats to marine ecosystems? How has the evolution of primary producers impacted animals, and how has animal evolution impacted primary producers? In this course, we will review the latest evidence regarding these major questions in the history of marine ecosystems. We will develop familiarity with the most common groups of marine animal fossils. We will also conduct original analyses of paleontological data, developing skills both in the framing and testing of scientific hypotheses and in data analysis and presentation.

Same as: BIO 119, GS 123, GS 223B

**EARTHSYS 123. Asian Americans and Environmental Justice. 3-5 Units.**

One central tenet of the environmental justice movement is centering the leadership of frontline communities. Unfortunately, the struggles of Asian Americans on the frontlines of corporate environmental pollution and extraction are less visible and less well-known. In this course, we will explore the Asian American voices that have contributed to the development of the environmental justice movement and the leadership that is shaping the future of this movement. This course is designed to provide students with education about the history of the environmental justice movement, the future being envisioned, and the strategies that are needed to get to the vision. It will draw on lectures, readings, guest presentations, case studies, and the instructor's more than 15 years of experience with organizing and social justice campaigns. Students will learn about the principles guiding the environmental justice movement; the vision and framework of how we achieve a just transition to a regenerative economy; the process of organizing and campaign work to advance a community agenda; and skills in collecting, analyzing, and communicating information.

Same as: ASNAMST 123

**EARTHSYS 124. Measurements in Earth Systems. 3-4 Units.**

A classroom, laboratory, and field class designed to provide students familiarity with techniques and instrumentation used to track biological, chemical, and physical processes operating in earth systems, encompassing upland, aquatic, estuarine, and marine environments. Topics include gas and water flux measurement, nutrient and isotopic analysis, soil and water chemistry determination. Students will develop and test hypotheses, provide scientific evidence and analysis, culminating in a final presentation.

Same as: ESS 212

**EARTHSYS 125. Shades of Green: Redesigning and Rethinking the Environmental Justice Movements. 3-5 Units.**

Historically, discussions of race, ethnicity, culture, and equity in the environment have been relegated to the environmental justice movement, which often focuses on urban environmental degradation and remains separated from other environmental movements. This course will seek to break out of this limiting discussion. We will explore access to outdoor spaces, definitions of wilderness, who is and isn't included in environmental organizations, gender and the outdoors, how colonialism has influenced ways of knowing, and the future of climate change. The course will also have a design thinking community partnership project. Students will work with partner organizations to problem-solve around issues of access and diversity. We value a diversity of experiences and epistemological beliefs, and therefore undergraduates and graduate students from all disciplines are welcome.

Same as: CSRE 125E, EARTHSYS 225, URBANST 125

**EARTHSYS 128. Evolution of Terrestrial Ecosystems. 4 Units.**

The what, when, where, and how do we know it regarding life on land through time. Fossil plants, fungi, invertebrates, and vertebrates (yes, dinosaurs) are all covered, including how all of those components interact with each other and with changing climates, continental drift, atmospheric composition, and environmental perturbations like glaciation and mass extinction. The course involves both lecture and lab components. Graduate students registering at the 200-level are expected to write a term paper, but can opt out of some labs where appropriate.

Same as: GS 128, GS 228

**EARTHSYS 129. Geographic Impacts of Global Change: Mapping the Stories. 4 Units.**

Forces of global change (eg., climate disruption, biodiversity loss, disease) impart wide-ranging political, socioeconomic, and ecological impacts, creating an urgent need for science communication. Students will collect data for a region of the US using sources ranging from academic journals to popular media and create an interactive Story Map (<http://stanford.maps.arcgis.com/apps/StorytellingTextLegend/index.html?appid=dafe2393fd2e4acc8b0a4e6e71d0b6d5>) that merges the scientific and human dimensions of global change. Students will interview stakeholders as part of a community-engaged learning experience and present the Map to national policy-makers. Our 2014 Map is being used by the CA Office of Planning & Research.

**EARTHSYS 12SC. Environmental and Geological Field Studies in the Rocky Mountains. 2 Units.**

The ecologically and geologically diverse Rocky Mountain area is being strongly impacted by changing land use patterns, global and regional environmental change, and societal demands for energy and natural resources. This field program emphasizes coupled environmental and geological problems in the Rocky Mountains, covering a broad range of topics including the geologic origin of the American West from three billion years ago to the present; paleoclimatology and the glacial history of this mountainous region; the long- and short-term carbon cycle and global climate change; and environmental issues in the American West related to changing land-use patterns and increased demand for its abundant natural resources. In addition to the science aspects of this course we will also investigate the unique western culture of the area particularly in regards to modern ranching and outfitting in the American West. These broad topics are integrated into a coherent field-study as we examine earth/ environmental science-related questions in three different settings: 1) the three-billion-year-old rocks and the modern glaciers of the Wind River Mountains of Wyoming; 2) the sediments in the adjacent Wind River basin that host abundant gas and oil reserves and also contain the long-term climate history of this region; and 3) the volcanic center of Yellowstone National Park and the mountainous region of Teton National Park. Students will complete six assignments based upon field exercises, working in small groups to analyze data and prepare reports and maps. Lectures will be held in the field prior to and after fieldwork. The students will read two required books prior to this course that will be discussed on the trip. Note: This course involves one week of backpacking in the Wind Rivers and hiking while staying in cabins near Jackson Hole, Wyoming. Students must arrive in Salt Lake City on Monday, September 4. (Hotel lodging will be provided for the night of September 4, and thereafter students will travel as a Sophomore College group.) We will return to campus on Friday, September 22.

Same as: ESS 12SC, GS 12SC

**EARTHSYS 130. Designing and Evaluating Community Engagement Programs for Social and Environmental Change. 3 Units.**

Non-profit organizations seeking to achieve social and environmental change often run outreach and education programs to engage community members in their cause. Effective application of social science theory and methods may improve the design and evaluation of such community engagement programs. In this class, we partner with environmental and social justice organizations in the Bay Area to explore two questions: 1) How can recent findings from the social sciences be applied to design more effective community engagement programs? 2) How can we rigorously evaluate outreach and education programs to ensure they are achieving the desired objectives? The course will include an overview of key theories from psychology, sociology, and education, field trips to partnering organizations, and a term-long community-engaged research project focused on designing and/or evaluating a local outreach or educational program that is meant to achieve social and environmental change.

Same as: ENVRES 201

**EARTHSYS 131. Pathways in Sustainability Careers. 1 Unit.**

Interactive, seminar-style sessions expose students to diverse career pathways in sustainability. Professionals from a variety of careers discuss their work, their career development and decision-points in their career pathways, as well as life style aspects of their choices.

Same as: EARTH 131

**EARTHSYS 132. Evolution of Earth Systems. 4 Units.**

This course examines biogeochemical cycles and how they developed through the interaction between the atmosphere, hydrosphere, biosphere, and lithosphere. Emphasis is on the long-term carbon cycle and how it is connected to other biogeochemical cycles on Earth. The course consists of lectures, discussion of research papers, and quantitative modeling of biogeochemical cycles. Students produce a model on some aspect of the cycles discussed in this course. Grades based on class interaction, student presentations, and the modeling project.

Same as: EARTHSYS 232, ESS 132, ESS 232

**EARTHSYS 133. Social Entrepreneurship Collaboratory. 4 Units.**

Interdisciplinary student teams create and develop U.S. and international social entrepreneurship initiatives. Proposed initiatives may be new entities, or innovative projects, partnerships, and/or strategies impacting existing organizations and social issues in the U.S. and internationally. Focus is on each team's research and on planning documents to further project development. Project development varies with the quarter and the skill set of each team, but should include: issue and needs identification; market research; design and development of an innovative and feasible solution; and drafting of planning documents. In advanced cases, solicitation of funding and implementation of a pilot project. Enrollment limited to 20. May be repeated for credit.

Same as: URBANST 133

**EARTHSYS 136. The Ethics of Stewardship. 2-3 Units.**

What responsibilities do humans have to nonhuman nature and future generations? How are human communities and individuals shaped by their relationships with the natural world? What are the social, political, and moral ramifications of drawing sustenance and wealth from natural resources? Whether we realize it or not, we grapple with such questions every time we turn on the tap, fuel up cars, or eat meals -and they are key to addressing issues like global climate change and environmental justice. In this class, we consider several perspectives on this ethical question of stewardship: the role of humans in the global environment. In addition to reading written work and speaking with land stewards, we will practice stewardship at the Stanford Educational Farm. This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: EARTHSYS 236

**EARTHSYS 138. International Urbanization Seminar: Cross-Cultural Collaboration for Sustainable Urban Development. 4-5 Units.**

Comparative approach to sustainable cities, with focus on international practices and applicability to China. Tradeoffs regarding land use, infrastructure, energy and water, and the need to balance economic vitality, environmental quality, cultural heritage, and social equity. Student teams collaborate with Chinese faculty and students partners to support urban sustainability projects. Limited enrollment via application; see [internationalurbanization.org](http://internationalurbanization.org) for details. Prerequisites: consent of the instructor(s).

Same as: CEE 126, IPS 274, URBANST 145

**EARTHSYS 139. Ecosystem Services: Frontiers in the Science of Valuing Nature. 3 Units.**

This advanced course explores the science of valuing nature, beginning with its historical origins, and then its recent development in natural (especially ecological), economic, psychological, and other social sciences. We will use the ecosystem services framework (characterizing benefits from ecosystems to people) to define the state of knowledge, core methods of analysis, and research frontiers, such as at the interface with biodiversity, resilience, human health, and human development. Intended for diverse students, with a focus on research and real-world cases. To apply, please email the instructor ([gdaily@stanford.edu](mailto:gdaily@stanford.edu)) with a brief description of your background and research interests.

Same as: BIO 138, BIO 238, EARTHSYS 239

**EARTHSYS 13SC. People, Land, and Water in the Heart of the West. 2 Units.**

Salmon River. Sun Valley. Pioneer Mountains. The names speak of powerful forces and ideas in the American West. Central Idaho - a landscape embracing snow-capped mountains, raging rivers, sagebrush deserts, farms, ranches, and resort communities - is our classroom for this field-based seminar led by David Freyberg, professor of Civil and Environmental Engineering, and David Kennedy, professor emeritus of History. This course focuses on the history and future of a broad range of natural resource management issues in the western United States. We will spend a week on campus preparing for a two-week field course in Idaho exploring working landscapes, private and public lands, water and fisheries, conservation, and the history and literature of the relationship between people and the land in the American West. After the first week spent on campus, we will drive to Idaho to begin the field portion of our seminar. In Idaho, we will spend time near Twin Falls, at Lava Lake Ranch near Craters of the Moon National Monument, in Custer County at the Upper Salmon River, and near Stanley in the Sawtooth National Forest. No prior camping experience is required, but students should be comfortable living outdoors in mobile base camps for periods of several days. Students will investigate specific issues in-depth and present their findings at the end of the course.

**EARTHSYS 140. The Energy-Water Nexus. 3 Units.**

Energy, water, and food are our most vital resources constituting a tightly intertwined network: energy production requires water, transporting and treating water needs energy, producing food requires both energy and water. The course is an introduction to learn specifically about the links between energy and water. Students will look first at the use of water for energy production, then at the role of energy in water projects, and finally at the challenge in figuring out how to keep this relationship as sustainable as possible. Students will explore case examples and are encouraged to contribute examples of concerns for discussion as well as suggest a portfolio of sustainable energy options.  
Same as: GEOPHYS 80

**EARTHSYS 141. Remote Sensing of the Oceans. 3-4 Units.**

How to observe and interpret physical and biological changes in the oceans using satellite technologies. Topics: principles of satellite remote sensing, classes of satellite remote sensors, converting radiometric data into biological and physical quantities, sensor calibration and validation, interpreting large-scale oceanographic features.  
Same as: EARTHSYS 241, ESS 141, ESS 241, GEOPHYS 141

**EARTHSYS 142. Remote Sensing of Land. 4 Units.**

The use of satellite remote sensing to monitor land use and land cover, with emphasis on terrestrial changes. Topics include pre-processing data, biophysical properties of vegetation observable by satellite, accuracy assessment of maps derived from remote sensing, and methodologies to detect changes such as urbanization, deforestation, vegetation health, and wildfires.  
Same as: EARTHSYS 242, ESS 162, ESS 262

**EARTHSYS 143. Molecular Geomicrobiology Laboratory. 4 Units.**

In this course, students will be studying the biosynthesis of cyclic lipid biomarkers, molecules that are produced by modern microbes that can be preserved in rocks that are over a billion years old and which geologist use as molecular fossils. Students will be tasked with identifying potential biomarker lipid synthesis genes in environmental genomic databases, expressing those genes in a model bacterial expression system in the lab, and then analyzing the lipid products that are produced. The overall goal is for students to experience the scientific research process including generating hypotheses, testing these hypotheses in laboratory experiments, and communicating their results through a publication style paper. Prerequisites: BIO83 and CHEM35 or permission of the instructor.  
Same as: BIO 142, ESS 143, ESS 243

**EARTHSYS 144. Fundamentals of Geographic Information Science (GIS). 3-4 Units.**

Survey of geographic information including maps, satellite imagery, and census data, approaches to spatial data, and tools for integrating and examining spatially-explicit data. Emphasis is on fundamental concepts of geographic information science and associated technologies. Topics include geographic data structure, cartography, remotely sensed data, statistical analysis of geographic data, spatial analysis, map design, and geographic information system software. Computer lab assignments. All students are required to attend a weekly lab session.  
Same as: ESS 164

**EARTHSYS 146A. Atmosphere, Ocean, and Climate Dynamics: The Atmospheric Circulation. 3 Units.**

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the atmospheric circulation. Topics include the global energy balance, the greenhouse effect, the vertical and meridional structure of the atmosphere, dry and moist convection, the equations of motion for the atmosphere and ocean, including the effects of rotation, and the poleward transport of heat by the large-scale atmospheric circulation and storm systems. Prerequisites: MATH 51 or CME100 and PHYSICS 41.  
Same as: CEE 161I, CEE 261I, ESS 246A

**EARTHSYS 146B. Atmosphere, Ocean, and Climate Dynamics: the Ocean Circulation. 3 Units.**

Introduction to the physics governing the circulation of the atmosphere and ocean and their control on climate with emphasis on the large-scale ocean circulation. This course will give an overview of the structure and dynamics of the major ocean current systems that contribute to the meridional overturning circulation, the transport of heat, salt, and biogeochemical tracers, and the regulation of climate. Topics include the tropical ocean circulation, the wind-driven gyres and western boundary currents, the thermohaline circulation, the Antarctic Circumpolar Current, water mass formation, atmosphere-ocean coupling, and climate variability. Prerequisites: MATH 51 or CME100; and PHYSICS 41; and CEE 162A or CEE 101B or a graduate class in fluid dynamics or consent of the instructor.  
Same as: CEE 162I, CEE 262I, ESS 246B

**EARTHSYS 148. Grow it, Cook it, Eat it. An Experiential Exploration of How and Why We Eat What We Eat. 3 Units.**

This course provides an introductory exploration of the social, cultural, and economic forces that influence contemporary human diets. Through the combination of interrelated lectures by expert practitioners and hands-on experience planting, tending, harvesting, cooking, and eating food from Stanford's dining hall gardens, students will learn to think critically about modern agricultural practices and the relationship between cuisine and human and ecological health outcomes. Students will also learn and apply basic practices of human-centered design to develop simple frameworks for understanding various eating behaviors in Stanford's dining halls and to develop and test hypotheses for how R&DE Stanford Dining might influence eating behaviors to effect better health outcomes for people and the planet. This class, which is offered through the FEED Collaborative in the School of Earth, Energy and Environmental Sciences, requires an application. For more information about the FEED Collaborative, application procedures and deadlines, and other classes we teach, please visit our website at <http://feedcollaborative.org>.

**EARTHSYS 149. Wild Writing. 3 Units.**

What is wilderness and why does it matter? In this course we will interrogate answers to this question articulated by influential and diverse American environmental thinkers of the 19th, 20th, and 21st centuries, who through their writing transformed public perceptions of wilderness and inspired such actions as the founding of the National Park System, the passage of the Wilderness Act and the Clean Air and Water Acts, the establishment of the Environmental Protection Agency, and the birth of the environmental and climate justice movements. Students will also develop their own responses to the question of what is wilderness and why it matters through a series of writing exercises that integrate personal narrative, wilderness experience, and environmental scholarship, culminating in a ~3000 word narrative nonfiction essay. This course will provide students with knowledge, tools, experience, and skills that will empower them to become more persuasive environmental storytellers and advocates. If you are interested in signing up for the course, complete this pre-registration form [https://stanforduniversity.qualtrics.com/jfe/form/SV\\_9XqZeZs036Wlvop](https://stanforduniversity.qualtrics.com/jfe/form/SV_9XqZeZs036Wlvop). Same as: EARTHSYS 249

**EARTHSYS 15. Gender, Land Rights, and Climate Change: An International Perspective. 1 Unit.**

For decades, numerous and far-reaching consequences of anthropogenic climate change have disproportionately affected women, from poverty, food and water security, to land tenure and forced migration, to education and health. As a result, mitigating climate change has enormous implications for women's lives worldwide, yet too few national or international policies address this critical intersection. This weekly seminar will examine this dynamic in light of the Sustainable Development Goals and Paris Climate Treaty. The course will feature guest speakers, reading discussions, and communication exercises to spur policy reform and help students acquire relevant information for their future endeavors.

**EARTHSYS 151. Biological Oceanography. 3-4 Units.**

Required for Earth Systems students in the oceans track. Interdisciplinary look at how oceanic environments control the form and function of marine life. Topics include distributions of planktonic production and abundance, nutrient cycling, the role of ocean biology in the climate system, expected effects of climate changes on ocean biology. Local weekend field trips. Designed to be taken concurrently with Marine Chemistry (ESS/EARTHSYS 152/252). Prerequisites: BIO 43 and ESS 8 or equivalent.

Same as: EARTHSYS 251, ESS 151, ESS 251

**EARTHSYS 152. Marine Chemistry. 3-4 Units.**

Introduction to the interdisciplinary knowledge and skills required to critically evaluate problems in marine chemistry and related disciplines. Physical, chemical, and biological processes that determine the chemical composition of seawater. Air-sea gas exchange, carbonate chemistry, and chemical equilibria, nutrient and trace element cycling, particle reactivity, sediment chemistry, and diagenesis. Examination of chemical tracers of mixing and circulation and feedbacks of ocean processes on atmospheric chemistry and climate. Designed to be taken concurrently with Biological Oceanography (ESS/EARTHSYS 151/251).

Same as: EARTHSYS 252, ESS 152, ESS 252

**EARTHSYS 154. Intermediate Writing: Communicating Climate Change: Navigating the Stories from the Frontlines. 4 Units.**

In the next two decades floods, droughts and famine caused by climate change will displace more than 250 million people around the world. In this course students will develop an increased understanding of how different stakeholders including scientists, aid organizations, locals, policy makers, activists, and media professionals communicate the climate change crisis. They will select a site experiencing the devastating effects and research the voices telling the stories of those sites and the audiences who are (or are not) listening. Students might want to investigate drought-ridden areas such as the Central Valley of California or Darfur, Sudan; Alpine glaciers melting in the Alps or in Alaska; the increasingly flooded Pacific islands; the hurricane ravaged Gulf Coast, among many others. Data from various stakeholders will be analyzed and synthesized for a magazine length article designed to bring attention to a region and/or issue that has previously been neglected. Students will write and submit their article for publication. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

Same as: PWR 91EP

**EARTHSYS 155. Science of Soils. 3-4 Units.**

Physical, chemical, and biological processes within soil systems. Emphasis is on factors governing nutrient availability, plant growth and production, land-resource management, and pollution within soils. How to classify soils and assess nutrient cycling and contaminant fate. Recommended: introductory chemistry and biology.

Same as: ESS 155

**EARTHSYS 158. Geomicrobiology. 3 Units.**

How microorganisms shape the geochemistry of the Earth's crust including oceans, lakes, estuaries, subsurface environments, sediments, soils, mineral deposits, and rocks. Topics include mineral formation and dissolution; biogeochemical cycling of elements (carbon, nitrogen, sulfur, and metals); geochemical and mineralogical controls on microbial activity, diversity, and evolution; life in extreme environments; and the application of new techniques to geomicrobial systems. Recommended: introductory chemistry and microbiology such as CEE 274A.

Same as: EARTHSYS 258, ESS 158, ESS 258

**EARTHSYS 159. Economic, Legal, and Political Analysis of Climate-Change Policy. 5 Units.**

This course will advance students understanding of economic, legal, and political approaches to avoiding or managing the problem of global climate change. Theoretical contributions as well as empirical analyses will be considered. It will address economic issues, legal constraints, and political challenges associated with various emissions-reduction strategies, and it will consider policy efforts at the local, national, and international levels. Specific topics include: interactions among overlapping climate policies, the strengths and weaknesses of alternative policy instruments, trade-offs among alternative policy objectives, and decision making under uncertainty. Prerequisites: Econ 50 or its equivalent.

Same as: ECON 159, ECON 209, PUBLPOL 159

**EARTHSYS 160. Sustainable Cities. 4-5 Units.**

Service-learning course that exposes students to sustainability concepts and urban planning as a tool for determining sustainable outcomes in the Bay Area. Focus will be on the relationship of land use and transportation planning to housing and employment patterns, mobility, public health, and social equity. Topics will include government initiatives to counteract urban sprawl and promote smart growth and livability, political realities of organizing and building coalitions around sustainability goals, and increasing opportunities for low-income and communities of color to achieve sustainability outcomes. Students will participate in team-based projects in collaboration with local community partners and take part in significant off-site fieldwork. Prerequisites: consent of the instructor. (Cardinal Course certified by the Haas Center.) Same as: URBANST 164

**EARTHSYS 162. Data for Sustainable Development. 3-5 Units.**

The sustainable development goals (SDGs) encompass many important aspects of human and ecosystem well-being that are traditionally difficult to measure. This project-based course will focus on ways to use inexpensive, unconventional data streams to measure outcomes relevant to SDGs, including poverty, hunger, health, governance, and economic activity. Students will apply machine learning techniques to various projects outlined at the beginning of the quarter. The main learning goals are to gain experience conducting and communicating original research. Prior knowledge of machine learning techniques, such as from CS 221, CS 229, CS 231N, STATS 202, or STATS 216 is required. Open to both undergraduate and graduate students. Enrollment limited to 24. Students must apply for the class by filling out the form at <https://goo.gl/forms/9LSZF7IPkHadix5D3>. A permission code will be given to admitted students to register for the class. Same as: CS 325B, EARTHSYS 262

**EARTHSYS 164. Introduction to Physical Oceanography. 4 Units.**

Formerly CEE 164. The dynamic basis of oceanography. Topics: physical environment; conservation equations for salt, heat, and momentum; geostrophic flows; wind-driven flows; the Gulf Stream; equatorial dynamics and ENSO; thermohaline circulation of the deep oceans; and tides. Prerequisite: PHYSICS 41 (formerly 53). Same as: CEE 162D, CEE 262D, ESS 148

**EARTHSYS 16SC. Water and Power in the Pacific Northwest: The Columbia River. 2 Units.**

This seminar will explore the nature of and coupling between water and energy resources in the Pacific Northwest, using the Columbia River as our case study. We will explore the hydrologic, meteorologic, and geologic basis of water and energy resources, and the practical, social, environmental, economic, and political issues surrounding their development in the West. The Columbia River and its watershed provide a revealing prototype for examining these issues. A transnational, multi-state river with the largest residual populations of anadromous salmonids in the continental US, it provides a substantial fraction of the electrical energy produced in the Northwest (the Grand Coulee dam powerhouse on the Columbia is the largest-capacity hydropower facility in the US), it is a major bulk commodity transportation link to the interior West via its barge navigation system, it provides the water diversions supporting a large area of irrigated agriculture in Washington and Idaho, and its watershed is home to significant sources of solar and wind energy. We will use the Columbia to study water and energy resources, and especially their coupling, in the context of rapid climate change, ecosystem impacts, economics, and public policy. We will begin with a week of classroom study and discussion on campus, preparing for the field portion of the seminar. We will then travel to the Columbia basin, spending approximately 10 days visiting a number of water and energy facilities across the watershed, e.g., solar, wind, and natural gas power plants; dams and reservoirs with their powerhouses, fish passage facilities, navigation locks, and flood-mitigation systems; an irrigation project; operation centers; and offices of regulatory agencies. We will meet with relevant policy experts and public officials, along with some of the stakeholders in the basin. Over the summer students will be responsible for assigned readings from several sources, including monographs, online materials, and recent news articles. During the trip, students will work in small groups to analyze and assess one aspect of the coupling between water and energy resources in the Northwest. The seminar will culminate in presentations on these analyses. Travel expenses during the seminar will be provided (except incidentals) by the Bill Lane Center for the American West and Sophomore College. Same as: CEE 17SC, ENERGY 12SC

**EARTHSYS 16SI. Environmental Justice in the Bay Area. 2 Units.**

Hands-on, discussion-based class that seeks to expose students to the intersectionality of social justice and environmental well being. Through student-led talks and field trips around the Bay, the course pushes participants to think about connections between issues of privilege, race, health, gender equality, and class in environmental issues. Students from all experiences and fields of study are encouraged to join to gain a sense of place, engage critically with complex challenges, and learn about environmental justice in and out of the classroom. Same as: URBANST 16SI

**EARTHSYS 170. Environmental Geochemistry. 4 Units.**

Solid, aqueous, and gaseous phases comprising the environment, their natural compositional variations, and chemical interactions. Contrast between natural sources of hazardous elements and compounds and types and sources of anthropogenic contaminants and pollutants. Chemical and physical processes of weathering and soil formation. Chemical factors that affect the stability of solids and aqueous species under earth surface conditions. The release, mobility, and fate of contaminants in natural waters and the roles that water and dissolved substances play in the physical behavior of rocks and soils. The impact of contaminants and design of remediation strategies. Case studies. Prerequisite: 90 or consent of instructor. Same as: GS 170, GS 270

**EARTHSYS 172. Australian Ecosystems: Human Dimensions and Environmental Dynamics. 3 Units.**

This cross-disciplinary course surveys the history and prehistory of human ecological dynamics in Australia, drawing on geology, climatology, archaeology, geography, ecology and anthropology to understand the mutual dynamic relationships between the continent and its inhabitants. Topics include anthropogenic fire and fire ecology, animal extinctions, aridity and climate variability, colonization and spread of *Homo sapiens*, invasive species interactions, changes in human subsistence and mobility throughout the Pleistocene and Holocene as read through the archaeological record, the totemic geography and social organization of Aboriginal people at the time of European contact, the ecological and geographical aspects of the "Dreamtime", and contemporary issues of policy relative to Aboriginal land tenure and management.

Same as: ANTHRO 170, ANTHRO 270

**EARTHSYS 176. Open Space Management Practicum. 4-5 Units.**

The unique patchwork of urban-to-rural land uses, property ownership, and ecosystems in our region poses numerous challenges and opportunities for regional conservation and environmental stewardship. Students in this class will address a particular challenge through a faculty-mentored research project engaged with the Peninsula Open Space Trust, Acterra, or the Amah Mutsum Land Trust that focuses on open space management. By focusing on a project driven by the needs of these organizations and carried out through engagement with the community, and with thorough reflection, study, and discussion about the roles of scientific, economic, and policy research in local-scale environmental decision-making, students will explore the underlying challenges and complexities of what it means to actually do community-engaged research for conservation and open space preservation in the real world. As such, this course will provide students with skills and experience in research design in conservation biology and ecology, community and stakeholder engagement, land use policy and planning, and the practical aspects of land and environmental management.

Same as: EARTHSYS 276

**EARTHSYS 176A. Open Space Practicum Independent Study. 1-2 Unit.**

Additional practicum units for students intent on continuing their projects from EARTHSYS 176. Students who enroll in 176A must have completed EARTHSYS 176: Open Space Management Practicum, or have consent of the instructors.

**EARTHSYS 177C. Specialized Writing and Reporting: Environmental and Food System Journalism. 4-5 Units.**

Advanced reporting and writing course in the specific practices and standards of food journalism. This course begins with the assumption that students are familiar with the basics of reporting and research in journalism. We'll take those skills and apply them to the wide territory of food journalism, from farmer's markets to food waste, from travel and cultural writing to stories about agriculture and climate change. We will read a range of the best food journalism and students will be charged with writing both long form narrative essays and short magazine style pieces. We'll talk about how to hone in on the truly interesting idea, how to get more out of the reporting process and how to turn the raw materials of research and interviews into polished, engaging prose. Admission by application only, available from [vv1@stanford.edu](mailto:vv1@stanford.edu). Deadline December 4.

Same as: COMM 177C, COMM 277C, EARTHSYS 277C

**EARTHSYS 179S. Seminar: Issues in Environmental Science, Technology and Sustainability. 1-2 Unit.**

Invited faculty, researchers and professionals share their insights and perspectives on a broad range of environmental and sustainability issues. Students critique seminar presentations and associated readings.

Same as: CEE 179S, CEE 279S, ESS 179S

**EARTHSYS 18. Promoting Sustainability Behavior Change at Stanford. 2 Units.**

Stanford Green Living Council training course. Strategies for designing and implementing effective behavior change programs for environmental sustainability on campus. Includes methods from community-based social marketing, psychology, behavioral economics, education, public health, social movements, and design. Students design a behavior change intervention project targeting a specific environmental sustainability-related behavior. Lectures online and weekly sections/workshops.

**EARTHSYS 180. Principles and Practices of Sustainable Agriculture. 3-4 Units.**

Field-based training in ecologically sound agricultural practices at the Stanford Community Farm. Weekly lessons, field work, and group projects. Field trips to educational farms in the area. Topics include: soils, composting, irrigation techniques, IPM, basic plant anatomy and physiology, weeds, greenhouse management, and marketing. Application required. Deadline: March 14  
Application: [https://stanforduniversity.qualtrics.com/jfe/form/SV\\_bdBA34jEZxfdf](https://stanforduniversity.qualtrics.com/jfe/form/SV_bdBA34jEZxfdf).

Same as: ESS 280

**EARTHSYS 181. Urban Agriculture in the Developing World. 3-4 Units.**

In this advanced undergraduate course, students will learn about some of the key social and environmental challenges faced by cities in the developing world, and the current and potential role that urban agriculture plays in meeting (or exacerbating) those challenges. This is a service-learning course, and student teams will have the opportunity to partner with real partner organizations in a major developing world city to define and execute a project focused on urban development, and the current or potential role of urban agriculture. Service-learning projects will employ primarily the student's analytical skills such as synthesis of existing research findings, interdisciplinary experimental design, quantitative data analysis and visualization, GIS, and qualitative data collection through interviews and textual analysis. Previous coursework in the aforementioned analytical skills is preferred, but not required. Admission is by application.

Same as: EARTHSYS 281, ESS 181, ESS 281, URBANST 181

**EARTHSYS 182A. Ecological Farm Systems. 1-2 Unit.**

A project-based course emphasizing ways of doing in sustainable agricultural systems based at the Stanford Educational Farm. Students will work individually and in small groups on projects at the Stanford Educational Farm. This winter the course will include orchard establishment and educational garden design in addition to other topics. Instructor consent required. Application Only (Due January 9th): [https://stanforduniversity.qualtrics.com/jfe/form/SV\\_7714hyXJoRWGh0l](https://stanforduniversity.qualtrics.com/jfe/form/SV_7714hyXJoRWGh0l).

**EARTHSYS 185. Feeding Nine Billion. 4-5 Units.**

Feeding a growing and wealthier population is a huge task, and one with implications for many aspects of society and the environment. There are many tough choices to be made—on fertilizers, groundwater pumping, pesticide use, organics, genetic modification, etc. Unfortunately, many people form strong opinions about these issues before understanding some of the basics of how food is grown, such as how most farmers currently manage their fields, and their reasons for doing so. The goal of this class is to present an overview of global agriculture, and the tradeoffs involved with different practices. Students will develop two key knowledge bases: basic principles of crop ecology and agronomy, and familiarity with the scale of the global food system. The last few weeks of the course will be devoted to building on this knowledge base to evaluate different future directions for agriculture.



**EARTHSYS 186. Farm and Garden Environmental Education Practicum. 2 Units.**

Farms and gardens provide excellent settings for place-based environmental education that emphasize human ecological relationships and experiential learning. The O'Donohue Family Stanford Educational Farm is the setting to explore the principles and practices of farm and garden-based education in conjunction with the farm's new field trip program for local youth. The course includes readings and reflections on environmental education and emphasis on learning by doing, engaging students in the practice of team teaching. Application required. Deadline: March 14. Application: [https://stanforduniversity.qualtrics.com/jfe/form/SV\\_9SPufdULCh93rBT](https://stanforduniversity.qualtrics.com/jfe/form/SV_9SPufdULCh93rBT). Same as: EARTHSYS 286

**EARTHSYS 187. FEED the Change: Redesigning Food Systems. 2-3 Units.**

FEED the Change is a project-based course focused on solving real problems in the food system. Targeted at upper-class undergraduates, this course provides an opportunity for students to meet and work with thought-leading innovators, to gain meaningful field experience, and to develop connections with faculty, students, and others working to create impact in the food system. Students in the course will develop creative confidence by learning and using the basic principles and methodologies of human-centered design, storytelling, and media design. Students will also learn basic tools for working effectively in teams and for analyzing complex social systems. FEED the Change is taught at the d.school and is offered through the FEED Collaborative in the School of Earth. This class requires an application. For application information and more information about our work and about past class projects, please visit our website at <http://feedcollaborative.org/classes/>.

**EARTHSYS 188. Social and Environmental Tradeoffs in Climate Decision-Making. 1-2 Unit.**

How can we ensure that measures taken to mitigate global climate change don't create larger social and environmental problems? What metrics should be used to compare potential climate solutions beyond cost and technical feasibility, and how should these metrics be weighed against each other? How can modeling efforts and stakeholder engagement be best integrated into climate decision making? What information are we still missing to make fully informed decisions between technologies and policies? Exploration of these questions, alongside other issues related to potential negative externalities of emerging climate solutions. Evaluation of energy, land use, and geoenvironmental approaches in an integrated context, culminating in a climate stabilization group project. Same as: EARTHSYS 288

**EARTHSYS 190. The Multimedia Story. 2-3 Units.**

Stories are how we understand ourselves and the world. This course will teach how to plan, research, report and produce a long-form, rich-media science/environment feature story. Students will work in groups or individually to master the blending of text with data visualization, photos, audio, and video. Teachers are experienced digital journalists at leading national and international publications with a close eye on trends and innovations in online, investigative, and data journalism. Using the landmark New York Times story Snow Fall (<http://nyti.ms/1eTyf2Y>) as a departure point, the course will examine the questions: how do we engage and inform the public around critical environmental topics? How do we explain complex and sometimes hidden factors shaping the future of our world? Students are asked to express interest through this form: <http://bit.ly/2odHw07>.

**EARTHSYS 191. Concepts in Environmental Communication. 3 Units.**

Introduction to the history, development, and current state of communication of environmental science and policy to non-specialist audiences. Includes fundamental principles, core competencies, and major challenges of effective environmental communication in the public and policy realms and an overview of the current scope of research and practice in environmental communication. Intended for graduate students and advanced undergraduates, with a background in environmental science and/or policy studies. Prerequisite: Earth Systems core (EarthSys 111 and EarthSys 112) or equivalent. (Meets Earth Systems WIM requirement.). Same as: EARTHSYS 291

**EARTHSYS 196. Implementing Climate Solutions at Scale. 3 Units.**

Climate change is the biggest problem humanity has ever faced, and this course will teach students about the means and complexity of solving it. The instructors will guide the students in the application of key data and analysis tools for their final project, which will involve developing integrated plans for eliminating greenhouse gas emissions (100% reductions) by 2050 for a country, state, province, sector, or industry. Same as: EARTHSYS 296

**EARTHSYS 199. Honors Program in Earth Systems. 1-9 Unit.****EARTHSYS 20. The Cuisine of Change: Promoting Child Health and Combating Food Insecurity. 1 Unit.**

ASB Course. The course on nutrition, health and food insecurity is split into four projects: 1) Workshop a Story, in which students craft a personal narrative with input from the class, 2) Pose a Question, in which students in pairs attempt to educate the class on many sides of the same issue, 3) Create a Dish, in which students develop original dishes in support of local organizations, and 4) Teach a Class, in which students, in teams, develop a curriculum to be implemented in over the spring break trip. Furthermore, each section will expand the scope of the issue from the individual to the community and all the way up to national policies. The course will be a mix of some of the best lecturers and professors that we've encountered in our time at Stanford as well as a smattering of community challenges. Come with a willingness to push your comfort zone, as some of the activities include creative presentations, taking a no added sugar challenge, get vulnerable, and developing an intelligent attitude toward healthy eating.

**EARTHSYS 200. Environmental Communication in Action: The SAGE Project. 3 Units.**

This course is focused on writing about sustainability for a public audience through an ongoing project, SAGE (Sound Advice for a Green Earth), that is published by Stanford Magazine. Students contribute to SAGE, an eco advice column, by choosing, researching, and answering questions about sustainable living submitted by Stanford alumni and the general public. (Meets Earth Systems WIM requirement).

**EARTHSYS 201. Editing for Publication. 2 Units.**

Most student writing experiences end with a "final" written draft, but that leaves out crucial steps in the publication process. In this course, advanced students take responsibility for final editing and publication of the environmental advice column SAGE, starting with answers researched and written by students in EARTHSYS 200. Topics include developmental editing and project management for the SAGE project, structural editing for overall organization and impact of individual pieces, line editing for clarity and style, and fact checking and copy editing for accuracy and consistency.

**EARTHSYS 205. Food and Community: Food Security, Resilience and Equity. 2-3 Units.**

What can communities do to bolster food security, resiliency, and equity in the face of climate change? This course aims to respond to this question, in three parts. In Part I, we will explore the most current scientific findings on trends in anthropogenic climate forcing and the anticipated impacts on global and regional food systems. Specifically, Part I will review the anticipated impact of climate change on severe weather events, crop losses, and food price volatility and the influence of these impacts on global and regional food insecurity and hunger. In Part II, we will consider what communities can do to promote food security and equity in the face of these changes, by reviewing the emerging literature on food system resiliency. Finally, we will facilitate a conference in which multi-disciplinary teams from around the country will gather to initiate regional planning projects designed to enhance food system resilience and equity. Cardinal Course (certified by Haas Center). Limited enrollment. May be repeated for credit.

Same as: EARTHSYS 105

**EARTHSYS 206. World Food Economy. 5 Units.**

The economics of food production, consumption, and trade. The micro- and macro- determinants of food supply and demand, including the interrelationship among food, income, population, and public-sector decision making. Emphasis on the role of agriculture in poverty alleviation, economic development, and environmental outcomes. (graduate students enroll in 206).

Same as: EARTHSYS 106, ECON 106, ECON 206, ESS 106, ESS 206

**EARTHSYS 207. Spanish in Science/Science in Spanish. 2 Units.**

For graduate and undergraduate students interested in the natural sciences and the Spanish language. Students will acquire the ability to communicate in Spanish using scientific language and will enhance their ability to read scientific literature written in Spanish. Emphasis on the development of science in Spanish-speaking countries or regions. Course is conducted in Spanish and intended for students pursuing degrees in the sciences, particularly disciplines such as ecology, environmental science, sustainability, resource management, anthropology, and archeology.

Same as: BIO 208

**EARTHSYS 21. Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years. 3-5 Units.**

Fossil, genetic and archaeological evidence suggest that modern humans began to disperse out of Africa about 50,000 years ago. Subsequently, humans have colonized every major landmass on earth. This class introduces students to the data and issues regarding human dispersal, migration and colonization of continents and islands around the world. We explore problems related to the timing and cause of colonizing events, and investigate questions about changing patterns of land use, demography and consumption. Students are introduced to critical relationships between prehistoric population changes and our contemporary environmental crisis.

Same as: ANTHRO 18, ARCHLGY 12, HUMBIO 182

**EARTHSYS 210A. Senior Capstone and Reflection. 3 Units.**

The Earth Systems Senior Capstone and Reflection, required of all seniors, provides students with opportunities to synthesize and reflect on their learning in the major. Students participate in guided career development and planning activities and initiate work on an independent or group capstone project related to an Earth Systems problem or question of interest. In addition, students learn and apply principles of effective oral communication through developing and giving a formal presentation on their internship. Students must also take EARTHSYS 210P, Earth Systems Capstone Project, in the quarter following the Senior Capstone and Reflection Course. Prerequisite: Completion of an approved Earth Systems internship (EARTHSYS 260).

**EARTHSYS 210B. Senior Capstone and Reflection. 3 Units.**

The Earth Systems Senior Capstone and Reflection, required of all seniors, provides students with opportunities to synthesize and reflect on their learning in the major. Students participate in guided career development and planning activities and initiate work on an independent or group capstone project related to an Earth Systems problem or question of interest. In addition, students learn and apply principles of effective oral communication through developing and giving a formal presentation on their internship. Students must also take EARTHSYS 210P, Earth Systems Capstone Project, in the quarter following the Senior Capstone and Reflection Course. Prerequisite: Completion of an approved Earth Systems internship (EARTHSYS 260).

**EARTHSYS 210P. Earth Systems Capstone Project. 2 Units.**

Students work independently or in groups to complete their Senior Capstone Projects. They will participate in regular advising meetings with the instructor(s), and will give a final presentation on their projects at the end of the quarter in a special Earth Systems symposium. Prerequisite: EARTHSYS 210A, B, or C.

**EARTHSYS 211. Fundamentals of Modeling. 3-5 Units.**

Simulation models are a powerful tool for environmental research, if used properly. The major concepts and techniques for building and evaluating models. Topics include model calibration, model selection, uncertainty and sensitivity analysis, and Monte Carlo and bootstrap methods.

Emphasis is on gaining hands-on experience using the R programming language. Prerequisite: Basic knowledge of statistics.

Same as: ESS 211

**EARTHSYS 212. Human Society and Environmental Change. 4 Units.**

Interdisciplinary approaches to understanding human-environment interactions with a focus on economics, policy, culture, history, and the role of the state. Prerequisite: ECON 1.

Same as: EARTHSYS 112, ESS 112, HISTORY 103D

**EARTHSYS 214. Environmental Change and Emerging Infectious Diseases. 4-5 Units.**

The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV.

Same as: ANTHRO 177, ANTHRO 277, EARTHSYS 114, HUMBIO 114

**EARTHSYS 219. Will Work for Food. 1 Unit.**

This is a speaker series class featuring highly successful innovators in the food system. Featured speakers will talk in an intimate, conversational manner about their current work, as well as about their successes, failures, and learnings along the way. Additional information can be found here: <http://feedcollaborative.org/speaker-series/>.

Same as: EARTHSYS 119

**EARTHSYS 225. Shades of Green: Redesigning and Rethinking the Environmental Justice Movements. 3-5 Units.**

Historically, discussions of race, ethnicity, culture, and equity in the environment have been relegated to the environmental justice movement, which often focuses on urban environmental degradation and remains separated from other environmental movements. This course will seek to break out of this limiting discussion. We will explore access to outdoor spaces, definitions of wilderness, who is and isn't included in environmental organizations, gender and the outdoors, how colonialism has influenced ways of knowing, and the future of climate change. The course will also have a design thinking community partnership project. Students will work with partner organizations to problem-solve around issues of access and diversity. We value a diversity of experiences and epistemological beliefs, and therefore undergraduates and graduate students from all disciplines are welcome.

Same as: CSRE 125E, EARTHSYS 125, URBANST 125

**EARTHSYS 232. Evolution of Earth Systems. 4 Units.**

This course examines biogeochemical cycles and how they developed through the interaction between the atmosphere, hydrosphere, biosphere, and lithosphere. Emphasis is on the long-term carbon cycle and how it is connected to other biogeochemical cycles on Earth. The course consists of lectures, discussion of research papers, and quantitative modeling of biogeochemical cycles. Students produce a model on some aspect of the cycles discussed in this course. Grades based on class interaction, student presentations, and the modeling project.

Same as: EARTHSYS 132, ESS 132, ESS 232

**EARTHSYS 235. Podcasting the Anthropocene. 3 Units.**

The Anthropocene refers to the proposed geologic age defined by the global footprint of humankind. It's an acknowledgement of the tremendous influence people and societies exert on Earth systems. Students taking the course will identify a subject expert, workshop story ideas with fellow students and instructors, conduct interviews, iteratively write audio scripts, and learn the skills necessary to produce final audio podcast as their final project. Our expectation is that the final projects will be published on the award-winning Generation Anthropocene podcast, with possible opportunities to cross post in collaboration with external media partners. Students taking EARTHSYS 135/235 are strongly encouraged to take EARTHSYS 135A/235A beforehand. Meets Earth Systems WIM requirement. (Cardinal Course certified by the Haas Center).

**EARTHSYS 236. The Ethics of Stewardship. 2-3 Units.**

What responsibilities do humans have to nonhuman nature and future generations? How are human communities and individuals shaped by their relationships with the natural world? What are the social, political, and moral ramifications of drawing sustenance and wealth from natural resources? Whether we realize it or not, we grapple with such questions every time we turn on the tap, fuel up cars, or eat meals -and they are key to addressing issues like global climate change and environmental justice. In this class, we consider several perspectives on this ethical question of stewardship: the role of humans in the global environment. In addition to reading written work and speaking with land stewards, we will practice stewardship at the Stanford Educational Farm. This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: EARTHSYS 136

**EARTHSYS 238. Land Use Law. 3 Units.**

(Same as LAW 2505.) This course focuses on the pragmatic (more than theoretical) aspects of contemporary land use law and policy, including: the tools and legal foundation of modern land use law; the process of land development; vested property rights, development agreements, and takings; growth control, sprawl, and housing density; and direct democracy over land use. We explore how land use decisions affect environmental quality and how land use decision-making addresses environmental impacts. Special Instructions: All graduate students from other departments are encouraged to enroll, and no pre-requisites apply. Student participation is essential. Roughly two-thirds of the class time will involve a combination of lecture and classroom discussion. The remaining time will engage students in case studies based on actual land use issues and disputes. Elements used in grading: Attendance, class participation, writing assignments, and final exam. Elements used in grading: Attendance, Class Participation, Final Exam.

**EARTHSYS 239. Ecosystem Services: Frontiers in the Science of Valuing Nature. 3 Units.**

This advanced course explores the science of valuing nature, beginning with its historical origins, and then its recent development in natural (especially ecological), economic, psychological, and other social sciences. We will use the ecosystem services framework (characterizing benefits from ecosystems to people) to define the state of knowledge, core methods of analysis, and research frontiers, such as at the interface with biodiversity, resilience, human health, and human development. Intended for diverse students, with a focus on research and real-world cases. To apply, please email the instructor (gdaily@stanford.edu) with a brief description of your background and research interests.

Same as: BIO 138, BIO 238, EARTHSYS 139

**EARTHSYS 24. Quick Capture and Questions: Practicing Natural History Through Watercolor. 1 Unit.**

This course makes space to use art as an entry point for closer observation, deeper curiosity, and better understanding of natural systems. With a series of guest experts in art, science, and the practice of natural history, we will investigate the Jasper Ridge Biological Preserve through a number of lenses, microscopic to macroscopic. In each session, we will venture into the preserve to explore how field journaling, quick capture watercolor, and expressive language can mediate insight and sense of connection. Come build a community of practice with us! Apply at <https://tinyurl.com/earthsys24> and direct further questions to Freya Chay ([freyac@stanford.edu](mailto:freyac@stanford.edu)) and Hannah Black ([hmcblack@stanford.edu](mailto:hmcblack@stanford.edu)).

**EARTHSYS 241. Remote Sensing of the Oceans. 3-4 Units.**

How to observe and interpret physical and biological changes in the oceans using satellite technologies. Topics: principles of satellite remote sensing, classes of satellite remote sensors, converting radiometric data into biological and physical quantities, sensor calibration and validation, interpreting large-scale oceanographic features.

Same as: EARTHSYS 141, ESS 141, ESS 241, GEOPHYS 141

**EARTHSYS 242. Remote Sensing of Land. 4 Units.**

The use of satellite remote sensing to monitor land use and land cover, with emphasis on terrestrial changes. Topics include pre-processing data, biophysical properties of vegetation observable by satellite, accuracy assessment of maps derived from remote sensing, and methodologies to detect changes such as urbanization, deforestation, vegetation health, and wildfires.

Same as: EARTHSYS 142, ESS 162, ESS 262

**EARTHSYS 243. Environmental Advocacy and Policy Communication. 3 Units.**

Although environmental science suggests that coordinated policy action is critically necessary to address a host of pressing issues - from global climate change to marine pollution to freshwater depletion - governments have been slow to act. This course focuses on the translation of environmental science to public discourse and public policy, with an emphasis on the causes of our current knowledge-to-action gap and policy-sphere strategies to address it. We will read classic works of environmental advocacy, map our political system and the public relations and lobbying industries that attempt to influence it, grapple with analytical perspectives on effective and ethical environmental policy communication, engage with working professionals in the field, learn effective strategies for written and oral communication with policymakers, and write and workshop op-eds.

**EARTHSYS 249. Wild Writing. 3 Units.**

What is wilderness and why does it matter? In this course we will interrogate answers to this question articulated by influential and diverse American environmental thinkers of the 19th, 20th, and 21st centuries, who through their writing transformed public perceptions of wilderness and inspired such actions as the founding of the National Park System, the passage of the Wilderness Act and the Clean Air and Water Acts, the establishment of the Environmental Protection Agency, and the birth of the environmental and climate justice movements. Students will also develop their own responses to the question of what is wilderness and why it matters through a series of writing exercises that integrate personal narrative, wilderness experience, and environmental scholarship, culminating in a ~3000 word narrative nonfiction essay. This course will provide students with knowledge, tools, experience, and skills that will empower them to become more persuasive environmental storytellers and advocates. If you are interested in signing up for the course, complete this pre-registration form [https://stanforduniversity.qualtrics.com/jfe/form/SV\\_9XqZeZs036Wlvop](https://stanforduniversity.qualtrics.com/jfe/form/SV_9XqZeZs036Wlvop). Same as: EARTHSYS 149

**EARTHSYS 250. Directed Research. 1-9 Unit.**

Independent research. Student develops own project with faculty supervision. May be repeated for credit.

**EARTHSYS 251. Biological Oceanography. 3-4 Units.**

Required for Earth Systems students in the oceans track. Interdisciplinary look at how oceanic environments control the form and function of marine life. Topics include distributions of planktonic production and abundance, nutrient cycling, the role of ocean biology in the climate system, expected effects of climate changes on ocean biology. Local weekend field trips. Designed to be taken concurrently with Marine Chemistry (ESS/EARTHSYS 152/252). Prerequisites: BIO 43 and ESS 8 or equivalent.

Same as: EARTHSYS 151, ESS 151, ESS 251

**EARTHSYS 252. Marine Chemistry. 3-4 Units.**

Introduction to the interdisciplinary knowledge and skills required to critically evaluate problems in marine chemistry and related disciplines. Physical, chemical, and biological processes that determine the chemical composition of seawater. Air-sea gas exchange, carbonate chemistry, and chemical equilibria, nutrient and trace element cycling, particle reactivity, sediment chemistry, and diagenesis. Examination of chemical tracers of mixing and circulation and feedbacks of ocean processes on atmospheric chemistry and climate. Designed to be taken concurrently with Biological Oceanography (ESS/EARTHSYS 151/251).

Same as: EARTHSYS 152, ESS 152, ESS 252

**EARTHSYS 255. Microbial Physiology. 3 Units.**

Introduction to the physiology of microbes including cellular structure, transcription and translation, growth and metabolism, mechanisms for stress resistance and the formation of microbial communities. These topics will be covered in relation to the evolution of early life on Earth, ancient ecosystems, and the interpretation of the rock record. Recommended: introductory biology and chemistry.

Same as: BIO 180, ESS 255, GS 233A

**EARTHSYS 256. Soil and Water Chemistry. 3 Units.**

(Graduate students register for 256.) Practical and quantitative treatment of soil processes affecting chemical reactivity, transformation, retention, and bioavailability. Principles of primary areas of soil chemistry: inorganic and organic soil components, complex equilibria in soil solutions, and adsorption phenomena at the solid-water interface. Processes and remediation of acid, saline, and wetland soils. Recommended: soil science and introductory chemistry and microbiology.

Same as: ESS 256

**EARTHSYS 258. Geomicrobiology. 3 Units.**

How microorganisms shape the geochemistry of the Earth's crust including oceans, lakes, estuaries, subsurface environments, sediments, soils, mineral deposits, and rocks. Topics include mineral formation and dissolution; biogeochemical cycling of elements (carbon, nitrogen, sulfur, and metals); geochemical and mineralogical controls on microbial activity, diversity, and evolution; life in extreme environments; and the application of new techniques to geomicrobial systems. Recommended: introductory chemistry and microbiology such as CEE 274A.

Same as: EARTHSYS 158, ESS 158, ESS 258

**EARTHSYS 260. Internship. 1 Unit.**

Supervised field, lab, or private sector project. May consist of directed research under the supervision of a Stanford faculty member, participation in one of several off campus Stanford programs, or an approved non-Stanford program relevant to the student's Earth Systems studies. Required of and restricted to declared Earth Systems majors. Includes 15-page technical summary research paper that is subject to iterative revision.

**EARTHSYS 262. Data for Sustainable Development. 3-5 Units.**

The sustainable development goals (SDGs) encompass many important aspects of human and ecosystem well-being that are traditionally difficult to measure. This project-based course will focus on ways to use inexpensive, unconventional data streams to measure outcomes relevant to SDGs, including poverty, hunger, health, governance, and economic activity. Students will apply machine learning techniques to various projects outlined at the beginning of the quarter. The main learning goals are to gain experience conducting and communicating original research. Prior knowledge of machine learning techniques, such as from CS 221, CS 229, CS 231N, STATS 202, or STATS 216 is required. Open to both undergraduate and graduate students. Enrollment limited to 24. Students must apply for the class by filling out the form at <https://goo.gl/forms/9LSZF7IPkHadix5D3>. A permission code will be given to admitted students to register for the class.

Same as: CS 325B, EARTHSYS 162

**EARTHSYS 263F. Groundwork for COP21. 1 Unit.**

This course will prepare undergraduate and cotermin students to observe the climate change negotiations (COP 21) in Paris in November/December 2015. Students will develop individual projects to be carried out before and during the negotiation session and be paired with mentors. Please note: Along with EARTHSYS 163E/CEE 163E, this course is part of the required two-course-set in which undergraduate and cotermin masters degree students must enroll to receive accreditation to the climate negotiations.

**EARTHSYS 272. Antarctic Marine Geology. 3 Units.**

For upper-division undergraduates and graduate students. Intermediate and advanced topics in marine geology and geophysics, focusing on examples from the Antarctic continental margin and adjacent Southern Ocean. Topics: glaciers, icebergs, and sea ice as geologic agents (glacial and glacial marine sedimentology, Southern Ocean current systems and deep ocean sedimentation), Antarctic biostratigraphy and chronostratigraphy (continental margin evolution). Students interpret seismic lines and sediment core/well log data. Examples from a recent scientific drilling expedition to Prydz Bay, Antarctica. Up to two students may have an opportunity to study at sea in Antarctica during Winter Quarter.

Same as: ESS 242

**EARTHSYS 276. Open Space Management Practicum. 4-5 Units.**

The unique patchwork of urban-to-rural land uses, property ownership, and ecosystems in our region poses numerous challenges and opportunities for regional conservation and environmental stewardship. Students in this class will address a particular challenge through a faculty-mentored research project engaged with the Peninsula Open Space Trust, Acterra, or the Amah Mutsun Land Trust that focuses on open space management. By focusing on a project driven by the needs of these organizations and carried out through engagement with the community, and with thorough reflection, study, and discussion about the roles of scientific, economic, and policy research in local-scale environmental decision-making, students will explore the underlying challenges and complexities of what it means to actually do community-engaged research for conservation and open space preservation in the real world. As such, this course will provide students with skills and experience in research design in conservation biology and ecology, community and stakeholder engagement, land use policy and planning, and the practical aspects of land and environmental management. Same as: EARTHSYS 176

**EARTHSYS 276A. Open Space Practicum Independent Study. 1-2 Unit.**

Additional practicum units for students intent on continuing their projects from EARTHSYS 276. Students who enroll in 276A must have completed EARTHSYS 276: Open Space Management Practicum, or have consent of the instructors.

**EARTHSYS 277C. Specialized Writing and Reporting: Environmental and Food System Journalism. 4-5 Units.**

Advanced reporting and writing course in the specific practices and standards of food journalism. This course begins with the assumption that students are familiar with the basics of reporting and research in journalism. We'll take those skills and apply them to the wide territory of food journalism, from farmer's markets to food waste, from travel and cultural writing to stories about agriculture and climate change. We will read a range of the best food journalism and students will be charged with writing both long form narrative essays and short magazine style pieces. We'll talk about how to hone in on the truly interesting idea, how to get more out of the reporting process and how to turn the raw materials of research and interviews into polished, engaging prose. Admission by application only, available from [vv1@stanford.edu](mailto:vv1@stanford.edu). Deadline December 4.

Same as: COMM 177C, COMM 277C, EARTHSYS 177C

**EARTHSYS 281. Urban Agriculture in the Developing World. 3-4 Units.**

In this advanced undergraduate course, students will learn about some of the key social and environmental challenges faced by cities in the developing world, and the current and potential role that urban agriculture plays in meeting (or exacerbating) those challenges. This is a service-learning course, and student teams will have the opportunity to partner with real partner organizations in a major developing world city to define and execute a project focused on urban development, and the current or potential role of urban agriculture. Service-learning projects will employ primarily the student's analytical skills such as synthesis of existing research findings, interdisciplinary experimental design, quantitative data analysis and visualization, GIS, and qualitative data collection through interviews and textual analysis. Previous coursework in the aforementioned analytical skills is preferred, but not required. Admission is by application.

Same as: EARTHSYS 181, ESS 181, ESS 281, URBANST 181

**EARTHSYS 286. Farm and Garden Environmental Education Practicum. 2 Units.**

Farms and gardens provide excellent settings for place-based environmental education that emphasize human ecological relationships and experiential learning. The O'Donohue Family Stanford Educational Farm is the setting to explore the principles and practices of farm and garden-based education in conjunction with the farm's new field trip program for local youth. The course includes readings and reflections on environmental education and emphasis on learning by doing, engaging students in the practice of team teaching. Application required. Deadline: March 14. Application: [https://stanforduniversity.qualtrics.com/jfe/form/SV\\_9SPufdULCh93rbT](https://stanforduniversity.qualtrics.com/jfe/form/SV_9SPufdULCh93rbT).

Same as: EARTHSYS 186

**EARTHSYS 288. Social and Environmental Tradeoffs in Climate Decision-Making. 1-2 Unit.**

How can we ensure that measures taken to mitigate global climate change don't create larger social and environmental problems? What metrics should be used to compare potential climate solutions beyond cost and technical feasibility, and how should these metrics be weighed against each other? How can modeling efforts and stakeholder engagement be best integrated into climate decision making? What information are we still missing to make fully informed decisions between technologies and policies? Exploration of these questions, alongside other issues related to potential negative externalities of emerging climate solutions. Evaluation of energy, land use, and geoengineering approaches in an integrated context, culminating in a climate stabilization group project.

Same as: EARTHSYS 188

**EARTHSYS 289A. FEED Lab: Food System Design & Innovation. 3-4 Units.**

FEED Lab is a 3-4 unit introductory course in design thinking and food system innovation offered through the FEED Collaborative. Targeted at graduate students interested in food and the food system, this course provides a series of diverse, primarily hands-on experiences (design projects with industry-leading thinkers, field work, and collaborative leadership development) in which students both learn and apply the process of human-centered design to projects of real consequence in the food system. The intent of this course is to develop students' creative confidence, collaborative leadership ability, and skills in systems thinking to prepare them to be more effective as innovators and leaders in the food system. This course is mandatory for any student wishing to qualify for the FEED Collaborative's summer Leadership and Innovation Program, in which select students participate in full-time, paid, externship roles with collaborating thought-leaders in the industry. Admission is by application: <http://feedcollaborative.org/classes/>.

**EARTHSYS 289B. FEED Lab: Food System Design & Innovation. 3-4 Units.**

Primarily a follow-on course to EARTHSYS 289A, this course is an experiential education platform that enables students already experienced in design thinking to collaborate with faculty and industry thought-leaders on projects of real consequence in the local food system. A select cohort of students will work in small, diverse teams and will interact closely with the teaching team in an intentionally creative and informal classroom setting. Students will deepen their skills in design thinking and social entrepreneurship by working on projects sponsored by leading innovators in the FEED Collaborative's network. Some projects may turn into summer internships or research projects for students interested in continuing their work. Admission is by application: <http://feedcollaborative.org/classes/>.

**EARTHSYS 290. Master's Seminar. 2 Units.**

Required of and open only to Earth Systems master's students. Reflection on the Earth Systems coterminous experience and development of skills to clearly articulate interdisciplinary expertise to potential employers, graduate or professional schools, colleagues, business partners, etc. Hands-on projects to take students through a series of guided reflection activities. Individual and small group exercises. Required, self-chosen final project encapsulates each student's MS expertise in a form relevant to his or her future goals (ie. a personal statement, research poster, portfolio, etc.).

**EARTHSYS 291. Concepts in Environmental Communication. 3 Units.**

Introduction to the history, development, and current state of communication of environmental science and policy to non-specialist audiences. Includes fundamental principles, core competencies, and major challenges of effective environmental communication in the public and policy realms and an overview of the current scope of research and practice in environmental communication. Intended for graduate students and advanced undergraduates, with a background in environmental science and/or policy studies. Prerequisite: Earth Systems core (EarthSys 111 and EarthSys 112) or equivalent. (Meets Earth Systems WIM requirement.)

Same as: EARTHSYS 191

**EARTHSYS 292. Multimedia Environmental Communication. 3 Units.**

Introductory theory and practice of effective, accurate and engaging use of photography and web video production in communicating environmental science and policy concepts to the public. Emphasis on fundamental technique and process more than gear. Includes group project work, instructor and peer critiquing of work, and substantial out-of-class project work. Limited class size, preference to Earth Systems Master's students. No previous photography or video experience necessary.

**EARTHSYS 293. Environmental Communication Practicum. 1-5 Unit.**

Students complete an internship or similar practical experience in a professional environmental communication setting. Potential placements include environmental publications, NGOs, government agencies, on-campus entities, and science centers and museums. Restricted to students enrolled in the Environmental Communication Master of Arts in Earth Systems. Can be completed in any quarter.

**EARTHSYS 294. Environmental Communication Capstone. 1-5 Unit.**

The Earth Systems Master of Arts, Environmental Communication capstone project provides students with an opportunity to complete an ambitious independent project demonstrating mastery of an area of environmental communication. Capstone projects are most often applied communication projects such as writing, photography, or video projects; expressive or artistic works; or student-initiated courses, workshops, or curriculum materials. Projects focused on academic scholarship or communication theory research may also be considered. Restricted to students enrolled in the Earth Systems Master of Arts, Environmental Communication Program.

**EARTHSYS 296. Implementing Climate Solutions at Scale. 3 Units.**

Climate change is the biggest problem humanity has ever faced, and this course will teach students about the means and complexity of solving it. The instructors will guide the students in the application of key data and analysis tools for their final project, which will involve developing integrated plans for eliminating greenhouse gas emissions (100% reductions) by 2050 for a country, state, province, sector, or industry. Same as: EARTHSYS 196

**EARTHSYS 297. Directed Individual Study in Earth Systems. 1-9 Unit.**

Under supervision of an Earth Systems faculty member on a subject of mutual interest.

**EARTHSYS 298. Earth Systems Book Review. 2 Units.**

For Earth Systems master's students and advanced undergraduates only. Analysis and discussion of selected literary nonfiction books relevant to Earth systems topics. Examples of previous topics include political presentations of environmental change in the popular press, review of the collected works of Aldo Leopold, disaster literature, and global warming.

**EARTHSYS 299. M.S. Thesis. 1-9 Unit.****EARTHSYS 323. Stanford at Sea. 16 Units.**

(Graduate students register for 323H.) Five weeks of marine science including oceanography, marine physiology, policy, maritime studies, conservation, and nautical science at Hopkins Marine Station, followed by five weeks at sea aboard a sailing research vessel in the Pacific Ocean. Shore component comprised of three multidisciplinary courses meeting daily and continuing aboard ship. Students develop an independent research project plan while ashore, and carry out the research at sea. In collaboration with the Sea Education Association of Woods Hole, MA. Only 6 units may count towards the Biology major. Same as: BIOHOPK 182H, BIOHOPK 323H, ESS 323

**EARTHSYS 332. Theory and Practice of Environmental Education. 3 Units.**

Foundational understanding of the history, theoretical underpinnings, and practice of environmental education as a tool for addressing today's pressing environmental issues. The purpose, design, and implementation of environmental education in formal and nonformal settings with youth and adult audiences. Field trip and community-based project offer opportunities for experiencing and engaging with environmental education initiatives.

Same as: EDUC 332

**EARTHSYS 36N. Life at the Extremes: From the Deep Sea to Deep Space. 3 Units.**

Preference to freshmen. Microbial life is diverse and resilient on Earth; could it survive elsewhere in our solar system? This seminar will investigate the diversity of microbial life on earth, with an emphasis on extremophiles, and consider the potential for microbial life to exist and persist in extraterrestrial locales. Topics include microbial phylogenetic and physiological diversity, biochemical adaptations of extremophiles, ecology of extreme habitats, and apparent requirements and limits of life. Format includes lectures, discussions, lab-based activities and local field trips. Basics of microbiology, biochemistry, and astrobiology.

**EARTHSYS 37N. Climate Change: Science & Society. 3 Units.**

Preference to freshmen. How and why do greenhouse gases cause climate to change? How will a changing climate affect humans and natural ecosystems? What can be done to prevent climate change and better adapt to the climate change that does occur? Focus is on developing quantitative understanding of these issues rooted in both the physical and social sciences. Exercises based on simple quantitative observations and calculations; algebra only, no calculus.

**EARTHSYS 38N. The Worst Journey in the World: The Science, Literature, and History of Polar Exploration. 3 Units.**

This course examines the motivations and experiences of polar explorers under the harshest conditions on Earth, as well as the chronicles of their explorations and hardships, dating to the 1500s for the Arctic and the 1700s for the Antarctic. Materials include *The Worst Journey in the World* by Aspley Cherry-Garrard who in 1911 participated in a midwinter Antarctic sledging trip to recover emperor penguin eggs. Optional field trip into the high Sierra in March.

Same as: ESS 38N, GS 38N

**EARTHSYS 4. Coevolution of Earth and Life. 4 Units.**

Earth is the only planet in the universe currently known to harbor life. When and how did Earth become inhabited? How have biological activities altered the planet? How have environmental changes affected the evolution of life? Are we living in a sixth mass extinction? In this course, we will develop and use the tools of geology, paleontology, geochemistry, and modeling that allow us to reconstruct Earth's 4.5 billion year history and to reconstruct the interactions between life and its host planet over the past 4 billion years. We will also ask what this long history can tell us about life's likely future on Earth. We will also use One half-day field trip.

Same as: GS 4

**EARTHSYS 41N. The Global Warming Paradox. 3 Units.**

Preference to freshman. Focus is on the complex climate challenges posed by the substantial benefits of energy consumption, including the critical tension between the enormous global demand for increased human well-being and the negative climate consequences of large-scale emissions of carbon dioxide. Topics include: Earth's energy balance; detection and attribution of climate change; the climate response to enhanced greenhouse forcing; impacts of climate change on natural and human systems; and proposed methods for curbing further climate change. Sources include peer-reviewed scientific papers, current research results, and portrayal of scientific findings by the mass media and social networks.

**EARTHSYS 42. The Global Warming Paradox II. 1 Unit.**

Further discussion of the complex climate challenges posed by the substantial benefits of energy consumption, including the critical tension between the enormous global demand for increased human well-being and the negative climate consequences of large-scale emissions of carbon dioxide. Discussions of topics of student interest, including peer-reviewed scientific papers, current research results, and portrayal of scientific findings by the mass media and social networks. Focus is on student engagement in on-campus and off-campus activities. Prerequisite: EESS 41N or EARTHSYS 41N or consent of instructor. Same as: ESS 42

**EARTHSYS 44N. The Invisible Majority: The Microbial World That Sustains Our Planet. 3 Units.**

Microbes are often viewed through the lens of infectious disease yet they play a much broader and underappreciated role in sustaining our Earth system. From introducing oxygen into the Earth's atmosphere over 2 billion years ago to consuming greenhouse gases today, microbial communities have had (and continue to have) a significant impact on our planet. In this seminar, students will learn how microbes transformed the ancient Earth environment into our modern planet, how they currently sustain our Earth's ecosystems, and how scientists study them both in the present and in the past. Students will be exposed to the fundamentals of microbiology, biogeochemistry, and Earth history.

**EARTHSYS 46N. Exploring the Critical Interface between the Land and Monterey Bay: Elkhorn Slough. 3 Units.**

Preference to freshmen. Field trips to sites in the Elkhorn Slough, a small agriculturally impacted estuary that opens into Monterey Bay, a model ecosystem for understanding the complexity of estuaries, and one of California's last remaining coastal wetlands. Readings include Jane Caffrey's *Changes in a California Estuary: A Profile of Elkhorn Slough*. Basics of biogeochemistry, microbiology, oceanography, ecology, pollution, and environmental management.

Same as: ESS 46N

**EARTHSYS 46Q. Environmental Impact of Energy Systems: What are the Risks?. 3 Units.**

In order to reduce CO<sub>2</sub> emissions and meet growing energy demands during the 21st Century, the world can expect to experience major shifts in the types and proportions of energy-producing systems. These decisions will depend on considerations of cost per energy unit, resource availability, and unique national policy needs. Less often considered is the environmental impact of the different energy producing systems: fossil fuels, nuclear, wind, solar, and other alternatives. One of the challenges has been not only to evaluate the environmental impact but also to develop a systematic basis for comparison of environmental impact among the energy sources. The course will consider fossil fuels (natural gas, petroleum and coal), nuclear power, wind and solar and consider the impact of resource extraction, refining and production, transmission and utilization for each energy source.

Same as: GS 46Q

**EARTHSYS 49N. Multi-Disciplinary Perspectives on a Large Urban Estuary: San Francisco Bay. 3 Units.**

This course will be focused around San Francisco Bay, the largest estuary on the Pacific coasts of both North and South America as a model ecosystem for understanding the critical importance and complexity of estuaries. Despite its uniquely urban and industrial character, the Bay is of immense ecological value and encompasses over 90% of California's remaining coastal wetlands. Students will be exposed to the basics of estuarine biogeochemistry, microbiology, ecology, hydrodynamics, pollution, and ecosystem management/restoration issues through lectures, interactive discussions, and field trips. Knowledge of introductory biology and chemistry is recommended.

Same as: CEE 50N, ESS 49N

**EARTHSYS 56Q. Changes in the Coastal Ocean: The View From Monterey and San Francisco Bays. 3 Units.**

Preference to sophomores. Recent changes in the California current, using Monterey Bay as an example. Current literature introduces principles of oceanography. Visits from researchers from MBARI, Hopkins, and UCSC. Optional field trip to MBARI and Monterey Bay.

Same as: ESS 56Q

**EARTHSYS 57Q. Climate Change from the Past to the Future. 3 Units.**

Preference to sophomores. Numeric models to predict how climate responds to increase of greenhouse gases. Paleoclimate during times in Earth's history when greenhouse gas concentrations were elevated with respect to current concentrations. Predicted scenarios of climate models and how these models compare to known hyperthermal events in Earth history. Interactions and feedbacks among biosphere, hydrosphere, atmosphere, and lithosphere. Topics include long- and short-term carbon cycle, coupled biogeochemical cycles affected by and controlling climate change, and how the biosphere responds to climate change. Possible remediation strategies.

Same as: ESS 57Q

**EARTHSYS 61Q. Food and security. 3 Units.**

The course will provide a broad overview of key policy issues concerning agricultural development and food security, and will assess how global governance is addressing the problem of food security. At the same time the course will provide an overview of the field of international security, and examine how governments and international institutions are beginning to include food in discussions of security.

Same as: ESS 61Q, INTNLREL 61Q

**EARTHSYS 8. The Oceans: An Introduction to the Marine Environment. 4 Units.**

The course will provide a basic understanding of how the ocean functions as a suite of interconnected ecosystems, both naturally and under the influence of human activities. Emphasis is on the interactions between the physical and chemical environment and the dominant organisms of each ecosystem. The types of ecosystems discussed include coral reefs, deep-sea hydrothermal vents, coastal upwelling systems, blue-water oceans, estuaries, and near-shore dead zones. Lectures, multimedia presentations, group activities, and tide-pooling day trip.

Same as: ESS 8

**EARTHSYS 801. TGR Project. 0 Units.****EARTHSYS 9. Public Service Internship Preparation. 1 Unit.**

Are you prepared for your internship this summer? This workshop series will help you make the most of your internship experience by setting learning goals in advance; negotiating and communicating clear roles and expectations; preparing for a professional role in a non-profit, government, or community setting; and reflecting with successful interns and community partners on how to prepare sufficiently ahead of time. You will read, discuss, and hear from guest speakers, as well as develop a learning plan specific to your summer or academic year internship placement. This course is primarily designed for students who have already identified an internship for summer or a later quarter. You are welcome to attend any and all workshops, but must attend the entire series and do the assignments for 1 unit of credit.

Same as: ARTSINST 40, EDUC 9, HUMBIO 9, PUBLPOL 74, URBANST 101

**EARTHSYS 90. Introduction to Geochemistry. 3-4 Units.**

The chemistry of the solid earth and its atmosphere and oceans, emphasizing the processes that control the distribution of the elements in the earth over geological time and at present, and on the conceptual and analytical tools needed to explore these questions. The basics of geochemical thermodynamics and isotope geochemistry. The formation of the elements, crust, atmosphere and oceans, global geochemical cycles, and the interaction of geochemistry, biological evolution, and climate. Recommended: introductory chemistry.

Same as: GS 90

**EARTHSYS 91. Earth Systems Writers Collective. 1 Unit.**

Come join a community of environmental writers, publish your work, and get course credit at the same time! Are you currently working on an article, an op-ed, translating your class projects into publishable pieces or pursuing a new writing project? Are you interested in publishing your work in the quarterly Earth Systems newsletter and the annual Earth Systems magazine? In this weekly seminar, you will collaborate with others and get constructive feedback from a community of peer writers. You can enroll in the Earth Systems Writers Collective for 1 or 2 units, or just join without signing up for course credit. May be repeat for credit.

**EARTHSYS 95. Liberation Through Land: Organic Gardening and Racial Justice. 2 Units.**

Through field trips, practical work and readings, this course provides students with the tools to begin cultivating a relationship to land that focuses on direct engagement with sustainable gardening, from seed to harvest. The course will take place on the O'Donohue Family Stanford Educational Farm, where students will be given the opportunity to learn how to sow seeds, prepare garden beds, amend soils, build compost, and take care of plants. The history of forced farm labor in the U.S., from slavery to low-wage migrant labor, means that many people of color encounter agricultural spaces as sites of trauma and oppression. In this course we will explore the potential for revisiting a narrative of peaceful relation to land and crop that existed long before the trauma occurred, acknowledging the beautiful history of POC coexistence with land. Since this is a practical course, there will be a strong emphasis on participation. Application available at [https://docs.google.com/forms/d/e/1FAIpQLScdKKp7mtTNzS0-qc-La97LPj9w8SsWNZ5xrAYVjikTR86F6Q/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLScdKKp7mtTNzS0-qc-La97LPj9w8SsWNZ5xrAYVjikTR86F6Q/viewform?usp=sf_link); deadline to apply is September 19, 2017, at midnight. The course is co-sponsored by the Institute for Diversity in the Arts (IDA) and the Earth Systems Program.

Same as: CSRE 95

## Earth, Energy & Env Sciences (EEES)

### Economics (ECON)

**ECON 1. Principles of Economics. 5 Units.**

This is an introductory course in economics. We will cover both microeconomics (investigating decisions by individuals and firms) and macroeconomics (examining the economy as a whole). The primary goal is to develop and then build on your understanding of the analytical tools and approaches used by economists. This will help you to interpret economic news and economic data at a much deeper level while also forming your own opinions on economic issues. The course will also provide a strong foundation for those of you who want to continue on with intermediate microeconomics and/or intermediate macroeconomics and possibly beyond. In Spring 2017-2018 Econ 1 will use all class time for team-based learning instead of lectures; class attendance will be mandatory, and enrollment will be limited to 120 students.

**ECON 10. Microcosm of Silicon Valley and Wall Street. 1 Unit.**

Seminar in applied economics with focus on the microcosm of Silicon Valley, how growth companies are originated, managed and financed from start-up to IPO. Round-table discussion format. Applicable to those students with an interest in technology company formation, growth and finance including interaction with Wall Street. Enrollment limited to 10 juniors, seniors and co-term students.

**ECON 101. Economic Policy Seminar. 5 Units.**

Economic policy analysis, writing, and oral presentation. Topics vary with instructor. Limited enrollment. Prerequisites: Econ 51 and 52, 102B, and two field courses. Some sections require additional prerequisites.

**ECON 102A. Introduction to Statistical Methods (Postcalculus) for Social Scientists. 5 Units.**

Probabilistic modeling and statistical techniques relevant for economics. Concepts include: probability trees, conditional probability, random variables, discrete and continuous distributions, correlation, central limit theorems, point estimation, hypothesis testing and confidence intervals for both one and two populations. Prerequisite: MATH 20 or equivalent.



**ECON 102B. Applied Econometrics. 5 Units.**

Hypothesis tests and confidence intervals for population variances, chi-squared goodness-of-fit tests, hypothesis tests for independence, simple linear regression model, testing regression parameters, prediction, multiple regression, omitted variable bias, multicollinearity, F-tests, regression with indicator random variables, simultaneous equation models and instrumental variables. Topics vary slightly depending on the quarter. Prerequisites: Econ 102A or equivalent. Recommended: computer experience (course often uses STATA software to run regressions).

**ECON 102C. Advanced Topics in Econometrics. 5 Units.**

The program evaluation problem. Identifying and estimating the effects of policies on outcomes of interest (e.g., tax rates on labor supply, etc.). Identifying and estimating the effects of human capital on earnings and other labor market outcomes. Topics: Instrumental variables estimation; limited dependent variable models (probit, logit, Tobit models); Panel data techniques (fixed and random effect models, dynamic panel data models); Duration models; Bootstrap and Estimation by Simulation. Prerequisite: Econ 102B.

**ECON 106. World Food Economy. 5 Units.**

The economics of food production, consumption, and trade. The micro- and macro- determinants of food supply and demand, including the interrelationship among food, income, population, and public-sector decision making. Emphasis on the role of agriculture in poverty alleviation, economic development, and environmental outcomes. (graduate students enroll in 206).

Same as: EARTHSYS 106, EARTHSYS 206, ECON 206, ESS 106, ESS 206

**ECON 107. Causal Inference and Program Evaluation. 5 Units.**

Methods for estimating and doing inference for causal effects. Discussion of randomized experiments, matching methods, the role of the propensity score, instrumental variables, regression discontinuity, and natural experiments. Theoretical aspects of these methods as well as detailed applications drawn from economics, political science, education, and health care. Prerequisite: Econ 102A or equivalent.

**ECON 110. History of Financial Crises. 5 Units.**

Financial crises are as old as financial markets themselves. There are many similarities between historical events. The 2008 credit crisis, for example, is far from unique. More often than not financial crises are the result of bubbles in certain asset classes or can be linked to a specific form of financial innovation. This course gives an overview of the history of financial crises, asset price bubbles, banking collapses and debt crises. We start with the Tulip mania in 1636 and end with the recent European debt crises. The purpose of the course is to understand the causes of past crises and to develop a conceptual framework that ties common elements together. We will discuss the lessons that we can draw for financial markets today. Prerequisites: Econ 50 or Econ 135.

**ECON 111. Money and Banking. 5 Units.**

The primary course goal is for students to master the logic, intuition and operation of a financial system - money, financial markets (money and capital markets, debt and equity markets, derivatives markets), and financial institutions and intermediaries (the Central Bank, depository institutions, credit unions, pension funds, insurance companies, venture capital firms, investment banks, mutual funds, etc.). In other words, how money/capital change hands between agents over time, directly and through institutions. Material will be both quantitative and qualitative, yet always highly analytical with a focus on active learning - there will be an approximately equal emphasis on solving mathematical finance problems (e.g. bond or option pricing) and on policy analysis (e.g. monetary policy and financial regulation.) Students will not be rewarded for memorizing and regurgitating facts, but rather for demonstrating the ability to reason with difficult problems and situations with which they might not previously be familiar. Prerequisite: Econ 50, 52. Strongly recommended but not required: some familiarity with finance and statistics (e.g. Econ 135 or 140, Econ 102A).

**ECON 112. Financial Markets and Institutions: Recent Developments. 5 Units.**

The course covers innovations, challenges and proposed changes to the financial system. Topics include new mortgage products, foreclosure rules, securitization, credit ratings, credit derivatives, dealer networks, repo financing, implications for prudential regulation & monetary policy. Emphasis is on quantitative studies of these topics. Prerequisites: Econ 52, Econ 102B.

**ECON 113. Economics of Innovation. 5 Units.**

The role of innovation and technological change in long run economic growth and the sources of innovation in science, technology, and commercialization. Founding of new industries and new markets. Commercialization of new technologies. Incentives and organization of science. Entrepreneurship. Openness and proprietary/controlled innovation. Selected public policies toward invention and innovation. The industrial revolution, the shifting international location of innovation, and the information revolution. Focus of the second half of the course is on the newest research on the newest industries. Prerequisites: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51) and Econ 102B.

Same as: PUBLPOL 354

**ECON 118. Development Economics. 5 Units.**

The microeconomic problems and policy concerns of less developed countries. Topics include: health and education; risk and insurance; microfinance; agriculture; technology; governance. Emphasis is on economic models and empirical evidence. Prerequisites: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51), ECON 102B.

**ECON 119. The Russian Economy. 4-5 Units.**

Brief introduction to the economic history of Russia, general overview of the modern Russian economy with analysis of its macroeconomic features and dynamics, industrial structure, and the major institutional features that are important for understanding Russian economic development. The period of transition from Soviet-type planned economy to a market economy and market reforms (1991-1998), the period of economic growth (1999-2007), and the economic development of Russia during the current global crisis of 2008-2010. Analysis of Russia's social structure and social policy, labor markets, the regional structure of the economy, the role of the state, and major Russian industries (oil, metals, machinery). Emphasis on the specific institutional aspects that have shaped Russia's economic development.

Same as: REES 219

**ECON 11N. Understanding the Welfare System. 3 Units.**

Welfare-reform legislation passed by the federal government in the mid-1990s heralded a dramatic step in the movement that has been termed the devolution revolution, which is again being discussed in the context of healthcare reform. The centerpiece of devolution is the transfer of more responsibilities for antipoverty programs to the states. We will explore the effects of these reforms and the role that devolution plays in the ongoing debates over the designs of programs that make up America's social safety net. In addition to discussing conventional welfare programs (e.g., Medicaid, food stamps, TANF, SSI) and other governmental policies assisting low-income families (EITC, minimum wages), we will examine the trends in governmental spending on anti-poverty programs and how our nation defines poverty and eligibility for income support. We will apply economics principles throughout to understand the effectiveness of America's antipoverty programs and their consequences on the behavior and circumstances of families. Prerequisites: A basic understanding/knowledge of introductory economics is recommended.

**ECON 120. Japan & the World: Innovation, Economic Growth, Globalization, and Int'l Security Challenges. 3-5 Units.**

This course introduces students to the economy, politics, and international relations of contemporary Japan. The course puts a particular emphasis on several emerging issues in Japan including innovation and economic dynamism, Japan's contributions to international peace and cooperation, and Japan's response to international economic and geopolitical challenges. The course will invite several guest instructors, each of whom is an expert on at least one of the issues that Japan faces today, to give lectures in addition to the main instructors. The guest lecturers will also be available outside of the classroom for further discussion during their stays at Stanford. Same as: EASTASN 153, EASTASN 253, POLISCI 115E

**ECON 121. Social Science Field Research Methods and Applications. 5 Units.**

Fundamentals of the design, implementation and interpretation of social science field research. Building on a basic knowledge of statistical methods and economics, the course introduces observational field research and compares it with experimental field research. Significant attention devoted to explaining the details of research design as well as what can and cannot be learned through each type of field research. Emphasis placed on the theory of the design and analysis of statistical experiments. Topics include: sample size selection, power and size of statistical hypothesis tests, partial compliance, sample selection bias and methods for accounting for it. Development of critical reading skills emphasized through class discussions of academic journal articles and popular media accounts of field research. Examples of best practice field research studies presented as well as examples of commonly committed errors; students are expected to articulate and challenge or defend underlying assumptions and the extent to which real-world research matches up with concepts covered in lecture. Practical aspects of field work, including efficient and cost-effective data collection, teamwork, field team supervision, budget management, and common ethical considerations. Grading based on weekly problem sets that focus on developing data analysis skills using statistical software, a midterm examination, and a final project in which students write a detailed research proposal. Students can also apply to participate in a course project designing a field research project and implementing it in a developing country context during four weeks of the summer. Prerequisites: either ECON 1 and either STATS 60 or Econ 102A or equivalent.

Same as: EARTHSYS 120, PUBLPOL 120, PUBLPOL 220

**ECON 124. Economic Development and Challenges of East Asia. 3-5 Units.**

This course explores East Asia's rapid economic development and the current economic challenges. For the purpose of this course, we will focus on China, Japan, and Korea. The first part of the course examines economic growth in East Asia and the main mechanisms. In this context, we will examine government and industrial policy, international trade, firms and business groups, and human capital. We will discuss the validity of an East Asian model for economic growth. However, rapid economic growth and development in East Asia was followed by economic stagnation and financial crisis. The second part of the course focuses on the current economic challenges confronting these countries, in particular, inequality, demography, and entrepreneurship and innovation. Readings will come from books, journal articles, reports, news articles, and case studies. Many of the readings will have an empirical component and students will be able to develop their understanding of how empirical evidence is presented in articles. Prerequisites: Econ 102B.

**ECON 125. Economic Development, Microfinance, and Social Networks. 5 Units.**

An introduction to the study of the financial lives of households in less developed countries, focusing on savings, credit, informal insurance, the expansion of microfinance, and social networks. Prerequisites- Econ 51 or Publpol 51 and Econ 102B.

**ECON 126. Economics of Health and Medical Care. 5 Units.**

Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: demand for medical care and medical insurance; institutions in the health sector; economics of information applied to the market for health insurance and for health care; measurement and valuation of health; competition in health care delivery. Graduate students with research interests should take ECON 249. Prerequisites: ECON 50 and either ECON 102A or STATS 116 or the equivalent. Recommended: ECON 51.

Same as: BIOMEDIN 156, BIOMEDIN 256, HRP 256

**ECON 127. Economics of Health Improvement in Developing Countries. 5 Units.**

Application of economic paradigms and empirical methods to health improvement in developing countries. Emphasis is on unifying analytic frameworks and evaluation of empirical evidence. How economic views differ from public health, medicine, and epidemiology; analytic paradigms for health and population change; the demand for health; the role of health in international development. Prerequisites: ECON 50 and ECON 102B.

Same as: MED 262

**ECON 128. Economic Development: A Historical Perspective. 5 Units.**

The course explores the process of economic development from a historical perspective. It draws on contemporary theories of economic development and the historical experience of various regions over the last millennium. The substantive focus is on the cultural and institutional and social foundations for economic growth. The stalker focus is particularly on the Middle East, Europe and China. The course is conducted as a seminar based on in class discussion, readings, and students presentations. Limited Enrollment. Prerequisites: ECON 50, ECON 52, ECON 102B. Recommended: ECON 118.

**ECON 129. Credit markets and development: Some evidence from Latin America and the World. 5 Units.**

This course gives an overview of the importance (or not) of credit for development and the workings and failures of these markets from a microeconomic perspective. We will study retail credit markets, which include mortgage lending, credit cards, microcredit, auto loans, and loans to small firms. We will not cover macro credit topics like sovereign debt, the stock market, systemic risk, etc. We will draw on studies from México, the US and other countries. In the process we will also discuss on the main techniques to estimate causal effects. Prerequisites: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51), and Econ 102B.

**ECON 135. Finance for Non-MBAs. 3 Units.**

For graduate students and advanced undergraduates. This course teaches the foundations of finance, with applications in investment management, portfolio choice, and corporate finance. Topics include criteria for investment decisions, valuation of financial assets and liabilities, relationships between risk and return, market efficiency, and the valuation of derivative securities. Corporate financial instruments including debt, equity, and convertible securities will also be discussed. Equivalent to core MBA finance course, FINANCE 220. Prerequisites: ECON 50, ECON 102A, or equivalents; ability to use spreadsheets, and basic probability and statistics concepts including random variables, expected value, variance, covariance, and simple estimation and regression.

**ECON 136. Market Design. 5 Units.**

Use of economic theory and analysis to design allocation mechanisms and market institutions. Course focuses on three areas: the design of matching algorithms to solve assignment problems, with applications to school choice, entry-level labor markets, and kidney exchanges; the design of auctions to solve general resource allocation problems, with applications to the sale of natural resources, financial assets, radio spectrum, and advertising; and the design of platforms and exchanges, with applications to internet markets. Emphasis on connecting economic theory to practical applications. Students must write term paper.

Prerequisites: recommended: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51).

**ECON 137. Decision Modeling and Information. 5 Units.**

Effective decision models consider a decision maker's alternatives, information and preferences. The construction of such models in single-party situations with emphasis on the role of information. The course then evolves to two-party decision situations where one party has more information than the other. Models examined include: bidding exercises and the winner's curse, the Akerlof Model and adverse selection, the Principal-Agent model and risk sharing, moral hazard and contract design. Prerequisite: ECON 102A or equivalent. Recommended: Econ 50, Optimization and simulation in Excel.

**ECON 139D. Directed Reading. 1-10 Unit.**

May be repeated for credit.

**ECON 13N. Experimental Economics. 3 Units.**

This freshman seminar is for students who are interested in economics and want to get a hands on, front row experience with research. The goal of the seminar is to come up, as a group, with a research topic and question and implement an experiment to address the question.

**ECON 14. Navigating Financial Crises in the Modern Global Economy. 1 Unit.**

What causes financial crises? What are the keys to anticipating, preventing, and managing disruptions in the global financial system? This course prepares students to navigate future episodes as policymakers, finance professionals, and citizens by going inside the practical decisions made in an unfolding crisis, from the U.S. government and IMF to the boardroom and trading floor. Students will learn warning signs of distress; market structures that govern crisis dynamics; strategic interactions among the key actors; and lessons learned for creating a more resilient system. Concepts will be applied to real-world experiences in emerging market crises, the U.S. housing and global financial crisis, and the European sovereign crisis, as well as prospective risks from China's financial system and unwinding of extraordinary central bank stimulus.

Same as: PUBLPOL 14

**ECON 140. Introduction to Financial Economics. 5 Units.**

Modern portfolio theory and corporate finance. Topics: present value and discounting, interest rates and yield to maturity, various financial instruments including financial futures, mutual funds, the efficient market theory, basic asset pricing theory, the capital asset pricing model, and models for pricing options and other contingent claims. Use of derivatives for hedging. Prerequisites: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51), ECON 102A.

**ECON 141. Public Finance and Fiscal Policy. 5 Units.**

What role should and does government play in the economy? What are the effects of government spending, borrowing, and taxation on efficiency, equity and economic stability and growth? The course covers economic, historical and statistical analyses and current policy debates in the U.S. and around the world. Policy topics: Fiscal crises, budget deficits, the national debt and intergenerational equity; tax systems and tax reform; social security and healthcare programs and reforms; transfers to the poor; public goods and externalities; fiscal federalism; public investment and cost-benefit analysis; and the political economy of government decision-making. Prerequisites: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51), ECON 52 (can be taken concurrently).

Same as: PUBLPOL 107

**ECON 143. Finance and Society for non-MBAs. 4 Units.**

The financial system is meant to help people, businesses, and governments fund, invest, and manage risks, but it is rife with conflicts of interests and may allow people with more information and control to harm those with less of both. In this interdisciplinary course we explore the forces that shape the financial system and how individuals and society can benefit most from this system without being unnecessarily harmed and endangered. Topics include the basic principles of investment, the role and "dark side" of debt, corporations and their governance, banks and other financial institutions, why effective financial regulations are essential yet often fail, and political and ethical issues in finance. The approach will be rigorous and analytical but not overly technical mathematically. Prerequisite: Econ 1.

Same as: IPS 227, MS&E 147, POLISCI 127A, PUBLPOL 143

**ECON 145. Labor Economics. 5 Units.**

Analysis and description of labor markets. Determination of employment, hours of work, and wages. Wage differentials. Earnings inequality. Trade unions and worker co-operatives. Historical and international comparisons. Prerequisites: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51), ECON 102B.

**ECON 146. Economics of Education. 5 Units.**

How a decision to invest in education is affected by factors including ability and family background. Markets for elementary and secondary schooling; topics such as vouchers and charter schools, accountability, expenditure equalization among schools, and the teacher labor market. The market for college education emphasizing how college tuition is determined, and whether students are matched efficiently with colleges. How education affects economic growth, focusing on developing countries. Theory and empirical results. Application of economics from fields such as public economics, labor economics, macroeconomics, and industrial organization. Prerequisites: ECON 50, ECON 102B.

**ECON 147. The Economics of Labor Markets. 5 Units.**

This course will cover the economics of labor markets. Topics include: determinants of employment and unemployment, with a special focus on understanding business cycle fluctuations. Job creation and job destruction. The effects of technological change on the labor market. Determinants of labor supply and the effects of universal basic income. Prerequisites: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51), Econ 52, Econ 102B.

**ECON 149. The Modern Firm in Theory and Practice. 5 Units.**

Examines the empirics on the economics, management and strategy of organizations (e.g. firms). Topics include the organization of firms in US and internationally. Management practices around information systems, target setting and human resources. Focus on management practices in manufacturing, but also analyze retail, hospitals and schools, plus some recent field-experiments in developing countries. Prerequisites: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51), ECON 102B.

**ECON 145C. A Random Walk Down Wall Street. 2 Units.**

The title of this course is the title of one of the books that will be required summer reading. The course will introduce modern finance theory and cover a wide range of financial instruments: stocks, bonds, options, mutual funds, exchange traded funds, mortgage back securities, etc. Historical returns on different asset classes will be examined. The efficient market hypothesis and the case for and against index funds will be discussed. The course for 2015 will examine the ongoing policies to stimulate the economy, including the quantitative easing policy of the Federal Reserve. There will be coverage of global financial markets. We will try to reconcile the long-run return on stocks, bonds, and money market instruments with the capital asset pricing model. We will try to connect financial markets with the problems of the real economy including the entitlement programs. We will talk with venture capitalists, Federal Reserve officials, hedge fund and mutual fund managers, and those who manage large institutional endowments. Students will be expected to write a short paper and make an oral presentation to the class. A wide range of topics will be acceptable, including market regulation, the introduction of new financial instruments, the functioning of commodity futures markets, and evaluations of the federal government intervention in financial markets. Sophomore College Course: Application required, due noon, April 7, 2015. Apply at <http://soco.stanford.edu>.

**ECON 150. Economic Policy Analysis. 4-5 Units.**

The relationship between microeconomic analysis and public policy making. How economic policy analysis is done and why political leaders regard it as useful but not definitive in making policy decisions. Economic rationales for policy interventions, methods of policy evaluation and the role of benefit-cost analysis, economic models of politics and their application to policy making, and the relationship of income distribution to policy choice. Theoretical foundations of policy making and analysis, and applications to program adoption and implementation. Prerequisites: ECON 50 and ECON 102B. Undergraduate Public Policy students are required to take this class for a letter grade and enroll in this class for five units.

Same as: PUBLPOL 104, PUBLPOL 204

**ECON 152. The Future of Finance. 2 Units.**

(Same as Law 1038) If you are interested in a career in finance or that touches finance (computational science, economics, public policy, legal, regulatory, corporate, other), this course will give you a useful perspective. We will take on hot topics in the current landscape of global financial markets such as how the world has evolved post-financial crisis, how it is being disrupted by FinTech, RegTech, artificial intelligence, crowd financing, blockchain, machine learning & robotics (to name a few), how it is being challenged by IoT, cyber, financial warfare & crypto currency risks (to name a few) and how it is seizing new opportunities in fast-growing areas such as ETFs, new instruments/payment platforms, robo advising, big data & algorithmic trading (to name a few). The course will include guest-lecturer perspectives on how sweeping changes are transforming business models and where the greatest opportunities exist for students entering or touching the world of finance today including existing, new and disruptive players. While derivatives and other quantitative concepts will be handled in a non-technical way, some knowledge of finance and the capital markets is presumed. Elements used in grading: Class Participation, Attendance, Final Paper. Consent Application: To apply for this course, students must complete and email to the instructors the Consent Application Form, which is available on the Public Policy Program's website at <https://publicpolicy.stanford.edu/academics/undergraduate/forms>. See Consent Application Form for submission deadline.

Same as: ECON 252, PUBLPOL 364, STATS 238

**ECON 154. Law and Economics. 4-5 Units.**

This course explores the role of law in promoting well-being (happiness). Law, among its other functions, can serve as a mechanism to harmonize private incentives with cooperative gains, to maintain an equitable division of those gains, and to deter "cheating" and dystopia. Law is thus essential to civilization. Economic analysis of law focuses on the welfare-enhancing incentive effects of law and its enforcement and on law's role in reducing the risks of cooperation, achieved by fixing expectations of what courts or the state will do in various futures. Prerequisite: ECON 51 or PUBLPOL 51.

Same as: PUBLPOL 106, PUBLPOL 206

**ECON 155. Environmental Economics and Policy. 5 Units.**

Economic sources of environmental problems and alternative policies for dealing with them (technology standards, emissions taxes, and marketable pollution permits). Evaluation of policies addressing local air pollution, global climate change, and the use of renewable resources. Connections between population growth, economic output, environmental quality, sustainable development, and human welfare. Prerequisite: ECON 50. May be taken concurrently with consent of the instructor.

**ECON 157. Imperfect Competition. 5 Units.**

The interaction between firms and consumers in markets that fall outside the benchmark competitive model. How firms acquire and exploit market power. Game theory and information economics to analyze how firms interact strategically. Topics include monopoly, price discrimination, oligopoly, collusion and cartel behavior, anti-competitive practices, the role of information in markets, anti-trust policy, and e-commerce. Sources include theoretical models, real-world examples, and empirical papers. Prerequisite: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51).

**ECON 159. Economic, Legal, and Political Analysis of Climate-Change Policy. 5 Units.**

This course will advance students understanding of economic, legal, and political approaches to avoiding or managing the problem of global climate change. Theoretical contributions as well as empirical analyses will be considered. It will address economic issues, legal constraints, and political challenges associated with various emissions-reduction strategies, and it will consider policy efforts at the local, national, and international levels. Specific topics include: interactions among overlapping climate policies, the strengths and weaknesses of alternative policy instruments, trade-offs among alternative policy objectives, and decision making under uncertainty. Prerequisites: Econ 50 or its equivalent.

Same as: EARTHSYS 159, ECON 209, PUBLPOL 159

**ECON 15Q. The Economics of Immigration in the US: Past and Present. 3 Units.**

The United States has long been perceived as a land of opportunity for immigrants. Yet, both in the past and today, policy makers have often expressed concerns that immigrants fail to integrate into US society and lower wages for existing workers. There is an increasingly heated debate about how strict migration policy should be. This debate is rarely based on discussion of facts about immigrants assimilation. This class will review the literature on historical and contemporary migrant flows. We will tackle three major questions in the economics of immigration: whether immigrants were positively or negatively selected from their sending countries; how immigrants assimilated into the US economy and society; and what effects that immigration may have on the economy, including the effect of immigration on native employment and wages. In each case, we will present studies covering the two main eras of US immigration history, the Age of Mass Migration from Europe (1850-1920) and the recent period of renewed mass migration from Asia and Latin America. Students will participate in a final project, which could include developing their own recommendations for how to design immigration policy in the US. Prerequisite: Econ 1.

**ECON 160. Game Theory and Economic Applications. 5 Units.**

Introduction to game theory and its applications to economics. Topics: strategic and extensive form games, dominant strategies, Nash equilibrium, subgame-perfect equilibrium, and Bayesian equilibrium. The theory is applied to repeated games, voting, auctions, and bargaining with examples from economics and political science. Prerequisites: Working knowledge of calculus and basic probability theory.

**ECON 162. Games Developing Nations Play. 5 Units.**

If, as economists argue, development can make everyone in a society better off, why do leaders fail to pursue policies that promote development? The course uses game theoretic approaches from both economics and political science to address this question. Incentive problems are at the heart of explanations for development failure. Specifically, the course focuses on a series of questions central to the development problem: Why do developing countries have weak and often counterproductive political institutions? Why is violence (civil wars, ethnic conflict, military coups) so prevalent in the developing world, and how does it interact with development? Why do developing economies fail to generate high levels of income and wealth? We study how various kinds of development traps arise, preventing development for most countries. We also explain how some countries have overcome such traps. This approach emphasizes the importance of simultaneous economic and political development as two different facets of the same developmental process. No background in game theory is required. Same as: POLISCI 247A, POLISCI 347A

**ECON 164. The Law and Economics of the World Trading System. 5 Units.**

This course focuses on the purpose and design of the World Trade Organization (WTO). The course begins with a discussion of the economics of trade agreements and a brief introduction to the WTO as an institution. The course then considers a series of topics, which may include: the dispute resolution system; the choice between multilateral and regional or bilateral trade agreements; the international regulation of subsidies; the interface between international trade obligations and domestic regulation; safeguard measures; and trade preferences for developing countries in the WTO. Prerequisite: Econ 51.

**ECON 165. International Finance. 5 Units.**

We will explore models for analyzing a wide variety of issues in open-economy macroeconomics, such as the balance of payments; the determination of exchange rates; the relation between exchange rates and inflation; monetary and fiscal policy under flexible and fixed exchange rate regimes; macroeconomic gains (and pains?) from financial globalization; policy coordination and optimum currency areas; exchange rate crises; debt crises and the possibility of contagion. Our theoretical framework will structure our examination of important historical episodes and contemporary policy debates; the textbook will be supplemented with readings from recent scholarly articles and mainstream news sources. Active class participation is an important part of the course. Prerequisite: ECON 52.

**ECON 166. International Trade. 5 Units.**

Explaining patterns of trade among nations; characterizing the sources of comparative advantage in production and the prospect of gains from economies of scale. Enumerating and accounting for the net aggregate gains from trade, and identifying winners and losers from globalization. Analyzing the effects of international labor migration, foreign direct investment, outsourcing, and multinational companies. Strategic trade policy; international trade agreements; labor and environmental implications. We will review relevant theoretical frameworks, examine empirical evidence, and discuss historical and contemporary policy debates as covered in the popular press; active class participation is an important part of the course. Prerequisite: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51).

**ECON 178. Behavioral Economics. 5 Units.**

The field of behavioral economics draws on insights from other disciplines, especially psychology, to enrich our understanding of economic behavior. The course will discuss how people may display systematic behavioral patterns that diverge from the predictions of standard economic models, as well as the ways in which economists incorporate those considerations into their theories, and the implications of those theories for market outcomes and public policies. Prerequisites: ECON 50 and ECON 102A. Econ 51 is recommended.

**ECON 179. Experimental Economics. 5 Units.**

Methods and major subject areas that have been addressed by laboratory experiments. Focus is on a series of experiments that build on one another. Topics include decision making, two player games, auctions, and market institutions. How experiments are used to learn about preferences and behavior, trust, fairness, and learning. Final presentation of group projects. Prerequisites: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51), ECON 102A.

**ECON 17N. Energy, the Environment, and the Economy. 3 Units.**

Examines the intimate relationship between environmental quality and the production and consumption of energy. Assesses the economics efficiency and political economy implications of a number of current topics in energy and environmental economics. Topics include: the economic theory of exhaustible resources, Greenhouse Gas Emissions (GHG) control (cap and trade mechanisms and carbon fees), GHG emissions offsets, the Strategic Petroleum Reserve (SPR), the "smart" transmission grid for electricity, nuclear energy and nuclear waste, the real cost of renewable energy, natural gas and coal-fired electricity production, the global coal and natural gas markets, Corporate Average Fuel Efficiency (CAFE) and Low-Carbon Fuel Standards (LCFS), Energy Efficiency Investments and Demand Response, and Carbon Capture and Sequestration (CCS). For all topics, there will be reading to explain the economics and engineering behind the topic and class discussion to clarify and elaborate on this interaction.

**ECON 180. Honors Game Theory. 5 Units.**

Rigorous introduction to game theory and applications. Topics include solution concepts for static and dynamic games of complete and incomplete information, signaling games, repeated games, bargaining, and elements of cooperative game theory. Applications mainly from economics, but also political science, biology, and computer science. Prerequisites: Experience with abstract mathematics and willingness to work hard. No background in economics required.

**ECON 181. Honors Information and Incentives. 5 Units.**

Rigorous introduction to the theory of economic mechanisms under asymmetric information. Covers applications to price discrimination, taxation, regulation, long-term relationships, single-unit and multi-unit auctions. Forms a sequence with ECON 180 and ECON 182, but can be taken independently. Prerequisite: Experience with abstract mathematics and willingness to work hard. No prior knowledge of economics is required, although basic knowledge in game theory is useful.

**ECON 182. Honors Market Design. 5 Units.**

Rigorous introduction to the theory of matching and resource allocation, and its application to practical market design. Theory covers two-sided matching, "house allocation" problems, random assignment, and their variants. Applied topics include school choice, labor market, house allocation, and organ allocation for transplantation. Final paper required. Forms a sequence with ECON 180 and ECON 181, but can be taken independently. Prerequisites: Experience with abstract mathematics and willingness to work hard. No prior knowledge of economics is required, although basic knowledge in game theory is useful.

**ECON 183. The Cardinal Fund. 1-3 Unit.**

This is an experiential course that will cover the important concepts that underlying investment theory in Financial Economics. Students will manage an investment portfolio of at least \$1 million dollars. In doing so they will learn how risk and return are related in public capital markets. Students are expected to spend a substantial amount of time outside the classroom applying the knowledge they learn in the class. Prerequisites: Econ 51 (or IPS 204A, PublPol 301A), Econ 102B (or Stats 141, Stats 110, CEE 203, Earthsys 160, Educ 200C, Linguist 277, Psych 252), Econ 140 (or Econ 135), Econ 190 (or MS&E 140). Not accepting new students for 2017/2018.

**ECON 184. Institutional Investment Management: Theory and Practice. 5 Units.**

This course provides an introduction to the theory and practice of institutional investment management including asset allocation and manager selection across public and private equity, absolute return, real assets, and fixed income. The course is co-taught by the CIO of Stanford's endowment and takes the perspective of an institution with a long-term investment horizon like Stanford. We introduce and apply a framework for assessing investment strategies and investment firms. Students put theory into practice by meeting with leading investors from various asset classes. Enrollment capped at 20; required application due by September 6; see schedule section below for application instructions. Prerequisites: Econ 50 and 102A, may be taken concurrently.

**ECON 190. Introduction to Financial Accounting. 5 Units.**

This is a Case and Problem Discussion course. How to read, understand, and use corporate financial statements. Oriented towards the use of financial accounting information (rather than the preparer), and emphasizes the reconstruction of economic events from published accounting reports.

**ECON 191. Introduction to Cost Accounting. 5 Units.**

Focuses on how managers use accounting information for decision making. Students will study product and service costing, activity based costing, performance management and evaluation, CVP analysis, forecasting, factors to be considered in pricing decision, capital investment analysis, and quality management and measurement.

**ECON 198. Junior Honors Seminar. 5 Units.**

Primarily for students who expect to write an honors thesis. Weekly sessions go through the process of selecting a research question, finding relevant bibliography, writing a literature review, introduction, and study design, culminating in the write-up of an honors thesis proposal (prospectus) and the oral presentation of each student's research project. Students also select an adviser and outline a program of study for their senior year. Enrollment limited to 15. Same as: PUBLPOL 197

**ECON 199D. Honors Thesis Research. 1-10 Unit.**

In-depth study of an appropriate question and completion of a thesis of very high quality. Normally written under the direction of a member of the Department of Economics (or some closely related department). See description of honors program. Register for at least 1 unit for at least one quarter after your honors application is approved. Winter registration for one unit under the supervision of the Director of the Honors Program is mandatory for all honors students.

**ECON 19Q. Measuring the Performance of Governments in the U.S.. 3 Units.**

Spending by federal, state, and local governments accounts for about one-third of U.S. GDP and governments employ more than one-in-seven workers in the U.S. For most U.S. residents, government is represented by a complicated web of federal, state, and local policies. There is an increasingly contentious debate about the proper role of the government and regarding the impact of specific government policies. This debate is rarely grounded in a common set of facts. In this seminar, we will explore how each level of government interacts with U.S. residents through government services, public programs, taxes, and regulations. We will examine financial results for different levels of government while considering the net effects of government intervention on the health and economic well-being of individuals and families. Particular attention will be paid to certain sectors (e.g. education, health care, etc.) and to certain groups (e.g. those in poverty, the elderly, etc.). Along the way we will accumulate a set of metrics to assess the performance of each level of government while highlighting the formidable challenges of such an exercise. Prerequisite: Econ 1.

Same as: PUBLPOL 19Q

**ECON 202. Microeconomics I. 2-5 Units.**

(Non-Economics graduate students register for 202N.) Open to advanced undergraduates with consent of instructors. Theory of the consumer and the implications of constrained maximization; uses of indirect utility and expenditure functions; theory of the producer, profit maximization, and cost minimization; monotone comparative statics; behavior under uncertainty; partial equilibrium analysis and introduction to models of general equilibrium. Limited enrollment. Prerequisite: thorough understanding of the elements of multivariate calculus and linear algebra.

**ECON 202N. Microeconomics I For Non-Economics PhDs. 2-5 Units.**

Microeconomics I for non-Economics PhD students. Theory of the consumer and the implications of constrained maximization; uses of indirect utility and expenditure functions; theory of the producer, profit maximization, and cost minimization; behavior under uncertainty; partial equilibrium analysis and introduction to models of general equilibrium. Limited enrollment. Prerequisite: understanding of the elements of multivariate calculus and linear algebra.

**ECON 203. Microeconomics II. 2-5 Units.**

(Non-Economics graduate students register for 203N.) Non-cooperative game theory including normal and extensive forms, solution concepts, games with incomplete information, and repeated games. Externalities and public goods. The theory of imperfect competition: static Bertrand and Cournot competition, dynamic oligopoly, entry decisions, entry deterrence, strategic behavior to alter market conditions. Limited enrollment. Prerequisite: ECON 202.

**ECON 203N. Microeconomics II For Non-Economics PhDs. 2-5 Units.**

Non-cooperative game theory including normal and extensive forms, solution concepts, games with incomplete information, and repeated games. Externalities, public goods, and asymmetric information. The theory of imperfect competition and other applications. Limited enrollment. Prerequisite: understanding of the elements of multivariate calculus and linear algebra.

**ECON 204. Microeconomics III. 2-5 Units.**

Social Choice, including Arrow's theorem, the Gibbard-Satterthwaite theorem, and the Vickrey-Clarke-Groves mechanism. The theory of contracts, emphasizing contractual incompleteness and the problem of moral hazard. Incentive regulation. Competition with imperfect information, including signaling and adverse selection. Competitive equilibrium and the core. Limited enrollment. Non-Econ students need permission of instructor to enroll. Prerequisite: ECON 202 and 203.

**ECON 206. World Food Economy. 5 Units.**

The economics of food production, consumption, and trade. The micro- and macro- determinants of food supply and demand, including the interrelationship among food, income, population, and public-sector decision making. Emphasis on the role of agriculture in poverty alleviation, economic development, and environmental outcomes. (graduate students enroll in 206).

Same as: EARTHSYS 106, EARTHSYS 206, ECON 106, ESS 106, ESS 206

**ECON 209. Economic, Legal, and Political Analysis of Climate-Change Policy. 5 Units.**

This course will advance students understanding of economic, legal, and political approaches to avoiding or managing the problem of global climate change. Theoretical contributions as well as empirical analyses will be considered. It will address economic issues, legal constraints, and political challenges associated with various emissions-reduction strategies, and it will consider policy efforts at the local, national, and international levels. Specific topics include: interactions among overlapping climate policies, the strengths and weaknesses of alternative policy instruments, trade-offs among alternative policy objectives, and decision making under uncertainty. Prerequisites: Econ 50 or its equivalent.

Same as: EARTHSYS 159, ECON 159, PUBLPOL 159

**ECON 210. Macroeconomics I. 2-5 Units.**

Dynamic programming applied to a variety of economic problems. These problems will be formulated in discrete or continuous time, with or without uncertainty, with a finite or infinite horizon. There will be weekly problem sets and a take-home final that will require MATLAB programming. Limited enrollment.

**ECON 211. Macroeconomics II. 2-5 Units.**

Dynamic stochastic general equilibrium models using dynamic programming methods that are solved with MATLAB. Growth models (neoclassical, human capital, technical change) using optimal control theory. Limited enrollment. Prerequisite: ECON 210.

**ECON 212. Macroeconomics III. 2-5 Units.**

Real business cycle and new Keynesian models: business cycle fluctuations, inflation dynamics, the effects of monetary and fiscal policy, and optimal policy. Models of heterogeneity: search models of the labor market; precautionary savings and general equilibrium with incomplete markets; constrained efficiency; endogenous market incompleteness and recursive contracts; optimal taxation and redistribution. Limited enrollment. Prerequisites: ECON 203, ECON 210, ECON 211.

**ECON 214. Development Economics I. 2-5 Units.**

This course uses microeconomic analysis to understand development issues in lower income countries. Topics include institutions and governance; human capital accumulation; productivity; inequality; poverty traps. Prerequisites: 202 or 202N, 270.

**ECON 215. Development Economics II. 2-5 Units.**

This is a course focusing on macro development research. It will cover dynamic models of growth and development, with a focus on migration; technological change; the functioning of financial markets; and barriers to agricultural productivity in less developed countries. Prerequisites: 202 or 202N, 270.

**ECON 216. Development Economics III. 2-5 Units.**

This course focuses on savings, credit, informal insurance, the expansion of microfinance, social networks, social learning and technology adoption, public finance and firm organizations. Prerequisite: 202, 203, 204, 210, 211, 212, 270, 271, 272.

**ECON 217. Topics in International Macroeconomics: Theory and Evidence for Latin America. 2-5 Units.**

Banking systems, interest rates, regulatory policies, and the productivity of capital in developing countries. Controlling inflation: fiscal and monetary policies for macroeconomic stability. Currency crises, exchange rates, and the liberalization of foreign trade. Further applications to transitional socialist economies in Asia and E. Europe.

**ECON 220. Political Economy I. 2-5 Units.**

Theoretical models of political economy. Potential topics include: basic social choice theory, democracy, electoral competition, political accountability, legislative bargaining, lobbying, corruption, autocratic politics, democratization, conflict and arms races, and institutional change. Attention to economics implications, including taxation, redistribution, and public goods. Prerequisite: Econ 203 or permission of instructors.

Same as: POLISCI 311E

**ECON 225. Economics of Technology and Innovation. 2-5 Units.**

Graduate seminar on current research on the economics of innovation. Topics include the design of optimal patent policies, copyright policies, and the role of human capital (science, immigration, skill-biased technical change). Emphasis on empirical analyses of historical and contemporary data.

**ECON 226. U.S. Economic History. 2-5 Units.**

The role of economic history as a distinctive approach to the study of economics, using illustrations from U.S. history. Topics: historical and institutional foundations of the U.S. rise to world economic preeminence; economic causes and consequences of slavery; the American national system of technology; the Great Depression of the 1930s; national economic performance in a globalizing world. Intended for graduate students.

**ECON 227. European Economic History. 2-5 Units.**

European Economic History: covers topics in European Economic History from the Middle Ages to the twentieth century (but does not cover detailed economic history of particular European countries). Topics include competing hypotheses in explaining long term trends in economic growth and cross-country differences in long-term economic growth; the diffusion of knowledge; the formation, function, and persistence of institutions and organizations; the role of institutions and organizations (for example, apprenticeship, servitude, partnerships, cooperatives, social networks, share cropping, and communes) as solutions to contractual problems; the causes and consequences of income inequality; the economics of migration; the changing economic role of the family. The course will highlight the use of economic theory in guiding hypothesis testing, as well as the construction of new datasets and the execution of empirical analysis. Enrollment limited to graduate students.

**ECON 228. Institutions and Organizations in Historical Perspective. 2-5 Units.**

The course integrates historical analysis and economic theory in evaluating the nature and role of institutions in economic and political outcomes. The motivating question is the factors determining economic and political developments in the long run and the historical focus is on the Middle East, Europe, and China over the last millennium. The course first examines various approaches for the study of institutions, their nature and dynamics and then focuses on detailed discussions of frontier research papers.

**ECON 229. Causes and Consequences of the Rise in Inequality. 3 Units.**

In this class we will discuss the economic and institutional causes of the rise in inequality in the US and other countries over the last 40 years. We will also discuss the consequences of inequality in terms of social justice, economic welfare, aggregate economic performance, intergenerational mobility, and the possible implications of inequality for the recent global financial crisis.

**ECON 231. Analytics of Global Economic Externalities under Uncertainty. 3 Units.**

Fundamentally important issues for theoretical analysis of macro-dynamical systems with global externalities are the focus of this course's 9 (weekly) meetings: (i) public goods (e.g., information) and public bads (uncontrolled GHG emissions), (ii) sequential decision-making under uncertainty (e.g., multi-period investment programs, and management of evolving technology portfolios), and (iii) time discounting, allowing for rare events and catastrophic risks. Novel approaches to program designs for global climate stabilization, sustainable use of resources and the future adaptation of market mechanisms (e.g., carbon markets, and markets for potable water).

**ECON 233. Advanced Macroeconomics I. 2-5 Units.**

Topics in the theory and empirics of economic growth. For PhD-level students.

**ECON 234. Advanced Macroeconomics II. 2-5 Units.**

Modern macroeconomics of aggregate fluctuations in advanced economies. Current research on sovereign debt, fiscal policy and financial flows, low growth and stagnation, low interest rates, financial crises, unemployment fluctuations, and other timely topics. The course will be organized around the detailed study of recent research papers. Some lectures will be given by visiting macroeconomists. Students enrolled in MGTECON612 take the class for 4 units. Students develop a research proposal and present it to the instructors as the final exam. Prerequisite: Satisfaction of the economics department's core macro requirement or consent of the instructors.

**ECON 235. Advanced Macroeconomics III. 2-5 Units.**

Current topics to prepare student for research in the field. Recent research in labor-market friction, reallocation, fluctuations, wage and price determination, innovation, and productivity growth. Research methods, presentations skills, and writing in advanced economics.

**ECON 236. Financial Economics I. 2-5 Units.**

This course will cover research topics at the boundary between macroeconomics and finance. Topics may include the study of macroeconomic models with financial frictions, conventional and unconventional monetary policy, its transmission mechanism and the term structure of interest rates, sovereign debt crises, search frictions and segmentation in housing markets, (over)leveraging by households, heterogeneous expectations, excess volatility, financial bubbles and crises. Prerequisites: 210, 211, 212.

**ECON 237. Financial Economics II. 2-5 Units.**

This Ph.D. course will cover research topics at the boundary between macroeconomics and finance. Topics will include the study of macroeconomic models with financial frictions, the term structure of interest rates, conventional and unconventional monetary policy, sovereign debt crises, search frictions and segmentation in housing markets, (over)leveraging by households, heterogeneous expectations, excess volatility, financial bubbles and crises. Student presentations and course paper requirement. Designed for second year PhD students in economics or finance.

Same as: MGTECON 617

**ECON 239D. Directed Reading. 1-10 Unit.**

May be repeated for credit.

**ECON 23N. Capitalism, Socialism and Democracy. 3 Units.**

We will explore the evolution and current performance of capitalist and socialist economies, their interaction with democracy, and the contemporary debate about the appropriate roles of individual vs. collective rights and responsibilities.

**ECON 24. SENSE Labs Social Enterprise Seminar. 2 Units.**

SENSE labs seminar incubates social entrepreneurship startups through bi-weekly meetings that feature guest speakers. Enrollment by application.

**ECON 241. Public Economics I. 2-5 Units.**

Introduction to key issues in public economics, including the optimal design of tax and transfer policy, income and wealth inequality, social mobility, the empirical effect of taxes on earnings and savings, and behavioral welfare economics. Students will learn frontier theoretical and empirical tools that are currently used to address questions of relevance to economic policy. Prerequisites: ECON 202-204, ECON 210, ECON 270, ECON 271, or equivalent with consent of instructor.

**ECON 242. Public Economics II. 2-5 Units.**

We analyze how workers and incomes respond to taxation and anti-poverty programs. We learn how to use taxes and economic mechanisms to address externalities (pollution, social "bads" and "goods"). We learn fundamental tax reform, public goods, fiscal federalism, local public goods, and (special emphasis) government's role in education. Prerequisites: 202, 203, 204, 210, 270, 271, or similar with consent of instructor. Recommended: 241.

**ECON 243. Public Economics III. 2-5 Units.**

The course covers various topics relating to social insurance. The first half of the course covers the rationale for government interventions into private insurance markets, adverse selection, social insurance design and the intersection between social insurance and intra-family insurance. The second half of the course covers local public policy and urban economics, and includes topics such as spatial equilibrium, place-based policies and housing policy. Prerequisites: Econ 202, 203, 204, 210, 270, 271, or equivalent with consent of instructor. Recommended: Econ 241 and 242.

**ECON 246. Labor Economics I. 2-5 Units.**

Topics in current applied microeconomic research including intertemporal labor supply models, public policy, program evaluation, job search, migration, consumption behavior. Student and faculty presentations.

**ECON 247. Labor Economics II. 2-5 Units.**

Recent topics in applied micro, focusing on papers from top journals (QJE, AER, JPE, Econometrica and REStud) over the last ten years. Broad overview of current topic and techniques in applied-micro research. Topics include inequality, polarization and skill-biased technical change, discrimination, technology adoption and the spread of information, management practices, field experiments, peer effects and academic spillovers. Combination of student and faculty presentations. Additional sessions on general presentations, paper writing and research skills to prepare for job market. Typically also run a class trip to the NBER West-Coast labor meetings at the San Francisco Fed.

**ECON 248. Labor Economics III. 2-5 Units.**

Topics in the determination of earnings and job mobility. Classes of models include: search, human capital, Roy, sorting, learning and compensating differentials. Basic models as well as contemporary empirical work will be discussed.

**ECON 249. Topics in Health Economics I. 2-5 Units.**

Course will cover various topics in health economics, from theoretical and empirical perspectives. Topics will include public financing and public policy in health care and health insurance; demand and supply of health insurance and healthcare; physicians' incentives; patient decision-making; competition policy in healthcare markets, intellectual property in the context of pharmaceutical drugs and medical technology; other aspects of interaction between public and private sectors in healthcare and health insurance markets. Key emphasis on recent work and empirical methods and modelling. Prerequisites: Micro and Econometrics first year sequences (or equivalent). Curricular prerequisites (if applicable): First year graduate Microeconomics and Econometrics sequences (or equivalent).

Same as: HRP 249, MED 249



**ECON 24N. Social Choice & Market Design. 3 Units.**

The design of mechanisms for group decision making, addressing questions about how apartment mates should choose rooms and share the rent, how a government should select and pay its suppliers, how a town should elect a mayor, or how students and college ought to be matches to one another. The first three weeks include classic papers by two Nobel-prize winning scholars about matching students and about government procurement. We will ask questions such as: What are the provable properties of these mechanisms? Is it possible for individuals or groups to manipulate the mechanisms for their own advantage? The remaining weeks focus on group decisions that are guided by "voting" mechanisms, showing the inherent trade-offs and proving theorems about the incompatibility among some simple, desirable properties of mechanisms. The ideas treated in this class are being used today to design new mechanisms for voting, matching, auctions and other applications, based on an awareness of the formal properties that the mechanisms may have.

**ECON 250. Environmental Economics. 2-5 Units.**

Theoretical and empirical analysis of sources of and solutions to environmental problems, with application to local pollution challenges and global environmental issues such as climate change. Topics include: analysis of market failure, choice of environmental policy instruments, integrating environmental and distortionary taxes, environmental policy making under uncertainty, valuing environmental amenities, and measuring /promoting sustainable development.

**ECON 251. Natural Resource and Energy Economics. 2-5 Units.**

Economic theory and empirical analysis of non-renewable and renewable natural resources, with considerable attention to energy provision and use. Topics include: exhaustible resources; renewable resources; and energy industry market structure, pricing, and performance. Prerequisites: 202, 203, 204, 271, and 272, or equivalents with consent of instructor.

**ECON 252. The Future of Finance. 2 Units.**

(Same as Law 1038) If you are interested in a career in finance or that touches finance (computational science, economics, public policy, legal, regulatory, corporate, other), this course will give you a useful perspective. We will take on hot topics in the current landscape of global financial markets such as how the world has evolved post-financial crisis, how it is being disrupted by FinTech, RegTech, artificial intelligence, crowd financing, blockchain, machine learning & robotics (to name a few), how it is being challenged by IoT, cyber, financial warfare & crypto currency risks (to name a few) and how it is seizing new opportunities in fast-growing areas such as ETFs, new instruments/payment platforms, robo advising, big data & algorithmic trading (to name a few). The course will include guest-lecturer perspectives on how sweeping changes are transforming business models and where the greatest opportunities exist for students entering or touching the world of finance today including existing, new and disruptive players. While derivatives and other quantitative concepts will be handled in a non-technical way, some knowledge of finance and the capital markets is presumed. Elements used in grading: Class Participation, Attendance, Final Paper. Consent Application: To apply for this course, students must complete and email to the instructors the Consent Application Form, which is available on the Public Policy Program's website at <https://publicpolicy.stanford.edu/academics/undergraduate/forms>. See Consent Application Form for submission deadline.

Same as: ECON 152, PUBLPOL 364, STATS 238

**ECON 253. Energy Markets: Theory and Evidence from Latin America. 2-5 Units.**

What theory and practice around the world and in Latin America tell us about the design of energy markets; how distributional impacts and enforcement capabilities affect their implementation. Topics include: pricing in wholesale electricity markets, role of long-term contracting, auction design, evidence from spot and contract markets; design of markets for pollution permits, alternative environmental policy instruments, evidence from existing and proposed carbon markets and others, imperfect information, adverse selection in opt-in provisions, effect on innovation, interaction between markets, market power. Advanced undergraduates and masters students are welcome to enroll.

**ECON 255. Economics of Communication. 2-5 Units.**

This course will cover theoretical and empirical work on the provision of information in markets. Likely topics include: theory of strategic communication; persuasion; advertising and brands; financial analysis and disclosure; political communication; text mining and automated content analysis; and the political economy and industrial organization of media. Prerequisites: Econ 202 and 210 (or equivalent).

**ECON 257. Industrial Organization 1. 2-5 Units.**

Theoretical and empirical analyses of the determinants of market structure; firm behavior and market efficiency in oligopolies; price discrimination; price dispersion and consumer search; differentiated products; the role of information in markets, including insurance and adverse selection; auctions; collusion and cartel behavior; advertising; entry and market structure; market dynamics; strategic behavior.

**ECON 258. Industrial Organization IIA. 2-5 Units.**

Topics may include theoretical and empirical analysis of auctions, bargaining, price discrimination, advertising, brands, and markets for information, and research at the boundaries between IO and neighboring fields such as development, macro, trade, and behavioral economics.

**ECON 259. Industrial Organization II B. 2-5 Units.**

Theoretical and empirical analyses of the determinants of market structure; firm behavior and market efficiency in oligopolies; economics of antitrust and regulation, with focus on energy and environmental economics; the role of information asymmetries in markets: adverse selection and moral hazard, with focus on insurance and credit markets.

**ECON 25N. Public Policy and Personal Finance. 3 Units.**

The seminar will provide an introduction and discussion of the impact of public policy on personal finance. Voters regularly rate the economy as one of the most important factors shaping their political views and most of those opinions are focused on their individual bottom lines. In this course we will discuss the rationale for different public policies and how they affect personal financial situations. We will explore personal finance issues such as taxes, loans, charity, insurance, and pensions. Using the context of (hypothetical) personal finance positions, we will discuss the public policy implications of various proposals and how they affect different groups of people, for example: the implications of differential tax rates for different types of income, the promotion of home ownership in the U.S., and policies to care for our aging population. While economic policy will be the focus of much of the course, we will also examine some of the implications of social policies on personal finance as well. There will be weekly readings and several short policy-related writing assignments.

Same as: PUBLPOL 55N

**ECON 260. Industrial Organization III. 2-5 Units.**

Current research and policy questions in industrial organization. Course combines lectures by the instructors with student presentations, with an emphasis on initiating dissertation research in industrial organization. Prerequisites: ECON 257, ECON 258.

**ECON 265. International Economics. 2-5 Units.**

International macroeconomics and finance, emphasizing current research. The course is organized around the role of different types of frictions (in asset and goods markets) in explaining features of the international macroeconomy. Prerequisites: 202, 203, 204, 210, 211, 212.

**ECON 266. International Trade I. 2-5 Units.**

This course covers an introduction to models of international trade and economic geography from both a theoretical and an empirical perspective. Prerequisites: Econ 202, 203, 204, 210, 211, 212, 270, 271, 272.

**ECON 267. International Trade II. 2-5 Units.**

The first part of this course covers the factor-proportions theory of international trade. The second and much larger part of the course covers commercial policy, with an emphasis on the economics of trade agreements.

**ECON 268. International Finance and Exchange Rates. 2-5 Units.**

Monetary foundations of international exchange; the rules of the game since Bretton Woods. Foreign exchange risk under the world dollar standard. Hedging, forward covering, and interest parity relationships. International capital flows and the current account. Global trade imbalances; China and Japan versus the U.S. Inflation versus exchange rate targeting in developing countries.

**ECON 269. International Finance and Exchange Rates II. 2-5 Units.**

This is the second half of the international finance sequence. Part I: intertemporal approach to the current account, international real business cycle models, international risk-sharing, gains from financial integration, global imbalances, and exchange rate determination. Part 2: open-economy monetary models and currency unions. Part 3: international finance policy, capital controls and foreign exchange interventions. Part 4: sovereign debt. . Prerequisites: Econ 210, 211, 212 and 268.

**ECON 270. Intermediate Econometrics I. 2-5 Units.**

Probability, random variables, and distributions; large sample theory; theory of estimation and hypothesis testing. Limited enrollment. Prerequisites: math and probability at the level of Chapter 2, Paul G. Hoel, Introduction to Mathematical Statistics, 5th ed.

**ECON 271. Intermediate Econometrics II. 2-5 Units.**

Linear regression model, relaxation of classical-regression assumptions, simultaneous equation models, linear time series analysis, nonlinear estimation. Limited enrollment. Prerequisite: 270.

**ECON 272. Intermediate Econometrics III. 2-5 Units.**

Continuation of 271. Analysis of randomized experiments, identification and estimation of treatment effects, instrumental variables, nonlinear models, generalized methods of moments. Prerequisites: Econ 271 or permission of instructor.

**ECON 273. Advanced Econometrics I. 2-5 Units.**

Possible topics: parametric asymptotic theory. M and Z estimators. General large sample results for maximum likelihood; nonlinear least squares; and nonlinear instrumental variables estimators including the generalized method of moments estimator under general conditions. Model selection test. Consistent model selection criteria. Nonnested hypothesis testing. Markov chain Monte Carlo methods. Nonparametric and semiparametric methods. Quantile Regression methods.

**ECON 274. Advanced Econometrics II. 2-5 Units.**

(Formerly 273B); Possible topics: nonparametric density estimation and regression analysis; sieve approximation; contiguity; convergence of experiments; cross validation; indirect inference; resampling methods: bootstrap and subsampling; quantile regression; nonstandard asymptotic distribution theory; empirical processes; set identification and inference, large sample efficiency and optimality; multiple hypothesis testing.

**ECON 276. Computational Econometrics. 2-5 Units.**

Theory and computational methods necessary to implement state-of-the-art econometric methods used in theory-based empirical work. Topics covered include: computation of nonlinear M-estimators subject to equality and inequality constraints, simulation estimators, indirect inference, Markov Chain Monte Carlo methods, resampling (bootstrap and sub-sampling) methods for estimation and inference, dynamic discrete choice models, continuous and discrete mixture models and estimation and inference for partially identified models.

**ECON 277. Behavioral and Experimental Economics III. 2-5 Units.**

Economics 277 is a course for graduate students in the Economics department writing dissertations with behavioral or experimental components. Economics 277 is part of a three course sequence (along with Econ 278 & 279), which has two main objectives: 1) examining theories and evidence related to the psychology of economic decision making; 2) introducing methods of experimental economics, and exploring major subject areas (including those not falling within behavioral economics) that have been addressed through laboratory experiments. Focuses on series of experiments that build on one another in an effort to test between competing theoretical frameworks, with the objectives of improving the explanatory and predictive performance of standard models, and of providing a foundation for more reliable normative analyses of policy issues. Prerequisites: 204 and 271, or consent of instructor.

**ECON 278. Behavioral and Experimental Economics I. 2-5 Units.**

This is the first half of a three course sequence (along with Econ 277 & 279) on behavioral and experimental economics. The sequence has two main objectives: 1) examines theories and evidence related to the psychology of economic decision making, 2) Introduces methods of experimental economics, and explores major subject areas (including those not falling within behavioral economics) that have been addressed through laboratory experiments. Focuses on series of experiments that build on one another in an effort to test between competing theoretical frameworks, with the objects of improving the explanatory and predictive performance of standard models, and of providing a foundation for more reliable normative analyses of policy issues. Prerequisites: 204 and 271, or consent of instructor.

**ECON 279. Behavioral and Experimental Economics II. 2-5 Units.**

This is part of a three course sequence (along with Econ 277 & 278) on behavioral and experimental economics. The sequence has two main objectives: 1) examines theories and evidence related to the psychology of economic decision making, 2) Introduces methods of experimental economics, and explores major subject areas (including those not falling within behavioral economics) that have been addressed through laboratory experiments. Focuses on series of experiments that build on one another in an effort to test between competing theoretical frameworks, with the objects of improving the explanatory and predictive performance of standard models, and of providing a foundation for more reliable normative analyses of policy issues. Prerequisites: 204 and 271, or consent of instructor.

**ECON 27N. The Economics of Gender. 3 Units.**

This seminar draws on empirical and theoretical insights from multiple fields within economics. The objective is to understand the role of gender in economic decision making, and the changing significance, timing and meaning of work, career and family. We will focus on recent work in experimental economics, and empirical work in the developed world. But at times we will widen the perspective to developing countries and consider historical changes as well.

**ECON 282. Contracts, Information, and Incentives. 2-5 Units.**

Basic theories and recent developments in mechanism design and the theory of contracts. Topics include: hidden characteristics and hidden action models with one and many agents, design of mechanisms and markets with limited communication, long-term relationships under commitment and under renegotiation, property rights and theories of the firm.

**ECON 283. Theory and Practice of Auction Market Design. 2-5 Units.**

This class will focus on several topics in auction market design and related areas. It is an advanced course, intended as a sequel to the more basic market/mechanism/auction design courses offered at the Economics department and the GSB. Students are expected to be familiar with the material in those courses. We will briefly review some basics of auction theory, but the main goal of the class is to bring students closer to doing independent research and introduce them to recent contributions and currently active research areas. Specific topics may include: multi-item and combinatorial auctions; robust auction design; applied auction design with practical applications; matching and pricing on the Internet; radio spectrum auctions; securities markets; commodities; complex procurements. Grading based on presentation, assignment, and term paper.

**ECON 285. Matching and Market Design. 2-5 Units.**

This is an introduction to market design, intended mainly for second year PhD students in economics (but also open to other graduates students from around the university and to undergrads who have taken undergrad market design). It will emphasize the combined use of economic theory, experiments and empirical analysis to analyze and engineer market rules and institutions. In this first quarter we will pay particular attention to matching markets, which are those in which price doesn't do all of the work, and which include some kind of application or selection process. In recent years market designers have participated in the design and implementation of a number of marketplaces, and the course will emphasize the relation between theory and practice, for example in the design of labor market clearinghouses for American doctors, and school choice programs in a growing number of American cities (including New York and Boston), and the allocation of organs for transplantation. Various forms of market failure will also be discussed. Assignment: One final paper. The objective of the final paper is to study an existing market or an environment with a potential role for a market, describe the relevant market design questions, and evaluate how the current market design works and/or propose improvements on the current design.

**ECON 286. Game Theory and Economic Applications. 2-5 Units.**

Aims to provide a solid basis in game-theoretic tools and concepts, both for theorists and for students focusing in other fields. Technical material will include solution concepts and refinements, potential games, supermodular games, repeated games, reputation, and bargaining models. The class will also address some foundational issues, such as epistemic and evolutionary modeling. Prerequisite: 203 or consent of instructor.

**ECON 288. Computational Economics. 2-5 Units.**

This course studies computational approaches for solving dynamic economic models. First, it provides background in numerical analysis (approximation, integration, optimization, error analysis), and describes local and global numerical methods (perturbation, Smolyak, endogenous grid, stochastic simulation, cluster grid methods). Then, it shows applications from recent economic literature representing challenges to computational methods (new Keynesian models with a zero lower bound, default risk models, Krusell-Smith models, international trade models, overlapping-generations models, nonstationary growth models, dynamic games). Finally, it surveys recent developments in software and hardware (Python, Julia, GPUs, parallel computing, supercomputers), as well as machine learning techniques. No prerequisites. Grading on the basis of problem sets and a final project.

**ECON 289. Advanced Topics in Game Theory and Information Economics. 2-5 Units.**

Topics course covering a variety of game theory topics with emphasis on market design, such as matching theory and auction theory. Final paper required. Prerequisites: ECON 285 or equivalent. ECON 283 recommended.

**ECON 290. Multiperson Decision Theory. 3 Units.**

Students and faculty review and present recent research papers on basic theories and economic applications of decision theory, game theory and mechanism design. Applications include market design and analyses of incentives and strategic behavior in markets, and selected topics such as auctions, bargaining, contracting, and computation.

**ECON 291. Social and Economic Networks. 2-5 Units.**

Synthesis of research on social and economic networks by sociologists, economists, computer scientists, physicists, and mathematicians, with an emphasis on modeling. Includes methods for describing and measuring networks, empirical observations about network structure, models of random and strategic network formation, as well as analyses of contagion, diffusion, learning, peer influence, games played on networks, and networked markets.

**ECON 292. Quantitative Methods for Empirical Research. 2-5 Units.**

This is an advanced course on quantitative methods for empirical research. Students are expected to have taken a course in linear models before. In this course I will discuss modern econometric methods for nonlinear models, including maximum likelihood and generalized method of moments. The emphasis will be on how these methods are used in sophisticated empirical work in social sciences. Special topics include discrete choice models and methods for estimating treatment effects.

**ECON 293. Machine Learning and Causal Inference. 3 Units.**

This course will cover statistical methods based on the machine learning literature that can be used for causal inference. In economics and the social sciences more broadly, empirical analyses typically estimate the effects of counterfactual policies, such as the effect of implementing a government policy, changing a price, showing advertisements, or introducing new products. Recent advances in supervised and unsupervised machine learning provide systematic approaches to model selection and prediction, methods that are particularly well suited to datasets with many observations and/or many covariates. This course will review when and how machine learning methods can be used for causal inference, and it will also review recent modifications and extensions to standard methods to adapt them to causal inference and provide statistical theory for hypothesis testing. We consider the estimation of average treatment effects as well as personalized policies. Applications to the evaluation of large-scale experiments, including online A/B tests and experiments on networks, will receive special attention.

**ECON 299. Practical Training. 1-10 Unit.**

Students obtain employment in a relevant research or industrial activity to enhance their professional experience consistent with their degree programs. At the start of the quarter, students must submit a one page statement showing the relevance of the employment to the degree program along with an offer letter. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program. May be repeated for credit.

**ECON 300. Third-Year Seminar. 1-10 Unit.**

Restricted to Economics Ph.D. students. Students present current research. May be repeated for credit.

**ECON 310. Macroeconomic Workshop. 1-10 Unit.**

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**ECON 315. Development Workshop. 1-10 Unit.**

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**ECON 325. Economic History Workshop. 1-10 Unit.**

May be repeated for credit.

**ECON 335. Experimental/Behavioral Seminar. 1-10 Unit.**

Field seminar in experimental and behavioral economics.

**ECON 341. Public Economics and Environmental Economics Seminar. 1-10 Unit.**

Issues in measuring and evaluating the economic performance of government tax, expenditure, debt, and regulatory policies; their effects on levels and distribution of income, wealth, and environmental quality; alternative policies and methods of evaluation. Workshop format combines student research, faculty presentations, and guest speakers. Prerequisite: ECON 241 or consent of instructor.

**ECON 345. Labor Economics Seminar. 1-10 Unit.****ECON 354. Law and Economics Seminar. 2-6 Units.**

This seminar will examine current research by lawyers and economists on a variety of topics in law and economics. Several sessions of the seminar will consist of an invited speaker, usually from another university, who will discuss his or her current research. Representative of these sessions have been discussions of compensation for government regulations and takings, liability rules for controlling accidents, the definition of markets in antitrust analysis, the role of the government as a controlling shareholder, and optimal drug patent length. Cross-listed with LAW 344.

**ECON 355. Industrial Organization Workshop. 1-10 Unit.**

Current research in the field by visitors, presentations by students, and discussion of recent papers. Students write an original research paper, make a formal presentation, and lead a structured discussion.

**ECON 365. International Trade Workshop. 1-10 Unit.****ECON 370. Econometrics Workshop. 1-10 Unit.****ECON 380. INEQUALITY: Economic and Philosophical Perspectives. 5 Units.**

The nature of and problem of inequality is central to both economics and philosophy. Economists study the causes of inequality, design tools to measure it and track it over time, and examine its consequences. Philosophers are centrally concerned with the justification of inequality and the reasons why various types of inequality are or are not objectionable. In this class we bring both of these approaches together. Our class explores the different meanings of and measurements for understanding inequality, our best understandings of how much inequality there is, its causes, its consequences, and whether we ought to reduce it, and if so, how. This is an interdisciplinary graduate seminar. We propose some familiarity with basic ideas in economics and basic ideas in contemporary political philosophy; we will explain and learn about more complex ideas as we proceed. The class will be capped at 20 students.

Same as: ETHICSOC 371R, PHIL 371D, POLISCI 431L

**ECON 391. Microeconomic Theory Seminar. 1-10 Unit.****ECON 400. Ph.D. Dissertation. 1-15 Unit.**

Pre-TGR dissertation research. (Staff).

**ECON 45. Using Big Data to Solve Economic and Social Problems. 4-5 Units.**

This course will show how "big data" can be used to understand and solve some of the most important social and economic problems of our time. The course will give students an introduction to frontier research in applied economics and social science in a non-technical manner. Topics include equality of opportunity, education, income inequality, racial segregation, innovation and entrepreneurship, social networks, urban planning, health, crime, and political partisanship. In the context of these topics, the course will also provide a non-technical introduction to basic statistical methods and data analysis techniques, including regression analysis, causal inference, quasi-experimental methods, and machine learning. Optional sections will provide a more advanced treatment of these methods for interested students. Each week, the course will include a guest lecturer from a Silicon Valley firm or government agency who will discuss real-world applications of data science.

**ECON 47. Media Markets and Social Good. 5 Units.**

This class will apply tools from economics and related social sciences to study the functioning of media markets and their impact on society. The guiding question will be: when and how do media best serve the social good? Topics will include the economics of two-sided markets, media bias, polarization, social media, fake news, advertising, propaganda, effects of media on children, media and crime, and the role of media in corruption, protests and censorship. The course will give students a non-technical introduction to social science empirical methods, including regression analysis, causal inference, experimental and quasi-experimental methods, and machine learning.

**ECON 50. Economic Analysis I. 5 Units.**

Individual consumer and firm behavior under perfect competition. The role of markets and prices in a decentralized economy. Monopoly in partial equilibrium. Economic tools developed from multivariable calculus using partial differentiation and techniques for constrained and unconstrained optimization. Prerequisites: Econ 1 or 1V, and Math 51 or Math 51A or CME 100 or CME 100A.

**ECON 51. Economic Analysis II. 5 Units.**

Neoclassical analysis of general equilibrium, welfare economics, imperfect competition, externalities and public goods, risk and uncertainty, game theory, adverse selection, and moral hazard. Multivariate calculus is used. Prerequisite: ECON 50.

**ECON 52. Economic Analysis III. 5 Units.**

Long-run economic growth and short-run economic fluctuations. Focus on the macroeconomic tools of government: fiscal policy (spending and taxes) and monetary policy, and their effects on growth, employment, and inflation. Prerequisites: ECON 50.

**ECON 78N. Economic Policies of the Presidential Candidates. 3 Units.**

In nearly all polls, American voters rank the economy as one of their most important concerns. In the presidential election, much of the debate for voters will be on questions of economic policy. In this course, we will delve deeply into economic policy issues to understand options for government intervention and possible outcomes. We will combine economic analysis with political science methodology to understand efficient and implementable policy proposals. Specific areas of interest will be taxation, budget, entitlement programs, economic regulation and competition policy, trade, demography, income inequality, and monetary policy. The course will incorporate other timely and salient policy issues as they arise during the course of the campaign. Students will be expected to write a short paper and make an oral presentation to the class. A wide range of topics will be acceptable, including those directly related to campaign issues as well as other long-term economic issues facing the country.

Same as: PUBLPOL 78N

**ECON 801. TGR Project. 0 Units.**

**ECON 802. TGR Dissertation. 0 Units.**

## Education (EDUC)

**EDUC 100A. EAST House Seminar: Current Issues and Debates in Education. 1 Unit.**

Education and Society Theme (EAST) House seminar. In autumn quarter, faculty and other scholars from around the University discuss the latest issues, debates, and research in the field of Education. In winter quarter, research and practice pertaining to sex, gender, and education are presented by professionals and scholars. In the spring, the seminar provides an inquiry into the culture at Stanford and one's personal values. Through an examination of these topics, students are able to share and develop their varied interests in educational research, policy, and practice. Notes: Attendance at first class required. Seminar meets in the EAST House Dining Hall located at 554 Governor's Ave. The seminar is open to all students at Stanford with first-priority given to pre-assign residents of EAST House followed by other residents of EAST and all other undergraduates. Graduate students are allowed to enroll on a space-available basis. Visitors/auditors are not allowed. The seminar is required for all pre-assigned residents of EAST House and is repeatable for credit.

**EDUC 100B. EAST House Seminar: Current Issues and Debates in Education. 1 Unit.**

Education and Society Theme (EAST) House seminar. In autumn quarter, faculty and other scholars from around the University discuss the latest issues, debates, and research in the field of Education. In winter quarter, there will be a "speaker's tour" of the research centers in the GSE, including the John Gardner Center, YouCubed, SCANCOR, PACE, the Lemann Center, and others. In the spring, the seminar will focus on Asian Pacific Islander populations, counterstory, and Critical Race Theory. Through an examination of these topics, students are able to share and develop their varied interests in educational research, policy, and practice. Notes: Attendance at first class required. Seminar meets in the EAST House Dining Hall located at 554 Governor's Ave. The seminar is open to all students at Stanford with first-priority given to pre-assign residents of EAST House followed by other residents of EAST and all other undergraduates. Graduate students are allowed to enroll on a space-available basis. Visitors/auditors are not allowed. The seminar is required for all pre-assigned residents of EAST House and is repeatable for credit.

**EDUC 100C. EAST House Seminar: International Human Rights and Education. 1-2 Unit.**

This course examines international human rights in theory and practice. The focus is on how education may be seen as both a human rights issue as well as a tool to educate citizens about their human rights. We will discuss basic theories of human rights, investigate education as a human right, and read works that have defined it as such, including human rights documents and declarations. Students taking the class for 2 units will meet an additional hour and have the opportunity to engage with a local education and development organization working in Central America.

**EDUC 101. Introduction to Teaching and Learning. 4 Units.**

This course is designed to help undergraduates explore career interests in education; it is the core course for the Undergraduate Minor in Education, and fulfills requirements for Honors in Education. The course considers the philosophy, history, politics, professional practice and social structures of teaching in the United States. Students will read and discuss teaching theory and research, participate in learning activities and visit school teaching sites, as well as examine and analyze artifacts and models of teaching.

**EDUC 102. Examining Social Structures, Power, and Educational Access. 2-4 Units.**

Goal is to prepare Education and Youth Development fellows for their work with adolescents in the Haas Center's pre-college summer programs and to define their role in addressing educational inequities in the summer programs and beyond.

**EDUC 102I. International Education Policy Workshop. 2-4 Units.**

This is a project-based workshop. Practical introduction to issues in educational policy making, education reform, educational planning, implementation of policy interventions, and monitoring and evaluation in developing country contexts. Preference to students enrolled in ICE/IEAPA, but open to other students interested in international development or comparative public policy with instructor's consent. Attendance at first class required for enrollment.

Same as: EDUC 202I

**EDUC 103A. Tutoring: Seeing a Child through Literacy. 3-4 Units.**

Experience tutoring grade school readers in a low income community near Stanford under supervision. Training in tutoring; the role of instruction in developing literacy; challenges facing low income students and those whose first language is not English. How to see school and print through the eyes of a child. Ravenswood Reads tutors encouraged to enroll. Service Learning Course (certified by Haas Center). May be repeated for credit.

Same as: EDUC 203A

**EDUC 103B. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices. 3-5 Units.**

Focus is on classrooms with students from diverse racial, ethnic and linguistic backgrounds. Studies, writing, and media representation of urban and diverse school settings; implications for transforming teaching and learning. Issues related to developing teachers with attitudes, dispositions, and skills necessary to teach diverse students.

Same as: AFRICAAM 106, CSRE 103B, EDUC 337

**EDUC 104. Introduction to the Profession of Teaching. 3 Units.**

This course explores the profession of teaching through an internship in a local elementary or high school classroom. Students will observe and assist instruction for four hours per week. In class, students will read, discuss, and respond to theory and research related to teaching. The course is open to all undergraduates with an interest in the teaching profession; and it may be especially useful for students who are considering entering the profession of teaching and wish to spend time in a classroom. No prior experience in teaching is required.

**EDUC 105. How to learn Mathematics - New ideas from the science of learning. 1 Unit.**

This course will help provide the transition from high school to college learning and encourage the positive ideas and mindsets that shape productive learning. We will consider what learning theories have to tell us about mathematics learning, the nature of good teaching and the reasons for ongoing inequities in mathematics learning and participation. This seminar is for those who would like a more positive relationship with mathematics, and are interested in learning about ways to tackle education inequalities. Learning goals: First, it introduces students to theories of learning and in particular the learning of mathematics. Mathematics plays a key role in many students' learning identities and is often the cause of low self-esteem and anxiety. Research tells us that this is because mathematics in the US is taught in highly ineffective ways. Indeed there is a large gap between what we know works from research and what happens in most mathematics classrooms. This seminar will give participants an understanding of ways to relate positively to mathematics, to learn mathematics most productively and some of the learning barriers that often deny students the opportunity to engage with mathematics in productive ways. Second, the course will teach students about the inequalities that pervade the education system in the United States. We will examine the barriers to the participation of women and students of color and we will consider why social class and race are both strong predictors of mathematics achievement. It is hoped that students will leave the course with greater knowledge of why mathematics is important - to themselves and to the future of society. Course participants will be given the opportunity to take part in a mathematics camp, designed to change the pathways of middle school students, similar to this previous camp: <https://www.youcubed.org/solving-math-problem/> and to take part in the work of [youcubed.org](http://youcubed.org), if they wish.

Same as: CME 10

**EDUC 106. Interactive Media in Education. 3-5 Units.**

Workshop.

**EDUC 107. Education and Inequality: Big Data for Large-Scale Problems. 3-5 Units.**

In this course, students will use data from the Stanford Education Data Archive (SEDA) to study the patterns, causes, consequences, and remedies of educational inequality in the US. SEDA is based on 200 million test score records, administrative data, and census data from every public school, school district, and community in the US. The course will include lectures, discussion, and small group research projects using SEDA and other data.

Same as: EDUC 207, SOC 107E, SOC 205

**EDUC 110. Sociology of Education: The Social Organization of Schools. 4 Units.**

Seminar. Key sociological theories and empirical studies of the links between education and its role in modern society, focusing on frameworks that deal with sources of educational change, the organizational context of schooling, the impact of schooling on social stratification, and the relationships between the educational system and other social institutions such as families, neighborhoods, and the economy.

Same as: EDUC 310, SOC 132, SOC 332

**EDUC 111. The Young Adult Novel: A Literature For and About Adolescents. 4 Units.**

For undergraduates considering teaching or working with adolescents, and for those planning to apply to the coterminal program in the Stanford Teacher Education program (STEP). Students work together to define the genre of young adult novels. What they reveal about adolescence in America. How to read and teach young adult literature.

**EDUC 112. Urban Education. 3-5 Units.**

(Graduate students register for EDUC 212 or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education.

Same as: AFRICAAM 112, CSRE 112X, EDUC 212, SOC 129X, SOC 229X

**EDUC 113N. Mix | Remix | Mixtape: Writing and Reading DJ Culture. 3 Units.**

This course looks at the DJ as a crucial figure, a rhetor even, who influences both US and world culture and examines the DJ's practices as writing practices. From there we ask how other kinds of writing-public, academic, creative-can be informed by DJs and DJ culture. We will study specific practices like scratching, remixing, and the mixtape as well as different approaches and spaces in which DJs have shaped culture, from disco to Hip Hop to world music, from radio DJs to party DJs to beat-juggling and turntablism.

**EDUC 114N. Growing Up Bilingual. 3 Units.**

This course is a Freshman Introductory Seminar that has as its purpose introducing students to the sociolinguistic study of bilingualism by focusing on bilingual communities in this country and on bilingual individuals who use two languages in their everyday lives. Much attention is given to the history, significance, and consequences of language contact in the United States. The course focuses on the experiences of long-term US minority populations as well as that of recent immigrants. Same as: CHILATST 14N, CSRE 14N

**EDUC 115N. How to Learn Mathematics. 3 Units.**

What is going on in mathematics education in the United States? Why do so many people hate and fear math? What contributes to the high levels of innumeracy in the general population? Why do girls and women opt out of math when they get a chance? In this seminar we will consider seminal research on math learning in K-12 classrooms, including a focus on equity. We will spend time investigating cases of teaching and learning, through watching videos and visiting schools. This seminar is for those who are interested in education, and who would like to learn about ways to help students (and maybe yourselves?) learn and enjoy mathematics. If you have had bad math experiences and would like to understand them and put them behind you, this seminar will be particularly good for you. The final project for this class will involve developing a case of one or more math learners, investigating their journeys in the world of math.

**EDUC 116N. Howard Zinn and the Quest for Historical Truth. 3 Units.**

With more than two million copies in print, Howard Zinn's *A People's History* is a cultural icon. We will use Zinn's book to probe how we determine what was true in the past. *A People's History* will be our point of departure, but our journey will visit a variety of historical trouble spots: debates about whether the US was founded as a Christian nation, Holocaust denial, and the "Birther" controversy of President Obama.

Same as: HISTORY 116N

**EDUC 117. Research and Policy on Postsecondary Access. 3 Units.**

The transition from high school to college. K-16 course focusing on high school preparation, college choice, remediation, pathways to college, and first-year adjustment. The role of educational policy in postsecondary access. Service Learning Course (certified by Haas Center).

Same as: EDUC 417

**EDUC 117N. Losing My Religion: Secularism and Spirituality in American Lives. 2-4 Units.**

In this seminar you will explore theory and practice, sociological data, spiritual writing, and case studies in an effort to gain a more nuanced understanding about how religion, spirituality, and secularism attempt to make legible the constellation of concerns, commitments, and behaviors that bridge the moral and the personal, the communal and the national, the sacred, the profane, and the rational. Together we will cultivate critical perspectives on practices and politics, beliefs and belonging that we typically take for granted.

Same as: AMSTUD 117N, RELIGST 13N

**EDUC 118S. Designing Your Stanford. 2 Units.**

DYS uses a Design Thinking approach to help Freshmen and Sophomores learn practical tools and ideas to make the most of their Stanford experience. Topics include the purpose of college, major selection, educational wayfinding, and innovating college outcomes - all applied through an introduction to Design Thinking. This seminar class incorporates small group discussion, in-class activities, field exercises, personal reflection, and individual coaching. Admission to be confirmed by email to Axxess registered students prior to first class session. DYS uses a Design Thinking approach to help Freshmen and Sophomores learn practical tools and ideas to make the most of their Stanford experience. Topics include the purpose of college, major selection, educational wayfinding, and innovating college outcomes - all applied through an introduction to design mindsets and practices. This seminar class incorporates small group discussion, in-class activities, field exercises, personal reflection, and individual coaching. Additional course information at <http://www.designingyourstanford.org>. Same as: ME 104S

**EDUC 119S. History of American Indian Education. 5 Units.**

How the federal government placed education at the center of its Indian policy in second half of 19th century, subjecting Native Americans to programs designed to erase native cultures and American Indian responses to those programs. Topics include traditional Indian education, role of religious groups, Meriam Report, Navajo-Hopi Rehabilitation Act, Johnson-O'Malley Act, and public schools. Same as: EDUC 429S, NATIVEAM 119S

**EDUC 11SC. Work and Family. 2 Units.**

Examination into the forces behind the rise in women's paid work and subsequent changes in the workplace and in families. Topics include gendered division of labor, decisions about marriage and childrearing, economic issues, employers' role in structuring work and family, and public policy issues such as anti-discrimination laws, divorce laws, and subsidized child care.

**EDUC 120. Sociology of Science. 3-4 Units.**

The sociology of science concerns the social structures and practices by which human beings interpret, use and create intellectual innovations. In particular we will explore the claim that scientific facts are socially constructed and ask whether such a characterization has limits. Course readings will concern the formation and decline of various thought communities, intellectual social movements, scientific disciplines, and broader research paradigms. A special focus will be placed on interdisciplinarity as we explore whether the collision of fields can result in new scientific advances. This course is suitable to advanced undergraduates and doctoral students. Same as: EDUC 320, SOC 330

**EDUC 120C. Education and Society. 4-5 Units.**

The effects of schools and schooling on individuals, the stratification system, and society. Education as socializing individuals and as legitimizing social institutions. The social and individual factors affecting the expansion of schooling, individual educational attainment, and the organizational structure of schooling. Same as: EDUC 220C, SOC 130, SOC 230

**EDUC 122Q. Democracy in Crisis: Learning from the Past. 3 Units.**

This Sophomore Seminar will focus on U.S. democracy and will use a series of case studies of major events in our national history to explore what happened and why to American democracy at key pressure points. This historical exploration should shed light on how the current challenges facing American democracy might best be handled. (Cardinal Course certified by the Haas Center). Same as: HISTORY 52Q, POLISCI 20Q

**EDUC 123. Community-based Research As Tool for Social Change: Discourses of Equity in Communities & Classrooms. 3-5 Units.**

Issues and strategies for studying oral and written discourse as a means for understanding classrooms, students, and teachers, and teaching and learning in educational contexts. The forms and functions of oral and written language in the classroom, emphasizing teacher-student and peer interaction, and student-produced texts. Individual projects utilize discourse analytic techniques. Same as: AFRICAAM 130, CSRE 130, EDUC 322

**EDUC 124. Collaborative Design and Research of Technology-integrated Curriculum. 3-4 Units.**

The course introduces participatory design models for the development and research of educational materials through a studio-based, partnership driven, technology-integrated curriculum project. The special topic taken up in 2018 will be concussion education for youth. This is a studio experience working collaboratively with students, parents, and athletic coaches to design, field test, and make recommendations about learning activities and technology use for a complex curriculum that will engage immersive 360 3D technologies and social media. We will partner with TeachAids, an international nonprofit, on the curriculum development. Cardinal Course certified by the Haas Center.

**EDUC 126A. Introduction to Public Service Leadership. 1-2 Unit.**

Offered through the Haas Center for Public Service. A foundation and vision for a future of public service leadership. Students identify personal values and assess strengths as leaders. The ethics of public service and leadership theory.

**EDUC 126B. Public Service Leadership Program Practicum. 1 Unit.**

This course is for students in the Public Service Leadership Program offered through the Haas Center for Public Service. The PSLP Practicum provides an opportunity for PSLP students to reflect on their own leadership experiences and to learn from each other's leadership experiences while continuing to build a community of peer service leaders. The PSLP Practicum will meet every other week throughout the quarter.

**EDUC 12SC. Hip Hop as a Universal Language. 2 Units.**

This seminar-cipher considers the prospect of Hip Hop as a Universal Language. Hip Hop Culture has captured the minds of youth "all around the world, from Japan to Amsterdam" (like the homie Kurupt says), shaping youth identities, styles, attitudes, languages, fashions, and both physical and political stances. The field of global Hip Hop studies has emerged as scholars around the world grapple with what is arguably the most profound cultural, musical, and linguistic youth movement of the early 21st century. Participants in this seminar-cipher will be engaged in critical discussions around a particular constellation of concerns: Hip Hop Cultures, youth identities, the politics of language, race, and ethnicity, and the simultaneous processes of globalization and localization. Through the examination of various texts (scholarly readings, documentary films, guest speakers and artists), we span the Global Hip Hop Nation through scenes as diverse as Hong Kong's urban center, Germany's Mannheim inner-city district of Weststadt, the Brazilian favelas, the streets of Lagos and Dar es Salaam, and the hoods of the San Francisco Bay Area to explore Hip Hop's global linguistic flows.

**EDUC 130. Introduction to Counseling. 3 Units.**

The goal of counseling is to help others to create more satisfying lives for themselves. Clients learn to create and capitalize on unexpected events to open up new opportunities. The success of counseling is judged, not by the words and actions of the counselor, but by the progress that the client makes in the real world after counseling itself is ended. Students are encouraged to exert their full efforts within reasonable time limits to improve their competence.

**EDUC 131. Mediation for Dispute Resolution. 3 Units.**

Mediation as more effective and less expensive than other forms of settling disputes such as violence, lawsuits, or arbitration. How mediation can be structured to maximize the chances for success. Simulated mediation sessions.

Same as: PSYCH 152

**EDUC 134. Career and Personal Counseling. 3 Units.**

Theories and methods for helping people create more satisfying lives for themselves. Simulated counseling experiences.

Same as: EDUC 234, PSYCH 192

**EDUC 135. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.**

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 135, AFRICAST 235, EDUC 335, HRP 235, HUMBIO 26, MED 235

**EDUC 136. World, Societal, and Educational Change: Comparative Perspectives. 4-5 Units.**

Theoretical perspectives and empirical studies on the structural and cultural sources of educational expansion and differentiation, and on the cultural and structural consequences of educational institutionalization. Research topics: education and nation building; education, mobility, and equality; education, international organizations, and world culture.

Same as: EDUC 306D, SOC 231

**EDUC 136B. Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population. 3-4 Units.**

Recently two laws in Brazil (10639/2003 and 13465/2008), which came about due to intense pressure from Black and Indigenous social movements throughout the 20th century, have introduced changes in public education curriculum policies. These new curriculum policies mandate that the study of Afro-Brazilian, African, and Indigenous histories and cultures must be taught at all educational levels including at the elementary, secondary, and post-secondary levels. As part of this mandate, educators are now directed to incorporate considerations of ethnic-racial diversity in relation to people's thinking and experiences. These policies aim to fight racism as well as other forms of discrimination, and moreover, encourage the building of more equitable pedagogies. This course will discuss past and current policies and practices in Brazilian education from the point of view of different social projects organized by Indigenous Peoples, Afro-Brazilians, Asian-Brazilians, as well as Euro-Brazilians. It will also focus on Latin American efforts to promote equity in education, as well as to articulate different points of view, and reinforce and build epistemologies that support the decolonization of thinking, behaviors, research and policies. As part of this process, the course will study the experiences of people demanding these new public policies in terms of the extent to which they were able to influence institutional structures and to establish particular policy reforms. The course will also analyze theoretical frameworks employed by opponents of these movements to resist policies that might challenge their privileged place in society. In doing this, the course will offer theoretical and methodological avenues to promote research that can counter hegemonic curricular policies and pedagogical practices. The course will be fully participatory and oriented towards generating ongoing conversations and discussion about the various issues that arose in Brazil in relation to these two recent laws. To meet these goals, we will do a close reading of relevant scholarly works, paying particular attention to their theoretical frameworks, research designs, and findings.

Same as: AFRICAAM 126B, CSRE 126B, EDUC 236B, PUBLPOL 126B

**EDUC 139. Educating Young STEM Thinkers. 3-5 Units.**

The course introduces students to the design thinking process, the national conversations about the future of STEM careers, and opportunities to work with middle school students and K-12 teachers in STEM-based after-school activities and intercession camps. The course is both theory and practice focused. The purpose is twofold; to provide reflection and mentoring opportunities for students to learn about pathways to STEM careers and to introduce mentoring opportunities with young STEM thinkers.

Same as: EDUC 239, ME 139, ME 231

**EDUC 13SC. Language, Identity, and the Power of Public Discourse. 2 Units.**

Have you ever engaged in a conversation with someone who sounds different than you expect? This course explores instances like those that highlight the interaction between language and identity and its implications for learning. The theme of language and identity emerges as significant because of the subtle yet powerful impact it has on our cultural interactions. We have an inherent expectation of how we expect people to communicate. Yet, do these expectations interfere with teaching and learning practices? Many individuals take seminars and classes that focus on teaching professional modes of communication and discourse. This course will offer a detailed examination of scholarship that investigates the power of the subtle messages embedded in language. In addition, to gain a sense of the power of these interactions in practice, we will engage in the following research activities: (a) Participants will engage in school site visits to examine these interactions in practice; (b) Participants will engage in critical interviews of broadcasters at a local television station to discuss the role of language and identity in their presentation; and (c) We will visit a recording studio to discuss the role of language and identity with local hip-hop producers and artists.



**EDUC 140. Honors Research. 1-5 Unit.**

Provides opportunity for research in pursuit of senior honors theses.

**EDUC 141. Counterstory and Narrative Inquiry in Literature and Education. 3 Units.**

Counterstory is a method developed in critical legal studies that emerges out of the broad "narrative turn" in the humanities and social science. This course explores the value of this turn, especially for marginalized communities, and the use of counterstory as analysis, critique, and self-expression. Using an interdisciplinary approach, we examine counterstory as it has developed in critical theory, critical pedagogy, and critical race theory literatures, and explore it as a framework for liberation, cultural work, and spiritual exploration.

Same as: CSRE 141E, EDUC 341, LIFE 124

**EDUC 142. Foundational Course in Testing. 2-3 Units.**

Examines basic ideas in standardized testing and the implications and consequences of testing (e.g., fairness, accountability, and the testing of diverse populations) from a social, critical perspective.

**EDUC 145. Writing Across Languages and Cultures: Research in Writing and Writing Instruction. 3-5 Units.**

Theoretical perspectives that have dominated the literature on writing research. Reports, articles, and chapters on writing research, theory, and instruction; current and historical perspectives in writing research and research findings relating to teaching and learning in this area.

Same as: CSRE 243, EDUC 243

**EDUC 148. Critical Perspectives on Teaching and Tutoring English Language Learners. 1-3 Unit.**

Theoretical foundation for volunteer tutors of English language learners in urban environments working with children in school-based programs or adults in community-based settings. May be repeat for credit.

**EDUC 149. Theory and Issues in the Study of Bilingualism. 3-5 Units.**

Sociolinguistic perspective. Emphasis is on typologies of bilingualism, the acquisition of bilingual ability, description and measurement, and the nature of societal bilingualism. Prepares students to work with bilingual students and their families and to carry out research in bilingual settings.

Same as: EDUC 249

**EDUC 14SC. Public Education and Schooling: The Great Equalizer or the Fiercely Competitive Field?. 2 Units.**

Everyone seems to have an opinion about the American educational landscape. After all, we all have attended schools of various sorts, which help to shape our understandings about education. Yet, the political, social, and cultural terrains are ever-changing, especially within public education. This seminar will focus on some of the main current issues in U.S. urban schools. This course will take an interdisciplinary approach to examining major issues facing public schools today and to discussing effective policies and practices. There are two main components to the seminar: first, students will engage in a review of current educational research and policy; and second, they will conduct some service learning activity in a local, low-income public high school. In small groups, students will co-design projects that both draw on ideas generated from their readings and discussions and involve local high school students and educators. Through various lenses, we will survey the landscape of urban education in the United States and explore myriad theories or explanations for existing conditions, crises, and policies. Students will read a number of works that focus on the multiple environs of the educational system; the economy, the political context, the demands of accountability and standardization, residential patterns, and social and cultural relationships. Such explanations and issues may transcend U.S. boundaries and could be applicable in multiple contemporary urban education settings.

**EDUC 151. The Future of Information. 4 Units.**

As information has a fascinating history (see HISTORY 5A), so it possesses a promising if concerning future. Through lecture, demonstration, and in-class web-work, this course will provide students with advanced strategies in (a) identifying sources and tools for advancing the quest for information; (b) assessing elements of trust, authority, and chicanery in the provision of information; (c) recognizing the economic and legal structures shaping information sources, services, and rights; and (d) discovering who is behind what information. With a focus on the info-worlds of journalism, learning, governance, students will acquire and practice the forensic skills and web savvy of fact-checkers and investigative reporters, activists and scholars. Here's a class set to determine the future course of information.

Same as: STS 151

**EDUC 155. First Year Reflections Seminar. 1 Unit.**

Restricted to first-year undergraduates; limited enrollment. There are two options for how to participate. You can either enroll in three class weekday sessions weeks 4, 5 & 6 or one weekend section. These times provide a structured time for students to explore their identities, values, and the kind of lives they want to lead. Exercises and discussions led by faculty, staff, and upper-class student co-facilitators. Tuesday sessions will occur on 1/30, 2/6 & 2/13; Wednesday sessions will occur on 1/31, 2/7 & 2/14; Thursday sessions will occur on 2/1, 2/8 & 2/15. Weekend sections are on Saturday, 2/3 OR Sunday, 2/11 (Weekend sessions are longer and students only participate in one).

**EDUC 15SC. Remix | Reading and Writing DJ Culture. 2 Units.**

"last night a DJ saved my life" –Indeep (1982 song) In a moment that has been widely described being defined by remix culture, what might we learn from the traditions and practices of the artists who gave us the remix? This course looks at the DJ as an crucial figure, a rhetor even, who influences both US and world culture and examines the DJ's practices as writing practices. From there we ask how other kinds of writing; public, academic, creative, can be informed by DJs and DJ culture. We will study specific practices like scratching, remixing, and the mixtape as well as different approaches and spaces in which DJs have shaped culture, from disco to Hip Hop to world music, from radio DJs to party DJs to beat-juggling and turntablism. In addition to our readings, viewings and work in class, participants in the course will be able to participate in a DJ workshop introducing basic techniques like mixing, and will attend at least 1 live DJ set in San Francisco or Oakland. The course will make turntables and a DJ controller available for students to work on mixes and DJ techniques live, in class.

**EDUC 165. History of Higher Education in the U.S.. 3-5 Units.**

Major periods of evolution, particularly since the mid-19th century. Premise: insights into contemporary higher education can be obtained through its antecedents, particularly regarding issues of governance, mission, access, curriculum, and the changing organization of colleges and universities.

Same as: AMSTUD 165, EDUC 265, HISTORY 158C

**EDUC 170. Preparation for Independent Public Service Projects. 1 Unit.**

Open only to recipients of the Haas Summer Fellowship, which offers students the opportunity to initiate and carry out an innovative service project in collaboration with a community partner. Goal is to expand upon the work fellows did during the application process with respect to the feasibility and sustainability of their field projects.

**EDUC 171. Preschool Counts: Engaging Young Children in Math. 1-3 Unit.**

Restricted to students who participate in a service learning program focused on early math learning. Training for activities in preschool classrooms. Focus is on the teaching of math to young children, but also includes background on issues related to young children's cognitive, language, and social development; classroom management; cultural diversity; and early childhood education programs. May be repeated for credit.

**EDUC 173. Gender and Higher Education: National and International Perspectives. 4 Units.**

This course examines the ways in which higher education structures and policies affect females, males, and students in relation to each other and how changes in those structures and policies improve experiences for females and males similarly or differently. Students are expected to gain an understanding of theories and perspectives from the social sciences relevant to an understanding of the role of higher education in relation to structures of gender differentiation and hierarchy. Topics include undergraduate and graduate education; identity and sexuality; gender and science; gender and faculty; and the development of feminist scholarship and pedagogy. Attention is paid to how these issues are experienced by women and men in the United States, including people of color, and by academics throughout the world, and how these have changed over time.

Same as: EDUC 273, FEMST 173, SOC 173, SOC 273

**EDUC 177A. Well-Being in Immigrant Children & Youth: A Service Learning Course. 4 Units.**

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177A, CSRE 177E, HUMBIO 29A

**EDUC 177B. Well-Being in Immigrant Children & Youth: A Service Learning Course. 4 Units.**

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177B, CSRE 177F

**EDUC 177C. Well-Being in Immigrant Children & Youth: A Service Learning Course. 1-3 Unit.**

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177C, CSRE 177G

**EDUC 178. Latino Families, Languages, and Schools. 3-5 Units.**

The challenges facing schools to establish school-family partnerships with newly arrived Latino immigrant parents. How language acts as a barrier to home-school communication and parent participation. Current models of parent-school collaboration and the ideology of parental involvement in schooling.

Same as: EDUC 270

**EDUC 180. Directed Reading in Education. 1-15 Unit.**

For undergraduates and master's degree students. (All Areas).

**EDUC 180S. Pre-field Course for Alternative Spring Break. 1 Unit.**

Limited to students participating in the Alternative Spring Break program. See <http://asb.stanford.edu> for more inform.

**EDUC 181. Multicultural Issues in Higher Education. 4 Units.**

The primary social, educational, and political issues that have surfaced in American higher education due to the rapid demographic changes occurring since the early 80s. Research efforts and the policy debates include multicultural communities, the campus racial climate, and student development; affirmative action in college admissions; multiculturalism and the curriculum; and multiculturalism and scholarship.

Same as: CSRE 181, EDUC 381

**EDUC 183. Practicum in English-Spanish School & Community Interpreting. 3-4 Units.**

This practicum will assist students in developing a set of skills in English-Spanish interpreting that will prepare them to provide interpretation services in school and community settings. The course will build students' abilities to transfer intended meanings between two or more monolingual individuals of who are physically present in a school or community setting and who must communicate with each other for professional (and personal) purposes.

Same as: CHILATST 183X, EDUC 257

**EDUC 185. Master's Thesis. 1-15 Unit.**

(all areas).

**EDUC 190. Directed Research in Education. 1-15 Unit.**

For undergraduates and master's students. May be repeated for credit. (all areas).

**EDUC 192A. Interpersonal Learning & Leadership: An Introduction to the RA Role. 2 Units.**

Preparing students for roles as Resident and Community Assistants, "Intelligent Leadership" explores research on college student development, leadership and the complex dynamics of our changing society both within and outside the college environment. Participants will engage in course work that builds skills relevant to their positions and allow students to implement these skills in a real world environment. Through reflection, self-examination and engagement in interpersonal dynamics and analysis, students will examine how their peer group develops while at the university.

**EDUC 192B. Interpersonal Learning & Leadership - Row Staff Class. 2 Units.**

"Interpersonal Learning & Leadership - Row Staff Class" explores research on leadership and the complex dynamics of our changing society. Participants will engage in course work intended to build skills relevant to being on a Row Staff team. Students will practice self reflection, risk taking, facilitating, decision-making and group leadership. Students will develop strategies to build community and facilitate challenging conversations while creating a safe environment for their peers to do the same.

**EDUC 192C. Interpersonal Learning and Leadership: An introduction to the RA role while away from campus. 2 Units.**

"Interpersonal Learning & Leadership" explores research on leadership and the complex dynamics of our changing society. Participants will engage in course work intended to build skills relevant to the Resident Assistant/College Assistant position. Students will practice listening, question asking, self-reflection, risk taking, facilitating, conflict mediating and decision-making. They will explore how groups of people can come together for intellectual and interpersonal learning and growth within a complex society. Students will develop strategies to build community and facilitate challenging conversations while creating a safe environment for their peers to do the same.

**EDUC 192D. Interpersonal Learning and Leadership: Working with Ethnically Diverse Communities. 2 Units.**

"Interpersonal Learning & Leadership" explores research on leadership and the complex dynamics of our changing society. Participants will engage in course work intended to build skills relevant to the Ethnic Theme Associate position. Students will practice listening, question asking, self reflection, risk taking, facilitating, conflict mediating, decision-making and group leadership. They will explore how groups of people can come together for intellectual and interpersonal learning and growth within a complex society. Students will develop strategies to build community and facilitate challenging conversations while creating a safe environment for their peers to do the same.

**EDUC 192E. Interpersonal Learning and Leadership: Fraternity and Sorority life. 2 Units.**

This class will engage fraternity and sorority leadership in a meaningful discussion around the purpose and relevancy of the college fraternity and sorority. Participants will engage in coursework intended to build skills relevant to being a peer elected leader within their chapter. Specifically, students will research, discuss, and present on current trends impacting the contemporary fraternity and sorority community. Students will also practice self-reflection, decision-making, facilitating difficult conversations, and group leadership. Participants will gain a basic understanding of the challenges within the fraternity and sorority community and gain the skills necessary to analyze and approach these challenges successfully. As an outcome of this course, students will be able to look critically at Greek-letter organizations and their respective communities and will become better skilled as leaders to address problems and effect change as necessary.

**EDUC 193A. Listen Up! Core Peer Counseling Skills. 2 Units.**

Topics: verbal and non-verbal skills, open and closed questions, paraphrasing, working with feelings, summarization, and integration. Individual training, group exercises, role play practice with optional video feedback. Sections on relevance to crisis counseling and student life. Guest speakers from University and community agencies. Students develop and apply skills in University settings. Sections will be assigned during the first week of the quarter.

**EDUC 193B. Peer Counseling in the Chicano/Latino Community. 1 Unit.**

Topics: verbal and non-verbal attending and communication skills, open and closed questions, working with feelings, summarization, and integration. Salient counseling issues including Spanish-English code switching in communication, the role of ethnic identity in self-understanding, the relationship of culture to personal development, and Chicana/o student experience in University settings. Individual training, group exercises, role play, and videotape practice.  
Same as: CHILATST 193B

**EDUC 193C. Psychological Well-Being On Campus: Perspectives Of The Black Diaspora. 1 Unit.**

Topics: the concept of culture, Black cultural attributes and their effect on reactions to counseling, verbal and non-verbal attending, open and closed questions, working with feelings, summarization, and integration. Reading assignments, guest speakers, role play, and videotaped practice. Students develop and apply skills in the Black community on campus or in other settings that the student chooses.

**EDUC 193F. Psychological Well-Being on Campus: Asian American Perspectives. 1 Unit.**

Topics: the Asian family structure, and concepts of identity, ethnicity, culture, and racism in terms of their impact on individual development and the counseling process. Emphasis is on empathic understanding of Asians in America. Group exercises.  
Same as: ASNAMST 193F

**EDUC 193G. Psychological Well-Being on Campus: A Focus on Gender and Sexual Identities. 1 Unit.**

This course examines mental health and psychological well-being across the spectrum of gender and sexual identities. It addresses the unique challenges that face LGBTQ-identified students, and provides tools for supporting peers as they navigate these challenges. Discussion topics include current conceptualizations of gender identity and sexual orientation, including sexual and gender fluidity; the intersection of queer identities with multiple identities such as ethnic/racial identify and faith/spirituality; unpacking stereotypes; queer relationships and sexuality, coming out and disclosure, and mental health issues.  
Same as: FEMGEN 193G

**EDUC 193N. Peer Counseling in the Native American Community. 1 Unit.**

Verbal and non-verbal communication, strategic use of questions, methods of dealing with strong feelings, and conflict resolution. How elements of counseling apply to Native Americans including client, counselor, and situational variables in counseling, non-verbal communication, the role of ethnic identity in self-understanding, the relationship of culture to personal development, the impact of family on personal development, gender roles, and the experience of Native American students in university settings. Individual skill development, group exercises, and role practice.

**EDUC 193P. Peer Counseling at the Bridge. 1 Unit.**

Mental health issues such as relationships, substance abuse, sexual assault, depression, eating disorders, academic stressors, suicide, and grief and bereavement. Guest speakers.

**EDUC 193S. Peer Counseling on Comprehensive Sexual Health. 1 Unit.**

Information on sexually transmitted infections and diseases, and birth control methods. Topics related to sexual health such as communication, societal attitudes and pressures, pregnancy, abortion, and the range of sexual expression. Role-play and peer-education outreach projects. Required for those wishing to counsel at the Sexual Health Peer Resource Center (SHPRC).

**EDUC 194A. Frosh 101: Leader Training. 1-2 Unit.**

This course will prepare students to lead Frosh 101, a discussion style course designed to help first-year students with their transition to Stanford's dynamic campus. This course will expose students to inclusive teaching practices and research on the impact mental health, diversity and inclusion and sense of belonging have on the experiences of undergraduates. This course is the first of two courses that Frosh 101 leaders will take.

**EDUC 197. Gender and Education in Global and Comparative Perspectives. 4 Units.**

Theories and perspectives from the social sciences relevant to the role of education in changing, modifying, or reproducing structures of gender differentiation and hierarchy. Cross-national research on the status of girls and women and the role of development organizations and processes. As class meets just nine times, attendance at the first class meeting is required and no more than one absence is allowed in order to pass.

Same as: FEMGEN 297, SOC 134

**EDUC 199A. Undergraduate Honors Seminar. 3 Units.**

Required of juniors and seniors in the honors program in the School of Education. Student involvement and apprenticeships in educational research. Participants share ongoing work on their honors thesis. Prerequisite: consent of instructor. May be repeated for credit once.

**EDUC 199B. Undergraduate Honors Seminar. 1 Unit.**

Required of juniors and seniors in the honors program in the School of Education. Student involvement and apprenticeships in educational research. Participants share ongoing work on their honors thesis. Prerequisite: consent of instructor. May be repeated for credit once.

**EDUC 199C. Undergraduate Honors Seminar. 1 Unit.**

Required of juniors and seniors in the honors program in the School of Education. Student involvement and apprenticeships in educational research. Participants share ongoing work on their honors thesis. Prerequisite: consent of instructor. May be repeated for credit once.

**EDUC 200A. Introduction to Data Analysis and Interpretation. 4 Units.**

Primarily for master's students in the School of Education. Focus is on reading literature and interpreting descriptive and inferential statistics, especially those commonly found in education. Topics: basic research design, instrument reliability and validity, descriptive statistics, correlation, t-tests, one-way analysis of variance, and simple and multiple regression. All offerings of this course (whether meeting on Mon & Weds or Tues & Thurs) will be taught identically.

**EDUC 200B. Introduction to Qualitative Research Methods. 4 Units.**

(Formerly EDUC 151.) Primarily for master's students: An introduction to the core concepts and methods of qualitative research. Through a variety of hands-on learning activities, readings, field experiences, class lectures, and discussions, students will explore the processes and products of qualitative inquiry. This is a graduate level course. No undergraduates may enroll. Priority will be given to GSE students, and final enrollment depends on instructor approval after the first day of class.

**EDUC 201. History of Education in the United States. 3-5 Units.**

How education came to its current forms and functions, from the colonial experience to the present. Focus is on the 19th-century invention of the common school system, 20th-century emergence of progressive education reform, and the developments since WW II. The role of gender and race, the development of the high school and university, and school organization, curriculum, and teaching.

Same as: AMSTUD 201, HISTORY 258B

**EDUC 202. Introduction to Comparative and International Education. 4 Units.**

Contemporary theoretical debates about educational change and development, and the international dimension of issues in education. Emphasis is on the development of students' abilities to make cross-national and historical comparisons of educational phenomena.

**EDUC 202I. International Education Policy Workshop. 2-4 Units.**

This is a project-based workshop. Practical introduction to issues in educational policy making, education reform, educational planning, implementation of policy interventions, and monitoring and evaluation in developing country contexts. Preference to students enrolled in ICE/IEAPA, but open to other students interested in international development or comparative public policy with instructor's consent. Attendance at first class required for enrollment.

Same as: EDUC 102I

**EDUC 203. Using International Test Results in Educational Research. 4 Units.**

The course will analyze the origin and rationales given for various international tests, including FIMS, SIMS, TIMSS, PISA, the UNESCO tests in Latin America and Africa, and how they have been used in research and educational policy. The readings will cover the critiques leveled at such tests, the pros and cons about each type of test, the advantages and limitations of using international test data for policy research. The class will probably also do group projects utilizing data from the tests so students can familiarize themselves directly with the data.

**EDUC 203A. Tutoring: Seeing a Child through Literacy. 3-4 Units.**

Experience tutoring grade school readers in a low income community near Stanford under supervision. Training in tutoring; the role of instruction in developing literacy; challenges facing low income students and those whose first language is not English. How to see school and print through the eyes of a child. Ravenswood Reads tutors encouraged to enroll. Service Learning Course (certified by Haas Center). May be repeated for credit.

Same as: EDUC 103A

**EDUC 204. Introduction to Philosophy of Education. 3 Units.**

How to think philosophically about educational problems. Recent influential scholarship in philosophy of education. No previous study in philosophy required.

Same as: PHIL 231

**EDUC 205. Biosocial Medicine: The Social, Psychological, and Biological Determinants of Behavior and Wellbeing. 2-3 Units.**

Explores how social forces, psychological influences, and biological systems combine to affect human behavior in early childhood, in the educational experience, and throughout the life course. Examines how behaviors are linked to well-being. Uses a flipped classroom model, in which a series of lectures are available for students to view on-line before class. In-class time then focuses on case studies from published research. Undergraduates enroll for 3 units. This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: HUMBIO 65, SOMGEN 215

**EDUC 206A. Applied Research Methods in International and Comparative Education I: Introduction. 1-3 Unit.**

Required for M.A. students in ICE and IEPA. Orientation to the M.A. program and research project; exploration of resources for study and research.

**EDUC 206B. Applied Research Methods in International and Comparative Education II: Master's Paper Proposal. 1-3 Unit.**

Required for M.A. students in ICE and IEPA. Development of research skills through theoretical and methodological issues in comparative and international education. Preparation of a research proposal for the M.A. monograph.

**EDUC 206C. Applied Research Methods in ICE III: Data Collection and Analysis. 1-3 Unit.**

Required for M.A. students in ICE and IEPA. Practice in data collection and analysis. Preparation of the first draft of the M.A. monograph.

**EDUC 206D. Applied Research Methods in International and Comparative Education IV: Master's Paper Workshop. 3 Units.**

Conclusion of the M.A. program in ICE and IEPA; required of M.A. students. Reviews of students' research in preparation for their MA paper.

**EDUC 207. Education and Inequality: Big Data for Large-Scale Problems. 3-5 Units.**

In this course, students will use data from the Stanford Education Data Archive (SEDA) to study the patterns, causes, consequences, and remedies of educational inequality in the US. SEDA is based on 200 million test score records, administrative data, and census data from every public school, school district, and community in the US. The course will include lectures, discussion, and small group research projects using SEDA and other data.

Same as: EDUC 107, SOC 107E, SOC 205

**EDUC 208B. Curriculum Construction. 3-4 Units.**

The theories and methods of curriculum development and improvement. Topics: curriculum ideologies, perspectives on design, strategies for diverse learners, and the politics of curriculum construction and implementation. Students develop curriculum plans for use in real settings. Service Learning Course (certified by Haas Center).

**EDUC 209A. Policy, Organization, and Leadership Studies Seminar. 1-3 Unit.**

This is a required course for all POLS students. The goals of the POLS Seminar (EDUC 209ABC) are to assist students in making the most of their Stanford graduate experience across several dimensions (academic, professional, and social). EDUC 209A is focused on orienting students to the academic and extra-curricular aspects of the experience as quickly as possible, while helping them coalesce as a group and learn how to leverage each other's professional knowledge. Another goal is to help student define their graduate degree goals, so they can plan their year in a very intentional manner that will result in a project or experiences they can highlight during the required Spring quarter POLS Project Forum.

**EDUC 209B. Policy, Organization, and Leadership Studies Seminar. 1-3 Unit.**

This is a required course for all POLS students. The goals of the POLS Seminar (EDUC 209ABC) are to assist students in making the most of their Stanford graduate experience across several dimensions (academic, professional, and social). EDUC 209B focuses on building career skills and exposing students to a range of education research, policy, and practice and begins helping students conceptualize and frame their Spring POLS Project.

**EDUC 209C. Policy, Organization, and Leadership Studies Seminar. 1-3 Unit.**

This is a required course for POLS students. The goals of the POLS Seminar (EDUC 209ABC) are to assist students in making the most of their Stanford graduate experience across several dimensions (academic, professional, and social). EDUC 209C focuses on developing the POLS Project for the Spring Forum while continuing to develop career skills and expose students to a range of education research, policy, and practice.

**EDUC 210. Policy, Organization, and Leadership Studies Internship Workshop. 1-3 Unit.**

Forum for POLS students to link their academic learning to real world experience through in-class discussions, presentations, and reflective writing. Fall Quarter is focused on understanding the intern's role within the larger organization. Winter Quarter is outward looking with a focus on understanding the broader fields the students' organizations reside within. Spring Quarter focus is on students learning from and being prepared to teach others.

**EDUC 211. Beyond Bits and Atoms - Lab. 1-3 Unit.**

This course is a hands-on lab in the prototyping and fabrication of tangible technologies, with a special focus in learning and education. We will learn how to use state-of-the-art fabrication machines (3D printers, 3D scanners, laser cutters, routers) to design educational toolkits, educational toys, science kits, and tangible user interfaces. A special focus of the course will be to design low-cost technologies, particularly for urban school in the US and abroad. Interested students should complete the application at <https://web.stanford.edu/class/educ211> by January 5, and come to the first class at 9am in CERAS 101. Same as: CS 402L

**EDUC 212. Urban Education. 3-5 Units.**

(Graduate students register for EDUC 212 or SOC 229X). Combination of social science and historical perspectives trace the major developments, contexts, tensions, challenges, and policy issues of urban education. Same as: AFRICAAM 112, CSRE 112X, EDUC 112, SOC 129X, SOC 229X

**EDUC 213. Introduction to Teaching. 3-4 Units.**

Key concepts in teaching and learning; teacher content knowledge and pedagogical content knowledge; student prior knowledge and preconceptions; cognition and metacognition; classroom culture, motivation, and management; teaching diverse populations; comparison of teaching models; analysis of teaching; standards, accountability, and assessment of learning; assessing teaching quality; online learning and teaching.

**EDUC 214. Museum Cultures: Material Representation in the Past and Present. 3-5 Units.**

Students will open the "black box" of museums to consider the past and present roles of institutional collections, culminating in a student-curated exhibition. Today, museums assert their relevance as dynamic spaces for debate and learning. Colonialism and restitution, the politics of representation, human/object relationships, and changing frameworks of authority make museum work widely significant and consistently challenging. Through thinking-in-practice, this course reflexively explores "museum cultures": representations of self and other within museums and institutional cultures of the museum world itself. 3 credits (no final project) or 5 credits (final project). May be repeat for credit. Same as: AMSTUD 134, ARCHLGY 134, ARCHLGY 234, ARTHIST 284B, CSRE 134, NATIVEAM 134

**EDUC 215. LDT Internship Workshop. 1-3 Unit.**

The required internship is a cornerstone of the LDT program. This course will provide students an opportunity to link their academic learning to real world experience through in-class discussions, presentations, and reflective writing. It will allow the program director to monitor the quality of the experience and provide timely advice and support as needed for an optimal learning experience. The course will meet several times each quarter, adjacent to LDT seminar (Fridays, 12-1). An internship agreement will be required at the beginning of the course signed by the faculty advisor), as well as a reflection paper at the end of the course. Students will take the course for 1 unit, unless they request additional units for unpaid internship hours.

**EDUC 216. Education, Race, and Inequality in African American History, 1880-1990. 3-5 Units.**

Seminar. The relationship among race, power, inequality, and education from the 1880s to the 1990s. How schools have constructed race, the politics of school desegregation, and ties between education and the late 20th-century urban crisis.

Same as: AFRICAAM 116, AMSTUD 216, CSRE 216X, HISTORY 255E

**EDUC 217. Free Speech, Academic Freedom, and Democracy. 3 Units.**

The course examines connected ideas of free speech, academic freedom, and democratic legitimacy that are still widely shared by many of us but have been subject to skeptical pressures both outside and inside the academy in recent years. The course explores the principled basis of these ideas, how well they might (or might not) be defended against skeptical challenge, and how they might be applied in particular controversies about the rights of students, instructors, and researchers. Same as: ETHICSOC 217X, PHIL 278C

**EDUC 218. Topics in Cognition and Learning: Technology and Multitasking. 3 Units.**

In our new media ecology, has affinity for social media and multitasking become addictive? Detrimental to learning and well-being? What can we learn from studies in the developmental cognitive sciences and cognitive neurosciences of reward, attention, memory & learning, motivation, stress, and self-regulation for tackling the behavioral design problems we face in crafting better socio-technical systems? This seminar course is designed to engage students in recent advances in this rapidly growing research area via discussions of both historical and late-breaking findings in the literature. By drawing on a breadth of studies ranging from cognitive development, cognitive neuroscience, and educational/training studies, students will gain an appreciation for specific ways interdisciplinary approaches can add value to specific programs of research.

**EDUC 219E. The Creative Arts in Elementary Classrooms. 2 Units.**

For STEP Elementary only or for candidates in the Multiple Subjects program. Hands-on exploration of visual arts media and works of art.

**EDUC 220A. Introduction to the Economics of Education. 4 Units.**

The relationship between education and economic analysis. Topics: labor markets for teachers, the economics of child care, the effects of education on earnings and employment, the effects of education on economic growth and distribution of income, and the financing of education. Students who lack training in microeconomics, register for 220Y for 1 additional unit of credit.

**EDUC 220B. Introduction to the Politics of Education. 4 Units.**

(Same as GSBGEN 349.) The relationships between political analysis and policy formulation in education; focus is on alternative models of the political process, the nature of interest groups, political strategies, community power, the external environment of organizations, and the implementations of policy. Applications to policy analysis, implementation, and politics of reform. (APA).

**EDUC 220C. Education and Society. 4-5 Units.**

The effects of schools and schooling on individuals, the stratification system, and society. Education as socializing individuals and as legitimizing social institutions. The social and individual factors affecting the expansion of schooling, individual educational attainment, and the organizational structure of schooling.

Same as: EDUC 120C, SOC 130, SOC 230

**EDUC 220D. History of School Reform: Origins, Policies, Outcomes, and Explanations. 3-5 Units.**

Strongly recommended for students in the POLS M.A. program; others welcome. Focus is on 20th-century U.S. Intended and unintended patterns in school change; the paradox of reform that schools are often reforming but never seem to change much; rhetorics of reform and factors that inhibit change. Case studies emphasize the American high school. This course is strongly recommended for POLS students pursuing K-12 leadership.

Same as: HISTORY 258E

**EDUC 220Y. Introduction to the Economics of Education: Economics Section. 1-2 Unit.**

For those taking 220A who have not had microeconomics before or who need a refresher. Corequisite: 220A.

**EDUC 221A. Policy Analysis in Education. 4-5 Units.**

Major concepts associated with the development, enactment, and execution of educational policy. Issues of policy implementation, agenda setting and problem formulation, politics, and intergovernmental relations. Case studies. Goal is to identify factors that affect how analysts and policy makers learn about and influence education. Limited enrollment. Prerequisite: consent of instructor.

**EDUC 222. Resource Allocation in Education. 4-5 Units.**

Problems of optimization and design, and evaluation of decision experience. Marginal analysis, educational production functions, cost effectiveness and cost-benefit analysis, constrained maximization, program evaluation. Introduction to linear models for large-scale data analysis. Implications to model assumptions.

**EDUC 223. Language Issues in Educational Research and Practice. 2 Units.**

Provides the conceptual foundation for reasoning about language and linguistic groups as critical to making sound decisions in educational research and practice in a global economy and in multilingual societies.

**EDUC 226. Curating Experience: Representation in and beyond Museums. 2-4 Units.**

In an age when some 50% of museum visitors only "visit" museums online and when digital technologies have broken open archival access, anyone can be a curator, a critic, an historian, an archivist. In this context, how do museums create experiences that teach visitors about who they are and about the world around them? What are the politics of representation that shape learning in these environments? Using an experimental instructional approach, students will reconsider and redefine what it means to curate experience. (This course must be taken for a minimum of 3 units to satisfy a Ways requirement.).

Same as: AMSTUD 226X, CSRE 226X

**EDUC 228E. Becoming Literate in School I. 2 Units.**

First in a three course sequence. Introduction to reading and language arts theory and methodology for candidates STEP Elementary Teacher program. Instructional methods, formats, and materials.

**EDUC 228F. Becoming Literate in School II. 2 Units.**

Second in a three-course required sequence of reading and language arts theory and methodology for candidates in the STEP Elementary program. Theories for guiding instruction and curricular choices.

**EDUC 228G. Becoming Literate in School III. 2 Units.**

Third in a three-course required sequence of reading and language arts theory and methodology for candidates in STEP Elementary Teacher program. Theories for guiding instruction and curricular choices.

**EDUC 228H. Literacy, History, and Social Science. 1 Unit.**

How elementary school teachers can teach history and social science within a literacy framework. Topics include: historical thinking, reading, and writing; current research; applying nonfiction reading and writing strategies to historical texts; using primary sources with elementary students; adapting instruction to meet student needs; state standards; evaluating curriculum; assessing student knowledge; developing history and social science units; and embedding history and social science into the general literacy curriculum.

**EDUC 229A. Learning Design and Technology Seminar. 1-2 Unit.**

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology.

Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT).

**EDUC 229B. Learning Design and Technology Seminar. 1-2 Unit.**

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology.

Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT).

**EDUC 229C. Learning Design and Technology Seminar. 1-2 Unit.**

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology.

Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT).

**EDUC 229D. Learning Design and Technology Seminar. 2-5 Units.**

Four-quarter required seminar for the LDT master's program. Discussions and activities related to designing for learning with technology.

Support for internships and Master's project. Theoretical and practical perspectives, hands-on development, and collaborative efforts. (LDT).

**EDUC 231. Learning Religion: How People Acquire Religious Commitments. 4 Units.**

This course will examine how people learn religion outside of school, and in conversation with popular cultural texts and practices. Taking a broad social-constructivist approach to the variety of ways people learn, this course will explore how people assemble ideas about faith, identity, community, and practice, and how those ideas inform individual, communal and global notions of religion. Much of this work takes place in formal educational environments including missionary and parochial schools, Muslim madrasas or Jewish yeshivot. However, even more takes place outside of school, as people develop skills and strategies in conversation with broader social trends. This course takes an interdisciplinary approach to questions that lie at the intersection of religion, popular culture, and education. May be repeat for credit.

Same as: AMSTUD 231X, JEWISHST 291X, RELIGST 231X

**EDUC 232. Culture, Learning, and Poverty. 2-3 Units.**

This course examines the categories and methods used to analyze and explain educational inequalities in the United States from 1950 to present. Approaches to theories of school failure and methods of intervention are distinguished by their ideas on the play of learning, language, cognition, culture, and social class in human development. Particular attention is given to the Culture of Poverty controversies of the 1960s and their recent emergence.

**EDUC 233A. Counseling Theories and Interventions from a Multicultural Perspective. 3-5 Units.**

In an era of globalization characterized by widespread migration and cultural contacts, professionals face a unique challenge: How does one practice successfully when working with clients/students from so many different backgrounds? This course focuses upon the need to examine, conceptualize, and work with individuals according to the multiple ways in which they identify themselves. It will systematically examine multicultural counseling concepts, issues, and research. Literature on counselor and client characteristics such as social status or race/ethnicity and their effects on the counseling process and outcome will be reviewed. Issues in consultation with culturally and linguistically diverse parents and students and work with migrant children and their families are but a few of the topics covered in this course.

Same as: AFRICAAM 233A, CSRE 233A

**EDUC 233B. Adolescent Development and Mentoring in the Urban Context. 3 Units.**

Continuation of 233A. Topics include: developmental psychology and service learning; collaborating with the community; psychological research on altruism and prosocial behavior; volunteers' motivations; attributions about poverty, and the problem of prejudice.

**EDUC 234. Career and Personal Counseling. 3 Units.**

Theories and methods for helping people create more satisfying lives for themselves. Simulated counseling experiences.

Same as: EDUC 134, PSYCH 192

**EDUC 236. Beyond Bits and Atoms: Designing Technological Tools. 3-4 Units.**

Practicum in designing and building technology-enabled curricula and hands-on learning environments. Students use software toolkits and state-of-the-art fabrication machines to design educational software, educational toolkits, and tangible user interfaces. The course will focus on designing low-cost technologies, particularly for urban school in the US and abroad. We will explore theoretical and design frameworks from the constructionist learning perspective, critical pedagogy, interaction design for children. Interested students should complete the application at <https://web.stanford.edu/class/educ211> by January 5, and come to the first class at 9am in CERAS 101.

Same as: CS 402

**EDUC 236B. Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population. 3-4 Units.**

Recently two laws in Brazil (10639/2003 and 13465/2008), which came about due to intense pressure from Black and Indigenous social movements throughout the 20th century, have introduced changes in public education curriculum policies. These new curriculum policies mandate that the study of Afro-Brazilian, African, and Indigenous histories and cultures must be taught at all educational levels including at the elementary, secondary, and post-secondary levels. As part of this mandate, educators are now directed to incorporate considerations of ethnic-racial diversity in relation to people's thinking and experiences. These policies aim to fight racism as well as other forms of discrimination, and moreover, encourage the building of more equitable pedagogies. This course will discuss past and current policies and practices in Brazilian education from the point of view of different social projects organized by Indigenous Peoples, Afro-Brazilians, Asian-Brazilians, as well as Euro-Brazilians. It will also focus on Latin American efforts to promote equity in education, as well as to articulate different points of view, and reinforce and build epistemologies that support the decolonization of thinking, behaviors, research and policies. As part of this process, the course will study the experiences of people demanding these new public policies in terms of the extent to which they were able to influence institutional structures and to establish particular policy reforms. The course will also analyze theoretical frameworks employed by opponents of these movements to resist policies that might challenge their privileged place in society. In doing this, the course will offer theoretical and methodological avenues to promote research that can counter hegemonic curricular policies and pedagogical practices. The course will be fully participatory and oriented towards generating ongoing conversations and discussion about the various issues that arose in Brazil in relation to these two recent laws. To meet these goals, we will do a close reading of relevant scholarly works, paying particular attention to their theoretical frameworks, research designs, and findings.

Same as: AFRICAAM 126B, CSRE 126B, EDUC 136B, PUBLPOL 126B

**EDUC 239. Educating Young STEM Thinkers. 3-5 Units.**

The course introduces students to the design thinking process, the national conversations about the future of STEM careers, and opportunities to work with middle school students and K-12 teachers in STEM-based after-school activities and intercession camps. The course is both theory and practice focused. The purpose is twofold; to provide reflection and mentoring opportunities for students to learn about pathways to STEM careers and to introduce mentoring opportunities with young STEM thinkers.

Same as: EDUC 139, ME 139, ME 231

**EDUC 240. Adolescent Development and Learning. 3 Units.**

How do adolescents develop their identities, manage their inner and outer worlds, and learn? Presuppositions: that fruitful instruction takes into account the developmental characteristics of learners and the task demands of specific curricula; and that teachers can promote learning and motivation by mediating among the characteristics of students, the curriculum, and the wider social context of the classroom. Prerequisite: STEP student or consent of instructor. (STEP).

**EDUC 241. Race, Justice, and Integration. 3 Units.**

Recent philosophical research on injustice, race, and the ideal of racial integration.

Same as: AFRICAAM 241, PHIL 142, PHIL 242

**EDUC 242. Workshop on Instrument Development for Assessment, Research or Evaluation Purposes I. 3 Units.**

This course is designed with the belief that collecting information is a routine activity in which most researchers and educators are involved. Developing and improving instruments to gather information for descriptive, assessment, research, or evaluation purposes is a goal that unites all social sciences. Therefore, this course focuses on the technical skills required to develop, judge, and/or select quality instruments in diverse domains. The course will focus on your personal journey to develop or judge an instrument on something that is important for you.

**EDUC 243. Writing Across Languages and Cultures: Research in Writing and Writing Instruction. 3-5 Units.**

Theoretical perspectives that have dominated the literature on writing research. Reports, articles, and chapters on writing research, theory, and instruction; current and historical perspectives in writing research and research findings relating to teaching and learning in this area. Same as: CSRE 243, EDUC 145

**EDUC 244. Classroom Management and Leadership. 3 Units.**

Student and teacher roles in developing a classroom community. Strategies for classroom management within a theoretical framework. STEP secondary only.

**EDUC 244E. Elementary Classroom Leadership and Management. 1 Unit.**

How to best manage a classroom. Student and teacher roles in developing a classroom community. Strategies for classroom management within a theoretical framework. STEP elementary only.

**EDUC 244F. Elementary Classroom Leadership and Management. 1 Unit.**

Skills for developing a positive classroom learning environment. Theoretical issues and opportunities to acquire strategies and make links with practice teaching class. STEP elementary only.

**EDUC 245. Understanding Racial and Ethnic Identity Development. 3-5 Units.**

This seminar will explore the impact and relative salience of racial/ethnic identity on select issues including: discrimination, social justice, mental health and academic performance. Theoretical perspectives on identity development will be reviewed, along with research on other social identity variables, such as social class, gender and regional identifications. New areas within this field such as the complexity of multiracial identity status and intersectional invisibility will also be discussed. Though the class will be rooted in psychology and psychological models of identity formation, no prior exposure to psychology is assumed and other disciplines-including cultural studies, feminist studies, and literature-will be incorporated into the course materials.

Same as: AFRICAAM 245, CSRE 245

**EDUC 246A. Secondary Teaching Seminar. 4 Units.**

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: instruction, curricular planning, classroom interaction processes, portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student.

**EDUC 246B. Secondary Teaching Seminar. 5 Units.**

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: guided observations, building classroom community, classroom interaction processes, topics in special education portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student.

**EDUC 246C. Secondary Teaching Seminar. 4 Units.**

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: instruction, curricular planning, classroom interaction processes, portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student. (STEP).

**EDUC 246D. Secondary Teaching Seminar. 2-7 Units.**

Preparation and practice in issues and strategies for teaching in classrooms with diverse students. Topics: instruction, curricular planning, classroom interaction processes, portfolio development, teacher professionalism, patterns of school organization, teaching contexts, and government educational policy. Classroom observation and student teaching with accompanying seminars during each quarter of STEP year. 16 units required for completion of the program. Prerequisite: STEP student.

**EDUC 246E. Elementary Teaching Seminar. 3 Units.**

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

**EDUC 246F. Elementary Teaching Seminar. 4-6 Units.**

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

**EDUC 246G. Elementary Teaching Seminar. 3 Units.**

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

**EDUC 246H. Elementary Teaching Seminar. 4 Units.**

Integrating theory and practice in teacher development. Topics include: equity, democracy, and social justice in the context of teaching and learning; teacher reflection, inquiry, and research; parent/teacher relationships; youth development and community engagement; professional growth and development; teacher leadership and school change processes; preparation for the job search, the STEP Elementary Portfolio, and the STEP Elementary Conference. Prerequisite: STEP student.

**EDUC 247. Moral and Character Education. 3 Units.**

Contemporary scholarship and educational practice related to the development of moral beliefs and conduct in young people. The psychology of moral development; major philosophical, sociological, and anthropological approaches. Topics include: natural capacities for moral awareness in the infant; peer and adult influences on moral growth during childhood and adolescence; extraordinary commitment during adulthood; cultural variation in moral judgment; feminist perspectives on morality; the education movement in today's schools; and contending theories concerning the goals of moral education.

**EDUC 249. Theory and Issues in the Study of Bilingualism. 3-5 Units.**

Sociolinguistic perspective. Emphasis is on typologies of bilingualism, the acquisition of bilingual ability, description and measurement, and the nature of societal bilingualism. Prepares students to work with bilingual students and their families and to carry out research in bilingual settings. Same as: EDUC 149



**EDUC 250. What Do Students Really Know? The Risks of Modern Assessment. 3 Units.**

This course focuses on helping students to advance their knowledge about theory, design and research issues related to assessing student learning for accountability and learning purposes. The course explores assessment topics with a critical perspective in two contexts: large-scale and classroom assessment. The course will help students become critical test consumers, better-informed assessment evaluators, and advocator of reliable, valid and fair assessments for culturally and linguistically diverse populations.

**EDUC 252. Introduction to Test Theory. 3 Units.**

Concepts of reliability and validity; derivation and use of test scales and norms; mathematical models and procedures for test validation, scoring, and interpretation.

**EDUC 252L. Introduction to Test Theory - Lab. 2 Units.**

This course will cover the material from 252A in an applied setting. Emphasis will be in developing a capacity for applying and interpreting psychometrics techniques to real-world and simulated data.

**EDUC 256. Psychological and Educational Resilience Among Children and Youth. 4 Units.**

Theoretical, methodological, and empirical issues pertaining to the psychological and educational resilience of children and adolescents. Overview of the resilience framework, including current terminology and conceptual and measurement issues. Adaptive systems that enable some children to achieve successful adaptation despite high levels of adversity exposure. How resilience can be studied across multiple levels of analysis, ranging from cell to society. Individual, family, school, and community risk and protective factors that influence children's development and adaptation. Intervention programs designed to foster resilient adaptation in disadvantaged children's populations. Same as: HUMBIO 149

**EDUC 257. Practicum in English-Spanish School & Community Interpreting. 3-4 Units.**

This practicum will assist students in developing a set of skills in English-Spanish interpreting that will prepare them to provide interpretation services in school and community settings. The course will build students' abilities to transfer intended meanings between two or more monolingual individuals of who are physically present in a school or community setting and who must communicate with each other for professional (and personal) purposes. Same as: CHILATST 183X, EDUC 183

**EDUC 258. Literacy Development and Instruction. 3-5 Units.**

Literacy acquisition as a developmental and educational process. Problems that may be encountered as children learn to read. How to disentangle home, community, and school instruction from development.

**EDUC 260A. Statistical Methods for Group Comparisons and Causal Inference. 3 Units.**

See <http://rogosateaching.com/stat209/>. Critical examination of statistical methods in social science and life sciences applications, especially for cause and effect determinations. Topics: mediating and moderating variables, potential outcomes framework, encouragement designs, multilevel models, heterogeneous treatment effects, matching and propensity score methods, analysis of covariance, instrumental variables, compliance, path analysis and graphical models, group comparisons with longitudinal data. Prerequisite: intermediate-level statistical methods.

Same as: HRP 239, STATS 209

**EDUC 260B. Advanced Statistical Methods for Observational Studies. 2-3 Units.**

Design principles and statistical methods for observational studies. Topics include: matching methods, sensitivity analysis, and instrumental variables. 3 unit registration requires a small project and presentation. Computing is in R. Pre-requisites: HRP 261 and 262 or STAT 209 (HRP 239), or equivalent. See <http://rogosateaching.com/somgen290/>. Same as: CHPR 290, HRP 292, STATS 266

**EDUC 261. Sociocultural Theories of Learning & Development: Vygotsky & Bakhtin. 3 Units.**

Grounded in theories of Vygotsky and Bakhtin, this course will review commonly used, but often misunderstood, concepts about how context enters theories of learning and development. Topics will include: distinctions between development and learning; the place of culture in developing higher mental functions; the zone of proximal development, conceptions and misconceptions; contributions of activity theory; importance of heterogeneity and multivocality; and role of language in ideological becoming; or idea development. Focus will be on using theory to guide research.

**EDUC 262A. Curriculum and Instruction in English. 3 Units.**

Approaches to teaching English in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. (STEP).

**EDUC 262B. Curriculum and Instruction in English. 3 Units.**

Approaches to teaching English in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. STEP secondary only.

**EDUC 262C. Curriculum and Instruction in English. 3 Units.**

Approaches to teaching English in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. (STEP).

**EDUC 262D. Curriculum & Instruction Elective in English. 4 Units.**

Methodology of science instruction: teaching for English and language arts; linking the goals of teaching English with interdisciplinary curricula; opportunities to develop teaching materials. For STEP Program students only.

**EDUC 263A. Curriculum and Instruction in Mathematics. 3 Units.**

The purposes and programs of mathematics in the secondary curriculum; teaching materials, methods. Prerequisite: STEP student or consent of instructor. (STEP) 263A. Sum, 263B. Aut, 263C. Win.

**EDUC 263B. Curriculum and Instruction in Mathematics. 3 Units.**

The purposes and programs of mathematics in the secondary curriculum; teaching materials, methods. Prerequisite: STEP student or consent of instructor. (STEP) 263A. Sum, 263B. Aut, 263C. Win.

**EDUC 263C. Curriculum and Instruction in Mathematics. 3 Units.**

The purposes and programs of mathematics in the secondary curriculum; teaching materials, methods. Prerequisite: STEP student or consent of instructor. (STEP) 263A. Sum, 263B. Aut, 263C. Win.

**EDUC 263D. Curriculum & Instruction Elective in Math. 4 Units.**

Methodology of math instruction: teaching for mathematical thinking and reasoning; linking the goals of teaching math with literacy and interdisciplinary curricula; opportunities to develop teaching materials. For STEP Program students only.

**EDUC 263E. Quantitative Reasoning in Mathematics I. 2 Units.**

First of a three-course sequence in mathematics for STEP elementary teacher candidates. Content, pedagogy, and context. Mathematics subject matter; the orchestration of teaching and learning of elementary mathematics including curriculum, classroom and lesson design, and cases studies. Sociocultural and linguistic diversity, equity, differentiation of instruction, the impact of state and national standards, and home/community connections.

**EDUC 263F. Quantitative Reasoning in Mathematics II. 2 Units.**

Second of a three-course sequence in mathematics for STEP elementary teacher candidates. Content, pedagogy, and context. Mathematics subject matter; the orchestration of teaching and learning of elementary mathematics including curriculum, classroom and lesson design, and cases studies. Sociocultural and linguistic diversity, equity, differentiation of instruction, the impact of state and national standards, and home/community connections.

**EDUC 263G. Quantitative Reasoning in Mathematics III. 2 Units.**

Third of a three-course sequence in mathematics for STEP elementary teacher candidates. Content, pedagogy, and context. Mathematics subject matter; the orchestration of teaching and learning of elementary mathematics including curriculum, classroom and lesson design, and cases studies. Sociocultural and linguistic diversity, equity, differentiation of instruction, the impact of state and national standards, and home/community connections.

**EDUC 264A. Curriculum and Instruction in World Languages. 3 Units.**

Approaches to teaching foreign languages in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. Prerequisite: STEP student. (STEP).

**EDUC 264B. Curriculum and Instruction in World Languages. 3 Units.**

Approaches to teaching foreign languages in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. STEP secondary only.

**EDUC 264C. Curriculum and Instruction in World Languages. 3 Units.**

Approaches to teaching foreign languages in the secondary school, including goals for instruction, teaching techniques, and methods of evaluation. Prerequisite: STEP student. (STEP).

**EDUC 264E. Methods and Materials in Bilingual Classrooms. 2 Units.**

Restricted to STEP elementary teacher candidates in the BCLAD program. Theories, research, and methods related to instruction of Spanish-English bilingual children, grades K-8. Approaches to dual language instruction, and pedagogical and curricular strategies for the instruction of reading, language arts, science, history, social science, and math in Spanish. Assessment issues and practices with bilingual students. In Spanish.

**EDUC 265. History of Higher Education in the U.S.. 3-5 Units.**

Major periods of evolution, particularly since the mid-19th century. Premise: insights into contemporary higher education can be obtained through its antecedents, particularly regarding issues of governance, mission, access, curriculum, and the changing organization of colleges and universities.

Same as: AMSTUD 165, EDUC 165, HISTORY 158C

**EDUC 266. Educational Neuroscience. 3 Units.**

An introduction to the growing intersection between education research and emerging research on functional brain development. Students will probe the contributions and limitations of emerging theoretical and empirical contribution of neuroscience approaches to specific academic skills such as reading and mathematics, as well as exposure to general processes crucial for educational success, including motivation, attention, and social cognition. Final projects will explore these themes in the service of interventions designed to improve how these functions.

**EDUC 267A. Curriculum and Instruction in Science. 3 Units.**

Possible objectives of secondary science teaching and related methods: selection and organization of content and instructional materials; lab and demonstration techniques; evaluation, tests; curricular changes; ties with other subject areas. Prerequisite: STEP student or consent of instructor. (STEP).

**EDUC 267B. Curriculum and Instruction in Science. 3 Units.**

Possible objectives of secondary science teaching and related methods: selection and organization of content and instructional materials; lab and demonstration techniques; evaluation, tests; curricular changes; ties with other subject areas. Prerequisite: STEP student or consent of instructor. (STEP).

**EDUC 267C. Curriculum and Instruction in Science. 3 Units.**

Possible objectives of secondary science teaching and related methods: selection and organization of content and instructional materials; lab and demonstration techniques; evaluation, tests; curricular changes; ties with other subject areas. Prerequisite: STEP student or consent of instructor. (STEP).

**EDUC 267D. Curriculum & Instruction Elective in Science. 4 Units.**

Methodology of science instruction: teaching for scientific reasoning; linking the goals of teaching science with literacy and interdisciplinary curricula; opportunities to develop teaching materials. For STEP Program students only.

**EDUC 267E. Development of Scientific Reasoning and Knowledge. 2 Units.**

For STEP elementary teacher candidates. Theories and methods of teaching and learning science. How to develop curricula and criteria for critiquing curricula. Students design a science curriculum plan for a real setting. State and national science frameworks and content standards. Alternative teaching approaches; how to select approaches that are compatible with learner experience and lesson objectives. Focus is on the linguistic and cultural diversity of California public school students.

**EDUC 267F. Development of Scientific Reasoning and Knowledge II. 2 Units.**

Continuation of 267E. Scientific knowledge and pedagogical skills for supporting science instruction. Topics include: how children build scientific understandings and what that understanding might look and sound like in young children; what school science is and how concepts are connected to the doing of it; physical, life, and earth science constructs.

**EDUC 267G. Integrating the Garden into the Elementary Curriculum. 1 Unit.**

This mini-course uses the garden and kitchen environments to provide teacher candidates with real-world contexts in which to explore some of the key issues that children face in health, nutrition, and sustainability. Teacher candidates will gain an understanding of how to integrate the various themes with content areas and standards and an appreciation for the importance of addressing children's health needs in an era when the country is facing increased obesity and other health problems.

**EDUC 268A. Curriculum and Instruction in History and Social Science. 3 Units.**

The methodology of history instruction: teaching for historical thinking and reasoning; linking the goals of teaching history with literacy; curriculum trends; and opportunities to develop teaching and resource units. Prerequisite: STEP student.

**EDUC 268B. Curriculum and Instruction in History and Social Science. 3 Units.**

The methodology of history instruction: teaching for historical thinking and reasoning; linking the goals of teaching history with literacy; curriculum trends; and opportunities to develop teaching and resource units. Prerequisite: STEP student.

**EDUC 268C. Curriculum and Instruction in History and Social Science. 3 Units.**

The methodology of history instruction: teaching for historical thinking and reasoning; linking the goals of teaching history with literacy; curriculum trends; and opportunities to develop teaching and resource units. Prerequisite: STEP student.

**EDUC 268D. Curriculum & Instruction Elective in History. 4 Units.**

The methodology of history instruction: teaching for historical thinking and reasoning; linking the goals of teaching history with literacy and interdisciplinary curricula; opportunities to develop teaching materials. For STEP Program students only.

**EDUC 269. The Ethics in Teaching. 1 Unit.**

Goal is to prepare for the ethical problems teachers confront in their professional lives. Skills of ethical reasoning, familiarity with ethical concepts, and how to apply these skills and concepts in the analysis of case studies. Topics: ethical responsibility in teaching, freedom of speech and academic freedom, equality and difference, indoctrination, and the teaching of values.

**EDUC 270. Latino Families, Languages, and Schools. 3-5 Units.**

The challenges facing schools to establish school-family partnerships with newly arrived Latino immigrant parents. How language acts as a barrier to home-school communication and parent participation. Current models of parent-school collaboration and the ideology of parental involvement in schooling.

Same as: EDUC 178

**EDUC 271. Education Policy in the United States. 3 Units.**

(Same as GSBGEN 347) The course will provide students from different disciplines with an understanding of the broad educational policy context. The course will cover topics including a) school finance systems; b) an overview of policies defining and shaping the sectors and institutional forms of schooling, c) an overview of school governance, d) educational human-resource policy, e) school accountability policies at the federal and state levels; and f) school assignment policies and law, including intra- and inter-district choice policies, desegregation law and policy.

**EDUC 273. Gender and Higher Education: National and International Perspectives. 4 Units.**

This course examines the ways in which higher education structures and policies affect females, males, and students in relation to each other and how changes in those structures and policies improve experiences for females and males similarly or differently. Students are expected to gain an understanding of theories and perspectives from the social sciences relevant to an understanding of the role of higher education in relation to structures of gender differentiation and hierarchy. Topics include undergraduate and graduate education; identity and sexuality; gender and science; gender and faculty; and the development of feminist scholarship and pedagogy. Attention is paid to how these issues are experienced by women and men in the United States, including people of color, and by academics throughout the world, and how these have changed over time.

Same as: EDUC 173, FEMST 173, SOC 173, SOC 273

**EDUC 275. Leading U.S. Schools. 3-4 Units.**

The landscape of schooling in the U.S. is dynamic and replete with ideologies, myths, and beliefs. Organizational theory, leadership theory, and empirical research are lenses through which students will develop a deeper and broader understanding of the similarities and differences among private schools, parochial schools, traditional K-12 schools, charter schools, and alternative schools. Students will connect theory and research to practice by visiting and learning about two or more schools of their choosing.

**EDUC 276. Educational Assessment. 3 Units.**

Reliability, validity, bias, fairness, and properties of test scores. Uses of tests to monitor, manage, and reform instruction. Testing and competition, meritocracy, achievement gaps, and explanations for group differences.

**EDUC 277. Education of Immigrant Students: Psychological Perspectives. 4 Units.**

Historical and contemporary approaches to educating immigrant students. Case study approach focuses on urban centers to demonstrate how stressed urban educational agencies serve immigrants and native-born U.S. students when confronted with overcrowded classrooms, controversy over curriculum, current school reform movements, and government policies regarding equal educational opportunity.

**EDUC 278. Introduction to Issues in Evaluation. 3-4 Units.**

Open to master's and doctoral students with priority to students in the School of Education. Focus is on the basic literature and major theoretical and practical issues in the field of program evaluation. Topics include: defining purpose, obtaining credible evidence, the role of the evaluator, working with stakeholder, values in evaluation, utilization, and professional standards. The course project is to design an evaluation for a complex national or international program selected by the instructor.

**EDUC 280. Learning & Teaching of Science. 3 Units.**

This course will provide students with a basic knowledge of the relevant research in cognitive psychology and science education and the ability to apply that knowledge to enhance their ability to learn and teach science, particularly at the undergraduate level. Course will involve readings, discussion, and application of the ideas through creation of learning activities. It is suitable for advanced undergraduates and graduate students with some science background.

Same as: ENGR 295, PHYSICS 295

**EDUC 281. Technology for Learners. 3-4 Units.**

How can we use technology to improve learning? Many hope that technology will make learning easier, faster, or accessible to more learners. This course explores a variety of approaches to designing tools for learning, the theories behind them, and the research that tests their effectiveness. Strong focus on evaluating and designing new tools for specific learners and subjects. Space is limited. Priority is given to master's students in the LDT Master's Program. Cardinal Course certified by the Haas Center.

**EDUC 283. Child Development In and Beyond Schools. 2 Units.**

(Formerly EDUC 144). How schools form a context for children's social and cognitive development. Focus is on early and middle childhood. Transactional processes between children and learning opportunities in classroom contexts. Topics include: alternative theoretical perspectives on the nature of child development; early experience and fit with traditional school contexts; assessment practices and implications for developing identities as learners; psychological conceptions of motivational processes and alternative perspectives; the role of peer relationships in schools; and new designs for learning environments. Readings address social science and methodological issues. STEP Elementary only.

**EDUC 284A. Designing Equitable Groupwork. 1 Unit.**

Teaching in academically and linguistically heterogeneous classrooms requires a repertoire of pedagogical strategies. Focus is on how to provide access to intellectually challenging curriculum and equal-status interaction for students in diverse classrooms. Emphasis is on group work and its cognitive, social, and linguistic benefits for students. How to prepare for group work, equalize participation, and design learning tasks that support conceptual understanding, mastery of content and language growth. How to assess group products and individual contributions. (STEP).

**EDUC 284B. Designing Equitable Groupwork. 1 Unit.**

Teaching in academically and linguistically heterogeneous classrooms requires a repertoire of pedagogical strategies. Focus is on how to provide access to intellectually challenging curriculum and equal-status interaction for students in diverse classrooms. Emphasis is on group work and its cognitive, social, and linguistic benefits for students. How to prepare for group work, equalize participation, and design learning tasks that support conceptual understanding, mastery of content and language growth. How to assess group products and individual contributions. (STEP).

**EDUC 285. Supporting Students with Special Needs. 2-3 Units.**

For STEP teacher candidates. Needs of exceptional learners, identification of learning differences and disabilities, and adaptations in the regular inclusion classroom. Legal requirements of special education, testing procedures, development of individualized education plans, and support systems and services. Students follow a special needs learner to understand diagnosis, student needs, and types of services.

**EDUC 286B. Second Language Acquisition Research. 4 Units.**

Major research findings and theories in second language acquisition. Second language research and theories in formal and informal settings where a second language is learned.

**EDUC 287. Graduate Research Workshop on Psychological Interventions. 3 Units.**

Psychological research has the potential to create novel interventions that promote the public good. This workshop will expose students to psychologically 'wise' intervention research and to support their efforts to conduct such interventions, especially in the context of education, broadly conceived, as well as other areas. The first part of the class will address classic interventions and important topics in intervention research, including effective delivery mechanisms, sensitive behavioral outcomes, the role of theory and psychological process, and considerations of the role of time and of mechanisms that can sustain treatment effects over time. In the second part of the class, students will present and receive feedback on their own ongoing and/or future intervention research. Prerequisite: Graduate standing in Psychology or Education, or consent of instructor.

Same as: PSYCH 274

**EDUC 288. Organizational Analysis. 4 Units.**

Principles of organizational behavior and analysis; theories of group and individual behavior; organizational culture; and applications to school organization and design. Case studies.

Same as: SOC 271

**EDUC 289. The Centrality of Literacies in Teaching and Learning. 3 Units.**

(Formerly EDUC 166.) Focus is on principles in understanding, assessing, and supporting the reading and writing processes, and the acquisition of content area literacies in secondary schools. Literacy demands within particular disciplines and how to use oral language, reading, and writing to teach content area materials more effectively to all students. (STEP).

**EDUC 290. Instructional Leadership: Building Capacity for Excellent Teaching. 3-4 Units.**

This course focuses on the role of leaders in designing, supporting and sustaining excellent teaching. How do leaders create the organizational conditions to focus attention on the technical core of instruction, curriculum and assessment. Course goals: 1) explore a variety of educational leadership approaches, 2) investigate the theory of action underlying these approaches to leadership and consider the implications for instructional practice and 3) develop understanding of the relationship between the leadership approach and the learning environment.

**EDUC 291. Learning Sciences and Technology Design Research Seminar and Colloquium. 1-3 Unit.**

Students and faculty present and critique new and original research relevant to the Learning Sciences and Technology Design doctoral program. Goal is to develop a community of scholars who become familiar with each other's work. Practice of the arts of presentation and scholarly dialogue while introducing seminal issues and fundamental works in the field.

**EDUC 292. Academic Writing for Clarity and Grace. 2-4 Units.**

Students will acquire helpful writing strategies, habits, and critical faculties; increase their sense of writing as revision; and leave them with resources that will support them in their own lifelong pursuit of good writing. Students will work on revising their own papers and editing papers of other students. Class will focus on exercises in a variety of critical writing skills: framing, concision, clarity, emphasis, rhythm, action, actors, argument, data, quotations, and usage. Course enrollment limited to graduate students.

**EDUC 293. Church, State, & Schools: Issues in Education & Religion. 4 Units.**

This course will examine interactions between religion and education, focusing on both formal and experiential sites in which people and communities explore, articulate, encounter, and perform religious ideologies and identities. The class will focus on different religious traditions and their encounters the institutions and structures of education in American culture, both in the United States and as it manifests in American culture transnationally.

Same as: AMSTUD 293, RELIGST 293X

**EDUC 295. Learning and Cognition in Activity. 3 Units.**

Methods and results of research on learning, understanding, reasoning, problem solving, and remembering, as aspects of participation in social organized activity. Principles of coordination that support cognitive achievements and learning in activity settings in work and school environments.

Same as: PSYCH 261A

**EDUC 297. Teaching and Learning in Higher Education. 1-4 Unit.**

(Same as LAW 303) This course is co-taught by Tom Ehrlich, GSE, and Mariatte Denman, Office of the Vice Provost for Teaching & Learning. It provides doctoral and masters students with an opportunity to focus on teaching and learning along with graduate students from many disciplines throughout the university. Students watch and interview master teachers at Stanford, prepare a syllabus module for a workshop or class they might teach, and learn a range of effective pedagogical methods. The course is open not only to masters students and doctoral students from all schools who expect to work in higher education, but also to students interested in K-12 education, and they may develop a teaching module for use in those schools.

Same as: VPTL 297

**EDUC 298. Seminar on Teaching Introductory Computer Science. 1 Unit.**

Faculty, undergraduates, and graduate students interested in teaching discuss topics raised by teaching computer science at the introductory level. Prerequisite: consent of instructor.

Same as: CS 298

**EDUC 299. Equity and Schooling. 3 Units.**

(Formerly EDUC 167.) Introduction to the theories and practices of equity and democracy in education. How to think about teaching and schooling in new ways; the individual moral and political reasons for becoming a teacher. (STEP).

**EDUC 301. Workshop on Race, Ethnicity, and Language in Schools. 1-4 Unit.**

The Workshop on Race, Ethnicity, and Language in Schools is a new School of Education initiative that examines the profound and enduring relationships between race, ethnicity, and language in education in the U.S. and elsewhere. The seminar brings together an interdisciplinary group of leading scholars and graduate students in language in education to address the role of race and ethnicity in a host of complex and controversial language educational issues that cut across the areas of practice, policy, and pedagogy.

**EDUC 302. Behavior Design. 3 Units.**

Students learn Behavior Design and practice applying the methods to change human behavior in measurable ways. In this particular course, all projects will focus on one theme: Designing the first step.

**EDUC 303. Designing Learning Spaces. 3-4 Units.**

Project-based. How space shapes personal interactions and affords learning opportunities in formal and informal settings. How to integrate learning principles into the design of spaces and develop a rubric to assess the impact on learning.

**EDUC 304. Critical Theory and Pedagogy. 1-5 Unit.**

The course samples the work of Critical Theory, proper, critical theory more generally, and critical pedagogy in the schools, as it draws on the educational consequences of a school of thought. The project of critical theory is examined in light of the curricular applications that it has inspired and the scholarly implications of studying education in this seemingly critical theoretical manner. Students will evaluate a particular curricular point of application of these related theoretical developments. Course may be repeated 4 times.

**EDUC 305. A Political Economy of the Mind. 3-4 Units.**

This course seeks categories and procedures for the appreciation, description, analysis, and reorganization of people in difficult circumstances. Examples from the history of fiction and classic political economy are used to explore the strengths and weaknesses of various approaches. In depth attention to individual lives and daily struggles give fiction and economic theory more appropriately positive views of people without the advantages of schooling than most educational research. Readings include fiction by Defoe, Austen, Dickens, Hurston, and Morrison and economic visions from Smith, Marx, Veblen, Keynes, and Galbraith.

**EDUC 306A. Economics of Education in the Global Economy. 5 Units.**

Case material considers development problems in the U.S. and abroad. Discussion sections on economic aspects of educational development.

**EDUC 306B. Global Education Policy & Organization. 3-5 Units.**

Education policy, politics, and development. Topics include: politics, interests, institutions, policy, and civil society; how schools and school systems operate as political systems; how policy making occurs in educational systems; and theories of development.

Same as: PUBLPOL 316

**EDUC 306D. World, Societal, and Educational Change: Comparative Perspectives. 4-5 Units.**

Theoretical perspectives and empirical studies on the structural and cultural sources of educational expansion and differentiation, and on the cultural and structural consequences of educational institutionalization. Research topics: education and nation building; education, mobility, and equality; education, international organizations, and world culture.

Same as: EDUC 136, SOC 231

**EDUC 306Y. Economic Support Seminar for Education and Economic Development. 1 Unit.**

Core economic concepts that address issues in education in developing and developed countries. Supply and demand, elasticity, discount rates, rate of return analysis, utility functions, and production functions. Corequisite: 306A. (Carnoy).

**EDUC 308. Assessment Development, Adaptation, and Review. 3 Units.**

Offers a critical perspective for examining current practices concerning the development, adaptation, and review of assessment instruments in state, national, and international assessment contexts.

**EDUC 30N. The Science of Diverse Communities. 3 Units.**

This course is an exploration. Most generally, its aim is to identify distinguishing features of good diverse communities and articulate them well enough to offer principles or guidelines for how to design and manage such communities - all with a particular focus on educational communities like schools, universities, academic disciplines, etc., but with the hope that such principles might generalize to other kinds of organizations and the broader society. The readings range from those on the origins of human communities and social identities to those on intergroup trust building. They also aim to embed our discussions in the major diversity issues of the day, or example, what's in the news about campus life. Thus the course has a practical purpose: to develop testable ideas for improving the comfort level, fairness and goodness-for-all of identity diverse communities—especially in educational settings. The course also has a basic science purpose: to explore the psychological significance of community. Is there a psychological need for community? Is there something about a need for community that can't be reduced to other needs, for example, for a gender, racial or sexual-orientation identity? How strong is the need for community against other needs? What kinds of human groupings can satisfy it? In meeting this need, can membership in one community substitute for membership in others? What do people need from communities in order to thrive in them? Do strong diverse communities dampen intergroup biases? Can strong community loyalty mitigate identity tensions within communities? Such questions, the hope is, will help us develop a more systematic understanding of the challenges and opportunities inherent in diverse human communities.

Same as: CSRE 30N, PSYCH 30N, SOC 179N

**EDUC 310. Sociology of Education: The Social Organization of Schools. 4 Units.**

Seminar. Key sociological theories and empirical studies of the links between education and its role in modern society, focusing on frameworks that deal with sources of educational change, the organizational context of schooling, the impact of schooling on social stratification, and the relationships between the educational system and other social institutions such as families, neighborhoods, and the economy.

Same as: EDUC 110, SOC 132, SOC 332

**EDUC 311. Research Workshop in International Education. 1 Unit.**

International Education Initiative (IEI) is a cross-campus initiative to promote greater collaboration around research in international education at Stanford. It is designed to help students conduct higher quality research in international education and gain wide exposure to the international education research community. Students will have the chance to engage with invited speakers from outside Stanford, present and get feedback about their own research, and learn new methodological tools.

**EDUC 312. Relational Sociology. 4 Units.**

Conversations, social relationships and social networks are the core features of social life. In this course we explore how conversations, relationships, and social networks not only have their own unique and independent characteristics, but how they shape one another and come to characterize many of the settings we enter and live in. As such, students will be introduced to theories and research methodologies concerning social interaction, social relationships, and social networks, as well as descriptions of how these research strands interrelate to form a larger relational sociology that can be employed to characterize a variety of social phenomenon. This course is suitable to advanced undergraduates and doctoral students.

Same as: SOC 224B

**EDUC 313. The Education of American Jews. 4 Units.**

This course will take an interdisciplinary approach to the question of how American Jews negotiate the desire to retain a unique ethnic sensibility without excluding themselves from American culture more broadly. Students will examine the various ways in which people debate, deliberate, and determine what it means to be an "American Jew". This includes an investigation of how American Jewish relationships to formal and informal educational encounters through school, popular culture, religious ritual, and politics.

Same as: JEWISHST 393X, RELIGST 313X

**EDUC 314. Technologies, Social Justice and Black Vernacular Culture. 3-5 Units.**

From texts to techne, from artifacts to discourses on science and technology, this course is an examination of how Black people in this society have engaged with the mutually constitutive relationships that endure between humans and technologies. We will focus on these engagements in vernacular cultural spaces, from storytelling traditions to music and move to ways academic and aesthetic movements have imagined these relationships. Finally, we will consider the implications for work with technologies in both school and community contexts for work in the pursuit of social and racial justice. Course is open to master's and doctoral students only.

**EDUC 315. Reforms in Federal Education Programs: The New ESSA through the Lens of Assessment and Language.. 2-5 Units.**

This seminar explores implications of three notable shifts in the new federal education law (ESSA): shifts in student assessment and school accountability practices; deliberate inclusion of English Learners throughout the law but in particular in Title I accountability; and, its consideration of appropriate quality of evidence to support its multiple programs. The course analyzes the law by examining legislative history, existing research of various components of NCLB, and considering research implications in the implementation of ESSA.

**EDUC 316. Social Network Methods. 4-5 Units.**

Introduction to social network theory, methods, and research applications in sociology. Network concepts of interactionist (balance, cohesion, centrality) and structuralist (structural equivalence, roles, duality) traditions are defined and applied to topics in small groups, social movements, organizations, communities. Students apply these techniques to data on schools and classrooms.

Same as: SOC 369

**EDUC 318. The Discourses of Teaching Reading. 3-5 Units.**

Students examine language, social relationships, and students' textual sense-making to further develop their conceptions of reading comprehension and their pedagogical practice as reading teachers. What it means to comprehend text; how classroom discourse matters in the development of textual understanding; and what understandings, purposes, and relationships should matter in classroom talk about text. Field work in which students facilitate small group text discussions for the duration of the quarter at a location of their choice.

**EDUC 319. Research on Teaching. 1-4 Unit.**

Introduction and historical perspective to theory, methods, and substantive findings of research on teaching.

**EDUC 320. Sociology of Science. 3-4 Units.**

The sociology of science concerns the social structures and practices by which human beings interpret, use and create intellectual innovations. In particular we will explore the claim that scientific facts are socially constructed and ask whether such a characterization has limits. Course readings will concern the formation and decline of various thought communities, intellectual social movements, scientific disciplines, and broader research paradigms. A special focus will be placed on interdisciplinarity as we explore whether the collision of fields can result in new scientific advances. This course is suitable to advanced undergraduates and doctoral students.

Same as: EDUC 120, SOC 330

**EDUC 321. Analysis of Social Interaction. 3 Units.**

Practicum on discourse, interactional, and cultural analysis of videotaped data. Analysis of interactional data, and the basis on which analytic claims can be founded. The transcription of speech and movement in social interaction, and how to identify the patterns which participants use to display and interpret cultural meanings. The theoretical assumptions hidden in transcription systems. Prerequisite: first- or second-year graduate student.

**EDUC 322. Community-based Research As Tool for Social Change:Discourses of Equity in Communities & Classrooms. 3-5 Units.**

Issues and strategies for studying oral and written discourse as a means for understanding classrooms, students, and teachers, and teaching and learning in educational contexts. The forms and functions of oral and written language in the classroom, emphasizing teacher-student and peer interaction, and student-produced texts. Individual projects utilize discourse analytic techniques.

Same as: AFRICAAM 130, CSRE 130, EDUC 123

**EDUC 323A. The Practice of Education Policy Analysis. 3-5 Units.**

Key issues in the K-12 education policy. Modern theories about the making of policy and its implementation. Preparation to do policy analysis in education.

**EDUC 325A. Proseminar 1. 3 Units.**

Required of and limited to first-year Education doctoral students. Core questions in education: what is taught, to whom, and why; how do people learn; how do teachers teach and how do they learn to teach; how are schools organized; how are educational systems organized; and what are the roles of education in society?.

**EDUC 325B. Proseminar 2. 3 Units.**

Required of and limited to first-year Education doctoral students. Core questions in education: what is taught, to whom, and why; how do people learn; how do teachers teach and how do they learn to teach; how are schools organized; how are educational systems organized; and what are the roles of education in society?.

**EDUC 325C. Proseminar 3. 2-4 Units.**

Required of and limited to first-year Education doctoral students. Core questions in education: what is taught, to whom, and why; how do people learn; how do teachers teach and how do they learn to teach; how are schools organized; how are educational systems organized; and what are the roles of education in society?.

**EDUC 326. Advanced Regression Analysis. 3-4 Units.**

Social science researchers often deal with complex data and research questions that traditional statistics models like linear regression cannot adequately address. This course offers the opportunity to understand and apply two widely used types of advanced regression analysis that allow the examination of 1) multilevel data structures (multilevel models) and 2) multivariate research questions (structural equation models).

**EDUC 327A. The Conduct of Qualitative Inquiry. 3-4 Units.**

Two quarter sequence for doctoral students to engage in research that anticipates, is a pilot study for, or feeds into their dissertations. Prior approval for dissertation study not required. Students engage in common research processes including: developing interview questions; interviewing; coding, analyzing, and interpreting data; theorizing; and writing up results. Participant observation as needed. Preference to students who intend to enroll in 327C.

Same as: SOC 331

**EDUC 327C. The Conduct of Qualitative Inquiry. 1-4 Unit.**

For doctoral students. Students bring research data for analysis and writing. Preference to those who have completed 327A.

**EDUC 328. Topics in Learning and Technology: Core Mechanics for Learning. 3 Units.**

Contents of the course change each year. The course can be repeated. In game play, core mechanics refers to the rules of interaction that drive the game forward. This class will consider whether there are core mechanics that can drive learning forward, and if so, how to build them into learning environments.

**EDUC 328A. Topics in Learning and Technology: d.compress - Designing Calm. 3 Units.**

Contents of the course change each year. The course can be repeated. Stress silently but steadily damages physical and emotional well-being, relationships, productivity, and our ability to learn and remember. This highly experiential and project-oriented class will focus on designing interactive technologies to enable calm states of cognition, emotion, and physiology for better human health, learning, creativity and productivity. Same as: CS 377D

**EDUC 329. Seminar on Teacher Professional Development. 1-4 Unit.**

Theories, principles, design, and practices of professional development. Topics include: pedagogies of professional development; design principles for transformative professional development; frameworks and processes to support teacher learning; research on professional development processes and outcomes; and policy issues. Optional practicum in subsequent terms in which course participants are able to offer a professional development opportunity to practicing teachers through the Center to Support Excellence in Teaching.

**EDUC 330. Teaching English Language Learners: Issues in Policy, Leadership, and Instruction. 3-4 Units.**

Current perspectives and research on issues facing educators serving the English language learner population. Issues include federal education legislation, civil rights law, national Common Core Standards, content and language proficiency standards assessment and accountability, school improvement models, school structure, community engagement, addressing issues of long-term English learners, programming for newcomer ELLs, early childhood education, and promoting bilingualism.

**EDUC 332. Theory and Practice of Environmental Education. 3 Units.**

Foundational understanding of the history, theoretical underpinnings, and practice of environmental education as a tool for addressing today's pressing environmental issues. The purpose, design, and implementation of environmental education in formal and nonformal settings with youth and adult audiences. Field trip and community-based project offer opportunities for experiencing and engaging with environmental education initiatives.

Same as: EARTHSYS 332

**EDUC 333A. Understanding Learning Environments. 3 Units.**

Advanced seminar. Theoretical approaches to learning used to analyze learning environments and develop goals for designing resources and activities to support effective learning practices.

**EDUC 333B. Imagining the Future of Learning: SparkTruck - Designing Mobile Interventions for Education. 4 Units.**

Created at the d.school last year, SparkTruck has traveled over 15,000 miles across the USA, teaching thousands of kids how to build stuff and unleash their creativity. In this class, students will explore the potential of a mobile platform for affecting change in the educational ecosystem. Topics will include introductions to the design process, modern prototyping tools, and the complex education ecosystem. Students will work in teams in this project-based class, and an emphasis will be placed on real-world prototyping through hands-on field work in local schools. Interested and qualified students will have the opportunity to embark on a cross-country road trip in the SparkTruck this summer. Open to all graduate students and well-qualified undergrads of any major. Enrollment is limited. Apply at [www.sparktruck.org/apply](http://www.sparktruck.org/apply).

Same as: ME 376A

**EDUC 334. Strategic Educational Research and Organizational Reform Clinic. 4 Units.**

(Same as STRAMGT 360). This is a two-quarter clinical course offered in the Winter and Spring Quarters that brings together upper-level graduate students in education, law, and business from Stanford to collaborate with their peers at other universities (Columbia University, Harvard University, University of Pennsylvania, University of Michigan) and provide strategic research and consulting to public education organizations. Participants engage in a rigorous and rewarding learning experience, including: (i) An intensive seminar in the design, leadership and management, and transformation of public school systems, charter management organizations, start-ups, and other K-12 public- and social-sector institutions; (ii) Comprehensive skills training in team-based problem solving, strategic policy research, managing multidimensional (operational, policy, legal) projects to specified outcomes in complex environments, client counseling, and effective communication; and (iii) A high-priority consulting project for a public education sector client (e.g., school district, state education agency, charter management organization, non-profit) designing and implementing solutions to a complex problem at the core of the organization's mission to improve the educational outcomes and life chances of children. The participant's team work will allow public agencies throughout the nation to receive relevant, timely, and high-quality research and advice on institutional reforms that otherwise may not receive the attention they deserve.

**EDUC 334A. Youth and Education Law Project: Clinical Practice. 4 Units.**

(Same as LAW 660A). The Youth and Education Law Project offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters have the opportunity to handle all aspects of their clients' cases. Students working in this area interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation or special education due process hearings. This work offers students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees or the county board of education. The education clinic includes two or three mandatory training sessions to be held at the beginning of the term, a weekly seminar that focuses on legal skills and issues in law and education policy, regular case review, and a one hour weekly meeting with the clinic instructor. Admission is by consent of instructor. Beginning with the 2009-2010 academic year, each of the Law School's clinical courses is being offered on a full-time basis for 12 credits.

**EDUC 334B. Youth and Education Law Project: Clinical Methods. 4 Units.**

(Same as LAW 660B). The Youth and Education Law Project offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters have the opportunity to handle all aspects of their clients' cases. Students working in this area interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation, or special education due process hearings. This work offers students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees of the county board of education. The education clinic includes two or three mandatory training sessions to be held at the beginning of the term, a weekly seminar that focuses on legal skills and issues in law and education policy, regular case review, and a one hour weekly meeting with the clinic instructor. Admission is by consent of instructor. Beginning with the 2009-2010 academic year, each of the Law School's clinical courses is being offered on a full-time basis for 12 credits.

**EDUC 334C. Youth and Education Law Project: Clinical Coursework. 4 Units.**

(Same as LAW 660C). The Youth and Education Law Project offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or policy research and advocacy. All students have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with community groups in advocating for the provision of better and more equitable educational opportunities to their children. In addition, the clinic may pursue a specific policy research and advocacy project that will result in a written policy brief and policy proposal. Students working on special education matters have the opportunity to handle all aspects of their clients' cases. Students working in this area interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation, or special education due process hearings. This work offers students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees or the county board of education. The education clinic includes two or three mandatory training sessions to be held at the beginning of the term, a weekly seminar that focuses on legal skills and issues in law and education policy, regular case review, and a one hour weekly meeting with the clinic instructor. Admission is by consent of instructor. Beginning with the 2009-2010 academic year, each of the Law School's clinical courses is being offered on a full-time basis for 12 credits.

**EDUC 335. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.**

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.  
Same as: AFRICAST 135, AFRICAST 235, EDUC 135, HRP 235, HUMBIO 26, MED 235

**EDUC 336. Language, Identity, and Classroom Learning. 1-3 Unit.**

As contemporary research focuses on how people act and recognize each other, analyzing interaction while acknowledging identity allows for a dynamic examination of cultural interaction. Broad cultural categorization can be overly expansive in identifying the characteristics of large groups of individuals.



**EDUC 336A. Law and Public Policy: Issues in Implementation. 3 Units.** (Same as LAW 636.) This seminar will focus on issues related to achieving successful implementation of the goals of legislation. It is widely recognized that the goals of legislation often are not realized and that the failure frequently rests in breakdowns in the implementation process by the agencies and organizations charged with implementing the legislation. In response to problems in implementation, the institutional context of public policy implementation is changing. One category of innovations, known by names such as "management-based regulation" and "evidence-based" social service delivery, gives broad discretion to street-level service providers but subjects them to intensive monitoring and disciplined performance comparison. Another category applies market concepts to regulation or social services, for example, by creating tradable rights (e.g. pollution allowances) or vouchers (for schools, housing, or healthcare). These, and other, new approaches are affecting both the contours of public law doctrine and the nature of lawyering in the public sector. Lawyers in the public sector are increasingly drawing on skills of institutional design and monitoring of the kind associated with private sector transactional practice. This seminar will examine some of the emerging general themes of innovative policy implementation and look at a range of case studies. Topics will include the conditions under which financial and other rewards and sanctions are useful in bringing about desired behaviors, the pluses and minuses of the creation of markets as alternatives to government run programs, and efforts at improving implementation by improving management activities. Examples will be taken from both regulation and social services, and are likely to include environmental protection, education, child protective services, healthcare, food and workplace safety, nuclear power safety, and regulation of financial institutions. We will invite presentations by academics and practitioners.

**EDUC 337. Race, Ethnicity, and Linguistic Diversity in Classrooms: Sociocultural Theory and Practices. 3-5 Units.** Focus is on classrooms with students from diverse racial, ethnic and linguistic backgrounds. Studies, writing, and media representation of urban and diverse school settings; implications for transforming teaching and learning. Issues related to developing teachers with attitudes, dispositions, and skills necessary to teach diverse students. Same as: AFRICAAM 106, CSRE 103B, EDUC 103B

**EDUC 338. Innovations in Education. 3-4 Units.** Each year students in this course explore a new design challenge related to teaching. This year we will focus on creating school models. We welcome graduate students from a wide range of disciplines. Admission by application. Please see more information at <http://dschool.stanford.edu>.

**EDUC 339. Advanced Topics in Quantitative Policy Analysis. 1-2 Unit.** For doctoral students. How to develop a researchable question and research design, identify data sources, construct conceptual frameworks, and interpret empirical results. Presentation by student participants and scholars in the field. May be repeated for credit.

**EDUC 340. Psychology and American Indian Mental Health. 3-5 Units.** Western medicine's definition of health as the absence of sickness, disease, or pathology; Native American cultures' definition of health as the beauty of physical, spiritual, emotional, and social things, and sickness as something out of balance. Topics include: historical trauma; spirituality and healing; cultural identity; values and acculturation; and individual, school, and community-based interventions. Prerequisite: experience working with American Indian communities. Same as: NATIVEAM 240

**EDUC 341. Counterstory and Narrative Inquiry in Literature and Education. 3 Units.**

Counterstory is a method developed in critical legal studies that emerges out of the broad "narrative turn" in the humanities and social science. This course explores the value of this turn, especially for marginalized communities, and the use of counterstory as analysis, critique, and self-expression. Using an interdisciplinary approach, we examine counterstory as it has developed in critical theory, critical pedagogy, and critical race theory literatures, and explore it as a framework for liberation, cultural work, and spiritual exploration.

Same as: CSRE 141E, EDUC 141, LIFE 124

**EDUC 342. Child Development and New Technologies. 3 Units.**

Focus is on the experiences computing technologies afford children and how these experiences might influence development. Sociocultural theories of development as a conceptual framework for understanding how computing technologies interact with the social ecology of the child and how children actively use technology to meet their own goals. Emphasis is on influences of interactive technology on cognitive development, identity, and social development equity.

**EDUC 343A. Navigating the Academic Profession. 1-2 Unit.**

For DARE doctoral fellows only. The roles and responsibilities of faculty members in American colleges and universities in the 21st century. How to become productive faculty members within the higher education enterprise.

**EDUC 343B. Practicum for fellows in the Stanford Preparing Future Professors Program. 1 Unit.**

Nine weekly one-hour sessions consisting of discussions of: (1) the previous week's SJSU shadowing experiences and (2) readings related to session themes.

**EDUC 343C. Preparing for Faculty Careers. 1 Unit.**

For graduate students and postdoctoral fellows from all disciplines who are considering a faculty career of any type and at any of a broad range of institutions. Numbers are limited and so whether formally registered (grad students) or attending as auditors (grad students or postdocs), all participants must commit to attending the entire course. Begins with a methodology to help determine if a faculty career is a good fit for the values, interests and abilities of each participant. Progresses to an exploration of different types of faculty roles and different institutional contexts (e.g., tenure-track vs. non-tenure-track; research-intensive vs. teaching-intensive; large vs. small; etc.). Discusses how to identify and land a faculty position. Ends with concrete tips on how to thrive in such a role. May be repeated for credit.

**EDUC 346. Research Seminar in Higher Education. 4 Units.**

Major issues, current structural features of the system, the historical context that shaped it, and theoretical frameworks. The purposes of higher education in light of interest groups including students, faculty, administrators, and external constituents. Issues such as diversity, stratification, decentralization, and changes that cut across these groups.

**EDUC 347. The Economics of Higher Education. 3-4 Units.**

(Same as GSBGEN 348) Topics: the worth of college and graduate degrees, and the utilization of highly educated graduates; faculty labor markets, careers, and workload; costs and pricing; discounting, merit aid, and access to higher education; sponsored research; academic medical centers; and technology and productivity. Emphasis is on theoretical frameworks, policy matters, and the concept of higher education as a public good. Stratification by gender, race, and social class.

**EDUC 348. Policy and Practice in Science Education. 3-4 Units.**

Values and beliefs that dominate contemporary thinking about the role and practice of science education, what the distinctive features of science are, and the arguments for its value as part of compulsory education. Research on the conceptual and affective outcomes of formal science education, how the changing nature of contemporary society challenges current practice, and the rationale for an alternative pedagogy, curriculum and assessment.

**EDUC 349. Comparative Higher Education. 3-4 Units.**

This course examines the expansion, impact, and organization of higher education across the world. This course engages students with sociological theory and comparative research on global and national sources of influence on higher education developments, e.g. admissions criteria, curricular content, governance structure.. At the end of the course students should be able to compare and contrast developments across countries.

Same as: SOC 297

**EDUC 350. Workshop on New Research. 1 Unit.**

This course will integrate attendance and participation at the research lectures given by visitors with separate, faculty-led workshops that discuss the presented study, its methodologies, and the research and policy contexts in which it is situated. This workshop will also provide an opportunity for professional development relevant to academic publishing and effective presentation.

**EDUC 351A. Statistical Methods for Longitudinal Research. 2-3 Units.**

See <http://rogosateaching.com/stat222/>. Research designs and statistical procedures for time-ordered (repeated-measures) data. The analysis of longitudinal panel data is central to empirical research on learning, development, aging, and the effects of interventions.

Topics include: measurement of change, growth curve models, analysis of durations including survival analysis, experimental and non-experimental group comparisons, reciprocal effects, stability. Prerequisite: intermediate statistical methods.

Same as: STATS 222

**EDUC 351B. Statistical Issues in Testing and Assessment. 2-3 Units.**

The new book by Howard Wainer, "Uneducated Guesses: Using Evidence to Uncover Misguided Education Policies" is the basis for this seminar. Also included will be supporting research literature and data analysis activities for topics such as college admissions, methods for missing data, assessment of achievement gaps, and the use of value-added analysis. See <http://www-stat.stanford.edu/~rag/ed351B/>.

**EDUC 352. Education Research Partnerships. 3-5 Units.**

This course focuses on developing and sustaining effective education research partnerships. Partnerships are essential in creating new research projects, conducting field-based inquiry, and in implementing lessons from research projects. The course emphasizes the power of successful partnerships in improving education while exploring potential barriers to the formation and productivity of partnerships. During this course there will be explicit opportunities for students to develop the knowledge and capacities necessary for effective collaborative partnership research.

**EDUC 353A. Problems in Measurement: Item Response Theory. 3 Units.**

Study of the mathematical models used in psychological measurement with an emphasis on item response theory (IRT). We will examine various problems, including estimation of item parameters and person abilities, polytomous response models, and other issues. A key focus of this course will be on developing applied skills with the relevant models. Prerequisites included EDUC 252 (or consent of the instructor).

**EDUC 353C. Problems in Measurement: Generalizability Theory. 3 Units.**

Application to analysis of educational achievement data, including performance assessments. Fundamental concepts, computer programs, and actual applications.

**EDUC 354. School-Based Decision Making. 4 Units.**

Leadership and organizational issues. Leadership as it plays out in the pragmatic demands and tensions of site-level decision processes. Interdependence and complexity of several factors critical to school achievement and equity outcomes: governance, culture, instruction, resource alignment, inquiry, community engagement. School decision-making as a capacity-building process.

**EDUC 355. Higher Education and Society. 3 Units.**

For undergraduates and graduate students interested in what colleges and universities do, and what society expects of them. The relationship between higher education and society in the U.S. from a sociological perspective. The nature of reform and conflict in colleges and universities, and tensions in the design of higher education systems and organizations.

**EDUC 356. Street History: Learning the Past in School and Out. 3-5 Units.**

Interdisciplinary. Since Herodotus, history and memory have competed to shape minds: history cultivates doubt and demands interpretation; memory seeks certainty and detests that which thwarts its aims. History and memory collide in modern society, often violently. How do young people become historical amidst these forces; how do school, family, nation, and mass media contribute to the process?

Same as: HISTORY 337C

**EDUC 357. Science and Environmental Education in Informal Contexts. 3-4 Units.**

There are ever-expanding opportunities to learn science in contexts outside the formal classroom, in settings such as zoos, museums, and science centers. How are issues around science and the environment presented in these contexts, how do people behave and learn in these contexts, and what messages do they take away? This course will cover the learning theories and empirical research that has been conducted in these settings. Case studies of nearby science centers will add an experiential dimension.

**EDUC 359B. Research on Science Teaching and Learning. 2-3 Units.**

An exploration and review of the main programs of research that have been conducted in the field of science education, their findings and implications.

**EDUC 359C. Science Literacy. 2-3 Units.**

The changing debate over conceptions of the nature of science and the calls to broaden it. Themes, directions, limitations, and epistemological foundations of the body of research on the nature of science.

**EDUC 359F. Research in Mathematics Education: Conducting Inquiry. 2-4 Units.**

This seminar will serve as both a workshop for developing participants' own professional trajectories as mathematics education scholars and a forum for discussion on key issues related to conducting research and making an impact in the field of mathematics education. Participants will be invited to share their own research and to engage in discussions about possible impact. This seminar is restricted to mathematics education students.

**EDUC 360. Child Development in Contexts of Risk and Adversity. 3-4 Units.**

In this course students will learn about theoretical, methodological, and empirical issues pertaining to developmental psychopathology and resilience of children and adolescents. The course focuses on (1) current conceptual and empirical issues; (2) cognitive, affective, and motivational processes that underlie some of the most salient childhood mental health symptoms and disorders; (3) family, school, and cultural factors that contribute to developmental psychopathology and resilience; and (4) cutting-edge analytic methods that are currently employed in studies of developmental psychopathology and resilience.

**EDUC 361. Workshop: Networks and Organizations. 1-3 Unit.**

For students doing advanced research. Group comments and criticism on dissertation projects at any phase of completion, including data problems, empirical and theoretical challenges, presentation refinement, and job market presentations. Collaboration, debate, and shaping research ideas. Prerequisite: courses in organizational theory or social network analysis.

Same as: SOC 361W

**EDUC 364. Cognition and Learning. 3-4 Units.**

Cognitive psychology is the study of human thought including topics including the nature of expertise, creativity, and memory. Emphasis is on learning. The role of cognitive psychology in helping people learn, and determining the most desirable type of learning and whether people have learned. Students design and conduct their own learning study.

**EDUC 365. Social, Emotional, and Personality Development. 3 Units.**

Limited to doctoral students in DAPS and those with a background in child and adolescent development. Developmental processes that account for psychological adaptation in social relationships, schools, and other interpersonal settings. Theoretical models of social, personality, and emotional development. Topics such as self-concept, empathy, motivation, aggression, and personality formation.

**EDUC 366. Learning in Formal and Informal Environments. 3 Units.**

How learning opportunities are organized in schools and non-school settings including museums, after-school clubs, community art centers, theater groups, aquariums, sports teams, and new media contexts. Sociocultural theories of development as a conceptual framework. Readings from empirical journals, web publications, and books. Collaborative written or multimedia research project in which students observe and document a non-school learning environment.

**EDUC 367. Cultural Psychology. 3-5 Units.**

(Formerly 292.) The relationship between culture and psychological processes; how culture becomes an integral part of cognitive, social, and moral development. Both historical and contemporary treatments of cultural psychology, including deficit models, crosscultural psychology, ecological niches, culturally specific versus universal development, sociocultural frameworks, and minority child development. The role of race and power in research on cultural psychology.

**EDUC 368. Cognitive Development in Childhood and Adolescence. 3 Units.**

This course aims to broaden and deepen students' understanding of cognitive development from the prenatal period through adolescence. It will examine various theoretical, methodological, and empirical issues pertaining to different domains of cognitive development, such as neurobiological plasticity, infant cognition, theory of mind, memory, language, and executive functions. Throughout the course, as we survey research findings, we will discuss (1) methods that researchers have employed in their study of cognitive development; (2) limitations of current research and directions for future research; and (3) translation of research findings for practitioners and policymakers.

**EDUC 370. Parenting and Family Relationships in Childhood. 3-4 Units.**

This course will focus on the relevance of parenting and family relationships for children's development. We will examine studies of: (1) how parental and child behaviors contribute to sensitivity, responsiveness, scaffolding, autonomy, and control within the dyad; (2) parents' role in socializing children's emotions and their ethnic/racial identity; and (3) parents' involvement in early education. We will discuss cultural and economic factors affecting our conceptualization, measurement, and interpretations of parents' behaviors and their interactions with their children.

**EDUC 371. Social Psychology and Social Change. 2-3 Units.**

The course is intended as an exploration of the major ideas, theories, and findings of social psychology and their applied status. Special attention will be given to historical issues, classic experiments, and seminal theories, and their implications for topics relevant to education. Contemporary research will also be discussed. Advanced undergraduates and graduate students from other disciplines are welcome, but priority for enrollment will be given to graduate students. In order to foster a vibrant, discussion-based class, enrollment will be capped at 20 students. Interested students should enroll in the class through simple enroll or access, and complete this survey (<https://tinyurl.com/SPSC17>) to be considered for admission to the course. Please contact the course TA, Michael Schwalbe ([schwalbe\[at\]stanford.edu](mailto:schwalbe[at]stanford.edu)), if you have any further questions.

Same as: PSYCH 265

**EDUC 373. Genetics and Society. 3 Units.**

This course will focus on social science engagement with developments in genetic research, focusing on two key issues. First, social scientists are trying to figure out how genetic data can be used to help them better understand phenomena they have been long endeavoring to understand. Second, social scientists try to improve understanding of how social environments moderate, amplify, or attenuate genetic influences on outcomes.

Same as: HUMBIO 158S, SOC 232

**EDUC 374. Philanthropy and Civil Society. 1-3 Unit.**

Cross-listed with Law (LAW 781), Political Science (POLISCI 334) and Sociology (SOC 374). Associated with the Center for Philanthropy and Civil Society (PACS). Year-long workshop for doctoral students and advanced undergraduates writing senior theses on the nature of civil society or philanthropy. Focus is on pursuit of progressive research and writing contributing to the current scholarly knowledge of the nonprofit sector and philanthropy. Accomplished in a large part through peer review. Readings include recent scholarship in aforementioned fields. May be repeated for credit for a maximum of 9 units.

Same as: POLISCI 334, SOC 374

**EDUC 375A. Seminar on Organizational Theory. 5 Units.**

The social science literature on organizations assessed through consideration of the major theoretical traditions and lines of research predominant in the field.

Same as: MS&E 389, SOC 363A

**EDUC 375B. Seminar on Organizations: Institutional Analysis. 3-5 Units.**

Seminar. Key lines of inquiry on organizational change, emphasizing network, institutional, and evolutionary arguments.

Same as: SOC 363B

**EDUC 376. Higher Education Leadership Colloquium. 2-3 Units.**

This course presents a series of speakers from Stanford and other higher education institutions who work at the middle to higher levels of administration. Speakers and topics are guided by student interest, but include a range from student affairs to finance. Sessions are intended to be interactive.

**EDUC 377. Comparing Institutional Forms: Public, Private, and Nonprofit. 4 Units.**

For students interested in the nonprofit sector, those in the joint Business and Education program, and for Public Policy MA students. The focus is on the missions, functions, and capabilities of nonprofit, public, and private organizations, and the managerial challenges inherent in the different sectors. Focus is on sectors with significant competition among institutional forms, including health care, social services, the arts, and education. Sources include scholarly articles, cases, and historical materials.

Same as: GSBGEN 346, PUBLPOL 317, SOC 377

**EDUC 377B. Strategic Management of Nonprofit Organizations and Social Ventures. 4 Units.**

(Same as STRAMGT 368). This course seeks to provide a survey of the strategic, governance, and management issues facing a wide range of nonprofit organizations and their executive and board leaders, in the era of venture philanthropy and social entrepreneurship. The students will also be introduced to core managerial issues uniquely defined by this sector such as development/fundraising, investment management, performance management and nonprofit finance. The course also provides an overview of the sector, including its history and economics. Cases involve a range of nonprofits, from smaller, social entrepreneurial to larger, more traditional organizations, including education, social service, environment, health care, religion, NGO's and performing arts. In exploring these issues, this course reinforces the frameworks and concepts of strategic management introduced in the core first year courses. In addition to case discussions, the course employs role plays, study group exercises and many outsider speakers.

**EDUC 377C. Philanthropy: Strategy, Innovation and Social Change. 3 Units.**

Appropriate for any student driven to effect positive social change from either the for-profit or nonprofit sector, Philanthropy will challenge students to expand their own strategic thinking about philanthropic aspiration and action. In recent decades, philanthropy has become an industry in itself - amounting to over \$358 billion in the year 2014. Additionally, the last decade has seen unprecedented innovation in both philanthropy and social value creation. This course explores the key operational and strategic distinctions between traditional philanthropic entities, such as community foundations, private foundations and corporate foundations; and innovative models, including funding intermediaries, open-source platforms, technology-driven philanthropies, impact investing and venture philanthropy. Course work will include readings and case discussions that encourage students to analyze both domestic and global philanthropic strategies as they relate to foundation mission, grantmaking, evaluation, financial management, infrastructure, knowledge management, policy change and board governance. Guest speakers will consist of high profile philanthropists, foundation presidents, social entrepreneurs and Silicon Valley business leaders creating new philanthropic models. The course will also provide students with real-world grantmaking experience in completing nonprofit organizational assessments and making grants to organizations totaling \$20,000.

**EDUC 377E. Improving and Measuring Social Impact. 3 Units.**

(Also GSBGEN 322). This course focuses on strategy and actionable measurement in government, non-profit organizations, market-based social enterprises, philanthropy, and impact investing. *¿Actionable¿* means that measurement is used by managers, investors, and other stakeholders in improving outcomes. The course explores the intersection of several ideas that seem to be in some tension with each other. (1) *¿In preparing for battle I have always found that plans are useless, but planning is indispensable.¿* (Dwight D. Eisenhower), (2) *You can't manage what you can't measure,* (3) *Measurement is expensive and its results are often ignored,* (4) *¿Not everything that counts can be counted and not everything that can be counted counts¿* (apocryphally attributed to Einstein), (5) *¿The more any quantitative social indicator is used for decision making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor.¿* (Campbell's Law). Specifically, the course will include: strategic planning, logic models, theories of change, monitoring, and evaluation; measuring the social impact of governments, non-governmental organizations, and market-based social enterprises, and asking how philanthropists and impact investors can assess their own impact; impact investing, performance contracting, and social impact bonds; and techniques for improving the behavior and accountability of individuals and organizations. These issues will be addressed mainly through business school case studies, which place the students in the position of CEOs, managers, and investors called upon to make major decisions. **WARNING:** The course has a fair amount of reading - not more than is common in undergraduate and graduate courses, but more than is typical for MBA courses in the GSB.

**EDUC 377F. Disruptions in Education. 3 Units.**

(Same as GSBGEN 345). This course will explore the contemporary higher education industry, focusing especially on the places where disruptions of all kinds present significant opportunities and challenges for investors, entrepreneurs, and the businesses that serve this huge global market, as well as for faculty, students, and higher education administrators. Using a variety of readings and case studies to better understand recent disruptions and the unbundling occurring across the post-secondary landscape, from outside and inside the academy, both for-profit and non-profit, the course will examine technology in teaching and learning; the future of the degree and alternatives to the traditional credential; accreditation; competency based education; debt and education financing models; investing in the education space; and tertiary products and platforms that serve the student services market. Guests will include higher education leaders and practitioners, as well as investors and entrepreneurs.

**EDUC 377G. Problem Solving for Social Change. 3 Units.**

(Also GSBGEN 367). Stanford graduates will play important roles in solving many of today's and tomorrow's major societal problems -- such as improving educational and health outcomes, conserving energy, and reducing global poverty -- which call for actions by nonprofit, business, and hybrid organizations as well as governments. This course teaches skills and bodies of knowledge relevant to these roles through problems and case studies drawn from nonprofit organizations, for-profit social enterprises, and governments. Topics include designing, implementing, scaling, and evaluating social strategies; systems thinking; decision making under risk; psychological biases that adversely affect people's decisions; methods for influencing individuals' and organizations' behavior, ranging from incentives and penalties to "nudges;" human-centered design; corporate social responsibility; and pay-for-success programs. We will apply these concepts and tools to address an actual social problem facing Stanford University. (With the exception of several classes on strategy and evaluation, there is no substantial overlap with Paul Brest's and Mark Wolfson's course, Strategic Philanthropy and Impact Investing (GSBGEN 319), which has a different focus from this one.).

**EDUC 377H. Leadership & Diversity: Topics from Education. 3 Units.**

(Same as GSBGEN 377). This course will explore the critical role diversity plays in successful organizations and challenge students to develop their own brand of leadership, learning from leaders in education who have grappled with these challenges. As impact-oriented leaders aspiring to address challenges across social, economic, and political arenas, we have an imperative to advance diversity, and education provides the perfect canvas on which to explore this imperative. High-stakes issues such as school district reform, teacher effectiveness, and the school-to-prison pipeline present complex dilemmas that demand superb leadership skills. In this course, we will: (1) explore the role that diversity plays in complex leadership challenges; (2) study a range of effective leadership approaches considering different topics in education; and (3) understand our own values and decision-making criteria, developing tactics to improve our leadership capacity. We will examine contemporary leaders and controversies from education, draw upon timeless historical thinkers, enjoy the wisdom of guest speakers, and work intensively in small groups to highlight challenges, opportunities, and tradeoffs. By exploring a range of approaches and situations, we will work to a deeper understanding of ourselves and how to become more capable, empathetic, and effective leaders.

**EDUC 380. Supervised Internship. 1-15 Unit.****EDUC 381. Multicultural Issues in Higher Education. 4 Units.**

The primary social, educational, and political issues that have surfaced in American higher education due to the rapid demographic changes occurring since the early 80s. Research efforts and the policy debates include multicultural communities, the campus racial climate, and student development; affirmative action in college admissions; multiculturalism and the curriculum; and multiculturalism and scholarship.

Same as: CSRE 181, EDUC 181

**EDUC 382. Student Development and the Study of College Impact. 4 Units.**

The philosophies, theories, and methods that undergird most research in higher education. How college affects students. Student development theories, models of college impact, and issues surrounding data collection, national databases, and secondary data analysis.

**EDUC 386. Leadership and Administration in Higher Education. 2 Units.**

Definitions of leadership and leadership roles within colleges and universities. Leadership models and organizational concepts. Case study analysis of the problems and challenges facing today's higher education administrators.

**EDUC 387. Workshop: Comparative Studies of Educational and Political Systems. 1-5 Unit.**

Analysis of quantitative and longitudinal data on national educational systems and political structures. May be repeated for credit. Prerequisite: consent of instructor.

Same as: SOC 311A

**EDUC 388A. Language Policies and Practices. 2 Units.**

For STEP teacher candidates seeking to meet requirements for the English Learner Authorization on their preliminary credential. Historical, political, and legal foundations of education programs for English learners. Theories of second language learning, and research on the effectiveness of bilingual education. Theory-based methods to facilitate and measure English learners' growth in language and literacy acquisition, and create environments which promote English language development and content area learning through specially designed academic instruction in English. (STEP).

**EDUC 388F. Introduction to Academic Language. 1 Unit.**

This course will provide opportunities for pre-service teachers to begin to develop an understanding of language uses, forms, and mechanics through application of a functional approach to academic language. By exploring language structures (phonology, morphology, syntax, semantics) as well as language-in-use (pragmatics and discourse), teacher candidates will be able to better recognize linguistic demands and challenges of students in the classroom.

**EDUC 389A. Race, Ethnicity, and Language: Racial, Ethnic, and Linguistic Formations. 3-5 Units.**

Language, as a cultural resource for shaping our identities, is central to the concepts of race and ethnicity. This seminar explores the linguistic construction of race and ethnicity across a wide variety of contexts and communities. We begin with an examination of the concepts of race and ethnicity and what it means to be "doing race," both as scholarship and as part of our everyday lives. Throughout the course, we will take a comparative perspective and highlight how different racial/ethnic formations (Asian, Black, Latino, Native American, White, etc.) participate in similar, yet different, ways of drawing racial and ethnic distinctions. The seminar will draw heavily on scholarship in (linguistic) anthropology, sociolinguistics and education. We will explore how we talk and don't talk about race, how we both position ourselves and are positioned by others, how the way we talk can have real consequences on the trajectory of our lives, and how, despite this, we all participate in maintaining racial and ethnic hierarchies and inequality more generally, particularly in schools. Same as: ANTHRO 320A, CSRE 389A, LINGUIST 253

**EDUC 389B. Race, Ethnicity, and Language: Writing Race, Ethnicity, and Language in Ethnography. 3-4 Units.**

This methods seminar focuses on developing ethnographic strategies for representing race, ethnicity, and language in writing without reproducing the stereotypes surrounding these categories and practices. In addition to reading various ethnographies, students conduct their own ethnographic research to test out the authors' contrasting approaches to data collection, analysis, and representation. The goal is for students to develop a rich ethnographic toolkit that will allow them to effectively represent the (re)production and (trans)formation of racial, ethnic, and linguistic phenomena.

Same as: ANTHRO 398B, LINGUIST 254

**EDUC 389C. Race, Ethnicity, and Language: Pedagogical Possibilities. 3-4 Units.**

This seminar explores the intersections of language and race/racism/racialization in the public schooling experiences of students of color. We will briefly trace the historical emergence of the related fields of sociolinguistics and linguistic anthropology, explore how each of these scholarly traditions approaches the study of language, and identify key points of overlap and tension between the two fields before considering recent examples of inter-disciplinary scholarship on language and race in urban schools. Issues to be addressed include language variation and change, language and identity, bilingualism and multilingualism, language ideologies, and classroom discourse. We will pay particular attention to the implications of relevant literature for teaching and learning in urban classrooms.

Same as: CSRE 385

**EDUC 391. Engineering Education and Online Learning. 3 Units.**

A project based introduction to web-based learning design. In this course we will explore the evidence and theory behind principles of learning design and game design thinking. In addition to gaining a broad understanding of the emerging field of the science and engineering of learning, students will experiment with a variety of educational technologies, pedagogical techniques, game design principles, and assessment methods. Over the course of the quarter, interdisciplinary teams will create a prototype or a functioning piece of educational technology.

Same as: ENGR 391

**EDUC 393. Proseminar: Education, Business, Politics. 3 Units.**

Overview of the field of education for joint degree (M.B.A./M.A.) students.

**EDUC 394. School and District Leadership to Support English Learners' Academic Achievement. 3-5 Units.**

NOTE: This will be a blended course comprising (1) two real-time face-to-face meetings during scheduled course time, one the first week of the quarter and one at the end; (2) two real-time but virtual "meets ups" during the quarter; (3) readings, discussions, and assignments done individually and in groups throughout the quarter; (4) a final project synthesizing student learning across course topics, to be presented and discussed in the last week's meeting. English learners (ELs) constitute nearly 10% of the U.S. public school population. At some point in their careers, the majority of educators will have English learners in their schools and classrooms. This course is designed for students interested in learning about the legal framework and research base for the education of ELs from the perspective of school and district leaders.

**EDUC 395. Scholarly Writing in Education and the Social Sciences. 3-5 Units.**

Focus is on producing articles for scholarly journals in education and the social sciences. Ethics and craft of scholarly publishing. Writing opinion articles for lay audiences on issues of educational and social import.

**EDUC 397A. Democracy and Education. 2-3 Units.**

John Dewey's *Democracy and Education* may be the most comprehensive and influential book on educational theory and practice. Conceptualizing democracy and its implications for schooling is its central concern. We offer a close reading of Dewey's effort paired with Denis Phillips's recent chapter by chapter commentary on Dewey's book. A century after *Democracy and Education* in 1916 and the founding of Stanford's School of Education in 1917, Phillips's *Companion* invites a reexamination of American democracy and education today.

**EDUC 398. Core Mechanics for Learning. 3 Units.**

In game play, core mechanics refers to the rules of interaction that drive the game forward. This class will consider whether there are core mechanics that can drive learning forward, and if so, how to build them into learning environments. The course mixes basic theory, research methods, and application of learning principles.

**EDUC 399A. Designing Surveys. 1-2 Unit.**

This workshop/course is designed for students who are designing a survey for use in a research project. The workshop content draws on relevant cognitive processing theories and research (on comprehension, retrieval, judgment, and reporting). In addition to some readings and a few lectures, this workshop is designed to be highly interactive and practical. By the end of the course students will have designed and pilot tested their survey instrument. Course may be repeated for credit.

**EDUC 400A. Introduction to Statistical Methods in Education. 3-4 Units.**

(Formerly EDUC 160.) Basic techniques in descriptive and inferential statistics for educational research will be covered with an emphasis on rigorous preparation for intermediate and advanced courses. Topics include central tendency, variance, probability, distributions, confidence interval, t-test, F-test, correlation, regression, and analysis of variance. Non-parametric statistics and graphical principles for data representation will also be addressed. Students will also be introduced to STATA in preparation for subsequent higher level courses.

**EDUC 400B. Statistical Analysis in Education: Regression. 5 Units.**

Primarily for doctoral students; part of doctoral research core; prerequisite for advanced statistical methods courses in School of Education. Basic regression, a widely used data-analytic procedure, including multiple and curvilinear regression, regression diagnostics, analysis of residuals and model selection, logistic regression. Proficiency with statistical computer packages.

**EDUC 401A. Mini Courses in Methodology: Statistical Packages for the Social Sciences. 1 Unit.**

Statistical analysis using SPSS, including generating descriptive statistics, drawing graphs, calculating correlation coefficients, conducting t-tests, analysis of variance, and linear regression. Building up datasets, preparing datasets for analysis, conducting statistical analysis, and interpreting results.

Same as: SPSS

**EDUC 401B. Mini Courses in Methodology: Stata. 1 Unit.**

The goal of this course is to familiarize students with the Stata statistical software package for use in quantitative research. By the end of the course, students should be able to import and export data, clean and manage data, conduct standard statistical tests (e.g., correlation, t-test, regression), and produce a graph.

**EDUC 401C. Data Analysis Examples Using R. 1 Unit.**

We will do basic and intermediate level data analysis examples, likethose that students will have seen in their courses, in R. Examplesinclude: descriptive statistics and plots, analysis of variance,ncorrelation and regression, categorical variables, multilevel data.nSee <http://rogosateaching.com/ed401/>.

**EDUC 401D. Multilevel Modeling Using R. 1 Unit.**

See <http://rogosateaching.com/stat196/> . Multilevel data analysis examples using R. Topics include: two-level nested data, growth curve modeling, generalized linear models for counts and categorical data, nonlinear models, three-level analyses. Class meets April 11, April 18, April 25, May 2, May 16.

Same as: STATS 196A

**EDUC 403. Education's Digital Future. 1 Unit.**

Digital technologies are rapidly evolving and reorganizing the way we play, learn, and work. Significant questions have emerged about how digital and networked information technologies might be both narrowing and widening gaps in access to learning opportunities. It is becoming clear that technology alone will not catalyze the forms of equity that are so essential for preparing young people and their families for a rapidly changing future. Instead we need to deeply rethink and intentionally redesign the social organizations and tools that provide learning opportunities (schools, workplaces, community organizations, libraries) and study these innovations at a regional as well as national level. In this course and public seminar, designed to foster new forms of collaboration and innovation, we will engage these questions through a series of invited conversations with a broad range of stakeholders including researchers, educators, and industry representatives. May be repeat for credit.

**EDUC 404. Topics in Brazilian Education: Public Policy and Innovation for the 21st Century. 1-2 Unit.**

The objective of this seminar is to provide students from different backgrounds an opportunity to learn about current issues and debates on Brazilian education. The seminar will cover topics on the history of Brazilian education; an overview of current school reforms at the federal level; educational assessments; education and economic growth; educational equity; teacher labor market; technology and education; early childhood; and higher education to Brazil.

**EDUC 405. Teaching the Humanities. 3 Units.**

This course, designed for graduate students in the humanities and education, explores approaches to teaching the humanities at both the secondary and collegiate levels, with a focus on the teaching of text, and how the humanities can help students develop the ability to read and think critically. The course explores purposes and pedagogical approaches for teaching humanities through a variety of texts and perspectives. The course is designed as an opportunity for doctoral students in the Humanities both to enrich their own teaching, and to broaden their understanding of professional teaching opportunities, including community college and secondary school teaching.

**EDUC 407. Lytics Seminar. 1-4 Unit.**

This course is a survey of research methods with applications in online learning. The methods covered are very interdisciplinary, including an introduction to machine learning, text/discourse analysis, causal modeling, and psychometrics. Broader questions in research methodology are also covered, including how to formulate a good research question, when to use qualitative or quantitative methods, and the relative merits of theory-driven confirmatory vs. exploratory research. The goal of this course is to support researchers in the online learning space and other fields in their research endeavors.

**EDUC 408. Social Interaction Analysis. 1-4 Unit.**

This seminar will focus on foundations and methodic approaches to the study of social interaction.

**EDUC 411. Early Childhood Education. 3-4 Units.**

This course addresses a broad set of topics that have implications for developmentally appropriate and effective early childhood education. It begins with children's social, emotional and cognitive development and issues related to poverty, culture and language. We will also examine research evidence on effective instruction for young children, evaluations of preschool interventions, and several current policy debates.

**EDUC 412. Workshop in Religion and Education. 1 Unit.**

This 1-unit workshop will explore the intersection of religion and education across a variety of learning environments and demographics. It invites an ongoing conversation of the relationships between schools, congregations, religious bodies, learners, seekers, philanthropy, and public education. Advanced students and visiting scholars will have an opportunity to present their work for discussion. May be repeat for credit. Same as: RELIGST 333X

**EDUC 413. Ethnographies of Religion: Education, Socialization, Indoctrination. 3-5 Units.**

Religion has long been a central preoccupation for ethnographers interested in the formation and function of social groups. Much ethnography of religion focuses on rituals and practices of inscription – exploring the ways in which religious communities turn concepts into practices (and vice versa) that reinscribe members within an collective. These efforts take many forms, but they are, at their core, educational, insofar as they serve as an informal curriculum for the acquisition and rehearsal of theological, communal, ritual, textual, and embodied forms. This seminar will focus on the educational aspects central to ethnographic approaches to the study of religion, looking into and beyond schools.

**EDUC 416. Issues and Alternative Approaches in the Testing of English Language Learners. 2-3 Units.**

This course is intended for future researchers, practitioners, and decision makers. It examines major challenges in the testing of English language learners (ELLs) from the perspective of validity and fairness. The course provides a critical review of current practices in large-scale assessment concerning ELLs in terms of three kinds of limitations: population misspecification, measurement error, and overgeneralization. The course also promotes creative thinking in the development of alternative views and practices in ELL testing.

**EDUC 417. Research and Policy on Postsecondary Access. 3 Units.**

The transition from high school to college. K-16 course focusing on high school preparation, college choice, remediation, pathways to college, and first-year adjustment. The role of educational policy in postsecondary access. Service Learning Course (certified by Haas Center). Same as: EDUC 117

**EDUC 419. Academic Achievement of Language Minority Students. 3-5 Units.**

Emphasis is on the current state of knowledge in the research literature and comparisons to students' experiences and observations in bilingual education, English as a second language, reading instruction, cultural issues in education, and research methods.

**EDUC 421. Powerful Ideas for Learning Sciences and Technology Design. 3 Units.**

This course is intended as a graduate level seminar that provides in-depth readings and discussions, Professor Roy Pea's professional reflections, and student essay-writing on topics examined in Dr. Pea's select publications and associated influential writings.

**EDUC 424. Introduction to Research in Curriculum and Teacher Education. 2-5 Units.**

Required for first-year CTE doctoral students. How to conceptualize, design, and interpret research. How to read, interpret, and critique research; formulate meaningful research questions; evaluate and conduct a literature review; and conceptualize a study. Readings include studies from different research paradigms. Required literature review in an area students expect to explore for their qualifying paper.

**EDUC 425. Advanced Topics in Research on Self and Stigma. 1-3 Unit.**

This course focuses on the relevance of self, identity, and stigmatization to understanding and remedying social problems. A key focus will be on how interactions between the self-system and social systems (e.g. schools, workplaces, institutions) drive outcomes over time, including educational and economic inequality. More broadly, class discussion and readings will address a social psychological analysis of intervention and change.

**EDUC 429S. History of American Indian Education. 5 Units.**

How the federal government placed education at the center of its Indian policy in second half of 19th century, subjecting Native Americans to programs designed to erase native cultures and American Indian responses to those programs. Topics include traditional Indian education, role of religious groups, Meriam Report, Navajo-Hopi Rehabilitation Act, Johnson-O'Malley Act, and public schools. Same as: EDUC 119S, NATIVEAM 119S

**EDUC 430A. Experimental Research Designs in Educational Research. 3-5 Units.**

The course will cover the following topics: a) the logic of causal inference and the Fisher/Neyman/Rubin counterfactual causal model (Fisher, 1935; Heckman, 1979; Holland, 1986; Neyman, 1990; Rubin, 1978); b) randomized experiments; c) complex randomized experiments in education (cluster randomized trials, multi-site trials, staggered implementation via randomization, etc.); d) policy experiments with randomization; e) meta-analysis; and f) power in randomized experiments; g) the ethics and politics of randomized experiments.

**EDUC 430B. Causal Inference in Quantitative Educational and Social Science Research. 3-5 Units.**

This course surveys quantitative methods to make causal inferences in the absence of randomized experiment including the use of natural and quasi-experiments, instrumental variables, regression discontinuity, fixed effects estimators, and difference-in-differences. We emphasize the proper interpretation of these research designs and critical engagement with their key assumptions for applied researchers. Prerequisites: Prior training in multivariate regression (e.g., ECON 102B or the permission of the instructor).

Same as: SOC 257

**EDUC 430C. Using Data to Describe the World: Descriptive Social Science Research Techniques. 3-5 Units.**

Course will provide hands-on practice in analysis of data from experimental and quasi-experimental research designs, including a) instrumental variables estimators; b) regression discontinuity estimators; c) difference-in-difference estimators; d) matching estimators; e) fixed effects estimators; and f) panel data methods (including individual fixed effects models, lagged covariate adjustment models, growth models, etc.). Prerequisites: satisfactory completion of EDUC 255B, EDUC 257C or SOC 257.

Same as: SOC 258

**EDUC 437. Curricular Practical Training. 1-3 Unit.**

"Curricular Practical Training" independent study sections specifically created for international students in F-1 Visa Status who wish to receive credit and to be paid for internships.

**EDUC 438. Second Language Acquisition Theories: Implications for Policy, Instruction and Teacher Preparation. 3-5 Units.**

This course will first offer a snapshot of Second Language Acquisition (SLA) theories, contrast varying theoretical perspectives and examine how they inform the language teaching and learning process. It will then engage students in the examination and discussion of well-known approaches used in language instruction (e.g., leveled ELD, SIOP, CLIL, bilingual education, secondary foreign language education, heritage language instruction) in order to identify the theoretical perspectives informing particular pedagogies and practices.

**EDUC 445. Entrepreneurial Approaches to Education Reform. 3 Units.**

(Same as STRAMGT 335) In this course, students will investigate opportunities and challenges of entrepreneurial ventures trying to make a positive impact in public education. The course requires a basic level of understanding of the U.S. K-12 public school system. The first session will analyze the structure of the public education as an industry, with a special emphasis on understanding the achievement gap. Subsequent sessions will explore challenges in increasing efficacy, ensuring financial sustainability, and scaling for entrepreneurs who have sought to change student outcomes, solve pain points, and innovate. The course will feature a variety of ventures (including schools, education technology, training, and supplemental services) and organizational models (for-profit, not-for-profit, and benefit corporation). This course is suitable for students aspiring to be entrepreneurs, leaders in entrepreneurial organizations, leaders in educational organizations, Board members, donors or investors. (Note: this is not a "how-to" course on starting an entrepreneurial venture.).

**EDUC 447. Leading Change in Public Education. 2 Units.**

(Same as STRAMGT 537) American public education is in crisis. What will it take to get it back on track? As in all large-scale enterprises in need of transformative change, leadership matters greatly. This course focuses on what it takes from a strategic and extremely practical perspective to lead change in public education at the systems level. We will meet some of the most exciting educational leaders in public education today and dissect their leadership styles, strategies, innovations and solutions. We will look for lessons from traditional U.S. districts, successful charter management organizations, and international perspectives to determine what it takes to be an effective leader in education reform. Students will debate the strategies and efficacy of how different leaders approached systems-level change, and will form their own working hypotheses of what is needed to help transform the American education system. The course will end with a look at education fellowship programs and other ways for Stanford graduates to take on meaningful leadership roles in K-12 education reform. Dan Katzir worked for Bain & Company, Teach for America, and Sylvan Learning Systems before joining The Broad Foundation as its founding managing director. He is an experienced case study teacher and the editor of *The Redesign of Urban School Systems* (Harvard University Press, 2013). This course was designed to be taken in tandem with STRAMGT 535: Entrepreneurial Approaches to Education Reform and the courses will be highly complementary in approach.

**EDUC 450A. Qualitative Analysis in Education. 4 Units.**

Primarily for doctoral students; part of doctoral research core. Methods for collecting and interpreting qualitative data including case study, ethnography, discourse analysis, observation, and interview.

**EDUC 450C. Qualitative Interviewing. 3 Units.**

Addressing the theoretical underpinnings of qualitative interviews as well as the application of theory to practice, this course considers different approaches to interviewing. Interview types covered will range from group interviews to individual interviews, and from unstructured, ethnographically oriented interviews to highly structured interviews. Working with community partners to facilitate application to practice, the students will move from theory to interview design, implementation, and initial stages of analysis, with an emphasis on consistency in approach and utility in graduate-level research.

**EDUC 453. Doctoral Dissertation. 1-15 Unit.**

For doctoral students only. (all areas).

**EDUC 460. Language, Culture, Cognition, and Assessment. 3 Units.**

Examines the intersection of language, culture, and cognition, and the implications of this intersection in educational assessment. Knowledge from different disciplines is used to reason about assessment from the conceptual, methodological, and social perspectives.

**EDUC 465. Development and Psychological Sciences (DAPS) Faculty Student Seminar. 1 Unit.**

Faculty and students in the DAPS graduate training program will convene to discuss how the disciplines of developmental and psychological sciences impact education, ground these issues in the work of current faculty and advanced student research, discuss professional development issues unique to this area, and share student perspectives on the field and their progress in the program. May be repeat for credit.

**EDUC 466. Doctoral Seminar in Curriculum Research. 2-4 Units.**

Required of all doctoral students in CTE, normally during their second year in the program. Students present their ideas regarding a dissertation or other research project, and prepare a short research proposal that often satisfies their second-year review.

**EDUC 467. QP Presentation Seminar and Symposium. 1-3 Unit.**

For 3rd and 4th year PhD students in CTE. Students will learn to transform their 2nd year qualifying papers into polished oral presentations suitable for professional academic conferences. Course will cover presentation skills, including appropriate use of visuals; time management; and strategic attention to key aspects of study background, motivation, methods, findings, conclusions, and implications. At the end of the course students will participate in a series of public symposia to present the results of their QP study. For additional units students will have the option to write proposals to present their studies at professional conferences.

**EDUC 470. Practicum. 1-15 Unit.**

For advanced graduate students. (all areas).

**EDUC 480. Directed Reading. 1-15 Unit.**

For advanced graduate students. (all areas).

**EDUC 490. Directed Research. 1-15 Unit.**

For advanced graduate students. (all areas).

**EDUC 493. Workshop in Design and Analysis of Comparative Studies. 1-3 Unit.**

A workshop for second-year and later students with data analysis or research design activities including dissertation planning or analysis. Readings and exercises developed around participating student research. Topics have included: multilevel data analysis, within-subjects designs, and implementation of matching methods for comparing non-equivalent groups. Various computing customs accommodated. See <http://web.stanford.edu/~rag/ed493/>. Prerequisite: intermediate statistical methods course work.

**EDUC 801. TGR Project. 0 Units.**

For advanced graduate students. Instructor consent required. (all areas).

**EDUC 802. TGR Dissertation. 0 Units.**

For advanced graduate students. Instructor consent required. (all areas).



**EDUC 9. Public Service Internship Preparation. 1 Unit.**

Are you prepared for your internship this summer? This workshop series will help you make the most of your internship experience by setting learning goals in advance; negotiating and communicating clear roles and expectations; preparing for a professional role in a non-profit, government, or community setting; and reflecting with successful interns and community partners on how to prepare sufficiently ahead of time. You will read, discuss, and hear from guest speakers, as well as develop a learning plan specific to your summer or academic year internship placement. This course is primarily designed for students who have already identified an internship for summer or a later quarter. You are welcome to attend any and all workshops, but must attend the entire series and do the assignments for 1 unit of credit.

Same as: ARTSINST 40, EARTHYSYS 9, HUMBIO 9, PUBLPOL 74, URBANST 101

**EDUC 98. Service Learning Practicum. 1 Unit.**

For Alternative Spring Break program leaders. The skills and philosophical framework to develop and lead an ASB experience. May be repeat for credit.

## Electrical Engineering (EE)

**EE 100. The Electrical Engineering Profession. 1 Unit.**

Lectures/discussions on topics of importance to the electrical engineering professional. Continuing education, professional societies, intellectual property and patents, ethics, entrepreneurial engineering, and engineering management.

**EE 101A. Circuits I. 4 Units.**

Introduction to circuit modeling and analysis. Topics include creating the models of typical components in electronic circuits and simplifying non-linear models for restricted ranges of operation (small signal model); and using network theory to solve linear and non-linear circuits under static and dynamic operations. Prerequisite: ENGR40 or ENGR40M is useful but not strictly required.

**EE 101B. Circuits II. 4 Units.**

Continuation of EE101A. Introduction to circuit design for modern electronic systems. Modeling and analysis of analog gain stages, frequency response, feedback. Filtering and analog-to-digital conversion. Fundamentals of circuit simulation. Prerequisites: EE101A, EE102A. Recommended: CME102.

**EE 102A. Signal Processing and Linear Systems I. 4 Units.**

Concepts and tools for continuous- and discrete-time signal and system analysis with applications in signal processing, communications, and control. Mathematical representation of signals and systems. Linearity and time invariance. System impulse and step responses. System frequency response. Frequency-domain representations: Fourier series and Fourier transforms. Filtering and signal distortion. Time/frequency sampling and interpolation. Continuous-discrete-time signal conversion and quantization. Discrete-time signal processing. Prerequisite: MATH 53 or CME 102.

**EE 102B. Signal Processing and Linear Systems II. 4 Units.**

Continuation of EE 102A. Concepts and tools for continuous- and discrete-time signal and system analysis with applications in communications, signal processing and control. Analog and digital modulation and demodulation. Sampling, reconstruction, decimation and interpolation. Finite impulse response filter design. Discrete Fourier transforms, applications in convolution and spectral analysis. Laplace transforms, applications in circuits and feedback control. Z transforms, applications in infinite impulse response filter design. Prerequisite: EE 102A.

**EE 103. Introduction to Matrix Methods. 3-5 Units.**

Introduction to applied linear algebra with emphasis on applications. Vectors, norm, and angle; linear independence and orthonormal sets; applications to document analysis. Clustering and the k-means algorithm. Matrices, left and right inverses, QR factorization. Least-squares and model fitting, regularization and cross-validation. Constrained and nonlinear least-squares. Applications include time-series prediction, tomography, optimal control, and portfolio optimization. Undergraduate students should enroll for 5 units, and graduate students should enroll for 3 units. Prerequisites: MATH 51 or CME 100, and basic knowledge of computing (CS 106A is more than enough, and can be taken concurrently). EE103/CME103 and Math 104 cover complementary topics in applied linear algebra. The focus of EE103 is on a few linear algebra concepts, and many applications; the focus of Math 104 is on algorithms and concepts.

Same as: CME 103

**EE 104. Introduction to Machine Learning. 3-5 Units.**

Introduction to machine learning. Formulation of supervised and unsupervised learning problems. Regression and classification. Data standardization and feature engineering. Loss function selection and its effect on learning. Regularization and its role in controlling complexity. Validation and overfitting. Robustness to outliers. Simple numerical implementation. Experiments on data from a wide variety of engineering and other disciplines. In this initial offering, enrollment is limited to 50 students. Undergraduate students should enroll for 5 units, and graduate students should enroll for 3 units. Prerequisites: EE 103; EE 178 or CS 109; CS106A or equivalent.

**EE 107. Embedded Networked Systems. 3 Units.**

Networked embedded systems are often hidden from our view, but they are a key component that enables our modern society. Embedded systems bridge our physical world with powerful digital measurement and control systems. Applications of today's embedded systems range from stabilization in drones authentication in credit cards, and even temperature control in toasters. In this class, students will learn about how to build an networked embedded system from the ground up. The lectures will focus on the key enabling components of embedded systems, including: Clocks, GPIO, Interrupts, Busses, Amplifiers, Regulators, Power supplies, ADC/DAC, DMA, and Storage. The goal of the class is to familiarize the students with these components such that they can build their own embedded systems in devices. Prerequisites: EE 102A or ENGR 40M.

**EE 108. Digital System Design. 4 Units.**

Digital circuit, logic, and system design. Digital representation of information. CMOS logic circuits. Combinational logic design. Logic building blocks, idioms, and structured design. Sequential logic design and timing analysis. Clocks and synchronization. Finite state machines. Microcode control. Digital system design. Control and datapath partitioning. Lab. \*In Autumn, enrollment preference is given to EE majors. Any EE majors who must enroll in Autumn are invited to contact the instructor. Formerly EE 108A.

**EE 109. Digital Systems Design Lab. 4 Units.**

The design of integrated digital systems encompassing both customized software and hardware. Software/hardware design tradeoffs. Algorithm design for pipelining and parallelism. System latency and throughput tradeoffs. FPGA optimization techniques. Integration with external systems and smart devices. Firmware configuration and embedded system considerations. Enrollment limited to 25; preference to graduating seniors. Prerequisites: 108B, and CS 106B or X.

**EE 114. Fundamentals of Analog Integrated Circuit Design. 3-4 Units.**

Analysis and simulation of elementary transistor stages, current mirrors, supply- and temperature-independent bias, and reference circuits. Overview of integrated circuit technologies, circuit components, component variations and practical design paradigms. Differential circuits, frequency response, and feedback will also be covered. Performance evaluation using computer-aided design tools.

Undergraduates must take EE 114 for 4 units. Prerequisite: 101B.

GER:DB-EngrAppSci.

Same as: EE 214A

**EE 116. Semiconductor Devices for Energy and Electronics. 3 Units.**

The underpinnings of modern technology are the transistor (circuits), the capacitor (memory), and the solar cell (energy). EE 116 introduces the physics of their operation, their historical origins (including Nobel prize breakthroughs), and how they can be optimized for future applications. The class covers physical principles of semiconductors, including silicon and new material discoveries, quantum effects, band theory, operating principles, and device equations. Recommended (but not required) co-requisite: EE 65 or equivalent.

**EE 118. Introduction to Mechatronics. 4 Units.**

Technologies involved in mechatronics (intelligent electro-mechanical systems), and techniques to apply this technology to mechatronic system design. Topics include: electronics (A/D, D/A converters, op-amps, filters, power devices); software program design, event-driven programming; hardware and DC stepper motors, solenoids, and robust sensing. Large, open-ended team project. Prerequisites: ENGR 40, CS 106, or equivalents. Same as: ME 210

**EE 124. Introduction to Neuroelectrical Engineering. 3 Units.**

Fundamental properties of electrical activity in neurons, technology for measuring and altering neural activity, and operating principles of modern neurological and neural prosthetic medical systems.

Topics: action potential generation and propagation, neuro-MEMS and measurement systems, experimental design and statistical data analysis, information encoding and decoding, clinical diagnostic systems, and fully-implantable neural prosthetic systems design. Prerequisite: EE 101A and EE 102A.

**EE 133. Analog Communications Design Laboratory. 3-4 Units.**

Design, testing, and applications. Amplitude modulation (AM) using multiplier circuits. Frequency modulation (FM) based on discrete oscillator and integrated modulator circuits such as voltage-controlled oscillators (VCOs). Phased-lock loop (PLL) techniques, characterization of key parameters, and their applications. Practical aspects of circuit implementations. Labs involve building and characterization of AM and FM modulation/demodulation circuits and subsystems. Enrollment limited to 30 undergraduates and coterminal EE students. Prerequisite: EE101B. Undergraduate students enroll in EE133 and Graduate students enroll in EE233. Recommended: EE114/214A.

Same as: EE 233

**EE 134. Introduction to Photonics. 4 Units.**

Photonics, optical components, and fiber optics. Conceptual and mathematical tools for design and analysis of optical communication, sensor and imaging systems. Experimental characterization of semiconductor lasers, optical fibers, photodetectors, receiver circuitry, fiber optic links, optical amplifiers, and optical sensors. Class project on confocal microscopy or other method of sensing or analyzing biometric data. Laboratory experiments. Prerequisite: EE 102A and one of the following: EE 42, Physics 43, or Physics 63.

**EE 142. Engineering Electromagnetics. 3 Units.**

Introduction to electromagnetism and Maxwell's equations in static and dynamic regimes. Electrostatics and magnetostatics: Gauss's, Coulomb's, Faraday's, Ampere's, Biot-Savart's laws. Electric and magnetic potentials. Boundary conditions. Electric and magnetic field energy. Electrodynamics: Wave equation; Electromagnetic waves; Phasor form of Maxwell's equations. Solution of the wave equation in 1D free space: Wavelength, wave-vector, forward and backward propagating plane waves. Poynting's theorem. Propagation in lossy media, skin depth. Reflection and refraction at planar boundaries, total internal reflection. Solutions of wave equation for various 1D-3D problems: Electromagnetic resonators, waveguides periodic media, transmission lines. Formerly EE 141. Pre-requisites: Phys 43 or EE 42, CME 100, CME 102 (recommended).

**EE 14N. Things about Stuff. 3 Units.**

Preference to freshmen. The stories behind disruptive inventions such as the telegraph, telephone, wireless, television, transistor, and chip are as important as the inventions themselves, for they elucidate broadly applicable scientific principles. Focus is on studying consumer devices; projects include building batteries, energy conversion devices and semiconductors from pocket change. Students may propose topics and projects of interest to them. The trajectory of the course is determined in large part by the students themselves.

**EE 151. Sustainable Energy Systems. 3 Units.**

Energy demand is expected to grow by 30% by 2025, while at the same time the European Union is demanding a carbon footprint at 1990 levels. We examine energy flow in the US and Europe, and deduce from it a strategy for sustainable growth. Potential solutions include distributed small scale networked energy generation, solar energy, wind and water, as well as nuclear energy. A systems perspective allows optimization. Fundamental concepts will be demonstrated in class through hands-on experiments.

**EE 153. Power Electronics. 3-4 Units.**

Addressing the energy challenges of today and the environmental challenges of the future will require efficient energy conversion techniques. This course will discuss the circuits used to efficiently convert ac power to dc power, dc power from one voltage level to another, and dc power to ac power. The components used in these circuits (e.g., diodes, transistors, capacitors, inductors) will also be covered in detail to highlight their behavior in a practical implementation. A lab will be held with the class where students will obtain hands on experience with power electronic circuits. Formerly EE 292J. Prerequisite: EE 101B.

Same as: EE 253

**EE 155. Green Electronics. 4 Units.**

Many green technologies including hybrid cars, photovoltaic energy systems, efficient power supplies, and energy-conserving control systems have at their heart intelligent, high-power electronics. This course examines this technology and uses green-tech examples to teach the engineering principles of modeling, optimization, analysis, simulation, and design. Topics include power converter topologies, periodic steady-state analysis, control, motors and drives, photovoltaic systems, and design of magnetic components. The course involves a hands-on laboratory and a substantial final project. Formerly EE 152. Required: EE101B, EE102A, EE108. Recommended: ENGR40 or EE122A.

Same as: EE 255

**EE 15N. The Art and Science of Engineering Design. 3 Units.**

The goal of this seminar is to introduce freshmen to the design process associated with an engineering project. The seminar will consist of a series of lectures. The first part of each lecture will focus on the different design aspects of an engineering project, including formation of the design team, developing a project statement, generating design ideas and specifications, finalizing the design, and reporting the outcome. Students will form teams to follow these procedures in designing a term project of their choice over the quarter. The second part of each lecture will consist of outside speakers, including founders of some of the most exciting companies in Silicon Valley, who will share their experiences about engineering design. On-site visits to Silicon Valley companies to showcase their design processes will also be part of the course. The seminar serves three purposes: (1) it introduces students to the design process of turning an idea into a final design, (2) it presents the different functions that people play in a project, and (3) it gives students a chance to consider what role in a project would be best suited to their interests and skills.

**EE 168. Introduction to Digital Image Processing. 3-4 Units.**

Computer processing of digital 2-D and 3-D data, combining theoretical material with implementation of computer algorithms. Topics: properties of digital images, design of display systems and algorithms, time and frequency representations, filters, image formation and enhancement, imaging systems, perspective, morphing, and animation applications. Instructional computer lab exercises implement practical algorithms. Final project consists of computer animations incorporating techniques learned in class. Prerequisite: Matlab programming.

**EE 169. Introduction to Bioimaging. 3 Units.**

Bioimaging is important for both clinical medicine, and medical research. This course will provide an introduction to several of the major imaging modalities, using a signal processing perspective. The course will start with an introduction to multi-dimensional Fourier transforms, and image quality metrics. It will then study projection imaging systems (projection X-Ray), backprojection based systems (CT, PET, and SPECT), systems that use beam forming (ultrasound), and systems that use Fourier encoding (MRI). Prerequisites: EE102A, EE102B.

**EE 178. Probabilistic Systems Analysis. 4 Units.**

Introduction to probability and statistics and their role in modeling and analyzing real world phenomena. Events, sample space, and probability. Discrete random variables, probability mass functions, independence and conditional probability, expectation and conditional expectation. Continuous random variables, probability density functions, independence and expectation, derived densities. Transforms, moments, sums of independent random variables. Simple random processes. Limit theorems. Introduction to statistics: significance, estimation and detection. Prerequisites: basic calculus.

**EE 179. Analog and Digital Communication Systems. 3 Units.**

This course covers the fundamental principles underlying the analysis, design and optimization of analog and digital communication systems. Design examples will be taken from the most prevalent communication systems today: cell phones, Wifi, radio and TV broadcasting, satellites, and computer networks. Analysis techniques based on Fourier transforms and energy/power spectral density will be developed. Mathematical models for random variables and random (noise) signals will be presented, which are used to characterize filtering and modulation of random noise. These techniques will then be used to design analog (AM and FM) and digital (PSK and FSK) communication systems and determine their performance over channels with noise and interference. Prerequisite: 102A.

**EE 17N. Engineering the Micro and Nano Worlds: From Chips to Genes. 3 Units.**

Preference to freshmen. The first part is hands-on micro- and nano-fabrication including the Stanford Nanofabrication Facility (SNF) and the Stanford Nanocharacterization Laboratory (SNL) and field trips to local companies and other research centers to illustrate the many applications; these include semiconductor integrated circuits ('chips'), DNA microarrays, microfluidic bio-sensors and microelectromechanical systems (MEMS). The second part is to create, design, propose and execute a project. Most of the grade will be based on the project. By the end of the course you will, of course, be able to read critically a New York Times article on nanotechnology. More importantly you will have experienced the challenge (and fun) of designing, carrying out and presenting your own experimental project. As a result you will be better equipped to choose your major. This course can complement (and differs from) the seminars offered by Profs Philip Wong and Hari Manoharan in that it emphasizes laboratory work and an experimental student-designed project. Prerequisites: high-school physics.

**EE 180. Digital Systems Architecture. 4 Units.**

The design of processor-based digital systems. Instruction sets, addressing modes, data types. Assembly language programming, low-level data structures, introduction to operating systems and compilers. Processor microarchitecture, microprogramming, pipelining. Memory systems and caches. Input/output, interrupts, buses and DMA. System design implementation alternatives, software/hardware tradeoffs. Labs involve the design of processor subsystems and processor-based embedded systems. Formerly EE 108B. Prerequisite: CS107 (required) and EE108 (recommended but not required).

**EE 190. Special Studies or Projects in Electrical Engineering. 1-15 Unit.**

Independent work under the direction of a faculty member. Individual or team activities involve lab experimentation, design of devices or systems, or directed reading. Course may be repeated for credit.

**EE 191. Special Studies and Reports in Electrical Engineering. 1-15 Unit.**

Independent work under the direction of a faculty member given for a letter grade only. If a letter grade given on the basis of required written report or examination is not appropriate, enroll in 190. Course may be repeated for credit.

**EE 191A. Special Studies and Reports in Electrical Engineering. 1 Unit.**

EE191A is part of the Accelerated Calculus for Engineers program. Independent work under the direction of a faculty member given for a letter grade only. EE 191A counts as a Math one unit seminar course: it is this unit that constitutes the ACE program.

**EE 191W. Special Studies and Reports in Electrical Engineering. 3-10 Units.**

WIM-version of EE 191. For EE students using special studies (e.g., honors project, independent research project) to satisfy then writing-in-major requirement. A written report that has gone through revision with an advisor is required. An advisor from the Writing Center is recommended. Same as: WIM

**EE 195. Electrical Engineering Instruction. 1-3 Unit.**

Students receive training from faculty or graduate student mentors to prepare them to assist in instruction of Electrical Engineering courses. The specific training and units of credit received are to be defined in consultation with one of the official instructors of EE 195. Note that University regulations prohibit students from being paid for the training while receiving academic credit for it. Enrollment limited.

**EE 203. The Entrepreneurial Engineer. 1 Unit.**

Seminar. For prospective entrepreneurs with an engineering background. Contributions made to the business world by engineering graduates. Speakers include Stanford and other engineering and M.B.A. graduates who have founded large and small companies in nearby communities. Contributions from EE faculty and other departments including Law, Business, and MS&E. May be repeated for credit.

**EE 204S. Business Management for Electrical Engineers and Computer Scientists. 3 Units.**

For SCPD students including NDOs; see EE204 for description.

**EE 205. Product Management for Electrical Engineers and Computer Scientists. 3 Units.**

Successful products are the highest impact contribution anyone can make in product development. Students will learn to build successful products using fundamental concepts in Product Management. These include understanding customers, their job to be done, identifying new product opportunities, and defining what to build that is technically feasible, valuable to the customer, and easy to use. The course has two components, Product Management Project with corporate partners, and case-based classroom discussion of PM concepts and application. Prerequisite: Students must be currently enrolled in a MS or PhD engineering degree program.

**EE 207. Neuromorphics: Brains in Silicon. 3 Units.**

(Formerly EE 304) Neuromorphic systems run perceptual, cognitive and motor tasks in real-time on a network of highly interconnected nonlinear units. To maximize density and minimize energy, these units—like the brain's neurons—are heterogeneous and stochastic. The first half of the course covers learning algorithms that automatically synthesize network configurations to perform a desired computation on a given heterogeneous neural substrate. The second half of the course surveys system-on-a-chip architectures that efficiently realize highly interconnected networks and mixed analog-digital circuit designs that implement area and energy-efficient nonlinear units. Prerequisites: EE102A is required. Same as: BIOE 313

**EE 212. Integrated Circuit Fabrication Processes. 3 Units.**

For students interested in the physical bases and practical methods of silicon VLSI chip fabrication, or the impact of technology on device and circuit design, or intending to pursue doctoral research involving the use of Stanford's Nanofabrication laboratory. Process simulators illustrate concepts. Topics: principles of integrated circuit fabrication processes, physical and chemical models for crystal growth, oxidation, ion implantation, etching, deposition, lithography, and back-end processing. Required for 410.

**EE 213. Digital MOS Integrated Circuits. 3 Units.**

Looks a little more deeply at how digital circuits operate, what makes a gate digital, and how to "cheat" to improve performance or power. To aid this analysis we create a number of different models for MOS transistors and choose the simplest one that can explain our the circuit's operation, using both hand and computer analysis. We explore static, dynamic, pulse-mode, and current mode logic, and show how they are used in SRAM design. Topics include sizing for min delay, noise and noise margins, power dissipation. The class uses memory design (SRAM) as a motivating example. DRAM and EEPROM design issues are also covered. Formerly EE 313. Prerequisites: EE 101B, EE 108. Recommended: EE 271.

**EE 214A. Fundamentals of Analog Integrated Circuit Design. 3-4 Units.**

Analysis and simulation of elementary transistor stages, current mirrors, supply- and temperature-independent bias, and reference circuits. Overview of integrated circuit technologies, circuit components, component variations and practical design paradigms. Differential circuits, frequency response, and feedback will also be covered. Performance evaluation using computer-aided design tools. Undergraduates must take EE 114 for 4 units. Prerequisite: 101B. GER:DB-EngrAppSci. Same as: EE 114

**EE 214B. Advanced Analog Integrated Circuit Design. 3 Units.**

Analysis and design of analog integrated circuits in advanced MOS and bipolar technologies. Device operation and compact modeling in support of circuit simulations needed for design. Emphasis on quantitative evaluations of performance using hand calculations and circuit simulations; intuitive approaches to design. Analytical and approximate treatments of noise and distortion; analysis and design of feedback circuits. Design of archetypal analog blocks for networking and communications such as broadband gain stages and transimpedance amplifiers. Prerequisites: EE114/214A.

**EE 216. Principles and Models of Semiconductor Devices. 3 Units.**

Carrier generation, transport, recombination, and storage in semiconductors. Physical principles of operation of the p-n junction, heterojunction, metal semiconductor contact, bipolar junction transistor, MOS capacitor, MOS and junction field-effect transistors, and related optoelectronic devices such as CCDs, solar cells, LEDs, and detectors. First-order device models that reflect physical principles and are useful for integrated-circuit analysis and design. Prerequisite: 116 or equivalent.

**EE 218. Power Semiconductor Devices and Technology. 3 Units.**

This course starts by covering the device physics and technology of current silicon power semiconductor devices including power MOSFETs, IGBTs, and Thyristors. Wide bandgap materials, especially GaN and SiC are potential replacements for Si power devices because of their fundamentally better properties. This course explores what is possible in these new materials, and what the remaining challenges are for wide bandgap materials to find widespread market acceptance in power applications. Future clean, renewable energy systems and high efficiency power control systems will critically depend on the higher performance devices possible in these new materials. Prerequisites: EE 116 or equivalent.

**EE 21N. What is Nanotechnology?. 3 Units.**

Nanotechnology is an often used word and it means many things to different people. Scientists and Engineers have some notion of what nanotechnology is, societal perception may be entirely different. In this course, we start with the classic paper by Richard Feynman ("There's Plenty of Room at the Bottom"), which laid down the challenge to the nanotechnologists. Then we discuss two classic books that offer a glimpse of what nanotechnology is: Engines of Creation: The Coming Era of Nanotechnology by Eric Drexler, and Prey by Michael Crichton. Drexler's thesis sparked the imagination of what nano machinery might do, whereas Crichton's popular novel channeled the public's attention to this subject by portraying a disastrous scenario of a technology gone astray. We will use the scientific knowledge to analyze the assumptions and predictions of these classic works. We will draw upon the latest research advances to illustrate the possibilities and impossibilities of nanotechnology.

**EE 222. Applied Quantum Mechanics I. 3 Units.**

Emphasis is on applications in modern devices and systems. Topics include: Schrödinger's equation, eigenfunctions and eigenvalues, solutions of simple problems including quantum wells and tunneling, quantum harmonic oscillator, coherent states, operator approach to quantum mechanics, Dirac notation, angular momentum, hydrogen atom, calculation techniques including matrix diagonalization, perturbation theory, variational method, and time-dependent perturbation theory with applications to optical absorption, nonlinear optical coefficients, and Fermi's golden rule. Prerequisites: MATH 52 and 53, EE 65 or PHYSICS 65 (or PHYSICS 43 and 45). Same as: MATSCI 201

**EE 223. Applied Quantum Mechanics II. 3 Units.**

Continuation of 222, including more advanced topics: quantum mechanics of crystalline materials, methods for one-dimensional problems, spin, systems of identical particles (bosons and fermions), introductory quantum optics (electromagnetic field quantization, coherent states), fermion annihilation and creation operators, interaction of different kinds of particles (spontaneous emission, optical absorption, and stimulated emission). Quantum information and interpretation of quantum mechanics. Other topics in electronics, optoelectronics, optics, and quantum information science. Prerequisite: 222.

**EE 225. Biochips and Medical Imaging. 3 Units.**

The course covers state-of-the-art and emerging bio-sensors, bio-chips, imaging modalities, and nano-therapies which will be studied in the context of human physiology including the nervous system, circulatory system and immune system. Medical diagnostics will be divided into bio-chips (in-vitro diagnostics) and medical and molecular imaging (in-vivo imaging). In-depth discussion on cancer and cardiovascular diseases and the role of diagnostics and nano-therapies.

Same as: MATSCI 382, SBIO 225

**EE 228. Basic Physics for Solid State Electronics. 3 Units.**

Topics: energy band theory of solids, energy bandgap engineering, classical kinetic theory, statistical mechanics, and equilibrium and non-equilibrium semiconductor statistics. Prerequisite: course in modern physics.

**EE 22N. Medical Imaging Systems. 3 Units.**

Preference to freshmen. The technology of major imaging modalities used for disease diagnosis: x-ray, ultrasound, and magnetic resonance; their history, societal impact, and clinical applications. Field trips to a medical center and an imaging research lab. Term paper and presentation. Prerequisites: high school physics and calculus.

**EE 230. Biophotonics: Light in Biology. 3 Units.**

This course will provide an introduction to the use of optics in biology, primarily focusing on microscopy from an engineering perspective (i.e., the focus of the course is more on technology than biology). Course material will be interspersed with labs to provide hands-on experience with common techniques in modern microscopy (e.g., brightfield, fluorescence, confocal and phase contrast microscopy). Background in college physics strongly recommended. Programming experience with Matlab required. Suggested prerequisites: EE 134 or EE 236A.

**EE 233. Analog Communications Design Laboratory. 3-4 Units.**

Design, testing, and applications. Amplitude modulation (AM) using multiplier circuits. Frequency modulation (FM) based on discrete oscillator and integrated modulator circuits such as voltage-controlled oscillators (VCOs). Phased-lock loop (PLL) techniques, characterization of key parameters, and their applications. Practical aspects of circuit implementations. Labs involve building and characterization of AM and FM modulation/demodulation circuits and subsystems. Enrollment limited to 30 undergraduates and coterminial EE students. Prerequisite: EE101B. Undergraduate students enroll in EE133 and Graduate students enroll in EE233. Recommended: EE114/214A.

Same as: EE 133

**EE 234. Photonics Laboratory. 3 Units.**

Photonics and fiber optics with a focus on communication and sensing. Experimental characterization of semiconductor lasers, optical fibers, photodetectors, receiver circuitry, fiber optic links, optical amplifiers, and optical sensors and photonic crystals. Prerequisite: EE 242 or equivalent. Recommended: EE 236A.

**EE 235. Analytical Methods in Biotechnology. 3 Units.**

This course provides fundamental principles underlying important analytical techniques used in modern biotechnology. The course comprises of lectures and hands-on laboratory experiments. Students will learn the core principles for designing, implementing and analyzing central experimental methods including polymerase chain reaction (PCR), electrophoresis, immunoassays, and high-throughput sequencing. The overall goal of the course is to enable engineering students with little or no background in molecular biology to transition into research in the field of biomedicine.

**EE 236A. Modern Optics. 3 Units.**

Geometrical optics, aberrations, optical instruments, radiometry. Ray matrices and Gaussian beams. Wave nature of light. Plane waves: at interfaces, in media with varying refractive index. Diffraction and Fourier optics. Interference, single-beam interferometers (Fabry-Perot), multiple-beam interferometers (Michelson, Mach-Zehnder). Polarization, Jones and Stokes calculi. Formerly EE 268. Prerequisites: EE 142 or familiarity with electromagnetism and plane waves.

**EE 236AL. Modern Optics - Laboratory. 1 Unit.**

The Laboratory Course allows students to work hands-on with optical equipment to conduct five experiments that compliment the lecture course. Examples are Gaussian Beams and Resonators, Interferometers, and Diffraction.

**EE 236B. Guided Waves. 3 Units.**

Maxwell's equations, constitutive relations. Kramers-Kronig relations. Modes in waveguides: slab, rectangular, circular. Photonic crystals, surface plasmon modes. General properties of waveguide modes: orthogonality, phase and group indices, group velocity dispersion. Chirped pulse propagation in dispersive media and its connection to Gaussian beam propagation. Time lens. Waveguide technologies: glass, silicon, III-V semiconductor, metallic. Waveguide devices: fibers, lasers, modulators, arrayed waveguide gratings. Scattering matrix description of passive optical devices, and constraints from energy conservation, time-reversal symmetry and reciprocity. Mode coupling, directional couplers, distributed-feedback structures. Resonators from scattering matrix and input-output perspective. Micro-ring resonators. Prerequisites: EE 236A and EE 242 or familiarity with differential form of Maxwell's equations.

**EE 236C. Lasers. 3 Units.**

Atomic systems, spontaneous emission, stimulated emission, amplification. Three- and four-level systems, rate equations, pumping schemes. Laser principles, conditions for steady-state oscillation. Transverse and longitudinal mode control and tuning. Exemplary laser systems: gas (HeNe), solid state (Nd:YAG, Ti:sapphire) and semiconductors. Elements of laser dynamics and noise. Formerly EE231. Prerequisites: EE 236B and familiarity with modern physics and semiconductor physics. Recommended: EE 216 and EE 223 (either may be taken concurrently).

**EE 23N. Imaging: From the Atom to the Universe. 3 Units.**

Preference to freshmen. Forms of imaging including human and animal vision systems, atomic force microscope, microscope, digital camera, holography and three-dimensional imaging, telescope, synthetic aperture radar imaging, nuclear magnetic imaging, sonar and gravitational wave imaging, and the Hubble Space telescope. Physical principles and exposure to real imaging devices and systems.

**EE 242. Electromagnetic Waves. 3 Units.**

Continuation of 142. Maxwell's equations. Plane waves in lossless and lossy media. Skin effect. Flow of electromagnetic power (Poynting's theorem). Reflection and refraction of waves at planar boundaries. Snell's law and total internal reflection. Reflection and refraction from lossy media. Guided waves. Parallel-plate and dielectric-slab waveguides. Hollow wave-guides, cavity resonators, microstrip waveguides, optical fibers. Interaction of fields with matter and particles. Antennas and radiation of electromagnetic energy. Prerequisites: EE 142 or PHYSICS 120.

**EE 243. Semiconductor Optoelectronic Devices. 3 Units.**

Semiconductor physics and optical processes in semiconductors. Operating principles and practical device features of semiconductor optoelectronic materials and heterostructures. Devices include: optical detectors (p-i-n, avalanche, and MSM); light emitting diodes; electroabsorptive modulators (Franz-Keldysh and QCSE), electrorefractive (directional couplers, Mach-Zehnder), switches (SEEDs); and lasers (waveguide and vertical cavity surface emitting). Prerequisites: semiconductor devices and solid state physics such as EE 216 or equivalent.

**EE 247. Introduction to Optical Fiber Communications. 3 Units.**

Fibers: single- and multi-mode, attenuation, modal dispersion, group-velocity dispersion, polarization-mode dispersion. Nonlinear effects in fibers: Raman, Brillouin, Kerr. Self- and cross-phase modulation, four-wave mixing. Sources: light-emitting diodes, laser diodes, transverse and longitudinal mode control, modulation, chirp, linewidth, intensity noise. Modulators: electro-optic, electro-absorption. Photodiodes: p-i-n, avalanche, responsivity, capacitance, transit time. Receivers: high-impedance, transimpedance, bandwidth, noise. Digital intensity modulation formats: non-return-to-zero, return-to-zero. Receiver performance: Q factor, bit-error ratio, sensitivity, quantum limit. Sensitivity degradations: extinction ratio, intensity noise, jitter, dispersion. Wavelength-division multiplexing. System architectures: local-area, access, metropolitan-area, long-haul. Prerequisites: EE 102A and EE 142.

**EE 251. High-Frequency Circuit Design Laboratory. 3 Units.**

Students will study the theory of operation of instruments such as the time-domain reflectometer, sampling oscilloscope and vector network analyzer. They will build on that theoretical foundation by designing, constructing and characterizing numerous wireless building blocks in the upper-UHF range (e.g., up to about 500MHz), in a running series of laboratory exercises that conclude in a final project. Examples include impedance-matching and coupling structures, filters, narrowband and broadband amplifiers, mixers/modulators, and voltage-controlled oscillators. Prerequisite: EE 114 or EE 214A.

**EE 252. Antennas. 3 Units.**

This course aims to cover the theory, simulation, and hands-on experiment in antenna design. Topics include: basic parameters to describe the performance and characteristics of an antenna, link budget analyses, solving the fields from a Hertzian dipole, duality, equivalence principle, reciprocity, linear wire antenna, circular loop antenna, antenna array, slot and patch antennas, helical antennas, wideband antennas, size reduction techniques, wideband small antennas, and circularly polarized (CP) small antennas. Students will learn to use a commercial electromagnetic simulator in lab sessions. A final project is designed to solve a research antenna design problem in biomedical area or wireless communications. Prerequisite: EE 142 or Physics 120 or equivalent. Enrollment capacity limited to 25 students.

**EE 253. Power Electronics. 3-4 Units.**

Addressing the energy challenges of today and the environmental challenges of the future will require efficient energy conversion techniques. This course will discuss the circuits used to efficiently convert ac power to dc power, dc power from one voltage level to another, and dc power to ac power. The components used in these circuits (e.g., diodes, transistors, capacitors, inductors) will also be covered in detail to highlight their behavior in a practical implementation. A lab will be held with the class where students will obtain hands on experience with power electronic circuits. Formerly EE 292J. Prerequisite: EE 101B. Same as: EE 153

**EE 254. Advanced Topics in Power Electronics. 3 Units.**

In this course, we will study the practical issues related to the practical design of power electronic converters. We will also explore the trade-offs involved in selecting among the different circuits used to convert ac to dc, dc to ac and back to dc over a wide range of power levels suitable for different applications. In Advanced Topics in Power Electronic, as a multidisciplinary field, we will discuss power electronics circuits, extraction of transfer functions in Continuous and discontinuous conduction mode, voltage and current control of power converters, design of input/output filters to meet Electro Magnetic Interference specifications, layout of power electronics circuits and put this knowledge in a very practical context. Prerequisites: EE 153/253.

**EE 255. Green Electronics. 4 Units.**

Many green technologies including hybrid cars, photovoltaic energy systems, efficient power supplies, and energy-conserving control systems have at their heart intelligent, high-power electronics. This course examines this technology and uses green-tech examples to teach the engineering principles of modeling, optimization, analysis, simulation, and design. Topics include power converter topologies, periodic steady-state analysis, control, motors and drives, photovoltaic systems, and design of magnetic components. The course involves a hands-on laboratory and a substantial final project. Formerly EE 152. Required: EE101B, EE102A, EE108. Recommended: ENGR40 or EE122A. Same as: EE 155

**EE 256. Numerical Electromagnetics. 3 Units.**

Principles and applications of numerical techniques for solving practical problems of electromagnetics. Finite-difference time-domain (FDTD) method and finite-difference frequency-domain (FDFD) method for solving Maxwell's equations. Numerical analysis of stability. Perfectly matched layer (PML) absorbing boundaries. Total-field/scattered-field (TF/SF) method. Waveguide mode analysis. Bloch boundary conditions. The course requires programming and the use of MATLAB or other equivalent tools. Prerequisite: EE 242 or equivalent.

**EE 261. The Fourier Transform and Its Applications. 3 Units.**

The Fourier transform as a tool for solving physical problems. Fourier series, the Fourier transform of continuous and discrete signals and its properties. The Dirac delta, distributions, and generalized transforms. Convolutions and correlations and applications; probability distributions, sampling theory, filters, and analysis of linear systems. The discrete Fourier transform and the FFT algorithm. Multidimensional Fourier transform and use in imaging. Further applications to optics, crystallography. Emphasis is on relating the theoretical principles to solving practical engineering and science problems. Prerequisites: Math through ODEs, basic linear algebra, Comfort with sums and discrete signals, Fourier series at the level of 102A.

**EE 262. Two-Dimensional Imaging. 3 Units.**

Time and frequency representations, two-dimensional auto- and cross-correlation, Fourier spectra, diffraction and antennas, coordinate systems and the Hankel and Abel transforms, line integrals, impulses and sampling, restoration in the presence of noise, reconstruction and tomography, imaging radar. Tomographic reconstruction using projection-slice and layergarm methods. Students create software to form images using these techniques with actual data. Final project consists of design and simulation of an advanced imaging system. Prerequisite: EE261. Recommended: EE278, EE279.

**EE 263. Introduction to Linear Dynamical Systems. 3 Units.**

Applied linear algebra and linear dynamical systems with applications to circuits, signal processing, communications, and control systems. Topics: least-squares approximations of over-determined equations, and least-norm solutions of underdetermined equations. Symmetric matrices, matrix norm, and singular-value decomposition. Eigenvalues, left and right eigenvectors, with dynamical interpretation. Matrix exponential, stability, and asymptotic behavior. Multi-input/multi-output systems, impulse and step matrices; convolution and transfer-matrix descriptions. Control, reachability, and state transfer; observability and least-squares state estimation. Prerequisites: Linear algebra and matrices as in EE103 or MATH104; ordinary differential equations and Laplace transforms as in EE102B or CME 102. Same as: CME 263

**EE 264. Digital Signal Processing. 3-4 Units.**

Digital signal processing (DSP) techniques and design of DSP applications. Topics include: discrete-time random signals; sampling and multi-rate systems; oversampling and quantization in A-to-D conversion; properties of LTI systems; quantization in fixed-point implementations of filters; digital filter design; discrete Fourier Transform and FFT; and spectrum analysis using the DFT. In the design part of the course, students develop basic DSP applications on an embedded processing platform. The 4-unit version of the course, which meets the EE design requirement, adds a final 4-week project and report. See [ee264.stanford.edu](http://ee264.stanford.edu) for more information. Prerequisite: EE 102A and EE 102B or equivalent, basic programming skills (Matlab and C++).

**EE 264W. Digital Signal Processing. 5 Units.**

Writing in the Major (WIM) version of the 4-unit EE 264 theory + lab/project course. This course also meets the EE design requirement. Digital signal processing (DSP) techniques and design of DSP applications. Topics include: discrete-time random signals; sampling and multi-rate systems; oversampling and quantization in A-to-D conversion; properties of LTI systems; quantization in fixed-point implementations of filters; digital filter design; discrete Fourier Transform and FFT; and spectrum analysis using the DFT. In the design part of the course, students complete basic labs and a 4 week final project and report. See [ee264.stanford.edu](http://ee264.stanford.edu) for more information. Prerequisite: EE 102A and EE 102B or equivalent, basic programming skills (Matlab and C++). Same as: WIM

**EE 266. Introduction to Stochastic Control with Applications. 3 Units.**

Focuses on conceptual foundation and algorithmic methodology of Dynamic Programming and Stochastic Control with applications to engineering, operations research, management science and other fields. Elaborates on the concept of probing, learning and control of stochastic systems, and addresses the practical application of the concept and methodology through the use of approximations. Prerequisites: 201, 221, or equivalents. Same as: MS&E 251

**EE 267. Virtual Reality. 3-4 Units.**

OpenGL, real-time rendering, 3D display systems, display optics & electronics, IMUs and sensors, tracking, haptics, rendering pipeline, multimodal human perception and depth perception, stereo rendering, presence. Emphasis on VR technology. Hands-on programming assignments. The 3-unit version requires a final programming assignment in which you create your own virtual environment. The 4-unit version requires a final course project and written report in lieu of the final assignment. Prerequisites: Strong programming skills, EE 103 or equivalent. Helpful: basic computer graphics / OpenGL.

**EE 267W. Virtual Reality. 5 Units.**

Writing in the Major (WIM) version of the 4-unit EE 267 theory + lab/project course. This course also meets the EE design requirement. Topics include: OpenGL, real-time rendering, 3D display systems, display optics & electronics, IMUs and sensors, tracking, haptics, rendering pipeline, multimodal human perception and depth perception, stereo rendering, presence. Emphasis on VR technology. Hands-on programming assignments. The 5-unit WIM version requires everything the 4-unit version does, i.e. a final course project and written report in lieu of the final assignment. The 5-unit WIM version additional requires participation in 2 writing in the major workshops, and weekly writing assignments. Prerequisites: Strong programming skills, EE 103 or equivalent. Helpful: basic computer graphics / OpenGL. Same as: WIM

**EE 26N. The Wireless World, and the Data You Leak. 3 Units.**

The world is increasingly based on wireless communication. Cell phones and WiFi are the most visible examples. Others are key fobs, water meters, gas and electric meters, garage door openers, baby monitors, and the list continues to expand. All of these produce RF signals you can detect and often decode. This seminar will explore how much information you broadcast throughout your day, and how it can easily be received and decoded using inexpensive hardware and public domain software. You will be able to explain why different information services use different frequencies, why they encode the information the way they do, and what security risks they present.

**EE 271. Introduction to VLSI Systems. 3 Units.**

Provides a quick introduction to MOS transistors and IC fabrication and then creates abstractions to allow you to create and reason about complex digital systems. It uses a switch resistor model of a transistor, uses it to model gates, and then shows how gates and physical layout can be synthesized from Verilog or SystemVerilog descriptions. Most of the class will be spent on providing techniques to create designs that can be validated, are low power, provide good performance, and can be completed in finite time. Prerequisites: 101A, 108A and 108B; familiarity with transistors, logic design, Verilog and digital system organization.

**EE 272. Design Projects in VLSI Systems. 3-4 Units.**

An introduction to mixed signal design. Working in teams you will create a small mixed-signal VLSI design using a modern design flow and CAD tools. The project involves writing a Verilog model of the chip, creating a testing/debug strategy for your chip, wrapping custom layout to fit into a std cell system, using synthesis and place and route tools to create the layout of your chip, and understanding all the weird stuff you need to do to tape-out a chip. Useful for anyone who will build a chip in their Ph.D. Pre-requisites: EE271 and experience in digital/analog circuit design.

**EE 273. Digital Systems Engineering. 3 Units.**

Electrical issues in the design of high-performance digital systems, including signaling, timing, synchronization, noise, and power distribution. High-speed signaling methods; noise in digital systems, its effect on signaling, and methods for noise reduction; timing conventions; timing noise (skew and jitter), its effect on systems, and methods for mitigating timing noise; synchronization issues and synchronizer design; clock and power distribution problems and techniques; impact of electrical issues on system architecture and design. Prerequisites: EE101A and EE108A. Recommended: EE114/214A.

**EE 278. Introduction to Statistical Signal Processing. 3 Units.**

Review of basic probability and random variables. Random vectors and processes; convergence and limit theorems; IID, independent increment, Markov, and Gaussian random processes; stationary random processes; autocorrelation and power spectral density; mean square error estimation, detection, and linear estimation. Formerly EE 278B. Prerequisites: EE178 and linear systems and Fourier transforms at the level of EE102A,B or EE261.

**EE 279. Introduction to Digital Communication. 3 Units.**

Digital communication is a rather unique field in engineering in which theoretical ideas have had an extraordinary impact on the design of actual systems. The course provides a basic understanding of the analysis and design of digital communication systems, building on various ideas from probability theory, stochastic processes, linear algebra and Fourier analysis. Topics include: detection and probability of error for binary and M-ary signals (PAM, QAM, PSK), receiver design and sufficient statistics, controlling the spectrum and the Nyquist criterion, bandpass communication and up/down conversion, design trade-offs: rate, bandwidth, power and error probability, coding and decoding (block codes, convolutional coding and Viterbi decoding). Prerequisites: 179 or 261, and 178 or 278.

**EE 282. Computer Systems Architecture. 3 Units.**

Course focuses on how to build modern computing systems, namely notebooks, smartphones, and data centers, covering primarily their hardware architecture and certain system software aspects. For each system class, we cover the system architecture, processor technology, advanced memory hierarchy and I/O organization, power and energy management, and reliability. We will also cover topics such as interactions with system software, virtualization, solid state storage, and security. The programming assignments allow students to explore performance/energy tradeoffs when using heterogeneous hardware resources on smartphone devices. Prerequisite: EE108B. Recommended: CS 140.

**EE 284. Introduction to Computer Networks. 3 Units.**

Structure and components of computer networks; functions and services; packet switching; layered architectures; OSI reference model; physical layer; data link layer; error control; window flow control; media access control protocols used in local area networks (Ethernet, Token Ring, FDDI) and satellite networks; network layer (datagram service, virtual circuit service, routing, congestion control, Internet Protocol); transport layer (UDP, TCP); application layer.

**EE 285. Embedded Systems Workshop. 2 Units.**

Project-centric building hardware and software for embedded computing systems. Students work on an existing project of their own or join one of these projects. Syllabus topics will be determined by the needs of the enrolled students and projects. Examples of topics include: interrupts and concurrent programming, deterministic timing and synchronization, state-based programming models, filters, frequency response, and high-frequency signals, low power operation, system and PCB design, security, and networked communication. Prerequisite: CS107 (or equivalent). Same as: CS 241

**EE 290A. Curricular Practical Training for Electrical Engineers. 1 Unit.**

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, EE MS and PhD students who have received a Satisfactory ("S") grade in EE290A; for 290C, EE PhD degree candidacy and an "S" grade in EE 290B; for 290D, EE PhD degree candidacy, an "S" grade in EE 290C and instructor consent.

**EE 290B. Curricular Practical Training for Electrical Engineers. 1 Unit.**

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, EE MS and PhD students who have received a Satisfactory ("S") grade in EE290A; for 290C, EE PhD degree candidacy and an "S" grade in EE 290B; for 290D, EE PhD degree candidacy, an "S" grade in EE 290C and instructor consent.

**EE 290C. Curricular Practical Training for Electrical Engineers. 1 Unit.**

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, EE MS and PhD students who have received a Satisfactory ("S") grade in EE290A; for 290C, EE PhD degree candidacy and an "S" grade in EE 290B; for 290D, EE PhD degree candidacy, an "S" grade in EE 290C and instructor consent.

**EE 290D. Curricular Practical Training for Electrical Engineers. 1 Unit.**

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, EE MS and PhD students who have received a Satisfactory ("S") grade in EE290A; for 290C, EE PhD degree candidacy and an "S" grade in EE 290B; for 290D, EE PhD degree candidacy, an "S" grade in EE 290C and instructor consent.

**EE 290E. Curricular Practical Training for Electrical Engineers. 1 Unit.**

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: for 290B, EE MS and PhD students who have received a Satisfactory ("S") grade in EE290A; for 290C, EE PhD degree candidacy and an "S" grade in EE 290B; for 290D, EE PhD degree candidacy, an "S" grade in EE 290C and instructor consent; for 290E, EE PhD degree candidacy, an "S" grade in EE 290D and instructor consent.

**EE 290F. Curricular Practical Training for Electrical Engineers. 1 Unit.**

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: EE PhD degree candidacy, an "S" grade in EE 290E and instructor consent.

**EE 290G. Curricular Practical Training for Electrical Engineers. 1 Unit.**

For EE majors who need work experience as part of their program of study. Final report required. Prerequisites: EE PhD degree candidacy, an "S" grade in EE 290F and instructor consent.

**EE 292A. Electronic Design Automation (EDA) and Machine Learning Hardware. 3 Units.**

The class teaches cutting-edge optimization and analysis algorithms for the design of complex digital integrated circuits and their use in designing machine learning hardware. It provides working knowledge of the key technologies in Electronic Design Automation (EDA), focusing on synthesis, placement and routing algorithms that perform the major transformations between levels of abstraction and get a design ready to be fabricated. As an example, the design of a convolutional neural network (CNN) for basic image recognition illustrates the interaction between hardware and software for machine learning. It will be implemented on a state-of-the-art FPGA board. Prerequisite: EE 108.

**EE 292B. Micro and Nanoscale Biosensing for Molecular Diagnostics. 3 Units.**

The course covers state-of-the-art and emerging bio-sensors, biochips, microfluidics, which will be studied in the context of molecular diagnostics. Students will briefly learn the relevant biology, biochemistry, and molecular biology pertinent to molecular diagnostics. Students will also become equipped with a thorough understanding of the interfaces between electronics, fluidics, and molecular biology. Topics will include microfluidics and mass transfer limits, electrode-electrolyte interfaces, electrochemical noise processes, biosensor system level characterization, determination of performance parameters such as throughput, detection limit, and cost, integration of sensor with microfluidics, and electronic readout circuitry architectures. Emphasis will be placed on in-depth quantitative design of biomolecular sensing platforms.

**EE 292C. Chemical Vapor Deposition and Epitaxy for Integrated Circuits and Nanostructures. 1 Unit.**

Fundamental aspects of CVD are initially considered, first focusing on processes occurring in the gas phase and then on those occurring on the surface. Qualitative understanding is emphasized, with minimal use of equations. Adding energy both thermally and by using a plasma is discussed; atomic-layer deposition is briefly considered. Examples of CVD equipment are examined. The second portion of the tutorial examines layers deposited by CVD. The focus is on group IV semiconductors  $\zeta$  especially epitaxial and heteroepitaxial deposition, in which the crystal structure of the depositing layer is related to that of the substrate. Polycrystalline silicon and the IC interconnect system are then discussed. Finally, the use of high-density plasmas for rapid gap filling is contrasted with alternative CVD dielectric deposition processes.



**EE 292E. Seminar Series for Image Systems Engineering. 1 Unit.**

Seminar. For engineering students interested in camera and display engineering, computer vision, and computational imaging. Speakers include Stanford faculty and research scientists as well as industry professionals, mostly from consumer electronics companies.

**EE 292G. NanoBioTechnology, Nanoscience and Sensing. 3 Units.**

Nanobiotechnology, which may be called a "Fundamental Technology of the 21st Century", is a new frontier for Biology with extremely important applications in medical diagnostics, therapeutics and drug discovery based on the development of new materials and sensors. The goal of this course is to provide an insight into the fundamentals of nanotechnology in biological and biomedical research by providing an overview of current topics in Nanoscience and Engineering and their modern day applications in biotechnology. This course will provide a bridge for students from a non-biology background at all levels to the world of Nanobiotechnology. Basic biological molecules and the importance of their detection as well as a thorough understanding of the interfaces between electronics, fluidics, and molecular biology are discussed. Focus is also provided on solid-state materials, Nanostructures and Nano devices and systems as related to biological applications especially detection and sensing, covering top-down MEMS fabrication and integration of sensors with microfluidics to bottom-up biochemistry, applications of Nanostructures and Nanobiotechnology in drug discovery, delivery, and controlled release and Nanobiotechnological applications in environment and food detection and mitigation.

**EE 292H. Engineering, Entrepreneurship & Climate Change. 1 Unit.**

The purpose of this seminar series course is to help students and professionals develop the tools to apply the engineering and entrepreneurial mindset to problems that stem from climate change, in order to consider and evaluate possible stabilizing, remedial and adaptive approaches. This course is not a crash course on climate change or policy. Instead we will focus on learning about and discussing the climate problems that seem most tractable to these approaches. Each week Dr. Field and/or a guest speaker will lead a short warm-up discussion/activity and then deliver a talk in his/her area of expertise. We will wrap up with small-group and full-class discussions of related challenges/opportunities and possible engineering-oriented solutions. Class members are asked to do background reading before each class, to submit a question before each lecture, and to do in-class brainstorming. May be repeated for credit.

**EE 292I. Insanely Great Products: How do they get built?. 1 Unit.**

Great products emerge from a sometimes conflict-laden process of collaboration between different functions within companies. This Seminar seeks to demystify this process via case-studies of successful products and companies. Engineering management and businesspeople will share their experiences in discussion with students. Previous companies profiled: Apple, Intel, Facebook, and Genentech – to name a few. Previous guests include: Jon Rubinstein (NeXT, Apple, Palm), Diane Greene (VMware), and Ted Hoff (Intel). Pre-requisites: None.

**EE 292L. Nanomanufacturing. 3 Units.**

Fundamentals of nanomanufacturing technology and applications. Topics include recent developments in process technology, lithography and patterning. Technology for FinFET transistors, NAND flash and 3D chips. Manufacturing of LEDs, thin film and crystalline solar cells. Flip classroom model is used supplementing classroom lectures with short videos. Guest speakers include distinguished engineers, entrepreneurs and venture capitalists actively engaged in nanomanufacturing. Prerequisite: background in device physics and process technology. Recommended: EE116, EE216, EE212.

**EE 292T. SmartGrids and Advanced Power Systems Seminar. 1-2 Unit.**

A series of seminar and lectures focused on power engineering. Renowned researchers from universities and national labs will deliver bi-weekly seminars on the state of the art of power system engineering. Seminar topics may include: power system analysis and simulation, control and stability, new market mechanisms, computation challenges and solutions, detection and estimation, and the role of communications in the grid. The instructors will cover relevant background materials in the in-between weeks. The seminars are planned to continue throughout the next academic year, so the course may be repeated for credit. Same as: CEE 272T

**EE 293A. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution. 3-4 Units.**

Operating principles and applications of emerging technological solutions to the energy demands of the world. The scale of global energy usage and requirements for possible solutions. Basic physics and chemistry of solar cells, fuel cells, and batteries. Performance issues, including economics, from the ideal device to the installed system. The promise of materials research for providing next generation solutions. Undergraduates register in 156 for 4 units; graduates register in 256 for 3 units. Prerequisites: MATSCI 145 and 152 or equivalent coursework in thermodynamics and electronic properties. Same as: ENERGY 293A, MATSCI 156, MATSCI 256

**EE 293B. Fundamentals of Energy Processes. 3 Units.**

For seniors and graduate students. Covers scientific and engineering fundamentals of renewable energy processes involving heat. Thermodynamics, heat engines, solar thermal, geothermal, biomass. Recommended: MATH 19-21; PHYSICS 41, 43, 45. Same as: ENERGY 293B

**EE 29N. Electromagnetic Sensors for the Internet of Things. 3 Units.**

Have you ever wondered how your phone know what way is up? How the traffic light know your car is there? How you can monitor your health with a smart bracelet? If so, you want to learn about electromagnetic sensors. In this course we will the electromagnetic principles that allows us to sense things and communicate with things at a distance. You will learn the fundamentals of electromagnetic sensing and build practical sensors in the laboratory.

**EE 300. Master's Thesis and Thesis Research. 1-15 Unit.**

Independent work under the direction of a department faculty. Written thesis required for final letter grade. The continuing grade 'N' is given in quarters prior to thesis submission. See 390 if a letter grade is not appropriate. Course may be repeated for credit.

**EE 303. Autonomous Implantable Systems. 3 Units.**

Integrating electronics with sensing, stimulation, and locomotion capabilities into the body will allow us to restore or enhance physiological functions. In order to be able to insert these electronics into the body, energy source is a major obstacle. This course focuses on the analysis and design of wirelessly powered catheter-deliverable electronics. Emphases will be on the interaction between human and electromagnetic fields in order to transfer power to the embedded electronics via electromagnetic fields, power harvesting circuitry, electrical-tissue interface, and sensing and actuating frontend designs. Prerequisites: EE 252 or equivalent.

**EE 308. Advanced Circuit Techniques. 3 Units.**

Design of advanced analog circuits at the system level, including switching power converters, amplitude-stabilized and frequency-stabilized oscillators, voltage references and regulators, power amplifiers and buffers, sample-and-hold circuits, and application-specific op-amp compensation. Approaches for finding creative design solutions to problems with difficult specifications and hard requirements. Emphasis on feedback circuit techniques, design-oriented thinking, and hands-on experience with modern analog building blocks. Several designs will be built and evaluated, along with associated laboratory projects. Prerequisite: EE 251 or EE 314A.

**EE 309. Semiconductor Memory Devices and Technology. 3 Units.**

The functionality and performance of ULSI systems are increasingly dependent upon the characteristics of the memory subsystem. This course introduces the student to various memory devices: SRAM, DRAM, NVRAM (non-volatile memory). This course will cover various aspects of semiconductor memories, including basic operation principles, device design considerations, device scaling, device fabrication, memory array addressing and readout circuits. Various cell structures (e.g. 1T-1C, 6T, 4T, 1T-1R, 0T-1R, 1S-1R, floating gate FLASH, SONOS, NROM), and memory organization (open bit-line, folded bit-line, NAND, NOR, cross-point etc.). This course will include a survey of new memory concepts (e.g. magnetic tunnel junction memory (MRAM, SST-RAM), ferroelectric memory (FRAM), phase change memory (PCM), metal oxide resistive switching memory (RRAM), nanoconductive bridge memory (CBRAM)). Offered Alternate years. Pre-requisite: EE 216. Preferred: EE 316.

**EE 310. SystemX: Ubiquitous Sensing, Computing and Communication Seminar. 1 Unit.**

This is a seminar course with invited speakers. Sponsored by Stanford's SystemX Alliance, the talks will cover emerging topics in contemporary hardware/software systems design. Special focus will be given to the key building blocks of sensors, processing elements and wired/wireless communications, as well as their foundations in semiconductor technology, SoC construction, and physical assembly as informed by the SystemX Focus Areas. The seminar will draw upon distinguished engineering speakers from both industry and academia who are involved at all levels of the technology stack and the applications that are now becoming possible. May be repeat for credit.

**EE 311. Advanced Integrated Circuits Technology. 3 Units.**

What are the practical and fundamental limits to the evolution of the technology of modern MOS devices and interconnects? How are modern devices and circuits fabricated and what future changes are likely? Advanced techniques and models of MOS devices and back-end (interconnect and contact) processing. What are future device structures and materials to maintain progress in integrated electronics? MOS front-end and back-end process integration. Prerequisites: EE 216 or equivalent. Recommended: EE 212.

**EE 312. Integrated Circuit Fabrication Laboratory. 3-4 Units.**

Formerly EE 410. Fabrication, simulation, and testing of a submicron CMOS process. Practical aspects of IC fabrication including silicon wafer cleaning, photolithography, etching, oxidation, diffusion, ion implantation, chemical vapor deposition, physical sputtering, and electrical testing. Students also simulate the CMOS process using process simulator TSUPREM4 of the structures and electrical parameters that should result from the process flow. Taught in the Stanford Nanofabrication Facility (SNF). Preference to students pursuing doctoral research program requiring SNF facilities. Enrollment limited to 20. Prerequisites: EE 212, EE 216, or consent of instructor.

**EE 314A. RF Integrated Circuit Design. 3 Units.**

Design of RF integrated circuits for communications systems, primarily in CMOS. Topics: the design of matching networks and low-noise amplifiers at RF, mixers, modulators, and demodulators; review of classical control concepts necessary for oscillator design including PLLs and PLL-based frequency synthesizers. Design of low phase noise oscillators. Design of high-efficiency (e.g., class E, F) RF power amplifiers, coupling networks. Behavior and modeling of passive and active components at RF. Narrowband and broadband amplifiers; noise and distortion measures and mitigation methods. Overview of transceiver architectures. Prerequisite: EE214B.

**EE 314B. Advanced RF Integrated Circuit Design. 3 Units.**

Analysis and design of modern communication circuits and systems with emphasize on design techniques for high-frequency (into mm-wave) ICs. Topics include MOS, bipolar, and BiCMOS high-frequency integrated circuits, including power amplifiers, extremely wideband amplifiers, advanced oscillators, phase-locked loops and frequency-translation circuits. Design techniques for mm-wave silicon ICs (on-chip low-loss transmission lines, unilateralization techniques, in-tegrated antennas, harmonic generation, etc) will also be studied. Prerequisite: EE314A or equivalent course in RF or microwave.

**EE 315. Analog-Digital Interface Circuits. 3 Units.**

Analysis and design of circuits and circuit architectures for signal conditioning and data conversion. Fundamental circuit elements such as operational transconductance amplifiers, active filters, sampling circuits, switched capacitor stages and voltage comparators. Sensor interfaces for micro-electromechanical and biomedical applications. Nyquist and oversampling A/D and D/A converters. Prerequisite: EE 214B.

**EE 316. Advanced VLSI Devices. 3 Units.**

In modern VLSI technologies, device electrical characteristics are sensitive to structural details and therefore to fabrication techniques. How are advanced VLSI devices designed and what future changes are likely? What are the implications for device electrical performance caused by fabrication techniques? Physical models for nanometer scale structures, control of electrical characteristics (threshold voltage, short channel effects, ballistic transport) in small structures, and alternative device structures for VLSI. Prerequisites: 216 or equivalent. Recommended: EE 212.

**EE 320. Nanoelectronics. 3 Units.**

This course covers the device physics and operation principles of nanoelectric devices, with a focus on devices for energy-efficient computation. Topics covered include devices based on new nanomaterials such as carbon nanotubes, semiconductor nanowires, and 2D layered materials such as graphene; non-FET based devices such as nanoelectromechanical (NEM) relay, single electron transistors (SET) and resonant tunneling diodes (RTD); as well as FET-based devices such as tunnel FET. Devices targeted for both logic and memory applications are covered. Prerequisites: Undergraduate device physics, EE222, EE216, EE316. Recommended courses: EE223, EE228, EE311.

**EE 323. Energy in Electronics. 3 Units.**

EE 323 examines energy in modern nanoelectronics, from fundamentals to systems. Fundamental topics include energy storage and transfer via electrons and phonons, ballistic limits of current and heat, meso- to macroscale mobility and thermal conductivity. Applied topics include power in nanoscale devices (1D nanotubes and nanowires, 2D materials, 3D silicon CMOS, resistive memory and interconnects), circuit leakage, temperature measurements, thermoelectric energy conversion, and thermal challenges in densely integrated systems. Basic knowledge of semiconductors, transistors, and Matlab (or similar) are recommended.

**EE 327. Properties of Semiconductor Materials. 3 Units.**

Modern semiconductor devices and integrated circuits are based on unique energy band, carrier transport, and optical properties of semiconductor materials. How to choose these properties for operation of semiconductor devices. Emphasis is on quantum mechanical foundations of the properties of solids, energy bandgap engineering, semi-classical transport theory, semi-conductor statistics, carrier scattering, electro-magneto transport effects, high field ballistic transport, Boltzmann transport equation, quantum mechanical transitions, optical absorption, and radiative and non-radiative recombination that are the foundations of modern transistors and optoelectronic devices. Prerequisites: EE216 or equivalent.

**EE 328. Physics of Advanced Semiconductor Devices. 3 Units.**

Principles governing the operation of modern semiconductor devices. Assumptions and approximations commonly made in analyzing devices. Emphasis is on the application of semiconductor physics to the development of advanced semiconductor devices such as heterojunctions, HJ-bipolar transistors, HJ-FETs, nanostructures, tunneling, single electron transistor and photonic devices. Use of SENTARUS, a 2-D Poisson solver, for simulation of ultra-small devices. Examples related to state-of-the-art devices and current device research. Prerequisite: 216. Recommended: 316.

**EE 329. The Electronic Structure of Surfaces and Interfaces. 3 Units.**

Physical concepts and phenomena for surface science techniques probing the electronic and chemical structure of surfaces, interfaces and nanomaterials. Microscopic and atomic models of microstructures; applications including semiconductor device technology, catalysis and energy. Physical processes of UV and X-ray photoemission spectroscopy, Auger electron spectroscopy, surface EXAFS, low energy electron diffraction, electron/photon stimulated ion desorption, scanning tunneling spectroscopy, ion scattering, energy loss spectroscopy and related imaging methods; and experimental aspects of these surface science techniques. Prerequisites: PHYSICS 70 and MATSCI 199/209, or consent of instructor. Same as: PHOTON 329

**EE 331. Biophotonics: Light in Medicine and Biology. 3 Units.**

Current topics and trends in the use of light in medicine and for advanced microscopy. Course begins with a review of relevant optical principles (basic physics required). Key topics include: light-tissue interactions; sensing and spectroscopy; contrast-enhanced imaging; super-resolution and label-free microscopy; medical applications of light for diagnostics, in-vivo imaging, and therapy; nanophotonics and array technologies. Open to non-majors; programming experience (Matlab and/or C) required.

**EE 332. Laser Dynamics. 3 Units.**

Dynamic and transient effects in lasers including spiking, Q-switching, mode locking, frequency modulation, frequency and spatial mode competition, linear and nonlinear pulse propagation, pulse shaping. Formerly EE 232. Prerequisite: 236C.

**EE 334. Micro and Nano Optical Device Design. 3 Units.**

Lecture and project course on design and analysis of optical devices with emphasis on opportunities and challenges created by scaling to the micrometer and nanometer ranges. The emphasis is on fundamentals, combined with some coverage of practical implementations. Prerequisite: EE 242 or equivalent.

**EE 336. Nanophotonics. 3 Units.**

Recent developments in micro- and nanophotonic materials and devices. Basic concepts of photonic crystals. Integrated photonic circuits. Photonic crystal fibers. Superprism effects. Optical properties of metallic nanostructures. Sub-wavelength phenomena and plasmonic excitations. Meta-materials. Prerequisite: Electromagnetic theory at the level of 242. Same as: MATSCI 346

**EE 340. Optical Micro- and Nano-Cavities. 3 Units.**

Optical micro- and nano-cavities and their device applications. Types of optical cavities (microdisks, microspheres, photonic crystal cavities, plasmonic cavities), and their electromagnetic properties, design, and fabrication techniques. Cavity quantum electrodynamics: strong and weak-coupling regime, Purcell factor, spontaneous emission control. Applications of optical cavities, including low-threshold lasers, optical modulators, quantum information processing devices, and bio-chemical sensors. Prerequisites: Advanced undergraduate or basic graduate level knowledge of electromagnetics, quantum.

**EE 346. Introduction to Nonlinear Optics. 3 Units.**

Wave propagation in anisotropic, nonlinear, and time-varying media. Microscopic and macroscopic description of electric-dipole susceptibilities. Free and forced waves; phase matching; slowly varying envelope approximation; dispersion, diffraction, space-time analogy. Harmonic generation; frequency conversion; parametric amplification and oscillation; electro-optic light modulation. Raman and Brillouin scattering; nonlinear processes in optical fibers. Prerequisites: 242, 236C.

**EE 347. Optical Methods in Engineering Science. 3 Units.**

Design and understanding of modern optical systems. Topics: geometrical optics; aberration theory; systems layout; applications such as microscopes, telescopes, optical processors. Computer ray tracing program as a design tool. Prerequisite: 236A or equivalent.

**EE 348. Advanced Optical Fiber Communications. 3 Units.**

Optical amplifiers: gain, saturation, noise. Semiconductor amplifiers. Erbium-doped fiber amplifiers. System applications: preamplified receiver performance, amplifier chains. Raman amplifiers, lumped vs. distributed amplification. Group-velocity dispersion management: dispersion-compensating fibers, filters, gratings. Interaction of dispersion and nonlinearity, dispersion maps. Multichannel systems. Wavelength-division multiplexing components: filters, multiplexers. WDM systems, crosstalk. Time, subcarrier, code and polarization-division multiplexing. Comparison of modulation techniques: differential phase-shift keying, phase-shift keying, quadrature-amplitude modulation. Comparison of detection techniques: noncoherent, differentially coherent, coherent. Prerequisite: 247.

**EE 349. Advanced Topics in Nano-Optics and Plasmonics. 3 Units.**

Electromagnetic phenomena at the nanoscale. Dipolar interactions between emitters and nanostructures, weak and strong coupling, surface plasmon polaritons and localized plasmons, electromagnetic field enhancements, and near-field coupling between metallic nanostructures. Numerical tools will be taught and used to simulate nano-optical phenomena. Prerequisite: EE 242 or equivalent.

**EE 355. Imaging Radar and Applications. 3 Units.**

Radar remote sensing, radar image characteristics, viewing geometry, range coding, synthetic aperture processing, correlation, range migration, range/Doppler algorithms, wave domain algorithms, polar algorithm, polarimetric processing, interferometric measurements. Applications: surface deformation, polarimetry and target discrimination, topographic mapping surface displacements, velocities of ice fields. Prerequisites: EE261. Recommended: EE254, EE278, EE279. Same as: GEOPHYS 265

**EE 356A. Resonant Converters. 3 Units.**

Miniaturization of efficient power converters remain a challenge in power electronics whose goal is to improving energy use and reducing waste. In this course, we will study the design of Resonant converters which are capable of operating at higher frequencies than their 'hard-switch' counterparts. Resonant converter are found in high performance applications where high control bandwidth and high power density are required. We will also explore practical design issues and trade off in selecting converter topologies in high performance applications. Prerequisites: EE153/EE253.

**EE 359. Wireless Communications. 3-4 Units.**

This course will cover advanced topics in wireless communications as well as current wireless system design. Topics include: an overview of current and future wireless systems; wireless channel models including path loss, shadowing, and statistical multipath channel models; fundamental capacity limits of wireless channels; digital modulation and its performance in fading and under intersymbol interference; techniques to combat fading including adaptive modulation and diversity; multiple antenna (MIMO) techniques to increase capacity and diversity, intersymbol interference including equalization, multicarrier modulation (OFDM), and spread spectrum; and multiuser system design, including multiple access techniques. Course is 3 units but can be taken for 4 units with an optional term project. Prerequisite: 279 or instructor consent.

**EE 364A. Convex Optimization I. 3 Units.**

Convex sets, functions, and optimization problems. The basics of convex analysis and theory of convex programming: optimality conditions, duality theory, theorems of alternative, and applications. Least-squares, linear and quadratic programs, semidefinite programming, and geometric programming. Numerical algorithms for smooth and equality constrained problems; interior-point methods for inequality constrained problems. Applications to signal processing, communications, control, analog and digital circuit design, computational geometry, statistics, machine learning, and mechanical engineering. Prerequisite: linear algebra such as EE263, basic probability.

Same as: CME 364A, CS 334A

**EE 364B. Convex Optimization II. 3 Units.**

Continuation of 364A. Subgradient, cutting-plane, and ellipsoid methods. Decentralized convex optimization via primal and dual decomposition. Monotone operators and proximal methods; alternating direction method of multipliers. Exploiting problem structure in implementation. Convex relaxations of hard problems. Global optimization via branch and bound. Robust and stochastic optimization. Applications in areas such as control, circuit design, signal processing, and communications. Course requirements include project. Prerequisite: 364A.

Same as: CME 364B

**EE 367. Computational Imaging and Display. 3 Units.**

Spawned by rapid advances in optical fabrication and digital processing power, a new generation of imaging technology is emerging: computational cameras at the convergence of applied mathematics, optics, and high-performance computing. Similar trends are observed for modern displays pushing the boundaries of resolution, contrast, 3D capabilities, and immersive experiences through the co-design of optics, electronics, and computation. This course serves as an introduction to the emerging field of computational imaging and displays. Students will learn to master bits and photons.

Same as: CS 448I

**EE 368. Digital Image Processing. 3 Units.**

Image sampling and quantization color, point operations, segmentation, morphological image processing, linear image filtering and correlation, image transforms, eigenimages, multiresolution image processing, noise reduction and restoration, feature extraction and recognition tasks, image registration. Emphasis is on the general principles of image processing. Students learn to apply material by implementing and investigating image processing algorithms in Matlab and optionally on Android mobile devices. Term project. Recommended: EE261, EE278.

Same as: CS 232

**EE 369A. Medical Imaging Systems I. 3 Units.**

Imaging internal structures within the body using high-energy radiation studied from a systems viewpoint. Modalities covered: x-ray, computed tomography, and nuclear medicine. Analysis of existing and proposed systems in terms of resolution, frequency response, detection sensitivity, noise, and potential for improved diagnosis. Prerequisite: EE 261.

**EE 369B. Medical Imaging Systems II. 3 Units.**

Imaging internal structures within the body using magnetic resonance studied from a systems viewpoint. Analysis of magnetic resonance imaging systems including physics, Fourier properties of image formation, effects of system imperfections, image contrast, and noise. Prerequisite: EE 261.

**EE 369C. Medical Image Reconstruction. 3 Units.**

Reconstruction problems from medical imaging, including magnetic resonance imaging (MRI), computed tomography (CT), and positron emission tomography (PET). Problems include reconstruction from non-uniform frequency domain data, automatic deblurring, phase unwrapping, reconstruction from incomplete data, and reconstruction from projections. Prerequisite: 369B.

**EE 371. Advanced VLSI Circuit Design. 3 Units.**

Design of high-performance digital systems, the things that cause them to fail, and how to avoid these problems. Topics will focus on current issues including: wiring resistance and how to deal with it, power and Gnd noise and regulation, clock (or asynchronous) system design and how to minimize clocking overhead, high-speed I/O design, energy minimization including leakage control, and structuring your Verilog code to result in high-performance, low energy systems. Extensive use of modern CAD tools. Prerequisites: EE 213 and EE 271, or consent of instructor.

**EE 372. Data Science for High Throughput Sequencing. 3 Units.**

Extraordinary advances in sequencing technology in the past decade have revolutionized biology and medicine. Many high-throughput sequencing based assays have been designed to make various biological measurements of interest. This course explores the various computational and data science problems that arises from processing, managing and performing predictive analytics on this high throughput sequencing data. Specific problems we will study include genome assembly, haplotype phasing, RNA-Seq assembly, RNA-Seq quantification, single cell RNA-seq analysis, multi-omics analysis, and genome compression. We attack these problems through a combination of tools from information theory, combinatorial algorithms, machine learning and signal processing. Through this course, the student will also get familiar with various software tools developed for the analysis of real sequencing data. Prerequisites: Basic knowledge of probability at the level of EE 178. Some programming experience.

**EE 373A. Adaptive Signal Processing. 3 Units.**

Learning algorithms for adaptive digital filters. Self-optimization. Wiener filter theory. Quadratic performance functions, their eigenvectors and eigenvalues. Speed of convergence. Asymptotic performance versus convergence rate. Applications of adaptive filters to statistical prediction, process modeling, adaptive noise canceling, adaptive antenna arrays, adaptive inverse control, and equalization and echo canceling in modems. Artificial neural networks. Cognitive memory/human and machine. Natural and artificial synapses. Hebbian learning. The Hebbian-LMS algorithm. Theoretical and experimental research projects in adaptive filter theory, communications, audio systems, and neural networks. Biomedical research projects, supervised jointly by EE and Medical School faculty. Recommended: EE263, EE264, EE278.

**EE 376A. Information Theory. 3 Units.**

The fundamental ideas of information theory. Entropy and intrinsic randomness. Data compression to the entropy limit. Huffman coding. Arithmetic coding. Channel capacity, the communication limit. Gaussian channels. Kolmogorov complexity. Asymptotic equipartition property. Information theory and Kelly gambling. Applications to communication and data compression. Prerequisite: EE178 or STATS 116, or equivalent. Same as: STATS 376A

**EE 376B. Network Information Theory. 3 Units.**

Network information theory deals with the fundamental limits on information flow in networks and the optimal coding schemes that achieve these limits. It aims to extend Shannon's point-to-point information theory and the Ford-Fulkerson max-flow min-cut theorem to networks with multiple sources and destinations. The course presents the basic results and tools in the field in a simple and unified manner. Topics covered include: multiple access channels, broadcast channels, interference channels, channels with state, distributed source coding, multiple description coding, network coding, relay channels, interactive communication, and noisy network coding. Prerequisites: EE376A. Same as: STATS 376B

**EE 376C. Universal Schemes in Information Theory. 3 Units.**

Universal schemes for lossless and lossy compression, channel coding and decoding, prediction, denoising, and filtering. Characterization of performance limitations in the stochastic setting: entropy rate, rate-distortion function, channel capacity, Bayes envelope for prediction, denoising, and filtering. Lempel-Ziv lossless compression, and Lempel-Ziv based schemes for lossy compression, channel coding, prediction, and filtering. Discrete universal denoising. Compression-based approach to denoising. The compound decision problem. Prerequisites: EE376A.

**EE 376D. Wireless Information Theory. 3 Units.**

Information theory forms the basis for the design of all modern day communication systems. The original theory was primarily point-to-point, studying how fast information can flow across an isolated noisy communication channel. Until recently, there has been only limited success in extending the theory to a network of interacting nodes. Progress has been made in the past decade driven by engineering interest in wireless networks. The course provides a unified overview of this recent progress made in information theory of wireless networks. Starting with an overview of the capacity of fading and multiple-antenna wireless channels, we aim to answer questions such as: What is the optimal way for users to cooperate and exchange information in a wireless network? How much benefit can optimal cooperation provide over traditional communication architectures? How can cooperation help to deal with interference between multiple wireless transmissions? Formerly EE361. Prerequisites: EE376A.

**EE 377. Information Theory and Statistics. 3 Units.**

Information theoretic techniques in probability and statistics. Fano, Assouad, and Le Cam methods for optimality guarantees in estimation. Large deviations and concentration inequalities (Sanov's theorem, hypothesis testing, the entropy method, concentration of measure). Approximation of (Bayes) optimal procedures, surrogate risks,  $f$ -divergences. Penalized estimators and minimum description length. Online game playing, gambling, no-regret learning. Prerequisites: EE 376A (or equivalent) or STATS 300A. Same as: STATS 311

**EE 378A. Statistical Signal Processing. 3 Units.**

Basic concepts of statistical decision theory; Bayes decision theory; HMMs and their state estimation (Forward-backward), Kalman as special case, approximate state estimation (particle filtering, Extended Kalman Filter), unknown parameters; Inference under logarithmic loss, mutual information as a fundamental measure of statistical relevance, properties of mutual information: data processing, chain rules. Directed information. Prediction under logarithmic loss; Context Tree Weighting algorithm; Sequential decision making in general: prediction under general loss functions, causal estimation, estimation of directed information. Non-sequential inference via sequential probability assignments. Universal denoising; Denoising from a decision theoretic perspective: nonparametric function estimation, wavelet shrinkage, density estimation; Estimation of mutual information on large alphabets with applications such as boosting the Chow-Liu algorithm. Estimation of the total variation distance, estimate the fundamental limit is easier than to achieve the fundamental limit; Peetre's  $K$ -functional and bias analysis: bias correction using jackknife, bootstrap, and Taylor series; Nonparametric functional estimation. Prerequisites: Familiarity with probability theory and linear algebra at the undergraduate level.

**EE 378B. Inference, Estimation, and Information Processing. 3 Units.**

Techniques and models for signal, data and information processing, with emphasis on incomplete data, non-ordered index sets and robust low-complexity methods. Linear models; regularization and shrinkage; dimensionality reduction; streaming algorithms; sketching; clustering, search in high dimension; low-rank models; principal component analysis. Applications include: positioning from pairwise distances; distributed sensing; measurement/traffic monitoring in networks; finding communities/clusters in networks; recommendation systems; inverse problems. Prerequisites: EE278 and EE263 or equivalent. Recommended but not required: EE378A.

**EE 379. Digital Communication. 3 Units.**

Modulation: linear, differential and orthogonal methods; signal spaces; power spectra; bandwidth requirements. Detection: maximum likelihood and maximum a posteriori probability principles; sufficient statistics; correlation and matched-filter receivers; coherent, differentially coherent and noncoherent methods; error probabilities; comparison of modulation and detection methods. Intersymbol interference: single-carrier channel model; Nyquist requirement; whitened matched filter; maximum likelihood sequence detection; Viterbi algorithm; linear equalization; decision-feedback equalization. Multi-carrier modulation: orthogonal frequency-division multiplexing; capacity of parallel Gaussian channels; comparison of single- and multi-carrier techniques. Prerequisite: EE102B and EE278 (or equivalents). EE279 is helpful but not required.

**EE 380. Colloquium on Computer Systems. 1 Unit.**

Live presentations of current research in the design, implementation, analysis, and applications of computer systems. Topics range over a wide range and are different every quarter. Topics may include fundamental science, mathematics, cryptography, device physics, integrated circuits, computer architecture, programming, programming languages, optimization, applications, simulation, graphics, social implications, venture capital, patent and copyright law, networks, computer security, and other topics of related to computer systems. May be repeated for credit.

**EE 382A. Parallel Processors Beyond Multicore Processing. 3 Units.**

Formerly EE392Q. The current parallel computing research emphasizes multi-cores, but there are alternative array processors with significant potential. This hands-on course focuses on SIMD (Single-Instruction, Multiple-Data) massively parallel processors. Topics: Flynn's Taxonomy, parallel architectures, Kestrel architecture and simulator, principles of SIMD programming, parallel sorting with sorting networks, string comparison with dynamic programming (edit distance, Smith-Waterman), arbitrary-precision operations with fixed-point numbers, reductions, vector and matrix multiplication, image processing algorithms, asynchronous algorithms on SIMD ("SIMD Phase Programming Model"), Mandelbrot set, analysis of parallel performance.

**EE 382C. Interconnection Networks. 3 Units.**

The architecture and design of interconnection networks used to communicate from processor to memory, from processor to processor, and in switches and routers. Topics: network topology, routing methods, flow control, router microarchitecture, and performance analysis. Enrollment limited to 30. Prerequisite: 282.

**EE 384A. Internet Routing Protocols and Standards. 3 Units.**

Local area networks addressing and switching; IEEE 802.11 bridging protocols (transparent bridging, virtual LANs). Internet routing protocols: interior gateways (RIP, OSPF) and exterior gateways (BGP); multicast routing; multiprotocol label switching (MPLS). Routing in mobile networks: Mobile IP, Mobile Ad Hoc Networks (MANET), Wireless Mesh Networks. Prerequisite: EE 284 or CS 144.

**EE 384B. Multimedia Communication over the Internet. 3 Units.**

Applications and requirements. Traffic generation and characterization: voice encoding (G.711, G.729, G.723); image and video compression (JPEG, H.261, MPEG-2, H.263, H.264), TCP data traffic. Quality impairments and measures. Networking technologies: LAN technologies; home broadband services (ADSL, cable modems, PONs); and wireless LANs (802.11). Network protocols for multimedia applications: resource reservation (ST2+, RSVP); differentiated services (DiffServ); and real-time transport protocol (RTP, RTCP). Audio-video-data conferencing standards: Internet architecture (SDP, SAP, SIP); ITU recommendations (H.320, H.323 and T.120); and real-time streaming protocol (RTSP). Emphasis will be placed on advances in network infrastructure and new services (VoIP, IPTV, Peer-to-peer communications, etc.) Prerequisite: 284 or CS 144. Recommended: 384A.

**EE 384C. Wireless Local and Wide Area Networks. 3 Units.**

Characteristics of wireless communication: multipath, noise, and interference. Communications techniques: spread-spectrum, CDMA, and OFDM. IEEE 802.11 physical layer specifications: FHSS, DSSS, IEEE 802.11b (CCK), and 802.11a/g (OFDM). IEEE 802.11 media access control protocols: carrier sense multiple access with collision avoidance (CSMA/CA), point coordination function (PCF), IEEE 802.11e for differentiated services. IEEE 802.11 network architecture: ad hoc and infrastructure modes, access point functionality. Management functions: synchronization, power management and association. IEEE 802.11s Mesh Networks. IEEE 802.16 (WiMAX) network architecture and protocols: Physical Layer (OFDMA) and Media Access Control Layer. Current research papers in the open literature. Prerequisite: EE 284 or CS 244A.

**EE 384E. Networked Wireless Systems. 3 Units.**

Design and implementation of wireless networks and mobile systems. The course will commence with a short retrospective of wireless communication and initially touch on some of the fundamental physical layer properties of various wireless communication technologies. The focus will then shift to design of media access control and routing layers for various wireless systems. The course will also examine adaptations necessary at transport and higher layers to cope with node mobility and error-prone nature of the wireless medium. Finally, it will conclude with a brief overview of other related issues including emerging wireless/mobile applications. Prerequisites: EE 284.

**EE 384S. Performance Engineering of Computer Systems & Networks. 3 Units.**

Modeling and control methodologies for high-performance network engineering, including: Markov chains and stochastic modeling, queueing networks and congestion management, dynamic programming and task/processor scheduling, network dimensioning and optimization, and simulation methods. Applications for design of high-performance architectures for wireline/wireless networks and the Internet, including: traffic modeling, admission and congestion control, quality of service support, power control in wireless networks, packet scheduling in switches, video streaming over wireless links, and virus/worm propagation dynamics and countermeasures. Enrollment limited to 30. Prerequisites: basic networking technologies and probability.

**EE 385A. Robust and Testable Systems Seminar. 1-4 Unit.**

Student/faculty discussions of research problems in the design of reliable digital systems. Areas: fault-tolerant systems, design for testability, production testing, and system reliability. Emphasis is on student presentations and Ph.D. thesis research. May be repeated for credit. Prerequisite: consent of instructor.

**EE 386. Robust System Design. 3 Units.**

Causes of system malfunctions; techniques for building robust systems that avoid or are resilient to such malfunctions through built-in error detection and correction, prediction, self-test, self-recovery, and self-repair; case studies and new research problems. Prerequisites: EE 108, EE180, and EE 282.

**EE 387. Algebraic Error Correcting Codes. 3 Units.**

Introduction to the theory of error correcting codes, emphasizing algebraic constructions, and diverse applications throughout computer science and engineering. Topics include basic bounds on error correcting codes; Reed-Solomon and Reed-Muller codes; list-decoding, list-recovery and locality. Applications may include communication, storage, complexity theory, pseudorandomness, cryptography, streaming algorithms, group testing, and compressed sensing. Prerequisites: Linear algebra, basic probability (at the level of, say, CS109, CME106 or EE178) and "mathematical maturity" (students will be asked to write proofs). Familiarity with finite fields will be helpful but not required. Same as: CS 250

**EE 388. Modern Coding Theory. 3 Units.**

Tools for analysis and optimization of iterative coding systems. LDPC, turbo and, RA codes. Optimized ensembles, message passing algorithms, density evolution, and analytic techniques. Prerequisite: 376A.

**EE 390. Special Studies or Projects in Electrical Engineering. 1-15 Unit.**

Independent work under the direction of a faculty member. Individual or team activities may involve lab experimentation, design of devices or systems, or directed reading. May be repeated for credit.

**EE 391. Special Studies and Reports in Electrical Engineering. 1-15 Unit.**

Independent work under the direction of a faculty member; written report or written examination required. Letter grade given on the basis of the report; if not appropriate, student should enroll in 390. May be repeated for credit.

**EE 392AA. Multi-Dimensional Data Transmission. 3 Units.**

EE 392AA focuses on state-of-the-art data communication systems that use multiple dimensions (parallel antennas, wires, links), including the latest versions of 5G, Wi-Fi, G.MGfast wireline, DOCSIS 3.1, and other systems that stress fundamental transmission limits. Topics include system design, particularly physical-layer modulation/coding for analysis and optimization for specific channels. Included are all vectored designs (MIMO, massive MIMO, SIMO, MISO) and methods to design and adapt both transmitter and receiver to variable channels. This course is approved for satisfying the MSEE Depth Sequence on Communication and Networking. Prerequisites: EE 278, EE 279, EE 379 or instructor consent.

**EE 392B. Industrial Internet of Things. 1 Unit.**

The seminar will feature guest lectures from the industry to discuss the state of the affairs in the Industrial Internet of Things (IIoT) with emphasis on existing and new Data Science, analytics, and Big Data applications. The class will address several verticals. One of them is electrical power industry, which is undergoing transition to renewables and distributed generation. Another one is aerospace industry including airlines and equipment vendors. Other verticals are oil and gas, data centers, and semiconductor manufacturing.

**EE 392E. VLSI Signal Processing. 3 Units.**

DSP architecture design. Study of circuit and architecture techniques in energy-area-performance space, design methodology based on a data-flow graph model that leads to hardware implementation. We explore automated wordlength reduction, direct and recursive filters, time-frequency analysis and other examples. The project focuses on architecture exploration for selected DSP algorithms. Useful for algorithm designers who consider hardware constraints and for circuit designers who prototype DSP algorithms in hardware. Prerequisites: EE102B and EE108A; Recommended: EE264 and EE271.

**EE 392I. Seminar on Trends in Computing and Communications. 1 Unit.**

Lectures series and invited talks on current trends in computing and communications, and ongoing initiatives for research and open innovation. This year's focus on evolving cloud computing architectures and their impact on the enterprise; big data trends and rise of the third platform; software as a service; wireless and cellular network architectures; mobility and mobile data proliferation; open mobile platforms (e.g. Android); multi-homed mobile networking, associated data communication and mobile resource trade-offs, and system implementation in smartphones and Android devices.

**EE 392K. Self-Programming Networks. 3 Units.**

This is an advanced topics course on building autonomous networks using data and techniques from machine learning. It covers two major application areas: Cloud Computing Systems and Mobile Wireless Networks. The course introduces the architecture of Self-Programming Networks for sensing, inferring, learning and control, consisting of (i) a "reflex layer" for inferring at line rate and at scale, and (ii) a "deliberate layer" for efficient resource scheduling and network control. Various sensing and inference algorithms for deriving insights and alerts from the sensed data will be discussed. Methods for synchronizing clocks across a large data center and using this to reconstruct the fine details of network performance (queue-depths, link utilizations and buffer and link compositions) in near real-time will be presented. Similarly, methods for inferring available bandwidth in dynamic mobile networks and using it to drive different application optimizations will be presented. Students will learn the use of neural networks and learning techniques (a) to accelerate inference and control algorithms, (b) for "workload fingerprinting", (c) for predicting wireless link capacities, and (d) for scheduling resources. Finally, the principles of creating an interactive database for detecting anomalies, raising alerts, and serving insights to the user will be discussed. The course involves a team-based project.

**EE 392T. Seminar in Chip Test and Debug. 1 Unit.**

Seminars by industry professionals in digital IC manufacturing test and silicon debug. Topics include yield and binsplit modeling, defect types and detection, debug hardware, physical analysis, and design for test/debug circuits. Case studies of silicon failures. Prerequisite: basic digital IC design (271 or 371).

**EE 400. Thesis and Thesis Research. 1-15 Unit.**

Limited to candidates for the degree of Engineer or Ph.D. May be repeated for credit.

**EE 402A. Topics in International Technology Management. 1 Unit.**

Theme for Autumn 2017 is "The Rise of Commercial Space Businesses in Asia." Distinguished guest speakers from industry, governments, and universities present and discuss businesses from Asia related to outer space, including telecommunications, debris removal, payload launch services, space medicine, etc. See syllabus for specific requirements, which may differ from those of other seminars at Stanford. Same as: EASTASN 402A

**EE 402T. Entrepreneurship in Asia. 1 Unit.**

Distinctive patterns and challenges of entrepreneurship in Asia; update of business and technology issues in the creation and growth of start-up companies in major Asian economies. Distinguished speakers from industry, government, and academia. Same as: EALC 402T, EASTASN 402T

**EE 414. RF Transceiver Design Laboratory. 3 Units.**

Students design, build, and test GHz transceivers using microstrip construction techniques and discrete components. The design, construction, and experimental characterization of representative transceiver building blocks: low noise amplifiers (LNAs), diode ring mixers, PLL-based frequency synthesizers, voltage-controlled oscillators (VCOs), power amplifiers (PAs), and microstrip filters and patch antennas. The characteristics of passive microstrip components (including interconnect). Emphasis is on a quantitative reconciliation of theoretical predictions and extensive experimental measurements performed with spectrum and network analyzers, time-domain reflectometers (TDRs), noise figure meter and phase noise analyzers. Prerequisites: EE 314A and EE 251 (or EE 251).

**EE 42. Introduction to Electromagnetics and Its Applications. 5 Units.**

Electricity and magnetism and its essential role in modern electrical engineering devices and systems, such as sensors, displays, DVD players, and optical communication systems. The topics that will be covered include electrostatics, magnetostatics, Maxwell's equations, one-dimensional wave equation, electromagnetic waves, transmission lines, and one-dimensional resonators. Pre-requisites: MATH 42 or MATH 51 or CME 100 or equivalent.

Same as: ENGR 42

**EE 46. Engineering For Good: Save the World and Have Fun Doing It. 3 Units.**

Projects that provide immediate and positive impact on the world. Focus is on global health by learning from experts in this field. Students work on real-world projects with help from members of NGOs and social entrepreneurial companies as part of the hand-on learning experience. Prerequisite: ENGR 40 or EE 122A or CS 106B or consent of instructor.

**EE 469B. RF Pulse Design for Magnetic Resonance Imaging. 3 Units.**

Magnetic resonance imaging (MRI) and spectroscopy (MRS) based on the use of radio frequency pulses to manipulate magnetization. Analysis and design of major types of RF pulses in one and multiple dimensions, analysis and design of sequences of RF pulses for fast imaging, and use of RF pulses for the creation of image contrast in MRI. Prerequisite: 369B.

**EE 60N. Man versus Nature: Coping with Disasters Using Space Technology. 4 Units.**

Preference to freshman. Natural hazards, earthquakes, volcanoes, floods, hurricanes, and fires, and how they affect people and society; great disasters such as asteroid impacts that periodically obliterate many species of life. Scientific issues, political and social consequences, costs of disaster mitigation, and how scientific knowledge affects policy. How spaceborne imaging technology makes it possible to respond quickly and mitigate consequences; how it is applied to natural disasters; and remote sensing data manipulation and analysis. GER:DB-EngrAppSci. Same as: GEOPHYS 60N

**EE 65. Modern Physics for Engineers. 4 Units.**

This course introduces the core ideas of modern physics that enable applications ranging from solar energy and efficient lighting to the modern electronic and optical devices and nanotechnologies that sense, process, store, communicate and display all our information. Though the ideas have broad impact, the course is widely accessible to engineering and science students with only basic linear algebra and calculus through simple ordinary differential equations as mathematics background. Topics include the quantum mechanics of electrons and photons (Schrödinger's equation, atoms, electrons, energy levels and energy bands; absorption and emission of photons; quantum confinement in nanostructures), the statistical mechanics of particles (entropy, the Boltzmann factor, thermal distributions), the thermodynamics of light (thermal radiation, limits to light concentration, spontaneous and stimulated emission), and the physics of information (Maxwell's demon, reversibility, entropy and noise in physics and information theory). Pre-requisite: Physics 41. Pre- or co-requisite: Math 53 or CME 102.

**EE 801. TGR Project. 0 Units.**

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**EE 802. TGR Dissertation. 0 Units.**

May be repeated for credit.

# Energy Resources Engineering (ENERGY)

## **ENERGY 101. Energy and the Environment. 3 Units.**

Energy use in modern society and the consequences of current and future energy use patterns. Case studies illustrate resource estimation, engineering analysis of energy systems, and options for managing carbon emissions. Focus is on energy definitions, use patterns, resource estimation, pollution. Recommended: MATH 21 or 42.  
Same as: EARTHSYS 101

## **ENERGY 101A. Energizing California. 1 Unit.**

A weekend field trip featuring renewable and nonrenewable energy installations in Northern California. Tour geothermal, bioenergy, and natural gas field sites with expert guides from the Department of Energy Resources Engineering. Requirements: One campus meeting and weekend field trip. Enrollment limited to 25. Freshman have first choice.

## **ENERGY 102. Fundamentals of Renewable Power. 3 Units.**

Do you want a much better understanding of renewable power technologies? Did you know that wind and solar are the fastest growing forms of electricity generation? Are you interested in hearing about the most recent, and future, designs for green power? Do you want to understand what limits power extraction from renewable resources and how current designs could be improved? This course dives deep into these and related issues for wind, solar, biomass, geothermal, tidal and wave power technologies. We welcome all student, from non-majors to MBAs and grad students. If you are potentially interested in an energy or environmental related major, this course is particularly useful. Recommended: Math 21 or 42.  
Same as: EARTHSYS 102

## **ENERGY 104. Sustainable Energy for 9 Billion. 3 Units.**

This course explores the transition to a sustainable energy system at large scales (national and global), and over long time periods (decades). Explores the drivers of global energy demand and the fundamentals of technologies that can meet this demand sustainably. Focuses on constraints affecting large-scale deployment of technologies, as well as inertial factors affecting this transition. Problems will involve modeling global energy demand, deployment rates for sustainable technologies, technological learning and economics of technical change. Recommended: ENERGY 101, 102.

## **ENERGY 110. Engineering Economics. 3 Units.**

The success of energy projects and companies is judged by technical, economic and financial criteria. This course will introduce concepts of engineering economy, e.g., time value of money, life cycle costs and financial metrics, and explore their application to the business of energy. We will use case studies, business school cases and possibly industry guest lecturers. Examples from the hydrocarbon businesses that dominate energy today will provide the framework for the analysis of both conventional and renewable energy.

## **ENERGY 120. Fundamentals of Petroleum Engineering. 3 Units.**

Lectures, problems, field trip. Engineering topics in petroleum recovery; origin, discovery, and development of oil and gas. Chemical, physical, and thermodynamic properties of oil and natural gas. Material balance equations and reserve estimates using volumetric calculations. Gas laws. Single phase and multiphase flow through porous media.  
Same as: ENGR 120

## **ENERGY 120A. Flow Through Porous Media Laboratory. 1 Unit.**

Laboratory measurements of permeability and porosity in rocks. Applications to subsurface fluid mechanics. Course is intended as an accompaniment to Energy 120.

## **ENERGY 121. Fundamentals of Multiphase Flow. 3 Units.**

Multiphase flow in porous media. Wettability, capillary pressure, imbibition and drainage, Leverett J-function, transition zone, vertical equilibrium. Relative permeabilities, Darcy's law for multiphase flow, fractional flow equation, effects of gravity, Buckley-Leverett theory, recovery predictions, volumetric linear scaling, JBN and Jones-Rozelle determination of relative permeability. Frontal advance equation, Buckley-Leverett equation as frontal advance solution, tracers in multiphase flow, adsorption, three-phase relative permeabilities.  
Same as: ENERGY 221

## **ENERGY 122. Lunch with Numerics. 1 Unit.**

This course provides students hands-on experience in the design and implementation of numerical methods for challenging fluid flow problems in the earth sciences. The base software used is the public domain code MRST. Students will explore common pitfalls of well-known numerical approaches, assess effectiveness of numerical methods for heterogeneous and strongly nonlinear problems and gain more insight into numerical accuracy and stability concepts.

## **ENERGY 123. When Technology Meets Reality: An In-depth Look at the Deepwater Horizon Blowout and Oil Spill. 1 Unit.**

The Deepwater Horizon blowout and spill in April 2010 occurred on one of the most advanced deepwater drilling rigs in the world operated by one of the most experienced companies. In this course we will look at and discuss the technologies and management practices involved in deepwater drilling and discuss how an accident like this happens and what could have been done differently to avoid it. We will focus on the Horizon and also look briefly at other high profile industrial and technological accidents.

## **ENERGY 12SC. Water and Power in the Pacific Northwest: The Columbia River. 2 Units.**

This seminar will explore the nature of and coupling between water and energy resources in the Pacific Northwest, using the Columbia River as our case study. We will explore the hydrologic, meteorologic, and geologic basis of water and energy resources, and the practical, social, environmental, economic, and political issues surrounding their development in the West. The Columbia River and its watershed provide a revealing prototype for examining these issues. A transnational, multi-state river with the largest residual populations of anadromous salmonids in the continental US, it provides a substantial fraction of the electrical energy produced in the Northwest (the Grand Coulee dam powerhouse on the Columbia is the largest-capacity hydropower facility in the US), it is a major bulk commodity transportation link to the interior West via its barge navigation system, it provides the water diversions supporting a large area of irrigated agriculture in Washington and Idaho, and its watershed is home to significant sources of solar and wind energy. We will use the Columbia to study water and energy resources, and especially their coupling, in the context of rapid climate change, ecosystem impacts, economics, and public policy. We will begin with a week of classroom study and discussion on campus, preparing for the field portion of the seminar. We will then travel to the Columbia basin, spending approximately 10 days visiting a number of water and energy facilities across the watershed, e.g., solar, wind, and natural gas power plants; dams and reservoirs with their powerhouses, fish passage facilities, navigation locks, and flood-mitigation systems; an irrigation project; operation centers; and offices of regulatory agencies. We will meet with relevant policy experts and public officials, along with some of the stakeholders in the basin. Over the summer students will be responsible for assigned readings from several sources, including monographs, online materials, and recent news articles. During the trip, students will work in small groups to analyze and assess one aspect of the coupling between water and energy resources in the Northwest. The seminar will culminate in presentations on these analyses. Travel expenses during the seminar will be provided (except incidentals) by the Bill Lane Center for the American West and Sophomore College.  
Same as: CEE 17SC, EARTHSYS 16SC



**ENERGY 130. Well Log Analysis I. 3 Units.**

For earth scientists and engineers. Interdisciplinary, providing a practical understanding of the interpretation of well logs. Lectures, problem sets using real field examples: methods for evaluating the presence of hydrocarbons in rock formations penetrated by exploratory and development drilling. The fundamentals of all types of logs, including electric and non-electric logs.

**ENERGY 141. Seismic Reservoir Characterization. 3-4 Units.**

(Same as GP241) Practical methods for quantitative characterization and uncertainty assessment of subsurface reservoir models integrating well-log and seismic data. Multidisciplinary combination of rock-physics, seismic attributes, sedimentological information and spatial statistical modeling techniques. Student teams build reservoir models using limited well data and seismic attributes typically available in practice, comparing alternative approaches. Software provided (SGEMS, Petrel, Matlab). Offered every other year. Recommended: ERE240/260, or GP222/223, or GP260/262 or GES253/257; ERE246, GP112.

Same as: ENERGY 241, GEOPHYS 241A

**ENERGY 146. Reservoir Characterization and Flow Modeling with Outcrop Data. 3 Units.**

Course gives an overview of concepts from geology and geophysics relevant for building subsurface reservoir models. Includes a required 1-day field trip and hands-on lab exercises. Target audience: MS and 1st year PhD students in PE/ERE/GS with little or no background in geology or geophysics. Topics include: basin and petroleum systems, depositional settings, deformation and diagenesis, introduction to reflection seismic data, rock and fluid property measurements, geostatistics, and flow in porous media.

Same as: ENERGY 246, GS 246

**ENERGY 153. Carbon Capture and Sequestration. 3-4 Units.**

CO<sub>2</sub> separation from syngas and flue gas for gasification and combustion processes. Transportation of CO<sub>2</sub> in pipelines and sequestration in deep underground geological formations. Pipeline specifications, monitoring, safety engineering, and costs for long distance transport of CO<sub>2</sub>. Comparison of options for geological sequestration in oil and gas reservoirs, deep unmineable coal beds, and saline aquifers. Life cycle analysis.

Same as: ENERGY 253

**ENERGY 155. Undergraduate Report on Energy Industry Training. 1-3 Unit.**

On-the-job practical training under the guidance of on-site supervisors. Required report detailing work activities, problems, assignments and key results. Prerequisite: written consent of instructor.

**ENERGY 158. Bringing New Energy Technologies to Market: Optimizing Technology Push and Market Pull. 3 Units.**

This research-based seminar will evaluate the impact of market interventions in commercializing four segments of our energy mix: wind, photovoltaics, lighting, and batteries. To accelerate the development of new technologies to reduce greenhouse gas emissions and improve national security, governments use policies like direct R&D funding, financial incentives or penalties, mandatory targets or caps, and performance standards to create market conditions that favor emerging technologies. Findings outlining the most effective mix of interventions over time will be submitted for publication. Enrollment limited to 12 graduate and co-term students. Those interested please email a paragraph to cathyzoi@stanford.edu by September 16, 2013 expressing why you want to take part and research experience you can bring to the seminar.

**ENERGY 160. Modeling Uncertainty in the Earth Sciences. 3 Units.**

Whether Earth Science modeling is performed on a local, regional or global scale, for scientific or engineering purposes, uncertainty is inherently present due to lack of data and lack of understanding of the underlying phenomena. This course highlights the various issues, techniques and practical tools available for modeling uncertainty of complex Earth systems as well as the impact uncertainty has on practical decisions for geo-engineering problems. The course focuses on practical breadth rather than theoretical depth. Topics covered are: the process of building models, sources of uncertainty, probabilistic techniques, spatial data analysis and geostatistics, grid and scale, spatio-temporal uncertainty, visualizing uncertainty in large dimensions, Monte Carlo simulation, sensitivity analysis, reducing uncertainty with data, value of information. Applications to both local (reservoir, aquifer) and global (climate) are covered through literature study. Extensive software use with SGEMS. Prerequisites: algebra (CME 104 or equivalent), introductory statistics course (CME 106 or equivalent).

**ENERGY 167. Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties. 3 Units.**

Appraisal of development and remedial work on oil and gas wells; appraisal of producing properties; estimation of productive capacity, reserves; operating costs, depletion, and depreciation; value of future profits, taxation, fair market value; original or guided research problems on economic topics with report. Prerequisite: consent of instructor.

Same as: ENERGY 267

**ENERGY 171. Energy Infrastructure, Technology and Economics. 3 Units.**

Oil and gas represents more than 50% of global primary energy. In delivering energy at scale, the industry has developed global infrastructure with supporting technology that gives it enormous advantages in energy markets; this course explores how the oil and gas industry operates. From the perspective of these established systems and technologies, we will look at the complexity of energy systems, and will consider how installed infrastructure enables technology development and deployment, impacts energy supply, and how existing infrastructure and capital invested in fossil energy impacts renewable energy development. Prerequisites: Energy 101 and 102 or permission of instructor.

Same as: ENERGY 271

**ENERGY 175. Well Test Analysis. 3 Units.**

Lectures, problems. Application of solutions of unsteady flow in porous media to transient pressure analysis of oil, gas, water, and geothermal wells. Pressure buildup analysis and drawdown. Design of well tests. Computer-aided interpretation.

**ENERGY 180. Oil and Gas Production Engineering. 3 Units.**

Design and analysis of production systems for oil and gas reservoirs. Topics: well completion, single-phase and multi-phase flow in wells and gathering systems, artificial lift and field processing, well stimulation, inflow performance. Prerequisite: 120.

Same as: ENERGY 280

**ENERGY 191. Optimization of Energy Systems. 3-4 Units.**

Introductory mathematical programming and optimization using examples from energy industries. Emphasis on problem formulation and solving, secondary coverage of algorithms. Problem topics include optimization of energy investment, production, and transportation; uncertain and intermittent energy resources; energy storage; efficient energy production and conversion. Methods include linear and nonlinear optimization, as well as multi-objective and goal programming. Tools include Microsoft Excel and AMPL mathematical programming language. Prerequisites: MATH 20, 41, or MATH 51, or consent of instructor. Programming experience helpful (e.g., CS 106A, CS 106B).

Same as: ENERGY 291

**ENERGY 192. Undergraduate Teaching Experience. 1-3 Unit.**

Leading field trips, preparing lecture notes, quizzes under supervision of the instructor. May be repeated for credit.

**ENERGY 193. Undergraduate Research Problems. 1-3 Unit.**

Original and guided research problems with comprehensive report. May be repeated for credit.

**ENERGY 194. Special Topics in Energy and Mineral Fluids. 1-3 Unit.**

May be repeated for credit.

**ENERGY 199. Senior Project and Seminar in Energy Resources. 3-4 Units.**

Individual or group capstone project in Energy Resources Engineering. Emphasis is on report preparation. May be repeated for credit.

**ENERGY 201. Laboratory Measurement of Reservoir Rock Properties. 3 Units.**

In this course, students will learn methods for measuring reservoir rock properties. Techniques covered include core preservation and sample preparation; Rock petrography; Interfacial tension of fluids; Measurement of contact angles of fluids on reservoir media; Capillary pressure measurement and interpretation; Absolute and effective porosities; Absolute permeability; Multiphase flow including relative permeability and residual saturation. The class will be 1 3-hour lecture/lab per week, with readings and weekly assignments. A field trip to a professional core characterization lab may be included.

**ENERGY 202. Petroleum Industry Performance Management. 1 Unit.**

Coming up with the right technical solution is only the beginning & it must be implemented. The art and science of Performance Management. How to guarantee results with Leading and Lagging KPIs (Key Performance Indicators). Assessment using the FAIRTM Model (Focus, Accountability, Involvement, Response). Operating Rhythm™: Business Reviews, Boardwalks, One-Pagers, Handover, and Crew Talks. Project management's implementation plans, milestones, and clear deliverables. Sustainability. After Action Reviews (AARs). Continuous Improvement (CI). Coaching's GROW Model (Goal, Reality, Options, Will). The ABC Model (Antecedent & Behavior & Consequence). Students will solve three Case Studies with these tools; the instructor will present the actual solution & what worked, what didn't, and why.

**ENERGY 203. The Energy Transformation Collaborative. 1-3 Unit.**

Solving the global energy challenge will require the creation and successful scale-up of hundreds of new ventures. This project-based course provides a launchpad for the development and creation of transformational energy ventures and innovation models. Interdisciplinary teams will research, analyze, and develop detailed launch plans for high-impact opportunities in the context of the new energy venture development framework offered in this course.

**ENERGY 204. Achieving Universal Energy Access by 2030: Can it be done?. 2-3 Units.**

Today 1.2 billion people have no access to electricity; many more don't have power that is reliable. Activities the developed world counts on for economic growth are severely limited where there isn't reliable electricity. Cost reductions in distributed, renewable energy generation and battery storage technologies are creating opportunities to bring affordable power to communities that have never had it. This course will examine what will need to be in place so that electricity can reach everyone by 2030.

**ENERGY 20N. Technology in the Greenhouse. 3 Units.**

The evidence that human activities are changing the climate is overwhelming. Energy use is woven throughout the fabric of modern societies, and energy systems are also a primary way that humans interact with the global Earth systems like climate. We know enough about the potential impacts of climate change to see that we need to transform the world's energy systems to a much cleaner set of technologies with much lower greenhouse gas emissions. Economies that use energy in a clean, cost-effective way will be much more competitive in the future. The clean energy transition is now underway, with reductions in coal use and rapid growth in solar and wind deployment, but there is much more to do to limit the adverse impacts of climate change. This seminar explores technology options available to make the changes needed, in the developed and developing worlds. There is no shortage of energy available for our use. Instead, the challenge is to convert those energy resources into services like electricity and transportation, and that conversion requires technology, as well as policies and markets that enable innovation. The scale of the world's energy systems is dauntingly large, and we will need a well-diversified set of options to meet the challenge. Wind, solar, nuclear, carbon capture and storage for fossil fuel use, modified agriculture, electric (and automated) vehicles, advanced air conditioning, and many other technology options exist. We will consider these technologies and ask what barriers will have to be addressed if they are to be deployed at a scale large enough to reduce the impact climate change. The format will be discussions of technologies and their potential with a project and student presentations toward the end of the quarter.

**ENERGY 212. Environmental Aspects of Oil and Gas Production. 1 Unit.**

This course introduces students to the major environmental aspects of oil and gas production, including law, policy, regulation, impact assessment, and mitigation. Through readings, lectures, homework, in-class activities, and case studies, students learn about the major state/federal laws and regulatory programs governing oil and gas in the U.S., industry permitting and compliance strategies, and current public stakeholder issues/challenges (with a particular focus on climate change and water management). Emerging legislative/regulatory trends, advocacy approaches, and sustainability concepts also are explored.

**ENERGY 214. The Global Price of Oil. 2 Units.**

Understanding the current and future price of oil requires the synthesis of geologic, engineering, financial, geopolitical, and macroeconomic information. In this seminar, we will build a global supply curve for petroleum by studying the marginal and full-cycle production costs for each of the major resource categories. We will study how reserve classification varies globally, and how global petroleum resources and reserves have changed and are likely to change over time. We will further investigate how the time lag between resource discovery, project sanctioning, and full production will affect future supply. Finally, we will study the elasticity of oil demand and how that demand is likely to change over time as the developing world gets richer and as competition from other energy sources increases.

**ENERGY 216. Entrepreneurship in Energy. 2 Units.**

The combined forces of climate change, technological development, and geopolitics are disrupting the energy industry, yet the competitiveness and regulated nature of the mature markets for fuel, power, and materials have created meaningful barriers to entry for startup companies. In this case based course, students will study real energy startups to understand what challenges they have overcome and continue to face. Each week, the course will focus on a different company and the founder or CEO of that company will present. Topics will include advanced battery technologies, photovoltaic manufacturing, solar and wind project development, oil & gas exploration & production, advanced biofuels, electric vehicles, distributed power generation, and financing energy startups.

**ENERGY 217. Research Seminar: Energy Development in the Emerging Economy. 2-3 Units.**

Through this research project, students will dive into and gain firsthand experience on evaluating the efficacy of a portfolio of 34 energy technology start-up projects in emerging economies that encompasses a range of regions, energy sectors, and technologies. Student's will learn from each project's unique experiences, and gather critical data that may help support the success of future similar endeavors. Some questions students will be looking to answer include (1) Was the project able to accomplish its goal(s)? (2) Are there common success factors or similar roadblocks? (3) Is the technology and/or solution still effective and operational?  
Prerequisite: submit survey <https://precourt.typeform.com/to/NdtU0Z> and permission of instructor.

**ENERGY 221. Fundamentals of Multiphase Flow. 3 Units.**

Multiphase flow in porous media. Wettability, capillary pressure, imbibition and drainage, Leverett J-function, transition zone, vertical equilibrium. Relative permeabilities, Darcy's law for multiphase flow, fractional flow equation, effects of gravity, Buckley-Leverett theory, recovery predictions, volumetric linear scaling, JBN and Jones-Rozelle determination of relative permeability. Frontal advance equation, Buckley-Leverett equation as frontal advance solution, tracers in multiphase flow, adsorption, three-phase relative permeabilities.

Same as: ENERGY 121

**ENERGY 222. Advanced Reservoir Engineering. 3 Units.**

Lectures, problems. General flow equations, tensor permeabilities, steady state radial flow, skin, and succession of steady states. Injectivity during fill-up of a depleted reservoir, injectivity for liquid-filled reservoirs. Flow potential and gravity forces, coning. Displacements in layered reservoirs. Transient radial flow equation, primary drainage of a cylindrical reservoir, line source solution, pseudo-steady state. May be repeated for credit.  
Prerequisite: 221.

**ENERGY 223. Reservoir Simulation. 3-4 Units.**

Fundamentals of petroleum reservoir simulation. Equations for multicomponent, multiphase flow between gridblocks comprising a petroleum reservoir. Relationships between black-oil and compositional models. Techniques for developing black-oil, compositional, thermal, and dual-porosity models. Practical considerations in the use of simulators for predicting reservoir performance. Class project. Prerequisite: 221 and 246, or consent of instructor. Recommended: CME 206.

**ENERGY 224. Advanced Reservoir Simulation. 3 Units.**

Topics include modeling of complex wells, coupling of surface facilities, compositional modeling, dual porosity models, treatment of full tensor permeability and grid nonorthogonality, local grid refinement, higher order methods, streamline simulation, upscaling, algebraic multigrid solvers, unstructured grid solvers, history matching, other selected topics. Prerequisite: 223 or consent of instructor. May be repeated for credit.

**ENERGY 225. Theory of Gas Injection Processes. 3 Units.**

Lectures, problems. Theory of multicomponent, multiphase flow in porous media. Miscible displacement: diffusion and dispersion, convection-dispersion equations and its solutions. Method of characteristic calculations of chromatographic transport of multicomponent mixtures. Development of miscibility and interaction of phase behavior with heterogeneity. May be repeated for credit.  
Prerequisite: CME 200.

**ENERGY 226. Thermal Recovery Methods. 3 Units.**

Theory and practice of thermal recovery methods: steam drive, cyclic steam injections, and in situ combustion. Models of combined mass and energy transport. Estimates of heated reservoir volume and oil recovery performance. Wellbore heat losses, recovery production, and field examples.

**ENERGY 227. Enhanced Oil Recovery. 3 Units.**

The physics, theories, and methods of evaluating chemical, miscible, and thermal enhanced oil recovery projects. Existing methods and screening techniques, and analytical and simulation based means of evaluating project effectiveness. Dispersion-convection-adsorption equations, coupled heat, and mass balances and phase behavior provide requisite building blocks for evaluation.

**ENERGY 230. Advanced Topics in Well Logging. 3 Units.**

State of the art tools and analyses; the technology, rock physical basis, and applications of each measurement. Hands-on computer-based analyses illustrate instructional material. Guest speakers on formation evaluation topics. Prerequisites: 130 or equivalent; basic well logging; and standard practice and application of electric well logs.

**ENERGY 240. Data science for geoscience. 3 Units.**

Overview of some of the most important data science methods (statistics, machine learning & computer vision) relevant for geological sciences, as well as other fields in the Earth Sciences. Areas covered are: extreme value statistics for predicting rare events; compositional data analysis for geochemistry; multivariate analysis for designing data & computer experiments; probabilistic aggregation of evidence for spatial mapping; functional data analysis for multivariate environmental datasets, spatial regression and modeling spatial uncertainty with covariate information (geostatistics). Identification & learning of geo-objects with computer vision. Focus on practicality rather than theory. Matlab exercises on realistic data problems.

Same as: GS 240

**ENERGY 241. Seismic Reservoir Characterization. 3-4 Units.**

(Same as GP241) Practical methods for quantitative characterization and uncertainty assessment of subsurface reservoir models integrating well-log and seismic data. Multidisciplinary combination of rock-physics, seismic attributes, sedimentological information and spatial statistical modeling techniques. Student teams build reservoir models using limited well data and seismic attributes typically available in practice, comparing alternative approaches. Software provided (SGEMS, Petrel, Matlab). Offered every other year. Recommended: ERE240/260, or GP222/223, or GP260/262 or GES253/257; ERE246, GP112.  
Same as: ENERGY 141, GEOPHYS 241A

**ENERGY 246. Reservoir Characterization and Flow Modeling with Outcrop Data. 3 Units.**

Course gives an overview of concepts from geology and geophysics relevant for building subsurface reservoir models. Includes a required 1-day field trip and hands-on lab exercises. Target audience: MS and 1st year PhD students in PE/ERE/GS with little or no background in geology or geophysics. Topics include: basin and petroleum systems, depositional settings, deformation and diagenesis, introduction to reflection seismic data, rock and fluid property measurements, geostatistics, and flow in porous media.  
Same as: ENERGY 146, GS 246

**ENERGY 251. Thermodynamics of Equilibria. 3 Units.**

Lectures, problems. The volumetric behavior of fluids at high pressure. Equation of state representation of volumetric behavior. Thermodynamic functions and conditions of equilibrium, Gibbs and Helmholtz energy, chemical potential, fugacity. Phase diagrams for binary and multicomponent systems. Calculation of phase compositions from volumetric behavior for multicomponent mixtures. Experimental techniques for phase-equilibrium measurements. May be repeated for credit.

**ENERGY 253. Carbon Capture and Sequestration. 3-4 Units.**

CO<sub>2</sub> separation from syngas and flue gas for gasification and combustion processes. Transportation of CO<sub>2</sub> in pipelines and sequestration in deep underground geological formations. Pipeline specifications, monitoring, safety engineering, and costs for long distance transport of CO<sub>2</sub>. Comparison of options for geological sequestration in oil and gas reservoirs, deep unmineable coal beds, and saline aquifers. Life cycle analysis.

Same as: ENERGY 153

**ENERGY 255. Master's Report on Energy Industry Training. 1-3 Unit.**

On-the-job training for master's degree students under the guidance of on-site supervisors. Students submit a report detailing work activities, problems, assignments, and key results. May be repeated for credit. Prerequisite: consent of adviser.

**ENERGY 259. Presentation Skills. 1 Unit.**

For teaching assistants in Energy Resources Engineering. Five two-hour sessions in the first half of the quarter. Awareness of different learning styles, grading philosophies, fair and efficient grading, text design; presentation and teaching skills, PowerPoint slide design; presentation practice in small groups. Taught in collaboration with the Center for Teaching and Learning.

**ENERGY 262. Physics of Wind Energy. 3 Units.**

Formerly CEE 261. An introduction to the analysis and modeling of wind energy resources and their extraction. Topics include the physical origins of atmospheric winds; vertical profiles of wind speed and turbulence over land and sea; the wind energy spectrum and its modification by natural topography and built environments; theoretical limits on wind energy extraction by wind turbines and wind farms; modeling of wind turbine aerodynamics and wind farm performance. Final project will focus on development of a new wind energy technology concept. Prerequisites: CEE 262A or ME 351A.

Same as: CEE 261B, ME 262

**ENERGY 267. Engineering Valuation and Appraisal of Oil and Gas Wells, Facilities, and Properties. 3 Units.**

Appraisal of development and remedial work on oil and gas wells; appraisal of producing properties; estimation of productive capacity, reserves; operating costs, depletion, and depreciation; value of future profits, taxation, fair market value; original or guided research problems on economic topics with report. Prerequisite: consent of instructor.

Same as: ENERGY 167

**ENERGY 269. Geothermal Reservoir Engineering. 3 Units.**

Conceptual models of heat and mass flows within geothermal reservoirs. The fundamentals of fluid/heat flow in porous media; convective/conductive regimes, dispersion of solutes, reactions in porous media, stability of fluid interfaces, liquid and vapor flows. Interpretation of geochemical, geological, and well data to determine reservoir properties/characteristics. Geothermal plants and the integrated geothermal system.

**ENERGY 271. Energy Infrastructure, Technology and Economics. 3 Units.**

Oil and gas represents more than 50% of global primary energy. In delivering energy at scale, the industry has developed global infrastructure with supporting technology that gives it enormous advantages in energy markets; this course explores how the oil and gas industry operates. From the perspective of these established systems and technologies, we will look at the complexity of energy systems, and will consider how installed infrastructure enables technology development and deployment, impacts energy supply, and how existing infrastructure and capital invested in fossil energy impacts renewable energy development. Prerequisites: Energy 101 and 102 or permission of instructor.

Same as: ENERGY 171

**ENERGY 273. Special Topics in Energy Resources Engineering. 1-3 Unit.****ENERGY 274. Complex Analysis for Practical Engineering. 3 Units.**

Complex analysis is closely related to potential theory, appearing in a variety of engineering disciplines, including flow dynamics, electrostatics, heat conduction and gravity fields. This course is devoted to explaining the fundamentals of complex analysis and instructing on how to develop mathematical tools to solve engineering problems in potential theory. Individual topics are lectured with motivating problems, so that students can understand why these subjects need to be covered and how these are applied to practical engineering problems.

**ENERGY 275. Quantitative Methods in Basin and Petroleum System Modeling. 1-3 Unit.**

Examine the physical processes operating in sedimentary basins by deriving the basic equations of fundamental, coupled geologic processes such as fluid flow and heat flow, deposition, compaction, mass conservation, and chemical reactions. Through hands-on computational exercises and instructor-provided "recipes," students will deconstruct the black box of basin modeling software. Students write their own codes (Matlab) as well as gain expertise in modern finite-element modeling software (PetroMod, COMSOL).

Same as: GS 256

**ENERGY 280. Oil and Gas Production Engineering. 3 Units.**

Design and analysis of production systems for oil and gas reservoirs. Topics: well completion, single-phase and multi-phase flow in wells and gathering systems, artificial lift and field processing, well stimulation, inflow performance. Prerequisite: 120.

Same as: ENERGY 180

**ENERGY 281. Applied Mathematics in Reservoir Engineering. 3 Units.**

The philosophy of the solution of engineering problems. Methods of solution of partial differential equations: Laplace transforms, Fourier transforms, wavelet transforms, Green's functions, and boundary element methods. Prerequisites: CME 204 or MATH 131, and consent of instructor.

**ENERGY 282. Chemical Kinetics of Fossil Fuel Creation and Utilization. 1 Unit.**

Chemical kinetics are an integral part of optimizing recovery of fossil fuels. After reviewing the genesis of various kinds of fossil fuels and the history of their use, the course describes the molecular structure of the various types and how that influences their pyrolysis kinetics. Methods for deriving reliable kinetics are covered, including how to determine which phenomenological models are appropriate. Applications discussed are petroleum formation, oil shale retorting, heavy oil upgrading, and coal liquefaction.

**ENERGY 284. Optimization and Inverse Modeling. 3 Units.**

Treatment of deterministic and stochastic optimization, gradient-based optimization, polytopy method, generalized least squares, non-linear least squares and confidence intervals by numerical methods and bootstrap. Adjoint method for gradient calculation. Genetic algorithms and simulated annealing. Development of proxy functions using regression techniques and neural networks. Application of optimization methods to solving non-linear inverse problems. Bayesian method, rejection sampling, metropolis sampling, uncertainty quantification. Parameterization of high-dimensional problems through various expansion techniques. Examples of various Earth sciences inverse problems including flow and wave equations. Requirements: CME 106 and 200 (or equivalent courses).

**ENERGY 285A. SUPRI-A Research Seminar: Enhanced Oil Recovery. 1 Unit.**

Focused study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SUPRI-A group. May be repeated for credit. Prerequisite: consent of instructor.

**ENERGY 285B. SUPRI-B Research Seminar: Reservoir Simulation. 1 Unit.**

Focused study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in SUPRI-B (reservoir simulation) program. May be repeated for credit. Prerequisite: consent of instructor.

**ENERGY 285C. SUPRI-C Research Seminar: Gas Injection Processes. 1 Unit.**

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SUPRI-D well test analysis group. May be repeated for credit. Prerequisite: consent of instructor.

**ENERGY 285D. SUPRI-D Research Seminar: Well Test Analysis. 1 Unit.**

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SUPRI-D well test analysis group. May be repeated for credit. Prerequisite: consent of instructor. (Horne).

**ENERGY 285F. SCRF Research Seminar: Geostatistics and Reservoir Forecasting. 1 Unit.**

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the SCRF (Stanford Center for Reservoir Forecasting) program. Prerequisite: consent of instructor.

**ENERGY 285G. Geothermal Reservoir Engineering Research Seminar. 1 Unit.**

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in the geothermal energy group. Presentation required for credit. Prerequisite: consent of instructor.

**ENERGY 285S. Smart Fields Research Seminar: Horizontal Well Technology. 1 Unit.**

Study in research areas within the department. Graduate students may participate in advanced work in areas of particular interest prior to making a final decision on a thesis subject. Current research in Smart Fields (productivity and injectivity of horizontal wells) program. Prerequisite: consent of instructor.

**ENERGY 289. Multiscale Methods for Transport in Porous Media. 3 Units.**

The concept of "tyranny of scales" in natural/engineered porous media refers to the disparity of temporal and spatial scales at which mass, momentum, and energy transport is best understood and at which predictions are needed for practical applications. Modeling approaches that incorporate process understanding at different temporal and spatial scales are often necessary to improve our predictive capabilities of natural and engineered porous media. The course focuses on the fundamental understanding of multiscale systems and corresponding modeling tools to analyze them.

**ENERGY 291. Optimization of Energy Systems. 3-4 Units.**

Introductory mathematical programming and optimization using examples from energy industries. Emphasis on problem formulation and solving, secondary coverage of algorithms. Problem topics include optimization of energy investment, production, and transportation; uncertain and intermittent energy resources; energy storage; efficient energy production and conversion. Methods include linear and nonlinear optimization, as well as multi-objective and goal programming. Tools include Microsoft Excel and AMPL mathematical programming language. Prerequisites: MATH 20, 41, or MATH 51, or consent of instructor. Programming experience helpful (e.g., CS 106A, CS 106B). Same as: ENERGY 191

**ENERGY 293A. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution. 3-4 Units.**

Operating principles and applications of emerging technological solutions to the energy demands of the world. The scale of global energy usage and requirements for possible solutions. Basic physics and chemistry of solar cells, fuel cells, and batteries. Performance issues, including economics, from the ideal device to the installed system. The promise of materials research for providing next generation solutions. Undergraduates register in 156 for 4 units; graduates register in 256 for 3 units. Prerequisites: MATSCI 145 and 152 or equivalent coursework in thermodynamics and electronic properties. Same as: EE 293A, MATSCI 156, MATSCI 256

**ENERGY 293B. Fundamentals of Energy Processes. 3 Units.**

For seniors and graduate students. Covers scientific and engineering fundamentals of renewable energy processes involving heat. Thermodynamics, heat engines, solar thermal, geothermal, biomass. Recommended: MATH 19-21; PHYSICS 41, 43, 45. Same as: EE 293B

**ENERGY 293C. Energy from Wind and Water Currents. 3 Units.**

This course focuses on the extraction of energy from wind, waves and tides. The emphasis in the course is technical leading to a solid understanding of established extraction systems and discussion of promising new technologies. We will also cover resource planning and production optimization through observations and computer simulations. The course includes at least one weekend field trip, and may include experiments in wind tunnel and/or flume. Prerequisites: CEE176B or EE293B, programming experience, understanding of fluid mechanics, electrical systems, and engineering optimization.

**ENERGY 294. Electrochemical Energy Storage Systems: Modeling and Estimation. 3 Units.**

The course focuses on modeling and estimation methods as necessary tools to extract the full potential from Lithium-ion batteries, specifically used in electrified vehicles. The complex nature of a battery system requires that a physics-based approach, in the form of electrochemical models, be used as a modeling platform to develop system-level control algorithms to allow designer to maximize batteries performance and longevity while guaranteeing safety operations. In this course, we will cover 1) first-principles methods to model battery dynamics, 2) electrochemical and control-oriented models, 3) parameter identification problems, 4) estimation algorithms for real-time application. A formal exposure to state space analysis and estimation of dynamical systems will be given.

**ENERGY 300. Graduate Directed Reading. 1-7 Unit.**

Independent studies under the direction of a faculty member for which academic credit may properly be allowed.

**ENERGY 301. The Energy Seminar. 1 Unit.**

Interdisciplinary exploration of current energy challenges and opportunities, with talks by faculty, visitors, and students. May be repeated for credit. Same as: CEE 301, MS&E 494

**ENERGY 355. Doctoral Report on Energy Industry Training. 1-3 Unit.**

On-the-job training for doctoral students under the guidance of on-site supervisors. Students submit a report on work activities, problems, assignments, and results. May be repeated for credit. Prerequisite: consent of adviser.

**ENERGY 359. Teaching Experience in Energy Resources Engineering. 1 Unit.**

For TAs in Energy Resources Engineering. Course and lecture design and preparation; lecturing practice in small groups. Classroom teaching practice in an Energy Resources Engineering course for which the participant is the TA (may be in a later quarter). Taught in collaboration with the Center for Teaching and Learning.

**ENERGY 360. Advanced Research Work in Energy Resources Engineering. 1-10 Unit.**

Graduate-level work in experimental, computational, or theoretical research. Special research not included in graduate degree program. May be repeated for credit.

**ENERGY 361. Master's Degree Research in Energy Resources Engineering. 1-6 Unit.**

Experimental, computational, or theoretical research. Advanced technical report writing. Limited to 6 units total.nn (Staff).

**ENERGY 362. Engineer's Degree Research in Energy Resources Engineering. 1-10 Unit.**

Graduate-level work in experimental, computational, or theoretical research for Engineer students. Advanced technical report writing. Limited to 15 units total, or 9 units total if 6 units of 361 were previously credited.

**ENERGY 363. Doctoral Degree Research in Energy Resources Engineering. 1-10 Unit.**

Graduate-level work in experimental, computational, or theoretical research for Ph.D. students. Advanced technical report writing.

**ENERGY 365. Special Research Topics in Energy Resources Engineering. 1-15 Unit.**

Graduate-level research work not related to report, thesis, or dissertation. May be repeated for credit.

**ENERGY 369. Practical Energy Studies. 1-3 Unit.**

Students work on realistic industrial reservoir engineering problems. Focus is on optimization of production scenarios using secondary or tertiary recovery techniques. When possible, projects are conducted in direct collaboration with industry. May be repeated for credit.

**ENERGY 801. TGR Project. 0 Units.**

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**ENERGY 802. TGR Dissertation. 0 Units.**

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## Engineering (ENGR)

**ENGR 10. Introduction to Engineering Analysis. 4 Units.**

Integrated approach to the fundamental scientific principles that are the cornerstones of engineering analysis: conservation of mass, atomic species, charge, momentum, angular momentum, energy, production of entropy expressed in the form of balance equations on carefully defined systems, and incorporating simple physical models. Emphasis is on setting up analysis problems arising in engineering. Topics: simple analytical solutions, numerical solutions of linear algebraic equations, and laboratory experiences. Provides the foundation and tools for subsequent engineering courses. Prerequisite: AP Physics and AP Calculus or equivalent.

**ENGR 100. Teaching Public Speaking. 3 Units.**

The theory and practice of teaching public speaking and presentation development. Lectures/discussions on developing an instructional plan, using audiovisual equipment for instruction, devising tutoring techniques, and teaching delivery, organization, audience analysis, visual aids, and unique speaking situations. Weekly practice speaking. Students serve as apprentice speech tutors. Those completing course may become paid speech instructors in the Technical Communications Program. Prerequisite: consent of instructor.

**ENGR 102W. Writing for Engineers. 3 Units.**

Intensive practicum focusing on effective communication of technical, scientific, and professional information in industry and academia. Best writing practices for varied audiences, purposes, and media. Group workshops and individual conferences with instructors. Designed for undergraduates.

**ENGR 103. Public Speaking. 3 Units.**

Priority to Engineering students. Introduction to speaking activities, from impromptu talks to carefully rehearsed formal professional presentations. How to organize and write speeches, analyze audiences, create and use visual aids, combat nervousness, and deliver informative and persuasive speeches effectively. Weekly class practice, rehearsals in one-on-one tutorials, videotaped feedback. Limited enrollment. Same as: ENGR 203

**ENGR 105. Feedback Control Design. 3 Units.**

Design of linear feedback control systems for command-following error, stability, and dynamic response specifications. Root-locus and frequency response design techniques. Examples from a variety of fields. Some use of computer aided design with MATLAB. Prerequisite: EE 102B, CME 102 (Math 53) or ME 161.

**ENGR 110. Perspectives in Assistive Technology (ENGR 110). 1-3 Unit.**

Seminar and student project course. Explores the medical, social, ethical, and technical challenges surrounding the design, development, and use of technologies that improve the lives of people with disabilities and older adults. Guest lecturers include engineers, clinicians, and individuals with disabilities. Field trips to local facilities, an assistive technology faire, and a film screening. Students from any discipline are welcome to enroll. 3 units for students (juniors, seniors, and graduate students preferred) who pursue a team-based assistive technology project with a community partner - enrollment limited to 24. 1 unit for seminar attendance only (CR/NC) or individual project (letter grade). Total enrollment limited to classroom capacity of 50. Projects can be continued as independent study in Spring Quarter. See <http://enr110.stanford.edu/>. Designated a Cardinal Course by the Haas Center for Public Service. Same as: ENGR 210

**ENGR 113A. Solar Decathlon 2015. 3 Units.**

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA. Same as: ENGR 213A

**ENGR 113C. Solar Decathlon 2015. 3 Units.**

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA. Same as: ENGR 213C

**ENGR 113D. SOLAR DECATHLON 2015. 3 Units.**

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA. Same as: ENGR 213D

**ENGR 115. Design the Tech Challenge. 2 Units.**

Students work with Tech Museum of San Jose staff to design the Tech Challenge, a yearly engineering competition for 6-12th grade students. Brainstorming, field trips to the museum, prototyping, coaching, and presentations to the Tech Challenge advisory board. See at <http://techchallenge.thetech.org>. May be repeated for credit. Same as: ENGR 215

**ENGR 117. Expanding Engineering Limits: Culture, Diversity, and Gender. 2-3 Units.**

This course investigates how culture, and diversity, including gender, shape who becomes an engineer, what problems get solved, and the quality of designs, technology, and products. We first examine the characteristics of engineering cultures – what are the interactions, symbols and ideas, and practices that define engineering? We then investigate how gender and other markers of diverse identities are interdependent and culturally constructed, how gender and other kinds of diversity are experienced in engineering cultures, and how these experiences have consequence for engineering innovation and the engineering profession. Finally, we analyze examples of cultural change in engineering and implications for engineering knowledge and practice. The course involves weekly presentations by distinguished scholars and engineers, readings, short writing assignments, small-group discussion, and exercises around one's own experiences in and related to engineering. Those taking the course for 3 units will also complete a research-based project, and must take the course for a letter grade to meet the undergraduate WAY-ED requirement.

Same as: CSRE 117, CSRE 217, FEMGEN 117, FEMGEN 217

**ENGR 118. Cross-Cultural Design for Service. 3 Units.**

Students spend the summer in China working collaboratively to use design thinking for a project in the countryside. Students learn and apply the principles of design innovation including user research, ideation, prototyping, storytelling and more in a cross cultural setting to design a product or service that will benefit Chinese villagers. Students should be prepared to work independently in a developing region of China, to deal with persistent ambiguity, and to work with a cross-cultural, diverse team of students on their projects. Applications for Summer 2012 were due in March.

**ENGR 119. Community Engagement Preparation Seminar. 1 Unit.**

This seminar is designed for engineering students who have already committed to an experiential learning program working directly with a community partner on a project of mutual benefit. This seminar is targeted at students participating in the Summer Service Learning Program offered through Stanford's Global Engineering Program. Same as: ENGR 219

**ENGR 120. Fundamentals of Petroleum Engineering. 3 Units.**

Lectures, problems, field trip. Engineering topics in petroleum recovery; origin, discovery, and development of oil and gas. Chemical, physical, and thermodynamic properties of oil and natural gas. Material balance equations and reserve estimates using volumetric calculations. Gas laws. Single phase and multiphase flow through porous media. Same as: ENERGY 120

**ENGR 130. Science, Technology, and Contemporary Society. 4-5 Units.**

Key social, cultural, and values issues raised by contemporary scientific and technological developments; distinctive features of science and engineering as sociotechnical activities; major influences of scientific and technological developments on 20th-century society, including transformations and problems of work, leisure, human values, the fine arts, and international relations; ethical conflicts in scientific and engineering practice; and the social shaping and management of contemporary science and technology.

**ENGR 131. Ethical Issues in Engineering. 4 Units.**

Fundamental ethical responsibilities of engineers. Ethical responsibilities to society, employers, colleagues, and clients; ethics, cost-benefit-risk analysis, and safety; informed consent; ethical responsibilities of radical engineering design; the ethics of whistleblowing; ethical issues engineers face as expert witnesses, consultants, and managers; ethical issues in engineering research, design, testing, and manufacturing; ethical issues arising from engineering work in foreign countries; and ethical issues arising from the social, cultural, and environmental contexts of contemporary engineering work. Contemporary case studies. Enrollment strictly limited to 60. Students seeking a slot must attend and complete an application at the first class session.

**ENGR 14. Intro to Solid Mechanics. 3 Units.**

Introduction to engineering analysis using the principles of engineering solid mechanics. Builds on the math and physical reasoning concepts in Physics 41 to develop skills in evaluation of engineered systems across a variety of fields. Foundational ideas for more advanced solid mechanics courses such as ME80 or CEE101A. Interactive lecture sessions focused on mathematical application of key concepts, with weekly complementary lab session on testing and designing systems that embody these concepts. Limited enrollment, subject to instructor approval. Pre-requisite: Physics 41.

**ENGR 140A. Leadership of Technology Ventures. 3-4 Units.**

First of three-part sequence for students selected to the Mayfield Fellows Program. Management and leadership within high technology startups, focusing on entrepreneurial skills related to product and market strategy, venture financing and cash flow management, team recruiting and organizational development, and the challenges of managing growth and handling adversity in emerging ventures. Other engineering faculty, founders, and venture capitalists participate as appropriate. Recommended: accounting or finance course (MS&E 140, ECON 90, or ENGR 60).

**ENGR 140B. Leadership of Technology Ventures. 1-2 Unit.**

Open to Mayfield Fellows only; taken during the summer internship at a technology startup. Students exchange experiences and continue the formal learning process. Activities journal. Credit given following quarter.

**ENGR 140C. Leadership of Technology Ventures. 2-3 Units.**

Open to Mayfield Fellows only. Capstone to the 140 sequence. Students, faculty, employers, and venture capitalists share recent internship experiences and analytical frameworks. Students develop living case studies and integrative project reports.

**ENGR 145. Technology Entrepreneurship. 4 Units.**

How do you create a successful start-up? What is entrepreneurial leadership in a large firm? What are the differences between an idea and true opportunity? How does an entrepreneur form a team and gather the resources necessary to create a great enterprise? Mentor-guided project focused on developing students' startup ideas, immersion in nuances of innovation and early stage entrepreneurship, case studies, research on the entrepreneurial process, and the opportunity to network with Silicon Valley's top entrepreneurs and venture capitalists. For undergraduates of all majors who seek to understand the formation and growth of high-impact start-ups in areas such as information, energy, medical and consumer technologies. No prerequisites. Limited enrollment.

**ENGR 15. Dynamics. 3 Units.**

The application of Newton's Laws to solve 2-D and 3-D static and dynamic problems, particle and rigid body dynamics, freebody diagrams, and equations of motion, with application to mechanical, biomechanical, and aerospace systems. Computer numerical solution and dynamic response. Prerequisites: Calculus (differentiation and integration) such as MATH 41; and ENGR 14 (statics and strength) or a mechanics course in physics such as PHYSICS 41.

**ENGR 150. Data Challenge Lab. 3-5 Units.**

In this lab, students develop the practical skills of data science by solving a series of increasingly difficult, real problems. Skills developed include: data manipulation, data visualization, exploratory data analysis, and basic modeling. The data challenges each student undertakes are based upon their current skills. Students receive one-on-one coaching and see how expert practitioners solve the same challenges. Limited enrollment; application required. See <http://datalab.stanford.edu> for more information.

**ENGR 154. Vector Calculus for Engineers. 5 Units.**

Computation and visualization using MATLAB. Differential vector calculus: analytic geometry in space, functions of several variables, partial derivatives, gradient, unconstrained maxima and minima, Lagrange multipliers. Introduction to linear algebra: matrix operations, systems of algebraic equations, methods of solution and applications. Integral vector calculus: multiple integrals in Cartesian, cylindrical, and spherical coordinates, line integrals, scalar potential, surface integrals, Green's, divergence, and Stokes' theorems. Examples and applications drawn from various engineering fields. Prerequisites: 10 units of AP credit (Calc BC with 5, or Calc AB with 5 or placing out of the single variable math placement test: <https://exploreddegrees-nextyear.stanford.edu/undergraduatedegreesandprograms/#apextt>), or Math 19-21. Same as: CME 100

**ENGR 155A. Ordinary Differential Equations for Engineers. 5 Units.**

Analytical and numerical methods for solving ordinary differential equations arising in engineering applications: Solution of initial and boundary value problems, series solutions, Laplace transforms, and nonlinear equations; numerical methods for solving ordinary differential equations, accuracy of numerical methods, linear stability theory, finite differences. Introduction to MATLAB programming as a basic tool kit for computations. Problems from various engineering fields. Prerequisite: 10 units of AP credit (Calc BC with 5, or Calc AB with 5 or placing out of the single variable math placement test: <https://exploreddegreesnextyear.stanford.edu/undergraduatedegreesandprograms/#apextt>), or Math 19-21. Recommended: CME100. Same as: CME 102

**ENGR 155B. Linear Algebra and Partial Differential Equations for Engineers. 5 Units.**

Linear algebra: matrix operations, systems of algebraic equations, Gaussian elimination, undetermined and overdetermined systems, coupled systems of ordinary differential equations, eigensystem analysis, normal modes. Fourier series with applications, partial differential equations arising in science and engineering, analytical solutions of partial differential equations. Numerical methods for solution of partial differential equations: iterative techniques, stability and convergence, time advancement, implicit methods, von Neumann stability analysis. Examples and applications from various engineering fields. Prerequisite: CME 102/ENGR 155A. Same as: CME 104

**ENGR 155C. Introduction to Probability and Statistics for Engineers. 4 Units.**

Probability: random variables, independence, and conditional probability; discrete and continuous distributions, moments, distributions of several random variables. Topics in mathematical statistics: random sampling, point estimation, confidence intervals, hypothesis testing, non-parametric tests, regression and correlation analyses; applications in engineering, industrial manufacturing, medicine, biology, and other fields. Prerequisite: CME 100/ENGR154 or MATH 51 or 52. Same as: CME 106

**ENGR 159Q. Japanese Companies and Japanese Society. 3 Units.**

Preference to sophomores. The structure of a Japanese company from the point of view of Japanese society. Visiting researchers from Japanese companies give presentations on their research enterprise. The Japanese research ethic. The home campus equivalent of a Kyoto SCTI course. Same as: MATSCI 159Q

**ENGR 192. Engineering Public Service Project. 1-2 Unit.**

Volunteer work on a public service project with a technical engineering component. Project requires a faculty sponsor and a community partner such as a nonprofit organization, school, or individual. Required report. See <http://soe.stanford.edu/publicservice>. May be repeated for credit. Prerequisite: consent of instructor.

**ENGR 193. Discover Engineering: How to Aim High, Embrace Uncertainty, and Achieve Impact. 1 Unit.**

This weekly seminar will provide students of all engineering majors with practical leadership skills training (e.g. how to network, advocate for yourself, assert influence) in order to make innovative and meaningful contributions in their fields. Career exploration and mentorship opportunities will be delivered through an inspiring line up of guest speakers and interactive activities, demonstrations and tours. May be repeat for credit.

**ENGR 199. Special Studies in Engineering. 1-15 Unit.**

Special studies, lab work, or reading under the direction of a faculty member. Often research experience opportunities exist in ongoing research projects. Students make arrangements with individual faculty and enroll in the section number corresponding to the particular faculty member. May be repeated for credit. Prerequisite: consent of instructor.

**ENGR 199W. Writing of Original Research for Engineers. 1-3 Unit.**

Technical writing in science and engineering. Students produce a substantial document describing their research, methods, and results. Prerequisite: completion of freshman writing requirements; prior or concurrent in 2 units of research in the major department; and consent of instructor. WIM for BioMedical Computation.

**ENGR 20. Introduction to Chemical Engineering. 4 Units.**

Overview of chemical engineering through discussion and engineering analysis of physical and chemical processes. Topics: overall staged separations, material and energy balances, concepts of rate processes, energy and mass transport, and kinetics of chemical reactions. Applications of these concepts to areas of current technological importance: biotechnology, energy, production of chemicals, materials processing, and purification. Prerequisite: CHEM 31. Same as: CHEMENG 20

**ENGR 202C. Technical Writing. 3 Units.**

How to write clear, concise, and well-ordered technical prose. Principles of editing for structure and style. Applications to a variety of genres in engineering and science. This offering for CEE SDC students only.

**ENGR 202S. Directed Writing Projects. 1 Unit.**

Individualized writing instruction for students working on writing projects such as dissertations, proposals, grant applications, honors or engineering theses, journal articles, conference papers, and teaching and research statements. Weekly one-on-one conferences with writing instructors from the Technical Communication Program. Students receive close attention to and detailed feedback on their writing. No prerequisite. Grading: Satisfactory/No Credit. This course may be repeated for credit.

**ENGR 202W. Technical Writing. 3 Units.**

How to write clear, concise, and well-ordered technical prose. Principles of editing for structure and style. Applications to a variety of genres in engineering and science.



**ENGR 203. Public Speaking. 3 Units.**

Priority to Engineering students. Introduction to speaking activities, from impromptu talks to carefully rehearsed formal professional presentations. How to organize and write speeches, analyze audiences, create and use visual aids, combat nervousness, and deliver informative and persuasive speeches effectively. Weekly class practice, rehearsals in one-on-one tutorials, videotaped feedback. Limited enrollment. Same as: ENGR 103

**ENGR 205. Introduction to Control Design Techniques. 3 Units.**

Review of root-locus and frequency response techniques for control system analysis and synthesis. State-space techniques for modeling, full-state feedback regulator design, pole placement, and observer design. Combined observer and regulator design. Lab experiments on computers connected to mechanical systems. Prerequisites: 105, MATH 103, 113. Recommended: Matlab.

**ENGR 207A. Linear Control Systems I. 3 Units.**

Introduction to control of discrete-time linear systems. State-space models. Controllability and observability. The linear quadratic regulator. Prerequisite: 105 or 205.

**ENGR 207B. Linear Control Systems II. 3 Units.**

Probabilistic methods for control and estimation. Statistical inference for discrete and continuous random variables. Linear estimation with Gaussian noise. The Kalman filter. Prerequisite: EE 263.

**ENGR 209A. Analysis and Control of Nonlinear Systems. 3 Units.**

Introduction to nonlinear phenomena: multiple equilibria, limit cycles, bifurcations, complex dynamical behavior. Planar dynamical systems, analysis using phase plane techniques. Describing functions. Lyapunov stability theory. SISO feedback linearization, sliding mode control. Design examples. Prerequisite: 205.

**ENGR 21. Engineering of Systems. 3 Units.**

A high-level look at techniques for analyzing and designing complex, multidisciplinary engineering systems, such as aircraft, spacecraft, automobiles, power plants, cellphones, robots, biomedical devices, and many others. The need for multi-level design, modeling and simulation approaches, computation-based design, and hardware and software-in-the-loop simulations will be demonstrated through a variety of examples and case studies. Several aspects of system engineering will be applied to the design of large-scale interacting systems and contrasted with subsystems such as hydraulic systems, electrical systems, and brake systems. The use of design-thinking, story-boarding, mockups, sensitivity analysis, simulation, team-based design, and the development of presentation skills will be fostered through several realistic examples in several fields of engineering.

**ENGR 210. Perspectives in Assistive Technology (ENGR 110). 1-3 Unit.**

Seminar and student project course. Explores the medical, social, ethical, and technical challenges surrounding the design, development, and use of technologies that improve the lives of people with disabilities and older adults. Guest lecturers include engineers, clinicians, and individuals with disabilities. Field trips to local facilities, an assistive technology faire, and a film screening. Students from any discipline are welcome to enroll. 3 units for students (juniors, seniors, and graduate students preferred) who pursue a team-based assistive technology project with a community partner - enrollment limited to 24. 1 unit for seminar attendance only (CR/NC) or individual project (letter grade). Total enrollment limited to classroom capacity of 50. Projects can be continued as independent study in Spring Quarter. See <http://engr110.stanford.edu/>. Designated a Cardinal Course by the Haas Center for Public Service. Same as: ENGR 110

**ENGR 213. Solar Decathlon. 1-4 Unit.**

Open to all engineering majors. Project studio for all work related to the Solar Decathlon 2013 competition. Each student will develop a personal work plan for the quarter with his or her advisor and perform multidisciplinary collaboration on designing systems for the home or pre-construction planning. Work may continue through the summer as a paid internship, as well as through the next academic year. For more information about the team and the competition, please visit [solardecathlon.stanford.edu](http://solardecathlon.stanford.edu).

**ENGR 213A. Solar Decathlon 2015. 3 Units.**

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA. Same as: ENGR 113A

**ENGR 213C. Solar Decathlon 2015. 3 Units.**

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA. Same as: ENGR 113C

**ENGR 213D. SOLAR DECATHLON 2015. 3 Units.**

Open to all majors. Seminar / Lab format course facilitates the student-led administration, conception, development, and execution of the Solar Decathlon 2015 competition entry sponsored by the US Department of Energy. (<http://www.solardecathlon.gov/>) Students shall learn best practices in creating design teams to address multi-disciplinary design problems. Students shall work both as individuals and in teams across multiple Stanford SD2015 phases of project management, research, fundraising, design, engineering, contracting, construction administration, and competitive testing in Irvine CA. Same as: ENGR 113D

**ENGR 215. Design the Tech Challenge. 2 Units.**

Students work with Tech Museum of San Jose staff to design the Tech Challenge, a yearly engineering competition for 6-12th grade students. Brainstorming, field trips to the museum, prototyping, coaching, and presentations to the Tech Challenge advisory board. See at <http://techchallenge.thetech.org>. May be repeated for credit. Same as: ENGR 115

**ENGR 219. Community Engagement Preparation Seminar. 1 Unit.**

This seminar is designed for engineering students who have already committed to an experiential learning program working directly with a community partner on a project of mutual benefit. This seminar is targeted at students participating in the Summer Service Learning Program offered through Stanford's Global Engineering Program. Same as: ENGR 119

**ENGR 231. Transformative Design. 3 Units.**

Too many alums are doing what they've always been told they're good at, and are living with regret and a sense that they're just resigned to doing this thing for the rest of their lives. Capabilities displaced their values as the primary decision driver in their lives. Our ultimate goal is to restore a sense of agency and passion into the lives of current Stanford students by creating the space to explore and experiment with the greatest design project possible: YOUR LIFE. We will turn d.school tools and mindsets onto the topic of our lives -- not in theory, but in reality -- and will prototype changes to make your life and career more fulfilling and rewarding. We will actively empathize and experiment in your life and work, so if you don't want to do that kind of self-examination, this class will not be a good fit for you.

**ENGR 240. Introduction to Micro and Nano Electromechanical Systems. 3 Units.**

Miniaturization technologies now have important roles in materials, mechanical, and biomedical engineering practice, in addition to being the foundation for information technology. This course will target an audience of first-year engineering graduate students and motivated senior-level undergraduates, with the goal of providing an introduction to M/NEMS fabrication techniques, selected device applications, and the design tradeoffs in developing systems. The course has no specific prerequisites, other than graduate or senior standing in engineering; otherwise, students will require permission of the instructors.

**ENGR 241. Advanced Micro and Nano Fabrication Laboratory. 3 Units.**

This project course focuses on developing processes for ExFab, a shared facility that supports flexible lithography, heterogeneous integration, and rapid micro prototyping. Team projects are approved by the instructor and are mentored by an ExFab staff member. Students will plan and execute experiments and document them in a final presentation and report, to be made available on the lab's Wiki for the benefit of the Stanford research community.

**ENGR 243. LAW, TECHNOLOGY, AND LIBERTY. 2 Units.**

New technologies from gene editing to networked computing have already transformed our economic and social structures and are increasingly changing what it means to be human. What role has law played in regulating and shaping these technologies? And what role can and should it play in the future? This seminar will consider these and related questions, focusing on new forms of networked production, the new landscape of security and scarcity, and the meaning of human nature and ecology in an era of rapid technological change. Readings will be drawn from a range of disciplines, including science and engineering, political economy, and law. The course will feature several guest speakers. There are no formal prerequisites in either engineering or law, but students should be committed to pursuing novel questions in an interdisciplinary context. The enrollment goal is to balance the class composition between law and non-law students. Elements used in grading: Attendance, Class Participation, Written Assignments. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. This course is cross-listed with the School of Engineering (TBA). May be repeat for credit. Same as: BIOE 242

**ENGR 245. The Lean LaunchPad: Getting Your Lean Startup Off the Ground. 3-4 Units.**

Apply the "Lean Startup" principles; "business model canvas," "customer development" and "Agile Engineering" to prototype, test, and iterate your idea while discovering if you have a profitable business model. This is the class adopted by the NSF and NIH as the Innovation Corps. Apply and work in teams. Info sessions held in November and December. Team applications required in December. Proposals can be software, hardware, or service of any kind. Projects are experiential and require incrementally building the product while talking to customers/partners each week. See course website <http://stanfordleanlaunchpad.weebly.com/>. Prerequisite: interest and passion in exploring whether a technology idea can become a real company. Limited enrollment.

**ENGR 250. Data Challenge Lab. 1-6 Unit.**

In this lab, students develop the practical skills of data science by solving a series of increasingly difficult, real problems. Skills developed include: data manipulation, exploratory data analysis, data visualization, and predictive modeling. The data challenges each student undertakes are based upon their current skills. Students receive one-on-one coaching and see how expert practitioners solve the same challenges. Prerequisite: ENGR150. Limited enrollment; application required. May be repeated for credit. See <http://datalab.stanford.edu> for more information.

**ENGR 25B. Biotechnology. 3 Units.**

Biology and chemistry fundamentals, genetic engineering, cell culture, protein production, pharmaceuticals, genomics, viruses, gene therapy, evolution, immunology, antibodies, vaccines, transgenic animals, cloning, stem cells, intellectual property, governmental regulations, and ethics. Prerequisites: CHEM 31 and MATH 20 or equivalent courage. Same as: CHEMENG 25B

**ENGR 25E. Energy: Chemical Transformations for Production, Storage, and Use. 3 Units.**

An introduction and overview to the challenges and opportunities of energy supply and consumption. Emphasis on energy technologies where chemistry and engineering play key roles. Review of energy fundamentals along with historical energy perspectives and current energy production technologies. In depth analyses of solar thermal systems, biofuels, photovoltaics and electrochemical devices (batteries and fuel cells). Prerequisites: high school chemistry or equivalent. Same as: CHEMENG 25E

**ENGR 280. From Play to Innovation. 2-4 Units.**

Focus is on enhancing the innovation process with playfulness. The class will be project-based and team-centered. We will investigate the human "state of play" to reach an understanding of its principal attributes and how important it is to creative thinking. We will explore play behavior, its development, and its biological basis. We will then apply those principles through design thinking to promote innovation in the corporate world. Students will work with real-world partners on design projects with widespread application. This course requires an application. You can find the application here: [dschool.stanford.edu/classes](http://dschool.stanford.edu/classes).

**ENGR 281. d.media - Designing Media that Matters. 2-3 Units.**

The combination of always-on smartphones, instant access to information and global social sharing is changing behavior and shifting cultural norms. How can we design digital experiences that make this change positive? Join the d.media team and find out! This course is project-based and hands-on. Three projects will explore visual design, interaction design and behavioral design all in the context of today's technology landscape and in service of a socially positive user experience. See <http://dmedia.stanford.edu>, Admission by application. See [dschool.stanford.edu/classes](http://dschool.stanford.edu/classes) for more information.

**ENGR 290. Graduate Environment of Support. 1 Unit.**

For course assistants (CAs) and tutors in the School of Engineering tutorial and learning program. Interactive training for effective academic assistance. Pedagogy, developing course material, tutoring, and advising. Sources include video, readings, projects, and role playing.

**ENGR 295. Learning & Teaching of Science. 3 Units.**

This course will provide students with a basic knowledge of the relevant research in cognitive psychology and science education and the ability to apply that knowledge to enhance their ability to learn and teach science, particularly at the undergraduate level. Course will involve readings, discussion, and application of the ideas through creation of learning activities. It is suitable for advanced undergraduates and graduate students with some science background.

Same as: EDUC 280, PHYSICS 295

**ENGR 298. Seminar in Fluid Mechanics. 1 Unit.**

Interdepartmental. Problems in all branches of fluid mechanics, with talks by visitors, faculty, and students. Graduate students may register for 1 unit, without letter grade; a letter grade is given for talks. May be repeated for credit.

**ENGR 299. Special Studies in Engineering. 1-15 Unit.**

Special studies, lab work, or reading under the direction of a faculty member. Often research experience opportunities exist in ongoing research projects. Students make arrangements with individual faculty and enroll in the corresponding section. Prerequisite: consent of instructor.

**ENGR 311A. Women's Perspectives. 1 Unit.**

Master's and Ph.D. seminar series driven by student interests. Possible topics: time management, career choices, health and family, diversity, professional development, and personal values. Guest speakers from academia and industry, student presentations with an emphasis on group discussion. Graduate students share experiences and examine scientific research in these areas. May be repeated for credit.

**ENGR 311B. Designing the Professional. 1 Unit.**

Once I get my degree, how do I get a life? What do you want out of life after Stanford? Wondering how to weave together what fits, is doable, and will be truly meaningful? Join us for Designing the Professional. This course applies the innovation principles of design thinking to the "wicked problem" of designing your life and vocation in and beyond Stanford. We'll approach these lifelong questions with a structured framework set in a seminar where you can work out your ideas in conversation with your peers. Seminar open to all graduate students (PhD, Masters) and Postdocs in all 7 schools.

**ENGR 311D. Portfolio to Professional: Supporting the Development of Digital Presence Through ePortfolios. 1 Unit.**

This course guides graduate students in creating a professional ePortfolio and establishing an online presence. The course includes seminar-style presentations and discussions, opportunities for feedback with career mentors, classmates, alumni, employers, and other community members using think-aloud protocols and peer review approaches. Curriculum modules focus on strategies for telling your story in the digital environment, platform considerations, evidence and architecture, visual design and user experience. Open to all graduate students and majors.

**ENGR 312. Science and Engineering Course Design. 2-3 Units.**

For students interested in an academic career and who anticipate designing science or engineering courses at the undergraduate or graduate level. Goal is to apply research on science and engineering learning to the design of effective course materials. Topics include syllabus design, course content and format decisions, assessment planning and grading, and strategies for teaching improvement.

Same as: VPPL 312

**ENGR 313. Topics in Engineering and Science Education. 1-2 Unit.**

This seminar series focuses on topics related to teaching science, technology, engineering, and math (STEM) courses based on education research. Each year focuses on a different topic related to STEM education. This course may be repeated for credit each year. This year we will explore problem-based learning in STEM courses, particularly focusing on design and evaluation of problem-based learning activities. The course will involve in-class discussions, small group activities, and guest lectures. Throughout the quarter, there will be several opportunities for directly practicing and applying STEM education strategies to specific teaching goals in your field.

**ENGR 341. Micro/Nano Systems Design and Fabrication. 3-5 Units.**

Laboratory course in micro and nano fabrication technology that combines lectures on theory and fundamentals with hands-on training in the Stanford Nanofabrication Facility. Prerequisite: ENGR 240 or equivalent.

**ENGR 342. MEMS Laboratory II. 3-4 Units.**

Emphasis is on tools and methodologies for designing and fabricating N/MEMS-based solutions. Student interdisciplinary teams collaborate to invent, develop, and integrate N/MEMS solutions. Design alternatives fabricated and tested with emphasis on manufacturability, assembly, test, and design. Limited enrollment. Prerequisite: ENGR 341.

**ENGR 350. Data Impact Lab. 1-6 Unit.**

In this lab, multi-disciplinary teams of students tackle high-impact, unsolved problems for social sector partners. Teams receive mentorship and coaching from Stanford faculty, domain experts, and data science experts from industry. Sample projects include innovations for: poverty alleviation in the developing world, local government services, education, and healthcare. Limited enrollment; application required. May be repeated for credit. See <http://datalab.stanford.edu> for more information.

**ENGR 391. Engineering Education and Online Learning. 3 Units.**

A project based introduction to web-based learning design. In this course we will explore the evidence and theory behind principles of learning design and game design thinking. In addition to gaining a broad understanding of the emerging field of the science and engineering of learning, students will experiment with a variety of educational technologies, pedagogical techniques, game design principles, and assessment methods. Over the course of the quarter, interdisciplinary teams will create a prototype or a functioning piece of educational technology.

Same as: EDUC 391

**ENGR 40. Introductory Electronics. 5 Units.**

Not offered. Students wishing to complete the equivalent of ENGR 40 should enroll in both ENGR 40A and ENGR 40B.

**ENGR 40A. Introductory Electronics. 3 Units.**

First portion of the former ENGR 40, for students not pursuing degree in Electrical Engineering. Instruction to be completed in the first seven weeks of the quarter. Students wishing to complete the equivalent of ENGR 40 should enroll in both ENGR 40A and ENGR 40B. Overview of electronic circuits and applications. Electrical quantities and their measurement, including operation of the oscilloscope. Basic models of electronic components including resistors, capacitors, inductors, and the operational amplifier. Lab. Lab assignments. Enrollment limited to 300.

**ENGR 40B. Introductory Electronics Part II. 2 Units.**

Second portion of the former ENGR 40. Instruction to be completed in the final three weeks of the quarter. Students wishing to complete the equivalent of ENGR 40 should enroll in both ENGR 40A and ENGR 40B. Students cannot enroll in ENGR 40B without enrolling in ENGR 40A. Students choose one the following sections (1) Frequency response of linear circuits, including basic filters, using phasor analysis. (2) Digital hardware and software implementations of a robot car. Lab. Lab assignments. Co-requisite: ENGR 40A. Enrollment limited to 300.

**ENGR 40M. An Intro to Making: What is EE. 3-5 Units.**

Is a hands-on class where students learn to make stuff. Through the process of building, you are introduced to the basic areas of EE. Students build a "useless box" and learn about circuits, feedback, and programming hardware, a light display for your desk and bike and learn about coding, transforms, and LEDs, a solar charger and an EKG machine and learn about power, noise, feedback, more circuits, and safety. And you get to keep the toys you build. Prerequisite: CS 106A.

**ENGR 42. Introduction to Electromagnetics and Its Applications. 5 Units.**

Electricity and magnetism and its essential role in modern electrical engineering devices and systems, such as sensors, displays, DVD players, and optical communication systems. The topics that will be covered include electrostatics, magnetostatics, Maxwell's equations, one-dimensional wave equation, electromagnetic waves, transmission lines, and one-dimensional resonators. Pre-requisites: MATH 42 or MATH 51 or CME 100 or equivalent.

Same as: EE 42

**ENGR 50. Introduction to Materials Science, Nanotechnology Emphasis. 4 Units.**

The structure, bonding, and atomic arrangements in materials leading to their properties and applications. Topics include electronic and mechanical behavior, emphasizing nanotechnology, solid state devices, and advanced structural and composite materials.

**ENGR 50E. Introduction to Materials Science, Energy Emphasis. 4 Units.**

Materials structure, bonding and atomic arrangements leading to their properties and applications. Topics include electronic, thermal and mechanical behavior; emphasizing energy related materials and challenges.

**ENGR 50M. Introduction to Materials Science, Biomaterials Emphasis. 4 Units.**

Topics include: the relationship between atomic structure and macroscopic properties of man-made and natural materials; mechanical and thermodynamic behavior of surgical implants including alloys, ceramics, and polymers; and materials selection for biotechnology applications such as contact lenses, artificial joints, and cardiovascular stents. No prerequisite.

**ENGR 60. Engineering Economics and Sustainability. 3 Units.**

Engineering Economics is a subset of the field of economics that draws upon the logic of economics, but adds that analytical power of mathematics and statistics. The concepts developed in this course are broadly applicable to many professional and personal decisions, including making purchasing decisions, deciding between project alternatives, evaluating different processes, and balancing environmental and social costs against economic costs. The concepts taught in this course will be increasingly valuable as students climb the career ladder in private industry, a non-governmental organization, a public agency, or in founding their own startup. Eventually, the ability to make informed decisions that are based in fundamental analysis of alternatives is a part of every career. As such, this course is recommended for engineering and non-engineering students alike. This course is taught exclusively online in every quarter it is offered. (Prerequisites: MATH 19 or 20 or approved equivalent.)

Same as: CEE 146S

**ENGR 62. Introduction to Optimization. 3-4 Units.**

Formulation and computational analysis of linear, quadratic, and other convex optimization problems. Applications in machine learning, operations, marketing, finance, and economics. Prerequisite: CME 100 or MATH 51.

Same as: MS&E 111, MS&E 211

**ENGR 62X. Introduction to Optimization (Accelerated). 3-4 Units.**

Optimization theory and modeling. The role of prices, duality, optimality conditions, and algorithms in finding and recognizing solutions. Perspectives: problem formulation, analytical theory, computational methods, and recent applications in engineering, finance, and economics. Theories: finite dimensional derivatives, convexity, optimality, duality, and sensitivity. Methods: simplex and interior-point, gradient, Newton, and barrier. Prerequisite: CME 100 or MATH 51 or equivalent.

Same as: MS&E 111X, MS&E 211X

**ENGR 70A. Programming Methodology. 3-5 Units.**

Introduction to the engineering of computer applications emphasizing modern software engineering principles: object-oriented design, decomposition, encapsulation, abstraction, and testing. Emphasis is on good programming style and the built-in facilities of respective languages. No prior programming experience required. Summer quarter enrollment is limited. Alternative versions of CS106A are available which cover most of the same material but in different programming languages: Java [Fall, Win, Spr, or Sum qtr enroll in CS106A Section 1] Javascript [Fall qtr enroll in CS 106A Section 2] Python [Winter or Spring qtr enroll in CS 106A Section 3].

Same as: CS 106A

**ENGR 70B. Programming Abstractions. 3-5 Units.**

Abstraction and its relation to programming. Software engineering principles of data abstraction and modularity. Object-oriented programming, fundamental data structures (such as stacks, queues, sets) and data-directed design. Recursion and recursive data structures (linked lists, trees, graphs). Introduction to time and space complexity analysis. Uses the programming language C++ covering its basic facilities. Prerequisite: 106A or equivalent. Summer quarter enrollment is limited.

Same as: CS 106B

**ENGR 70X. Programming Abstractions (Accelerated). 3-5 Units.**

Intensive version of 106B for students with a strong programming background interested in a rigorous treatment of the topics at an accelerated pace. Additional advanced material and more challenging projects. Winter quarter assignments will be based in CS department research. Prerequisite: excellence in 106A or equivalent, or consent of instructor. Winter quarter enrollment limited to 30.

Same as: CS 106X

**ENGR 80. Introduction to Bioengineering (Engineering Living Matter). 4 Units.**

Students completing BIOE.80 should have a working understanding for how to approach the systematic engineering of living systems to benefit all people and the planet. Our main goals are (1) to help students learn ways of thinking about engineering living matter and (2) to empower students to explore the broader ramifications of engineering life. Specific concepts and skills covered include but are not limited to: capacities of natural life on Earth; scope of the existing human-directed bioeconomy; deconstructing complicated problems; reaction & diffusion systems; microbial human anatomy; conceptualizing the engineering of biology; how atoms can be organized to make molecules; how to print DNA from scratch; programming genetic sensors, logic, & actuators; biology beyond molecules (photons, electrons, etc.); what constraints limit what life can do?; what will be the major health challenges in 2030?; how does what we want shape bioengineering?; who should choose and realize various competing bioengineering futures?.

Same as: BIOE 80

**ENGR 90. Environmental Science and Technology. 3 Units.**

Introduction to environmental quality and the technical background necessary for understanding environmental issues, controlling environmental degradation, and preserving air and water quality. Material balance concepts for tracking substances in the environmental and engineering systems.

Same as: CEE 70

## English (ENGLISH)

### ENGLISH 1. CSN Undergraduate Colloquium. 1 Unit.

This colloquium is intended for undergraduates who are interested in the history and theory of the novel, and who would like to attend the Center for the Study of the Novel's (CSN) annual conference. Before the conference, students will meet with CSN's graduate student staff, to read and discuss a small number of key texts by participating scholars, whose presentations students will then attend. After the conference, the colloquium will meet again, to discuss both the readings and conference papers, and explore their broader implications for the study of the novel. Attendance at both meetings of the colloquium, and at least one panel at the conference, is required for course credit.

Same as: DLCL 1

### ENGLISH 101A. How to Read Beowulf. 3-5 Units.

How much can we really know about something written a thousand or more years ago? In this class, we will work towards answering this question as we read the most famous piece of Old English literature. Our ultimate goal will be learning to read as medievalists, investigating what Beowulf's story, its characters, and its heroic ethos may have meant to its medieval audience's and what it means to us today. Whether you plan to research medieval topics in your undergraduate (or graduate) career, want to explore the medieval basis of modern fantasy and historical fiction, or just love a good epic tale, join us and learn to think, interpret, and research like a medievalist. This class can be taken as an Old English language course and/or an introduction to Old English literature in translation. All levels of experience are welcome!

### ENGLISH 101B. Multi-species Fictions: Animals and 20th Century American Literature. 3-5 Units.

What does it mean to be an animal? And what does it mean to be a person? Ideas about other species - how they think and feel, act and react - involve categories such as race, gender, class and ability in often-surprising ways. This course will trace the relationship between animal life and human identity in twentieth-century American fiction, from the advent of Darwinian thought to contemporary animal advocacy. Readings will include Jack London, Zora Neale Hurston, Linda Hogan, Ruth Ozeki, Philip K. Dick and Grant Morrison, as well selected texts from the growing field of critical animal theory. The course also offers an optional community engagement opportunity to work with Animal Assisted Happiness or another multi-species organization.

### ENGLISH 103B. Introduction to Old English Language and Literature. 5 Units.

Students will learn the language skills necessary to parse and translate the earliest literature written in the English language. The course will look at how Anglo-Saxon authors used the particularly rich qualities of their vernacular to craft texts that represent and reflect on war, a principal institution of their medieval society. Our discussion will consider how the conventions of genre and form, as well as contextual forces like religion, cultural tradition, and contemporary history, shaped their writing on the subject.

### ENGLISH 10A. Introduction to English I: Mapping Monsters in British Literature 650-1650. 5 Units.

Werewolves, dragons, cannibals, witches, sea monsters, faeries, moral monstrosity, madness, the uncanny and the grotesque the monstrous is frightening, fury-filled, unknowable, and seductive. Monsters inhabit the literary imagination and the historic landscape. Monsters live on the margins of society; they are culturally and ideologically fraught; they exhibit sexual, racial, religious, and physical difference. In this course, we shall examine the depiction and meaning of the monster in literature, manuscript images, and maps from England and Wales from about 650CE to 1650CE.

### ENGLISH 10B. Introduction to English I: What is Literary History?. 5 Units.

From the 14th to the 17th centuries, what are the relations between literature and history? How has our understanding of key works changed as historicism—or the approach that treats a period in its specificity—has changed? Discussion of how literature works as a force in culture, not only a reflection of other forces. Readings from Old English lyrics, Chaucer, the Gawain poet, More, Wyatt, Surrey, Lock, Sidney, Spenser, Raleigh, Marlowe, Shakespeare, Donne, Herbert, Milton and Cavendish.

### ENGLISH 10C. Introduction to English I: Tradition and Individuality, Medieval to Early Modern. 5 Units.

This course offers a comprehensive introduction to English literature from its beginning in the medieval period to the early seventeenth century. We will study individual literary voices and styles in the context of a growing national tradition. We will discuss major authors (such as Chaucer, More, Wyatt, Surrey, Sidney, Spenser, Jonson, Donne) and analyze representative literary works in a variety of genres, from the Old English elegy and Middle English lyrics to the Elizabethan sonnet, Renaissance comedy, and the allegorical epic. While the course equips students with specific analytical and interpretative tools necessary for a historical understanding of literature, it is equally committed to revealing the aesthetic interest that medieval and early modern literature still holds for the modern reader.

### ENGLISH 10UK. Lost in the Myths of Time. 1 Unit.

Robin Hood the Outlaw; Grendel, the monster of the moors; medieval battle-sites; early roadways: the remnants of medieval villages visible through Google Earth and cyber-visualization: this course will explore what ancient English landscapes and landmarks reveal about culture, society, politics, nation and identity a thousand years ago. (Mandatory for participants in the Lost in the Myths of Time Bing Overseas Seminar).

### ENGLISH 112A. Humanities Core: Great Books, Big Ideas -- Europe, Middle Ages and Renaissance. 3-4 Units.

This three-quarter sequence asks big questions of major texts in the European and American tradition. What is a good life? How should society be organized? Who belongs? How should honor, love, sin, and similar abstractions govern our actions? What duty do we owe to the past and future? The second quarter focuses on the transition from the Middle Ages to Modernity, Europe's re-acquaintance with classical antiquity and its first contacts with the New World. Authors include Dante, Shakespeare, Machiavelli, Cervantes, and Milton.

Same as: DLCL 12, FRENCH 12, HUMCORE 12

### ENGLISH 115D. Shakespeare, Language, Contexts. 5 Units.

This course will consider a range of Shakespeare plays (and the language of the plays) in relation to different contemporary and post-contemporary contexts, including transvestite theater, gender, sexuality, history, geopolitics, travel, and performance.

### ENGLISH 11A. Introduction to English II: From Milton to the Romantics. 5 Units.

Major moments in English literary history, from John Milton's *Paradise Lost* to John Keats's *Hyperion*. The trajectory involves a variety of literary forms, including Augustan satire, the illuminated poetry of William Blake's handcrafted books, the historical novel invented by Sir Walter Scott, the society novel of Jane Austen, and William Wordsworth's epic of psychological and artistic development. Literary texts will be studied in the context of important cultural influences, among them civil war, religious dissent, revolution, commercialization, colonialism, and industrialization.

**ENGLISH 11AX. Creative Writing: Short Fiction and Storytelling in the Arts. 2 Units.**

When we look closely at a photograph or painting, a story emerges, but how do we begin to interpret the meaning of that story without narration or passing time? When we listen to music or watch a ballet, we have a sense of emotion and drama, but why? And how has the artist created such things for us? These questions have great resonance for the fiction writer, who must generate from the most basic tool all the necessities of the short story: drama, character, setting, emotion, and lyricism. In order to write more affecting and beautiful stories, this course will ask us to explore beyond the literary, into the world of the visual and performing arts. We will pair short stories with paintings, films, songs, and performances. As we learn the many ways stories are told and experienced, we will bring these insights into our own work through prompted exercises, improv, games, collaboration, workshop, and revision. In addition to exercises, vignettes, and sketches, each student will complete a short story and have that story critiqued by both her peers and the instructor. Our primary aim in this class will be to make writing a daily practice that considers the work and value of art generally and in that way to take risks, succeed, reflect, revise, fail, and recover from failure.

**ENGLISH 11B. Introduction to English II: American Literature and Culture to 1855. 5 Units.**

(Formerly English 23/123). A survey of early American writings, including sermons, poetry, captivity and slave narratives, essays, autobiography, and fiction, from the colonial era to the eve of the Civil War. Same as: AMSTUD 150

**ENGLISH 11C. Introduction to English II: Milton and Melville. 5 Units.**

This course will study four literary masterpieces in depth: John Milton's *Paradise Lost* (1667; 1674); Book 4 of Jonathan Swift's *Gulliver's Travels* (1726); Jane Austen's *Persuasion* (1817); and Herman Melville's *Moby Dick* (1851). All of these works are complex and will repay close study. But they also work their way into an ongoing literary conversation in the western world and in that sense serve as touchstones for later writers. We will consider each work not only for its own aesthetic accomplishment but also in sometimes passionate debate with its author's historical circumstances.

**ENGLISH 120. The (Un)American Renaissance. 3-5 Units.**

The period between the 1820s and the 1860s has traditionally been called the "American Renaissance": a time when the U.S. nation, and its literature, flourished. The nineteenth century witnessed the publication of a number of important American texts that gave rise to a new national literary tradition, including familiar titles like *The Scarlet Letter*, *Moby-Dick*, and *Leaves of Grass*. Yet, as the nation stretched its geographical coordinates, writers from outside of this predominantly white, male literary heritage issued their own responses to the vision of a "New World Democracy." This course surveys and contextualizes these responses. Reading authors from Native American, Latino/a, African American, and French creole cultures, we'll expand our study of American literature to include writers who interrogate the project of American Democracy from both within and outside of the nation. While analyzing autobiographies, poems, short stories, and speeches we will also learn to read paintings, Native American sign systems, and newspaper sketches, in an exploration of what it meant to be "American" and what counted as "Literature" in the golden era of American Letters.

Same as: COMPLIT 124

**ENGLISH 122. Medieval Manuscripts, Digital Methodologies. 3-5 Units.**

Medieval Studies is entering a phase of digital abundance. In the last seven years, more medieval material has been put online than has ever been available for study at any point in the past. How can we engage with the growing mass of digitized material available to us? How does this sudden access impact the work we do, the types of questions we ask, the connections we make, and the audiences we write for? In this course, we will examine and evaluate digital medieval resources and software that has been created for interacting with those resources. Students will have the opportunity to design and create an innovative project based on medieval primary sources held at Stanford, applying current digital methods in the analysis and presentation of those resources. Same as: DLCL 122

**ENGLISH 122A. Austen and Woolf. 5 Units.**

Reading of three novels by Jane Austen, arguably the most influential and gifted of British female novelists, and three novels by Virginia Woolf, whose debt to Austen was immense. Topics include the relationship between women writers and the evolution of the English novel; the extraordinary predominance of the marriage plot in Austen's fiction (and the various transformations Woolf works on it); each novelist's relationship to the cultural and social milieu in which she wrote.

**ENGLISH 124. The American West. 5 Units.**

The American West is characterized by frontier mythology, vast distances, marked aridity, and unique political and economic characteristics. This course integrates several disciplinary perspectives into a comprehensive examination of Western North America: its history, physical geography, climate, literature, art, film, institutions, politics, demography, economy, and continuing policy challenges. Students examine themes fundamental to understanding the region: time, space, water, peoples, and boom and bust cycles.

Same as: AMSTUD 124A, ARTHIST 152, HISTORY 151, POLISCI 124A

**ENGLISH 126B. The Nineteenth Century Novel. 5 Units.**

A set of major works of art produced at the peak of the novel's centrality as a cultural form: Austen's *Emma*, Brontë's *Wuthering Heights*, Eliot's *Middlemarch*, Dickens's *Great Expectations*, Stevenson's *Dr. Jekyll and Mr. Hyde*, Hardy's *Tess of the d'Urbervilles*. The paradoxes of work, consciousness and the organization of narrative experience, habit and attention. Urban experience, shifting forms of individualism, ways of knowing other persons. Binary and concentric structures, happiness and moral action, arrays of characters.

**ENGLISH 127. The Tragedy of Becoming an Adult. 5 Units.**

We have to grow up. We have no choice in the matter. But what does this lack of choice mean for the way experience growing up, either as a tragedy or perhaps not? This course will explore various writers' approaches to one of the defining genres of the novel, the bildungsroman, the story of finding one's place in the world. We all negotiate between our youthful dreams and the compromises of experience. How do we forge our storylines? By choosing a vocation? A romantic partner? By moving from the country to the city, or from one country to another? Reading stories from Victorian and modernist Britain as well as contemporary America, we will question the variety of ways in which the bildungsroman explores questions of identity formation, social changes, and experiments in literary form. Readings include works by Charlotte Brontë, Charles Dickens, D.H. Lawrence, Gertrude Stein, Jeffrey Eugenides, Junot Díaz, and Hayao Miyazaki.

**ENGLISH 12A. Introduction to English III: Introduction to African American Literature. 5 Units.**

(Formerly English 43/143). In his bold study, *What Was African American Literature?*, Kenneth Warren defines African American literature as a late nineteenth- to mid-twentieth-century response to the nation's Jim Crow segregated order. But in the aftermath of the Jim Crow era and the Civil Rights movement, can critics still speak, coherently, of "African American literature"? And how does this political conception of African American literary production compare with accounts grounded in black language and culture? Taking up Warren's intervention, this course will explore African American literature from its earliest manifestations in the spirituals and slave narratives to texts composed at the height of desegregation and decolonization struggles at mid-century and beyond. Same as: AFRICAAM 43, AMSTUD 12A

**ENGLISH 12C. Introduction to English III: Modern Literature. 5 Units.**

Survey of the major trends in literary history from 1850 to the present.

**ENGLISH 130. Sex and the Novel. 5 Units.**

How do novels represent sexual life? This course reads texts from the eighteenth century to the present day, and considers how novelists represent the discombobulating effects of desire in fictional prose. Authors may include: S. Richardson, N. Hawthorne, J. Austen, E. Brontë, G. Gissing, H. James, D.H. Lawrence, J. Joyce, V. Nabokov, J. Baldwin, A. Hollinghurst and Z. Smith. Same as: FEMGEN 130S

**ENGLISH 131B. On the Road: American Travel Films. 3-5 Units.**

For more than a century, cars and cinema have occupied a romantic place in the American imagination, as vehicles that can take us someplace new, or engines for our fantasies of mobility, freedom and personal expression. Perhaps this is one reason why the road movie is one of the most enduring subgenres of twentieth-century film. In this class, we'll watch ten classic American travel films, one for each decade starting from Buster Keaton's silent *Go West* (1925) and arriving at Christopher Nolan's space epic *Interstellar* (2014). We thus begin on a train and end on a spaceship. In between we'll travel by car, bus, motorcycle and even on foot across America and beyond, in search of answers to the motivating questions for this course: what is the attraction of the open road, and how is the romance of its call embraced and challenged by the multiple genres of these films, the concerns of the decades in which they were produced, and the limits they impose on the idea of unrestricted travel, individual growth and independence.

**ENGLISH 131C. A.I.: Artificial Intelligence in Fiction. 3-5 Units.**

From self-driving cars to bots that alter democratic elections, artificial intelligence is growing increasingly powerful and prevalent in our everyday lives. Fiction has long been speculating about the technoutopia and catastrophe that A.I. could usher in. Indeed, fiction itself presents us with a kind of A.I. in the many characters that speak and think in its pages. So what constitutes an intelligence within literature or technology? In either field, is it ever possible to overcome the problem of other minds? Is there an ultimate boundary that demarcates bodies from machines? This course will begin with Mary Shelley's *Frankenstein* (1818) and Edgar Allan Poe's *Maelzel's Chess Player* (1836), then proceed through works such as Samuel Butler's *Erewhon* (1872), Isaac Asimov's *I, Robot* (1950), Stanley Kubrick's *2001: A Space Odyssey* (1968), and Stanford lecturer Scott Hutchins's *A Working Theory of Love* (2012), including a possible visit from Hutchins. Throughout, we will be asking ourselves what makes someone or something a person in our world today.

**ENGLISH 132C. Cosmopolitan Crime: Global Detective Fiction. 3-5 Units.**

Detective fiction is one of the most popular genres in the world. It is also, interestingly, one of the most international genres as well. In this course, we'll look at a selection of globally oriented detective stories, from the Sherlock Holmes to *The Tunnel*, and explore the ways in which detective fiction participates in the global imagination. How do these detective stories represent the tension between community and cultural difference? How do conceptions of cultural or racial otherness influence views of suspicion, guilt or innocence? How far does detective fiction fulfill a cosmopolitan ideal of transnational justice, and in what ways does it fall short? As we analyze the conventions of the detective genre and consider how it examines issues faced by our increasingly globalized community—including immigration, imperialism, identity politics, and terrorism—we'll ask larger questions about the nature of community, morality, law, and justice across national and cultural boundaries.

**ENGLISH 133C. King Arthur's Court: Medieval and Modern. 3-5 Units.**

Thomas Malory's Arthurian epic *Le Morte D'Arthur* is often thought of whimsically as the last medieval English text. As a prose narrative describing the gradual annihilation of King Arthur's legendary court at Camelot; the disintegration of the medieval courtly values that once held it together; and finally the death of Arthur himself to confirm its demise, the book seems in retrospect to be a fitting swan song for what we think of as the English middle ages. Through a focused reading of *Le Morte D'Arthur* students will be introduced to late medieval English literary history as we discuss the essential context of the poem—the Arthurian tradition, the linguistic qualities of late Middle English, and the birth of print culture in England. Our discussion of these subjects will open questions about how periods of literary history are defined by material and literary textual phenomena, as well as broader questions about how the modern idea of the medieval period was shaped by *Le Morte D'Arthur* and late medieval romance in general.

**ENGLISH 134. The Marriage Plot. 5 Units.**

The centrality of the marriage plot in the development of the British novel beginning in the 18th century with Samuel Richardson's *Pamela* and ending with Woolf's modernist novel *Mrs. Dalloway*. The relationship between novelistic plotting and the development of female characters into marriageable women. What is the relationship between the novel and feminine subjectivity? What aspects of marriage make it work as a plotting device? What kinds of marriages do marriage plots allow? Is the development of women's political agency related to their prominence in the novel form? Same as: FEMGEN 134

**ENGLISH 134A. Historical Fiction: Bringing the Past to Life in Text and Film. 3-5 Units.**

How does the past come to life, on the page and on the screen? From Walter Scott, to Toni Morrison, to the popular romances, films, and television series of today, this course considers a range of texts that draw their settings, characters, and plots from history. We will examine how each work addresses some of the central tensions of historical fiction: between the imagined past and the past as reconstructed through research, between description and the spirit of the past, between accuracy and relevance. Our focus will be on the craft of historical fiction and the power of techniques like description, dialogue, setting, and character to reanimate the past. For the final assessment, students will choose between a traditional argumentative paper and a historical story of their own invention.

**ENGLISH 134C. The Western: Imagining the West in Fiction and Film. 3-5 Units.**

The Wild West: a mythical place seared deep into the American imagination. Its familiar tropes lone riders on horseback, desert sunsets, saloon fights, train robberies echo through countless Western stories, novels, films, radio programs, and television series. Both formulaic and flexible, the Western has endured as a popular genre in American culture for more than a century, embodying and responding to many of the nation's broader anxieties surrounding its colonial history, its notions of masculinity and gender roles, its fascination with guns and violence, and its ideals of self-reliance and individualism. In this class we'll examine the Western genre through a selection of its central works in fiction and film, from the first dime novel Western, Ann S. Stephens Malaeska (1860), to Cormac McCarthy's acclaimed *Blood Meridian* (1985); and from the first silent film Western, Edwin S. Porter's *The Great Train Robbery* (1903), to the mid-century Hollywood films of John Ford, to Maggie Greenwald's feminist Western, *The Ballad of Little Jo* (1993). Along the way we'll examine the Western as both a literary form and a cultural phenomenon, probing the history of its enduring appeal as a genre. How do these novels and films construct, adapt, and subvert the form and expectations of the Western, and how do they both perpetuate and challenge the broader cultural problems of their, and our, time? Finally, as Californians and inheritors of the nation's westward expansion, what does the Western tell us about national myths of the West, and the place in which we live?

**ENGLISH 135C. Reading and Writing the Personal Essay. 3-5 Units.**

This course examines the literary and cultural significance of the personal essay. We will begin with some influential theories of the essay, and conclude by considering the changing media from periodicals to blogs in which it appears. In between, we will explore some of the many reasons writers have had for writing themselves into their essays, such as explaining their personal tastes, demanding action from their readers, bearing witness to trauma, and making the personal political. Course readings will be drawn from across the rich history of the personal essay, including works by Charles Lamb, Virginia Woolf, George Orwell, James Baldwin, Susan Sontag, Joan Didion, Alice Walker, David Foster Wallace, Elif Batuman, and Ta-Nehisi Coates. As we explore the literary history, structure, and style of the personal essay, we will also reflect on what this genre reveals about the modern person. How are individuals shaped by social, cultural, and political forces? How are the ways we construct and express ourselves affected by changes in the media? And what might the personal essay reveal about the shifting boundaries between self and other, public and private, fact and fiction? Throughout the course, students will complete a series of short critical assignments, culminating in a final paper in which they will apply what they have learned to produce personal essays of their own.

**ENGLISH 135E. William Blake: A Literary and Visual Exploration of the Illuminated Poetry. 5 Units.**

An introduction to the illuminated world of William Blake, poet, prophet, revolutionary, and visionary artist. The course will address Blake's visual iconography, belief system and ideology, unique mythology, and method of relief etching that allowed him to make every illuminated book a unique work of art, among them, *The Songs of Innocence and Experience*; *The Marriage of Heaven and Hell*; *The Book of Thel*; *Visions of the Daughters of Albion*; *The Book of Urizen*; *America a Prophecy*; and *Europe a Prophecy*.

Same as: ARTHIST 135

**ENGLISH 141C. Facts and Fictions: British Writing in the 1930s and the Rise of Fascism. 5 Units.**

In contemporary American politics where the phrase "alternative facts" has entered our lexicon in a post-truth attempt at media control, and where the activation of Brexit returns to Britain a little England model of insular nationalism, it might be a good time to return to the concerns of British writers in the 1930s about nationalism, militarism, and the politics of language. Well aware of nativist risks in a post-Depression era, as well as the loss of progressive ideals (unevenly) cultured during the 1920s, these writers explored the relationship and stakes between words and politics as they faced an increasingly fascistic continent. Writers include: G. Orwell, S. Jameson, W. Holtby, V. Brittain, N. Michinson, E. Waugh, S. Gibson, L. Woolf, V. Woolf, A. Huxley, W.H. Auden, C. Isherwood.

**ENGLISH 141F. Short Story to Big Screen. 3-5 Units.**

This course will study the adaptation from short stories to films, with a particular eye toward the form and structure of each media and their relationship to each other. Students will read a variety of 20th and 21st century stories and watch their adaptations (including "Rashomon" and "Brokeback Mountain"), as well as write a short screenplay adaptation and a short critical essay on a story/film of their choosing.

Same as: AMSTUD 141F

**ENGLISH 143A. American Indian Mythology, Legend, and Lore. 3-5 Units.**

(English majors and others taking 5 units, register for 143A.) Readings from American Indian literatures, old and new. Stories, songs, and rituals from the 19th century, including the Navajo Night Chant. Tricksters and trickster stories; war, healing, and hunting songs; Aztec songs from the 16th century. Readings from modern poets and novelists including N. Scott Momaday, Louise Erdrich, and Leslie Marmon Silko, and the classic autobiography, "Black Elk Speaks."

Same as: AMSTUD 143M, ENGLISH 43A, NATIVEAM 143A

**ENGLISH 144. Major Modernists: Virginia Woolf, James Joyce, Katherine Mansfield, T. S. Eliot. 5 Units.**

What made modernism "new"? Is the movement "evergreen"? We examine representational change, narrative innovation, and political aesthetics in the poetry, short fiction, and novels of four iconic pioneers: Virginia Woolf, James Joyce, Katherine Mansfield, and T.S. Eliot.

**ENGLISH 145D. Jewish American Literature. 5 Units.**

From its inception, Jewish-American literature has taken as its subject as well as its context the idea of Jewishness itself. Jewish culture is a diasporic one, and for this reason the concept of Jewishness differs from country to country and across time. What stays remarkably similar, though, is Jewish self-perception and relatedly Jewish literary style. This is as true for the first-generation immigrant writers like Isaac Bashevis Singer and Anzia Yezierska who came to the United States from abroad as it is for their second-generation children born in the United States, and the children of those children. In this course, we will consider the difficulties of displacement for the emigrant generation and their efforts to sustain their cultural integrity in the multicultural American environment. We'll also examine the often comic revolt of their American-born children and grandchildren against their (grand-)parents nostalgia and failure to assimilate. Only by considering these transnational roots can one understand the particularity of the Jewish-American novel in relation to mainstream and minority American literatures. In investigating the link between American Jewish writers and their literary progenitors, we will draw largely but not exclusively from Russia and the countries of Eastern Europe.

Same as: AMSTUD 145D, JEWISHST 155D, REES 145D

**ENGLISH 146A. Steinbeck. 3-5 Units.**

Introduction to the work of an American writer, beloved by general readers, often reviled by critics, whose career spanned from the Great Depression through World War II to the social upheavals of the 1960s. Focus on the social and political contexts of Steinbeck's major works; his fascination with California and Mexico; his interdisciplinary interest in marine biology and in philosophy; his diverse experiments with literary form, including drama and film.

Same as: AMSTUD 146A



**ENGLISH 147A. Speaking of Baseball. 3-5 Units.**

Since its invention in the nineteenth century, baseball has been steeped in lore and rhetoric. A cultural commentator recently pegged it one of three significant American contributions to world culture, along with jazz and the U.S. constitution. Literary and artistic representations of baseball abound, often treating it as more than a game and only a little less than a religion. In this class, we'll track representations and grand claims made for baseball by American poets, novelists, and commentators of all sorts. We'll weigh the cornucopia of literary nonfiction depicting the game. The goal will be to map the scope of this literature, defining a tradition's edges, determining its peaks, assessing its limits, challenges, and stakes. This class is open to anyone, whether familiar with the game, or totally new to it. We'll cover a variety of issues: Americana, mythologies of sport, gender and class, race, history, sociology, lots of poetry, and film. Same as: AMSTUD 147A

**ENGLISH 148. Family Drama: American Plays about Families. 5 Units.**

Focus on great dramas about family life (Albee, Kushner, Shephard, Vogel, Kron, Nottage, Parks). Communication in writing and speaking about conflict central to learning in this class. Same as: TAPS 248

**ENGLISH 150J. Queer Poetry in America. 3-5 Units.**

Some poets are known for portraying alternative sexualities in their poetry. Others seem to cover sexuality up. Can we use a poem to determine whether a poet is gay, lesbian, bisexual, transgender, or questioning? Or do some poets simply defy categorization? What makes a poem queer? Is poetry somehow more or less queer than other literary forms? Even if we can answer these questions, what would they tell us about literature in general? This course will investigate such topics and more by tracking queer poetry in twentieth-century America. We'll start with nineteenth-century figures Walt Whitman and Emily Dickinson, then move on to Gertrude Stein, Hart Crane, Langston Hughes, Countee Cullen, Elizabeth Bishop, Allen Ginsberg, Frank O'Hara, and others. We'll ask what their poetry meant in their own times, as well as what it means to us in our present era of expanding civil rights and changing sexual attitudes. Same as: AMSTUD 150J, FEMGEN 150J

**ENGLISH 151F. Angelheaded Hipsters: Beat Writers of San Francisco and New York. 5 Units.**

Reading of central writers of the Beat movement (Ginsberg, Kerouac, di Prima, Snyder, Whalen) as well as some related writers (Creeley, Gunn, Levertov). Issues explored include NY and SF, Buddhism and leftist politics, poetry and jazz. Some exposure to reading poems to jazz accompaniment. Examination of some of the writers and performers growing out of the Beats: Bob Dylan, rock music, especially from San Francisco, and jazz.

**ENGLISH 152G. Harlem Renaissance and Modernism. 5 Units.**

Examination of the explosion of African American artistic expression during 1920s and 30s New York known as the Harlem Renaissance. Amiri Baraka once referred to the Renaissance as a kind of "vicious Modernism", as a "BangClash", that impacted and was impacted by political, cultural and aesthetic changes not only in the U.S. but Europe, the Caribbean and Latin America. Focus on the literature, graphic arts, and the music of the era in this global context.

**ENGLISH 152K. Mixed-Race Politics and Culture. 5 Units.**

Today, almost one-third of Americans identify with a racial/ethnic minority group, and more than 9 million Americans identify with multiple races. What are the implications of such diversity for American politics and culture? This course approaches issues of race from an interdisciplinary perspective, employing research in the social sciences and humanities to assess how race shapes perceptions of identity as well as political behavior in 21st-century U.S. Issues surrounding the role of multiculturalism, immigration, acculturation, racial representation, and racial prejudice in American society. Topics include the political and social formation of race; racial representation in the media, arts, and popular culture; the rise and decline of the "one-drop rule" and its effect on political and cultural attachments; the politicization of census categories and the rise of the multiracial movement. Same as: AFRICAAM 226, AMSTUD 152K, CSRE 152K

**ENGLISH 153. Time, Space, and Place: Humanistic Inquiry in a Digital Age. 2-5 Units.**

What are the digital humanities? A definition might be: Digital humanities are those pursuits which use digital tools to explore topics of humanistic inquiry. But that definition is rather general. To have a more nuanced understanding of the digital humanities, students will be exposed to a number of its practices, and practitioners. Active engagement by all participants is expected. Students will read and annotate, map and perform digital textual analysis. Ultimately, students will have a better idea of what the digital humanities are, and will be introduced to different ways they can be practiced, opening up possibilities for further exploration.

**ENGLISH 153F. Transatlantic Female Modernists: Making it New with a Difference. 5 Units.**

How did American and British women writers in the early decades of the last century express their experiences of modernity in fiction and poetry? A major but oscillating critical lens on modernism has focused on questions of gender and sexuality, and how women expressed the experiences of writing as a woman during these years (1910-1940). But other differences and distinctions of race, class, culture, nation, and literary inheritance were also crucial to the endeavor to give voice to a new sense of identity for many of these women. This course aims to uncover what binds as well as what differentiates forms of political, aesthetic, and cultural representation in the works of several key innovators in this period: V. Woolf; Z. Neale Hurston; D. Barnes; K. Mansfield; N. Larson; A. Lowell; H.D.; J. Faust; N. Cunard.

**ENGLISH 154. Mapping the Romantic Imagination. 5 Units.**

In this course, we will apply spatial humanities techniques to the study of Romantic writing. In the lyric poetry, national tales and Gothic novels of the Romantic period, how did geography, both real and imagined, influence the kinds of writing that were possible? Were there kinds of writing that could only happen in certain kinds of places? Together, using a combination of GIS mapping and geo-location, we will create a digital, annotated map of the Romantic imaginative world.

**ENGLISH 154E. Twentieth-Century Irish Literature. 5 Units.**

Plays, poems, short stories, and novels. Writers include James Joyce, William Yeats, Mary Lavin, Kate O'Brien, William Trevor, Seamus Heaney, and Samuel Beckett. How the writer can sustain imaginative freedom and literary experiment in the face of a turbulent history.

**ENGLISH 154F. Film & Philosophy. 4 Units.**

Issues of authenticity, morality, personal identity, and the value of truth explored through film; philosophical investigation of the filmic medium itself. Screenings to include Blade Runner (Scott), Do The Right Thing (Lee), The Seventh Seal (Bergman), Fight Club (Fincher), La Jetée (Marker), Memento (Nolan), and Eternal Sunshine of the Spotless Mind (Kaufman). Taught in English.

**ENGLISH 156B. Yvor Winters: Poetry and Criticism. 5 Units.**

Yvor Winters's poetry and fiction spanned several important eras: Renaissance poetry, American and French Symbolism, Imagism, and what he called "Post Symbolism." In this course we will cover a good deal of literary history through the works of Winters, the fiction and poetry of his wife, Janet Lewis, and a variety of poems that touched on their work, including American Indian songs, Japanese haiku, and the poetry of Emily Dickinson, Hart Crane, William Carlos Williams, Wallace Stevens, Louise Bogan, Catherine Davis, J.V. Cunningham, Edgar Bowers, and N Scott Momaday. Among our concerns will be ways of addressing a wide variety of poetic styles.

**ENGLISH 159. James Baldwin & Twentieth Century Literature. 5 Units.**

Black, gay and gifted, Baldwin was hailed as a "spokesman for the race", although he personally, and controversially, eschewed titles and classifications of all kinds. This course examines his classic novels and essays as well his exciting work across many lesser-examined domains - poetry, music, theatre, sermon, photo-text, children's literature, public media, comedy and artistic collaboration. Placing his work in context with other writers of the 20C (Faulkner, Wright, Morrison) and capitalizing on a resurgence of interest in the writer (NYC just dedicated a year of celebration of Baldwin and there are 2 new journals dedicated to study of Baldwin), the course seeks to capture the power and influence of Baldwin's work during the Civil Rights era as well as his relevance in the "post-race" transnational 21st century, when his prescient questioning of the boundaries of race, sex, love, leadership and country assume new urgency.

Same as: AFRICAAM 159, FEMGEN 159

**ENGLISH 159A. Literature and Protest. 3-5 Units.**

How does literary art get involved in politics? What is the border between propaganda and art? This class examines moments when writers seem suddenly not only to represent politically charged topics and themes, but to have a part in bringing about political change. We'll look at case studies from the anti-apartheid movement in South Africa, the American Civil Rights struggle, 19th century Russia, and more.

Same as: AFRICAAM 159A, CSRE 159I

**ENGLISH 15SC. A New Millennial Mix: The Art & Politics of the "Mixed Race Experience". 2 Units.**

Recently, The New York Times and the National Geographic have hailed the "new face of America" as young, global, and hybrid. The NY Times gave this demographic a name: Generation E.A. (Ethnically Ambiguous). Our course examines the political and aesthetic implications of Generation E.A., and the hot new vogue for all things mixed. Galvanized by the 2000 census with its "mark one or more" (MOOM) racial option, dozens of organizations, websites, affinity and advocacy groups, modeling and casting agencies, television pilots, magazines, and journals—all focused on multi-racial/multi-cultural experiences—have emerged in the last few years. We will analyze representations of mixed race and multiculturalism in law, literature, history, art, performance, film, comedy, and popular culture. These cultural and legal events are changing the way we talk and think about race. Importantly, our seminar also broadens this discussion beyond race, exploring how crossings of the color-line so often intersect with other aspects of experience related to gender, religion, culture, or class. Field trips, films, communal lunches, and interactive assignments help us explore the current controversies over mixed-race identification and, more generally, the expressive and political possibilities for representing complex identities. Requirements include three two- to three-page analytical writing assignments, a presentation that can include an optional artistic or media component, and a final group-designed project. If you are a citizen of the 21st century, this class is for and about you.

**ENGLISH 160. Poetry and Poetics. 5 Units.**

Introduction to the reading of poetry, with emphasis on how the sense of poems is shaped through diction, imagery, and technical elements of verse.

**ENGLISH 161. Narrative and Narrative Theory. 5 Units.**

An introduction to stories and storytelling—that is, to narrative. What is narrative? When is narrative fictional and when non-fictional? How is it done, word by word, sentence by sentence? Must it be in prose? Can it be in pictures? How has storytelling changed over time? Focus on various forms, genres, structures, and characteristics of narrative.

**ENGLISH 162W. Writing Intensive Seminar in English. 5 Units.**

In these highly regarded, small-group seminars, students explore unique topics in English language literature, reading select primary texts alongside exemplary critical works and/or other cultural artifacts, while also honing their research and writing skills through series of assignments that culminate in a substantial original research essay. Classes are capped at 8, allowing for individualized attention and rich feedback. Click Schedule below to see individual course titles (in Notes). For fuller details and descriptions, go to <https://english.stanford.edu/courses/2017-18-english-162w>. Enrollment is by permission. English majors must take at least one WISE to fulfill WIM. Non-majors are welcome, space permitting. Contact the English Department's Student Services Manager, Melanie Ester ([melaniee@stanford.edu](mailto:melaniee@stanford.edu)), for more information.

Same as: WISE

**ENGLISH 163F. Shakespeare Now and Then. 5 Units.**

In this Introduction to Shakespeare on film, we will study approximately five Shakespearean plays, including *Romeo and Juliet*, *Much Ado About Nothing*, and *Macbeth*, alongside a selection of their movie adaptations. As well as getting to grips with the plays printed texts, we will investigate how the plays meanings and significations can change radically in performance.

**ENGLISH 166. Who were the Vikings?. 3-5 Units.**

Who were the Vikings and what has been their influence on contemporary culture? This course provides a broad introduction to Viking society and culture as well as to their legacy in the modern world. We will look at Viking life, mythology, literature, art and archaeology as well as modern adaptations of Viking culture in music, literature, film and television. We will read some of the great works of Viking literature & tales of Odin and Thor, of magic and monsters, of adventures across the seas - and examine online exhibitions of Vikings artefacts and settlements in Europe and Newfoundland. During the first half of the course, students will begin thinking about their final project & a creative reimagining one of the texts or artefacts which we will discuss in class. The latter half of the course will focus on the development of the Vikings as a cultural model for modern creative expression. We will investigate how Norse themes, characters and forms were adapted in Germany, England and the USA in the nineteenth and twentieth centuries by writers, artists and composers such as Richard Wagner, William Morris, Henry Longfellow and J.R.R. Tolkien. The course will conclude with a discussion of how the Vikings (and Viking ideas) are represented today in popular culture, including the 1958 Kirk Douglas film, *The Vikings*, the TV shows *The Vikings* and *Game of Thrones* and the Marvel comic books series. Students will be encouraged to examine the ways in which these texts engage with their historical models and consider how this might influence their own creative project.

**ENGLISH 167H. The Ethical Gangster. 3-5 Units.**

(English majors must register for 5 units) A study of recent developments in understanding human moral psychology using mafia movies to explore the differences between Kantian and Utilitarian moral theory. We will study the greatest hits of gangster fiction and film, from Fielding's *Jonathan Wild* to *The Sopranos*.

**ENGLISH 16SC. Learning Theater: From Audience to Critic at the Oregon Shakespeare Festival. 2 Units.**

Who doesn't love going to a play: sitting in the darkened theater, an anonymous member of the audience waiting to be entertained, charmed, and challenged? But how many of us know enough about the details of the plays, their interpretation, their production, and acting itself, to allow us to appreciate fully the theatrical experience? In this seminar, we will spend 13 days in Ashland, Oregon, at the Oregon Shakespeare Festival (OSF), where we will attend these plays: Shakespeare's *Henry V*, *Othello*, *Love's Labour's Lost*, and *Romeo and Juliet*; the world premiere of Mary Kathryn Nagle's *Mannahatta*; Kate Hamill's *Sense and Sensibility*, based on Jane Austen's novel; Richard Rodgers and Oscar Hammerstein's *Oklahoma!*; the world premiere of Idris Goodwin's *The Way the Mountain Moved*; Frances Ya-Chu Cowhig's *Snow in Midsummer*, based on the classical Chinese drama *The Injustice of Dou Yi That Moved Heaven and Earth* by Guan Hanqing; and Lauren Gunderson's *The Book of Will*. (To read more about these productions, go to [www.osfashland.org](http://www.osfashland.org)). We will also spend time backstage, meeting with actors, designers, and artistic and administrative directors of OSF. Students will read the plays before the seminar begins. In Ashland, they will produce staged readings and design a final paper based on one of the productions. These reviews will be delivered to the group and turned in on Thursday, September 20. Note: This seminar will convene in Ashland on Monday, September 3, and will adjourn to Stanford on Sunday, September 16. Students must arrive in Ashland by 4:00 p.m. on September 3. Room and board in Ashland and transportation to Stanford will be provided and paid for by the program.

**ENGLISH 172D. Introduction to Comparative Studies in Race and Ethnicity. 5 Units.**

How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. Includes an optional Haas Center for Public Service certified Community Engaged Learning section.

Same as: CSRE 196C, PSYCH 155, SOC 146, TAPS 165

**ENGLISH 172J. The Ethics of Metaphor: Identities in Parallel. 5 Units.**

Many of our political arguments are arguments by analogy. But analogies between ethnic and racial experiences are especially problematic, and especially incendiary. This class will think about metaphor and contend with how it's used in both fictional and nonfictional texts concerning race and ethnicity. The works we will read in this class are uncomfortable. They're uncomfortable because they address suffering and pain; they're uncomfortable because they compare suffering and pain; they're uncomfortable because of what they get right and because of what they don't. This is a class fundamentally concerned with how we traverse boundaries of race and ethnicity ethically, and about thinking through when and how authors have failed to do so. When does empathy become presumption? When does altruism become condescension? When does exploration become voyeurism? We will plumb these questions (to which there are no clear answers) through the lens of speeches, poetry, sci-fi, film, essays, short stories, and novels.

**ENGLISH 175E. Animals and the Fictions of Identity. 3-5 Units.**

In a post-Darwin world, the notion that we might all have an animal alter-ego lurking inside seems quite familiar. But ideas about animals—how they think and feel, act and react—involve identity categories such as race, gender, class and ability in surprising ways. This course will trace the relationship between animality and human life in twentieth-century American fiction, from race and indigeneity in Jack London's dog stories to the storytelling practices of contemporary animal advocacy groups. The course may also include an experiential component in which students will have the opportunity to explore multispecies concerns with a local organization.

Same as: AMSTUD 175E

**ENGLISH 179. Cultures of Disease: Cancer and HIV/AIDS. 5 Units.**

History, politics, science, and anthropology of cancer; political and economic issues of disease and health care in the U.S., including the ethics and economics of health care provision, the pharmaceutical industry, carcinogen production, and research priorities.

Same as: ANTHRO 179

**ENGLISH 180B. Reading Politics: The History and Future of Literacy. 3-5 Units.**

Reading is a political act. Through our major texts of Charles Dickens's *Oliver Twist*, Zora Neale Hurston's *The Eatonville Anthology*, and Azar Nafisi's *Reading Lolita in Tehran*, we will explore the classed, racialized, and gendered power dynamics of literacy and literature. How can books incite social revolutions? How can they maintain harmful inequalities? When is reading a tool of empowerment and when is it a tool of social control? We will examine these questions in a number of contexts, ranging from Victorian London, to the Jim Crow American South, from the Islamic revolution in Iran to a Silicon Valley proliferating with new forms of scientific, technological, and financial literacy. The course includes a significant service learning component, in which students will volunteer to tutor underprivileged readers through Bay Area literacy programs. Final projects will ask students to reflect on these tutoring experiences and consider the complex politics at work in the act of teaching someone to read.

**ENGLISH 182J. "When We Dead Awaken": Breakthroughs in Conceptions of the Gendered Self in Literature and the Arts. 4-5 Units.**

Remarkable breakthroughs in conceptions of the gendered self are everywhere evident in literature and the arts, beginning primarily with the Early Modern world and continuing into today. Many of these works inhere in innovations in literary and artistic forms in order to capture and even evoke the strong cognitive, or psychological, dimension of such awakenings. The reader, or viewer, is often challenged to adapt her or his mind to new forms of thought, such as John Donne's seventeenth century creation of the Dramatic Monologue, a form popular with modern writers, which requires the reader's cognitive presence in order to fill out the dramatic scene. In so doing, the reader often supplies the presence of the female voice and thereby enters into her self-consciousness and inner thoughts. Adrienne Rich, for example, specifically rewrites one of Donne's major poems from the female perspective. This can be, in Rich's words, an awakening for the active reader, as he or she assumes that often-unspoken female perspective. The course will also explore male conceptions of the self and how such conceptions are often grounded in cultural attitudes imposed on male subjects, which can contribute to gender-bias toward women, a subject often neglected in exploring gendered attitudes, but which is now gaining more study, for example, in Shakespeare's *Othello*. Readings from recent developments in the neurosciences and cognitive studies will be included in our study of artistic forms and how such forms can activate particular mindsets. Writers and artists will include Shakespeare, Michelangelo, John Donne, Virginia Woolf, Adrienne Rich, Gertrude Stein, Picasso, June Wayne, and Edward Albee's 1960's play, *Who's Afraid of Virginia Woolf?*.

Same as: FEMGEN 112, FEMGEN 212

**ENGLISH 183E. Self-Impersonation: Fiction, Autobiography, Memoir. 5 Units.**

Course will examine the intersecting genres of fiction, autobiography, and memoir. Topics will include the literary construction of selfhood and its constituent categories (gender, race, ethnicity, religion, etc.); the role of language in the development of the self; the relational nature of the self (vis-à-vis the family, "society," God); the cultural status of "individuality"; the concept of childhood; and the role of individual testimony in our understanding of family, religious and national history. In addition to short theoretical works, authors will include Knusgaard, Nabokov, Hoffman, Winterson, Said, Levi, Barthes, and Duras.

Same as: COMPLIT 183

**ENGLISH 184E. Literary Text Mining. 5 Units.**

This course will train students in applied methods for computationally analyzing texts for humanities research. The skills students will gain will include basic programming for textual analysis, applied statistical evaluation of results and the ability to present these results within a formal research paper or presentation. Students in the course will also learn the prerequisite steps of such an analysis including corpus selection and cleaning, metadata collection, and selecting and creating an appropriate visualization for the results.

**ENGLISH 185A. Literature and Medicine. 5 Units.**

Virginia Woolf once wrote, "The merest schoolgirl when she falls in love has Shakespeare or Keats to speak her mind for her, but let a sufferer try to describe a pain in his head to a doctor and language at once runs dry." Problems of representation are at the heart of the experiences of physical suffering and medical care; how has literature defined and redefined its relationship to these experiences? Topics include medical and literary interpretation, illness and metaphor, and the evolution of the surface-depth model of the self. The course centers on major works of literature that engage the imaginative potential of medicine and the narrative structures of disease, by authors including Jane Austen, Leo Tolstoy, and Arthur Conan Doyle, read alongside paintings (Rembrandt's *The Anatomy Lesson of Dr. Nicolaes Tulp*), film (Ingmar Bergman's *Cries and Whispers*), medical descriptions of disease, diagnostic tools, and theory (e.g., Sontag's *Illness as Metaphor*).

**ENGLISH 186B. The American Underground: Crime and the Criminal in American Literature. 5 Units.**

The literary representation of crime and the criminal from postrevolutionary through contemporary American literature. Topics will include the enigma of the criminal personality; varieties of crime, from those underwritten by religious or ethical principle to those produced by the deformations of bias; the impact on narrative form of the challenge of narrating crime; and the significance attributed to gratuitous crime in the American cultural context.

**ENGLISH 185I. From Canon to 'Fanon': Fan Fiction and the Democratization of Literature. 1-2 Unit.**

Fan fiction has been called one of the great unsung popular literary movements of the past fifty years. Long in existence but increasingly mainstream, the genre has emerged onto the 21st-century literary landscape as a cultural force to be reckoned with. This course will treat fan fiction as a legitimate genre of literature worthy of academic attention and analysis. We will examine both text and context, considering tropes and style of 'fanfic' as well as cultural impact and influence. Key themes of the course include intertextuality, reader-response criticism, and fanfic as a medium for narrative expansion and transgression.

**ENGLISH 190. Intermediate Fiction Writing. 5 Units.**

May be taken twice for credit. Lottery. Priority to last quarter/year in school, majors in English with Creative Writing emphasis, and Creative Writing minors. Prerequisite: 90 or 91.

**ENGLISH 190D. Dialogue Writing. 5 Units.**

For Fiction and Film students. Study how dialogue develops character, reveals information, moves plots forward, and creates tension. Use of short story, novels, graphic novels, and films. Students will write many short assignments, one dialogue scene, and one longer story or script (10-20pages). Priority to Fiction Into Film students, but open to all. Prerequisite: 90.

**ENGLISH 190F. Fiction into Film. 5 Units.**

Workshop. For screenwriting students. Story craft, structure, and dialogue. Assignments include short scene creation, character development, and a long story. How fictional works are adapted to screenplays, and how each form uses elements of conflict, time, summary, and scene. Priority to seniors and Film Studies majors. Prerequisite: 90.

**ENGLISH 190T. Special Topics in Intermediate Fiction Writing. 5 Units.**

Focus on a particular topic or process. Work includes aspects of reading short stories and novels, writing at least 30-50 pages of fiction, and responding to peers' work in workshop. May be repeated for credit. Prerequisite: 91 or 90.

**ENGLISH 190V. Reading for Writers. 5 Units.**

Taught by the Stein Visiting Fiction Writer. Prerequisite: 90 or 91.

**ENGLISH 191. Intermediate Creative Nonfiction. 5 Units.**

Continuation of 91. Workshop. The application of advanced storytelling techniques to fact-based personal narratives, emphasizing organic writing, discovering audience, and publication. Guest lecturers, collaborative writing, and publication of the final project in print, audio, or web formats. Prerequisite: 91 or 90.

**ENGLISH 191DC. DCI Intermediate Memoir Workshop. 5 Units.**

English 191DC will provide an intermediate-level course in the art and craft of writing memoir. It will build on those strategies for writing with meaning and insight about the events in our lives that were presented in English 91DC. During the term, we will read texts that broadly innovate within and outside of the formal traditions of the memoir form, finding new and exciting ways to represent personal experience. This section will also serve as the continuing examination and practice of the formal elements of the memoir. During the term, Fellows will write, workshop, present to the class, and revise at least two short pieces, one long piece, and working drafts of excerpts. All workshops will serve as the springboard for our larger class conversation about theme and craft. During the quarter, we will meet in individual conferences. Throughout the quarter, creative work will be assigned in the form of essays, imitations, and revisions. Critical work will be assigned in the form of planning and leading class discussions, and writing and discussing critiques of colleagues' essays. A variety of creative prompts, critical exercises, and assigned readings will foster your understanding and appreciation of the memoir form, as well as your growth as a creative writer. Energetic, committed participation is a must.

**ENGLISH 191T. Special Topics in Intermediate Creative Nonfiction. 5 Units.**

Workshop. Continuation of 91. Focus is on forms of the essay. Works from across time and nationality for their craft and technique; experimentation with writing exercises. Students read and respond to each other's longer nonfiction projects. May be repeated for credit. Prerequisite: 91 or 90.

**ENGLISH 191V. Reading for Creative Non-Fiction Writers. 5 Units.**

Taught by the Stein Visiting Writer. Prerequisite English 90 or 91. Permission number required to enroll.

**ENGLISH 192. Intermediate Poetry Writing. 5 Units.**

May be taken twice. Lottery. Priority to last quarter/year in school, majors in English with Creative Writing emphasis, and Creative Writing minors. Prerequisite: 92.

**ENGLISH 192T. Topics in Intermediate Poetry Writing. 5 Units.**

Generation and discussion of student poems. How to recognize a poem's internal structure; how to seek models for work. Students submit portfolio for group critique. May be repeated for credit. Prerequisite: ENGLISH 92.

**ENGLISH 192V. The Occasions of Poetry. 5 Units.**

Taught by the Mohr Visiting Poet. Prerequisite: 92. Permission number required to enroll.

**ENGLISH 194. Individual Research. 5 Units.**

See section above on Undergraduate Programs, Opportunities for Advanced Work, Individual Research.

**ENGLISH 195B. How to Write a Great Essay: A Writing Bootcamp for Undergraduates. 5 Units.**

The course will be a practical workshop for undergraduates on how to improve essay-writing skills. We will focus on the finer points of vocabulary, grammar, mechanics, logic, timing, intellectual precision; how to connect with (and delight) an audience; how to magnify a theme; how to deflect counter-arguments; how to develop your own sophisticated authorial 'style'; how to write sentences (and papers!) your reader will care about and admire and maybe even remember.

**ENGLISH 196A. Honors Seminar: Critical Approaches to Literature. 5 Units.**

Overview of literary-critical methodologies, with a practical emphasis shaped by participants' current honors projects. Restricted to students in the English Honors Program.

**ENGLISH 197. Seniors Honors Essay. 1-10 Unit.**

In two quarters.

**ENGLISH 198. Individual Work. 1-5 Unit.**

Undergraduates who wish to study a subject or area not covered by regular courses may, with consent, enroll for individual work under the supervision of a member of the department. 198 may not be used to fulfill departmental area or elective requirements without consent. Group seminars are not appropriate for 198.

**ENGLISH 198F. Hoffs-Roach Fiction into Film Tutorial. 2-5 Units.**

Up to three undergraduate writers work with Fiction Into Film instructors. Students design their own curriculum, and Instructors act as writing mentors and advisers. Prerequisite: 190F. Submitted manuscript required.

**ENGLISH 198L. Individual Work: Levinthal Tutorial. 5 Units.**

Undergraduate writers work individually with visiting Stegner Fellows in poetry, fiction, and if available, nonfiction. Students design their own curriculum; Stegner Fellows act as writing mentors and advisers. Prerequisites: 90, 91, or 92; submitted manuscript.

**ENGLISH 199. Senior Independent Essay. 1-10 Unit.**

Open, with department approval, to seniors majoring in non-Honors English who wish to work throughout the year on a 10,000 word critical or scholarly essay. Applicants submit a sample of their expository prose, proposed topic, and bibliography to the Director of Undergraduate Studies before preregistration in May of the junior year. Each student accepted is responsible for finding a department faculty adviser. May be repeated for credit.

**ENGLISH 1D. Dickens Book Club. 1 Unit.**

Through the academic year, we will read one Dickens novel, one number a week for 19 weeks, as the Victorians would have done as they read the serialized novel over the course of 19 months. The group gets together once a week for an hour and a half to discuss each number, to look carefully at the pattern that the author is weaving, to guess, as the Victorians would have done, what might be coming next, and to investigate the Victorian world Dickens presents. We look carefully at themes, characters, metaphorical patterns, and scenes that form Dickens' literary world, and spend increasing time evaluating the critique that Dickens levels at Victorian life. The weekly gatherings are casual; the discussion is lively and pointed.

**ENGLISH 201. The Bible and Literature. 5 Units.**

Differences in translations of the Bible into English. Recognizing and interpreting biblical allusion in texts from the medieval to modern periods. Readings from the Bible and from British, Canadian, American, and African American, and African literature in English.

**ENGLISH 227. Melville's Moby-Dick. 5 Units.**

A slow and careful reading of Herman Melville's 1850 masterpiece, *Moby-Dick*; or, *The Whale*. In the process, we will unfold the novel's nineteenth-century literary-historical context as well as the world of Melville's own literary, religious, philosophical, technological, commercial, and scientific citations and allusions. We will seek to understand the multiple significances of Melville's experiments with the novelistic genre and their relationship with his building out the meaning of Americanness. In the second half of the quarter, we will focus on a selection of major mid-twentieth-century through contemporary critical, literary-theoretical, and political-theoretical readings of *Moby-Dick*.

**ENGLISH 233. Baroque and Neobaroque. 3-5 Units.**

The literary, cultural, and political implications of the 17th-century phenomenon formed in response to the conditions of the 16th century including humanism, absolutism, and early capitalism, and dispersed through Europe, the Americas, and Asia. If the Baroque is a universal code of this period, how do its vehicles, such as tragic drama, Ciceronian prose, and metaphysical poetry, converse with one another? The neobaroque as a complex reaction to the remains of the baroque in Latin American cultures, with attention to the mode in recent Brazilian literary theory and Mexican poetry.

Same as: COMPLIT 301, ILAC 293E

**ENGLISH 240A. Crooks, Quacks, and Courtesans: Jacobean City Comedy. 5 Units.**

We will read a series of plays set in or around early modern London, written by playwrights such as Ben Jonson, Thomas Middleton, and John Marston. The course will explore the plays' hilarious representations of the London underworld, with its confidence tricksters and naive victims, as well as more serious topics such as social mobility and social relations, economic expansion, disease transmission, and the built environment. Plays studied will include: *The Alchemist*, *Epicene*, *The Roaring Girl*, *A Chaste Maid In Cheapside*, *The Dutch Courtesan*..

Same as: ENGLISH 340A, HISTORY 232E, HISTORY 332E

**ENGLISH 241. Eighteenth-Century Women Writers. 5 Units.**

The course will deal with a number of eighteenth-century English women writers—primarily novelists, but also poets, critics and playwrights. Authors to be studied in depth will include both relatively well-known writers such as Behn and Wollstonecraft, and lesser-known authors such as Sarah Scott, Elizabeth Inchbald and Anna Seward. Considerable attention will be paid to recent feminist scholarship on eighteenth-century women's writing, generic issues and the question of a "women's literary tradition," the material conditions of female authorship in the period, and the history of the eighteenth-century literary marketplace. Same as: FEMGEN 241W

**ENGLISH 287G. A Woman's Life: 20th- (and 21st-) Century Memoirs by Women. 5 Units.**

Why do women write memoirs? Why has the memoir form become such a popular genre for American female authors? What do such books reveal, More broadly, about the condition of women in Contemporary Society? We will approach these questions by reading autobiographical works by some if not all of the following writers: Gertrude Stein, Joan Didion, Kathryn Harris, Audre Lorde, Patti Smith, Lucy Grealy, Michelle Tea, Jeannette Walls, Carrie Fisher, and Alison Bechdel. Same as: FEMGEN 287G

**ENGLISH 290. Advanced Fiction Writing. 5 Units.**

Workshop critique of original short stories or novel. Prerequisites: manuscript, consent of instructor, and 190-level fiction workshop. May be repeated for credit.

**ENGLISH 292. Advanced Poetry Writing. 5 Units.**

Focus is on generation and discussion of student poems, and seeking published models for the work.

**ENGLISH 293. Literary Translation. 4 Units.**

An overview of translation theories and practices over time. The aesthetic, ethical, and political questions raised by the act and art of translation and how these pertain to the translator's tasks. Discussion of particular translation challenges and the decision processes taken to address these issues. Coursework includes assigned theoretical readings, comparative translations, and the undertaking of an individual translation project.

Same as: DLCL 293

**ENGLISH 300. Medieval Methodologies. 1-3 Unit.**

An introduction to the essential tool-kit for medievalists, this course will give all medievalists a great head start in knowing how to access and interpret major works and topics in the field. Stanford's medieval faculty will explain the key sources and methods in the major disciplines from History to Religion, French to Arabic, English to Chinese, and Art History to German and Music. In so doing, students will be introduced to the breadth and interdisciplinary potential of Medieval Studies. A workshop devoted to Digital Technologies and Codicology/Palaeography will offer elementary training in these fundamental skills.

Same as: DLCL 300, MUSIC 300C

**ENGLISH 302. Early Modern Prose Fictions. 3-5 Units.**

The course considers the English and European prose fictions of the sixteenth and seventeenth centuries—romances, picaresques, pastorals, narratives of social class, and other genres—in the context of Renaissance and present-day theories of fiction. How is narrative form conditioned by social reality, and in turn how does it provide a zone for reflection on that reality in terms different from those of the more codified genres of drama and poetry?

Same as: COMPLIT 303

**ENGLISH 305H. Readings in Close Reading. 5 Units.**

The difference between reading and reading closely. Is close reading a specific method of literary criticism or theory, or does it describe a sensibility that can accompany any interpretation? Categories and frameworks for this ubiquitous, often undefined critical practice. Different, sometimes competing, traditions of close reading and recent critiques and alternatives. Texts could include Empson, Barthes, Auerbach, T. J. Clark, Adorno, Brooks, de Man, D. A. Miller, Helen Vendler.

**ENGLISH 307D. Bringing the Archives to Life. 5 Units.**

Introduction to the critical skills required for working in the archives. Students will be taught the core methods for working with archival sources, and will be trained in the transcription, editing, interpretation, and publication of primary textual materials. Our textual materials will be generically varied and chronologically diverse, and we shall move from late medieval to contemporary holdings in Stanford University Library's Special Collections, in other archives at Stanford, and in local private holdings.

**ENGLISH 313. Performance and Performativity. 1-4 Unit.**

Performance theory through topics including: affect/trauma, embodiment, empathy, theatricality/performativity, specularity/visibility, liveness/disappearance, belonging/abjection, and utopias and dystopias. Readings from Schechner, Phelan, Austin, Butler, Conquergood, Roach, Schneider, Silverman, Caruth, Fanon, Moten, Anzaldúa, Agamben, Freud, and Lacan. May be repeated for credit.

Same as: FEMGEN 313, TAPS 313

**ENGLISH 314. Epic and Empire. 5 Units.**

Focus is on Virgil's Aeneid and its influence, tracing the European epic tradition (Ariosto, Tasso, Camoes, Spenser, and Milton) to New World discovery and mercantile expansion in the early modern period.

Same as: COMPLIT 320A

**ENGLISH 317A. Irony. 5 Units.**

Varieties of literary irony from Plato through the present. Topics include: verbal, dramatic, situational, and romantic irony. Focus will be on questions about what irony is and why writers use it. How does irony go astray? What kinds of topics seem to require irony? How does irony work? Writers include Chaucer, Swift, Thomas Mann, J.M. Coetzee and David Foster Wallace.

**ENGLISH 331. William Blake. 5 Units.**

This course will explore the illuminated world of William Blake poet, prophet, revolutionary, and visionary artist in the context of intellectual history, culture, and aesthetics. To study Blake is to witness the birth pangs of modernity and the pathos energy and agony of alternate, impossible histories that fell by the wayside. The task is multidisciplinary, and it is one that opens literary history into our contemporary moment. Blake challenges virtually every aspect of literary representation, from character to narrative structure, from poetic meter to typology and other features of print culture. He is historical in his situatedness (religious dissent, the chemical revolution, industrialization, commodification, and controversies about human and animal rights were all part of his milieu) but he is also radically present in his ongoing influence and relevance. The course will unpack Blake's iconography, ideology, mythology, and infernal method which made every illuminated book a unique work of art.

**ENGLISH 333. Philosophy, Literature, and the Arts Core Seminar. 2-4 Units.**

This course serves as the Core Seminar for the PhD Minor in Philosophy, Literature, and the Arts. It introduces students to a wide range of topics at the intersection of philosophy with literary and arts criticism. In this year's installment of the seminar, we will focus on issues about the nature of fiction, about the experience of appreciation and what it does for us, about the ethical consequences of imaginative fictions, and about different conceptions of the importance of the arts in life more broadly. The seminar is intended for graduate students. It is suitable for theoretically ambitious students of literature and the arts, philosophers with interests in value theory, aesthetics, and topics in language and mind, and other students with strong interest in the psychological importance of engagement with the arts. May be repeat for credit.

Same as: DLCL 333, PHIL 333

**ENGLISH 334B. Concepts of Modernity II: Culture, Aesthetics, and Society in the Age of Globalization. 5 Units.**

Emphasis on world-system theory, theories of coloniality and power, and aesthetic modernity/postmodernity in their relation to culture broadly understood.

Same as: MTL 334B

**ENGLISH 340A. Crooks, Quacks, and Courtesans: Jacobean City Comedy. 5 Units.**

We will read a series of plays set in or around early modern London, written by playwrights such as Ben Jonson, Thomas Middleton, and John Marston. The course will explore the plays' hilarious representations of the London underworld, with its confidence tricksters and naive victims, as well as more serious topics such as social mobility and social relations, economic expansion, disease transmission, and the built environment. Plays studied will include: *The Alchemist*, *Epicene*, *The Roaring Girl*, *A Chaste Maid In Cheapside*, *The Dutch Courtesan*..

Same as: ENGLISH 240A, HISTORY 232E, HISTORY 332E

**ENGLISH 350. Law and Literature. 3-4 Units.**

After its heyday in the 1970s and 1980s, many wondered whether the law and literature movement would retain vitality. Within the last decade there has, however, been an explosion of energy in the field, which has expanded beyond the boundaries of the literary text narrowly conceived and incorporated a range of other genres and humanistic approaches. Several recent or forthcoming books survey the range of emerging scholarship and the potential for new directions within the field. Using one of these—*New Directions in Law and Literature* (Oxford, 2017)—as a guide, this course will delve into a variety of topics that law and literature approaches can illuminate. These include, among others, conceptions of sovereignty and non-sovereign collectivities, the construction of the citizen and refugee, competing visions of marriage and its alternatives, law and the rhetorical tradition, and theoretical perspectives on intellectual property. Nearly every session will pair recent scholarship in the field with a literary or artistic work, ranging from Claudia Rankine's *Citizen* to Shakespeare's *Merchant of Venice*. Students taking the course for R credit can take the course for either 3 or 4 units, depending on the paper length. This class is limited to 22 students, with an effort made to have students from SLS (16 students will be selected by lottery) and six non-law students by consent of instructor. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper. Cross-listed with the Law School (LAW 3517).

**ENGLISH 354. Scalar Reading. 5 Units.**

The computational study of literature allows us to analyze literature across vastly different scales: from extremely detailed word frequencies, to massive archives of texts. But how does criticism operate at these two extremes? How do new methods of analysis respond to the theories of reading offered by literary criticism? In this class, we will compare the scalar modes of reading that our new methods offer with historical theories of critical reading practices, from hermeneutics, to close reading, and beyond.

**ENGLISH 356T. Intro to Psychoanalysis as a Critical Method. 3-5 Units.**

Primary reading in Freud, Lacan, Laplanche, Irigaray and Kristeva. Secondary readings in film theory (Mulvey to Silverman), art history (Bryson, Bersani) and poststructuralism (Derrida, Foucault, Butler). Same as: TAPS 356T

**ENGLISH 360E. Futurities. 5 Units.**

Literary studies has long had a wide array of methods for theorizing the past. In more recent years, scholars have begun to theorize the future with equal energy. But what do we talk about when we talk about the future? Events that might happen, the way the thought of the future affects our actions today, or something more? We will discuss queer futurities, Afrofuturism, ecological futurity, revolutionary futures, reception and the futures of texts, and more.

**ENGLISH 364A. CLR James and American Literature. 5 Units.**

Intellectual CLR James was an insatiable reader of world literature, but the literature and popular culture of the United States claimed a special place in his imagination. This seminar reads American literature from the mid-nineteenth- (Melville, Whitman) to the late-twentieth centuries (Wright, Morrison, Alice Walker) alongside James's literary criticism and political thought. Recent critical and theoretical texts will supplement these primary readings.

**ENGLISH 365. Fictions of Literary Being. 5 Units.**

In an essay from his book *The Flesh of Words*, Jacques Rancière refers to the suspensive existence of literature. This seminar will be devoted to an in-depth consideration of the possible meanings of this phrase. At issue for us will be the suspension of the normative assumption that the fundamental difference between a person (the author, the reader) and a fictional character is that the former has being while the latter does not. The syllabus will feature a sub-genre of the novel that disturbs this normative assumption by explicitly staging the collapse of the divide between actual and fictional being, flesh and word, author and character, through an extended representation of the porosity of those categories on every level of the text structural, characterological, and narratological. The result is the development of a metafictional discourse within the fiction itself that narrates a crossing-over of the author's material actuality with the immateriality of character. We'll examine the forms of crossing-over, its particular temporal and spatial conditions, and its ethical consequences and philosophical implications both within and outside the novel.

**ENGLISH 366. Practicing Theories. 5 Units.**

An exploration of some of the main currents in post-WWII and contemporary literary theory from the new criticism to deconstruction, new historicism, etc., arriving at contemporary debates about surface reading, digital humanities, affect, and the new materialisms.

**ENGLISH 373. Shakespearean Tragedy and Its Critics. 5 Units.**

A close study of Shakespeare's major tragedies and exemplary criticism from the Restoration to the present.

**ENGLISH 381B. Theories of Race and Ethnicity. 5 Units.**

This interdisciplinary and reading-intensive course has been designed to familiarize you with the key scholars, as well as the most recent developments, in theorizations of race and ethnicity in literary and cultural studies, performance studies, visual studies, and philosophy. As we work our way through this diverse set of readings, particular attention will be paid to how the various approaches illuminate key issues under current debate: subjectivity, identity, biological difference, racial representation, affect, and political activism.

**ENGLISH 385A. Ulysses. 5 Units.**

Through intensive close reading of Joyce's novel along with selected theoretical texts, we will examine the formal structures and cultural and political implications of *Ulysses*. Topics will include modernist aesthetics and narrative innovation, depictions of consciousness, gender and sexuality, vernacular modernism, and the sensorium of modernity.

**ENGLISH 390. Graduate Fiction Workshop. 3 Units.**

For Stegner fellows in the writing program. May be repeated for credit. Prerequisite: consent of instructor.

**ENGLISH 392. Graduate Poetry Workshop. 3 Units.**

For Stegner fellows in the writing program. May be repeated for credit. Prerequisite: consent of instructor.

**ENGLISH 394. Independent Study. 1-10 Unit.**

Preparation for first-year Ph.D. qualifying examination and third year Ph.D. oral exam.

**ENGLISH 395. Ad Hoc Graduate Seminar. 1-5 Unit.**

Three or more graduate students who wish in the following quarter to study a subject or an area not covered by regular courses and seminars may plan an informal seminar and approach a member of the department to supervise it.

**ENGLISH 396. Introduction to Graduate Study for Ph.D. Students. 5 Units.**

Required for first-year graduate students in English. The major historical, professional, and methodological approaches to the study of literature in English.

**ENGLISH 396L. Pedagogy Seminar I. 2 Units.**

Required for first-year Ph.D students in English. Prerequisite for teaching required for Ph.D. students in English, Modern Thought and Literature and Comparative Literature. Preparation for surviving as teaching assistants in undergraduate literature courses. Focus is on leading discussions and grading papers.

**ENGLISH 396P. Publication Workshop: The Article. 3-5 Units.**

For English Ph.D. candidates only. A practical and theoretical study of the genre of the journal article, with critical reflection on its status as a gateway to academic professionalization and as a highly specialized form of public address. We will be reading articles published over the last decade across a diverse range of journals, focusing on issues surrounding methodology, style, tone, and audience. Participants will work on developing an already polished piece of writing into the form of an article publishable by a peer-reviewed publication. Admission by application in Autumn quarter .

**ENGLISH 396R. Old and Modern(ist) Reading Group. 2 Units.**

This two-quarter-long reading group will alternate from week-to-week between Old English Biblical and Elegaic Poetry and David Jones's twentieth-century transnational Modernist masterpiece, "Anthemata" (which W. H. Auden called very probably the finest long poem written in English in this century). Students can choose to join biweekly for just Old English (in the original language) or just David Jones, or complete both sets of allied reading.

**ENGLISH 398. Research Course. 1-18 Unit.**

A special subject of investigation under supervision of a member of the department. Thesis work is not registered under this number.

**ENGLISH 398L. Literary Lab. 2-5 Units.**

Gathering and analyzing data, constructing hypotheses and designing experiments to test them, writing programs [if needed], preparing visuals and texts for articles or conferences. Requires a year-long participation in the activities of the Lab.

Same as: COMPLIT 398L

**ENGLISH 398Q. Qualifying Exam Workshop. 10 Units.**

Qualifying Exam Workshop for 1st year cohort.

**ENGLISH 398R. Revision and Development of a Paper. 4-5 Units.**

Students revise and develop a paper under the supervision of a faculty member with a view to possible publication.

**ENGLISH 398W. Orals, Publication and Dissertation Workshop. 2 Units.**

For third- and fourth-year graduate students in English. Strategies for studying for and passing the oral examination, publishing articles, and for writing and researching dissertations and dissertation proposals. May be repeated for credit.

**ENGLISH 399. Thesis. 1-10 Unit.**

For M.A. students only. Regular meetings with thesis advisers required.

**ENGLISH 43A. American Indian Mythology, Legend, and Lore. 3-5 Units.**

(English majors and others taking 5 units, register for 143A.) Readings from American Indian literatures, old and new. Stories, songs, and rituals from the 19th century, including the Navajo Night Chant. Tricksters and trickster stories; war, healing, and hunting songs; Aztec songs from the 16th century. Readings from modern poets and novelists including N. Scott Momaday, Louise Erdrich, and Leslie Marmon Silko, and the classic autobiography, "Black Elk Speaks".

Same as: AMSTUD 143M, ENGLISH 143A, NATIVEAM 143A

**ENGLISH 48N. The American Songbook and Love Poetry. 3 Units.**

A study of performances (Billie Holiday, Frank Sinatra etc) of songs by classic American composers (Porter, Rogers and Hart, Cohen).

Same as: AMSTUD 48N

**ENGLISH 50. HUMANITIES HOUSE WORKSHOP. 1 Unit.**

For student research workshops in Ng House / Humanities House. Open to both residents and non-residents. May be repeated for credit.

**ENGLISH 50A. Character Development: Writing a Script, Creating Engaging Characters. 1 Unit.**

Seminar with Writer in Residence John Markus (BA English '78); meets for seven sessions over three weeks in February. Students will work one on one and in small groups with this professional writer and Stanford alum. John has written everything from stand-up to critically-acclaimed network and cable television shows to independent films to, most recently, theatrical plays. This seminar is designed for students who would like to produce a piece of work in three weeks and/or to pursue a writing profession.

**ENGLISH 50B. A Humanist's Guide to Art, Community, Design, and the Earth. 1 Unit.**

This short, intensive seminar features Humanities Scholar & Artist in Residence Clare Whistler (visiting from England April 12-27) will meet for dialogue, workshop, creation, and improvisation. This workshop will help students to think through methods of humanistic inquiry as ways of integrating meaning and purpose into their lives; it will focus on projects, research, collaborations, walking explorations, and relationships. In five residence-based sessions around Gerhard Quad, students will learn to develop personal and professional practices such as finding and creating apprenticeships and internships, creating a Humanities "start up," and partnering with investors, foundations, fundraisers, patrons, and community. This course will be of interest to students who would like to maintain humanistic values, make a decent living, find good mentors and collaborators, and create communities that are attentive to their constructed and natural environments.

**ENGLISH 50Q. Life and Death of Words. 4 Units.**

In this course, we explore the world of words: their creation, evolution, borrowing, change, and death. Words are the key to understanding the culture and ideas of a people, and by tracing the biographies of words we are able to discern how the world was, is, and might be perceived and described. We trace how words are formed, and how they change in pronunciation, spelling, meaning, and usage over time. How does a word get into the dictionary? What do words reveal about status, class, region, and race? How is the language of men and women critiqued differently within our society? How does slang evolve? How do languages become endangered or die, and what is lost when they do? We will visit the Facebook Content Strategy Team and learn more about the role words play in shaping our online experiences. Together, the class will collect Stanford language and redesign the digital dictionary of the future. Trigger Warning: Some of the subject matter of this course is sensitive and may cause offense. Please consider this prior to enrolling in the course.

Same as: CSRE 50Q, FEMGEN 50Q, LINGUIST 50Q, NATIVEAM 50Q

**ENGLISH 51N. The Sisters: Poetry & Painting. 3 Units.**

Poetry and painting have often been called the "sister arts". Why? Sometimes a poem or a painting stands out to us, asking that we stay with it, that we remember it, although we cannot exactly say why. Poems have a way of making pictures in the mind, and paintings turn "rhymes" amid the people, places, and things they portray. Each is a concentrated world, inviting an exhilarating closeness of response: why does this line come first? Why does the artist include that detail? Who knows but that as we write and talk about these poems and pictures we will be doing what John Keats said a painter does: that is, arriving at a "trembling delicate and snail-horn perception of Beauty." Each week explore the kinship between a different pair of painter and poet and also focuses on a particular problem or method of interpretation. Some of the artist/poet combinations we will consider: Shakespeare and Caravaggio; Jorie Graham and (the photographer) Henri Cartier-Bresson; Alexander Pope and Thomas Gainsborough; William Wordsworth and Caspar David Friedrich; Christina Rossetti and Mary Cassatt; Walt Whitman and Thomas Eakins; Thomas Hardy and Edward Hopper.

Same as: ARTHIST 160N



**ENGLISH 52N. Mixed-Race Politics and Culture. 3 Units.**

Today, almost one-third of Americans identify with a racial/ethnic minority group, and more than 9 million Americans identify with multiple races. What are the implications of such diversity for American politics and culture? In this course, we approach issues of race from an interdisciplinary perspective, employing research in the social sciences and humanities to assess how race shapes perceptions of identity as well as political behavior in 21st century U.S. We will examine issues surrounding the role of multiculturalism, immigration, acculturation, racial representation and racial prejudice in American society. Topics we will explore include the political and social formation of "race"; racial representation in the media, arts, and popular culture; the rise and decline of the "one-drop rule" and its effect on political and cultural attachments; the politicization of Census categories and the rise of the Multiracial Movement.

Same as: AFRICAAM 52N, POLISCI 29N

**ENGLISH 67. Contemporary Chicano & Latino Literature. 4 Units.**

What does it mean to be Chicano and Latino in the United States today? And, how have U.S. writers portrayed the evolution of a Latino identity as it has changed from the age of the Civil Rights Movement to the age of Twitter? This class provides students with an overview of 20th and 21st century U.S. Latino/a literature by focusing on American authors writing after the 1960s to the present. We will read a range of writers, including Gloria Anzaldúa, Sandra Cisneros, Héctor Tobar, and Junot Díaz, and examine how these authors grapple with the artistic task of representing the different national cultures and histories (Mexican American, Puerto Rican, etc.) that inform the U.S. Latino experience. Throughout the quarter we will explore how these fictional narratives offer insights into the topics of American identity, immigration, assimilation, class status, Women of Color feminism, gender and sexuality. In addition, we will also consider contemporary representations from film and television, ultimately working toward a comprehensive analysis of how literary genres and popular cultural contribute to the meaning of Latinidad in the U.S.

Same as: CHILATST 67

**ENGLISH 68N. Mark Twain and American Culture. 4 Units.**

Preference to freshmen. Mark Twain defined the rhythms of our prose and the contours of our moral map. He recognized our extravagant promise and stunning failures, our comic foibles and tragic flaws. He is viewed as the most American of American authors—and as one of the most universal. How does his work illuminate his society's (and our society's) responses to such issues as race, gender, technology, heredity vs. environment, religion, education, art, imperialism, animal welfare, and what it means to be "American"?

Same as: AMSTUD 68N

**ENGLISH 70N. Shakespeare Unbound. 3 Units.**

Unbound from classical poetics, or from any strict adherence to the conventions of comedy, tragedy, and history, Shakespeare made—and still makes—the stage come to life. The course will focus on some of the more unsettling productions from the hand of the bard, among them *Titus Andronicus*, *The Taming of the Shrew*, *Romeo and Juliet*, *A Midsummer Night's Dream*, *As You Like It*, *Twelfth Night*, *Troilus and Cressida*, *Coriolanus*, *Cymbeline*, and *The Winter's Tale*.

**ENGLISH 71. Dangerous Ideas. 1 Unit.**

Ideas matter. Concepts such as race, progress, and evil have inspired social movements, shaped political systems, and dramatically influenced the lives of individuals. Others, like religious tolerance, voting rights, and wilderness preservation play an important role in contemporary debates in the United States. All of these ideas are contested, and they have a real power to change lives, for better and for worse. In this one-unit class we will examine these dangerous ideas. Each week, a faculty member from a different department in the humanities and arts will explore a concept that has shaped human experience across time and space. Some weeks will have short reading assignments, but you are not required to purchase any materials.

Same as: ARTHIST 36, COMPLIT 36A, EALC 36, FRENCH 36, HISTORY 3D, MUSIC 36H, PHIL 36, POLISCI 70, RELIGST 21X, SLAVIC 36

**ENGLISH 75N. American Short Stories. 3 Units.**

How and why did the short story take root and flourish in an American context? Early works of classic American literature read alongside stories by women and minority writers, stretching from the early nineteenth century to the contemporary period.

Same as: AMSTUD 75N

**ENGLISH 76. After the Apocalypse. 3 Units.**

What happens after the world, as we know it, has ended? In the course of examining classic and newer speculative fictional narratives detailing the ravages of various post-apocalyptic societies and the challenges those societies pose to the survivors, we explore several related questions: What is an apocalypse? What resources does speculative fiction offer for understanding and responding to oppressive societies? Where does the idea of the apocalypse originate? Is an apocalypse always in the future? Or has it already occurred? For whom might apocalypse constitute an ongoing present? In this course, we use the tools of close reading and historical criticism to build an archive of knowledge about the narrative, visual, and aural features of apocalypse. Students will be guided through the creation of a multimedia portfolio over the course of the quarter, for presentation at the end. No written midterm or final exam.

**ENGLISH 802. TGR Dissertation. 0 Units.****ENGLISH 81. Philosophy and Literature. 5 Units.**

Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track. Majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature, with particular focus on the question of value: what, if anything, does engagement with literary works do for our lives? Issues include aesthetic self-fashioning, the paradox of tragedy, the paradox of caring, the truth-value of fiction, metaphor, authorship, irony, make-believe, expression, edification, clarification, and training. Readings are drawn from literature and film, philosophical theories of art, and stylistically interesting works of philosophy. Authors may include Sophocles, Chaucer, Dickinson, Proust, Woolf, Borges, Beckett, Kundera, Charlie Kaufman; Barthes, Foucault, Nussbaum, Walton, Nehamas; Plato, Montaigne, Schopenhauer, Nietzsche, and Sartre. Taught in English.

Same as: CLASSICS 42, COMPLIT 181, FRENCH 181, GERMAN 181, ITALIAN 181, PHIL 81, SLAVIC 181

**ENGLISH 82N. Thinking about Photographs. 3 Units.**

The course will begin with a short history of photography since the 19th century; followed by both a hands-on exploration of different types of photographs (possibly using the Cantor Collection) and then a more theoretical discussion of some of the acknowledged classics of photographic writing (Susan Sontag's *On Photography*, Roland Barthes' *Camera Lucida*, Linfield's *The Cruel Radiance*).

**ENGLISH 90. Fiction Writing. 5 Units.**

The elements of fiction writing: narration, description, and dialogue. Students write complete stories and participate in story workshops. May be repeated for credit. Prerequisite: PWR 1 (waived in summer quarter).

**ENGLISH 90Q. Sports Writing. 3 Units.**

Study and practice of the unique narratives, tropes, images and arguments that creative writers develop when they write about popular sport. From regional fandom to individualist adventuring, boxing and baseball to mascot dancing and table tennis, exceptional creative writers mine from a diversity of leisure activity a rich vein of sports writing in the creative nonfiction genre. In doing so, they demonstrate the creative and formal adaptability required to write with excellence about any subject matter, and under the circumstances of any subjectivity. Discussion of the ways in which writers have framed, and even critiqued, our interest in athletic events, spectatorship, and athletic beauty. Writers include Joyce Carol Oates, Roland Barthes, David James Duncan, Arnold Rampersad, John Updike, Maxine Kumin, Susan Sterling, Ernest Hemingway, Norman Mailer, Dervla Murphy, Haruki Murakami, Don DeLillo, Henry Louis Gates, Jr., Annie Dillard, John McPhee, and Laura Hillenbrand. Close readings of essays on form and sport, as well as book excerpts. Students will engage in class discussions and write short weekly papers, leading to a more comprehensive project at the end of the quarter.

**ENGLISH 90V. Fiction Writing. 5 Units.**

Online workshop course that explores the ways in which writers of fiction have used language to examine the world, to create compelling characters, and to move readers. We will begin by studying a selection of stories that demonstrate the many techniques writers use to create fictional worlds; we'll use these stories as models for writing exercises and short assignments, leading to a full story draft. We will study figurative language, character and setting development, and dramatic structure, among other elements of story craft. Then, each student will submit a full draft and receive feedback from the instructor and his/her classmates. This course is taught entirely online, but retains the feel of a traditional classroom. Optional synchronous elements such as discussion and virtual office hours provide the student direct interaction with both the instructor and his/her classmates. Feedback on written work is both offered to and given by the student is essential to the course and creates class rapport.

**ENGLISH 90W. Writing and War. 5 Units.**

This introductory, five-unit course is designed for all students interested in reading the literature of and studying the expression of military conflict. Bridging the experiences of Veteran and non-Veteran students will be a central aim of the course and will be reflected in enrollment, reading materials, visiting guests and final narrative project.

**ENGLISH 91. Creative Nonfiction. 5 Units.**

Historical and contemporary as a broad genre including travel and nature writing, memoir, biography, journalism, and the personal essay. Students use creative means to express factual content. May be repeat for credit.

**ENGLISH 91A. ASIAN-AMERICAN AUTOBIOGRAPHY/W. 5 Units.**

This is a dual purpose class: a writing workshop in which you will generate autobiographical vignettes/essays as well as a reading seminar featuring prose from a wide range of contemporary Asian-American writers. Some of the many questions we will consider are: What exactly is Asian-American memoir? Are there salient subjects and tropes that define the literature? And in what ways do our writerly interactions both resistant and assimilative with a predominantly non-Asian context in turn recreate that context? We'll be working/experimenting with various modes of telling, including personal essay, the epistolary form, verse, and even fictional scenarios.

Same as: ASNAMST 91A

**ENGLISH 91DC. Writing the Memoir. 5 Units.**

Open to DCI Fellows and Partners only. In this course, we will practice the art and craft of writing memoir: works of prose inspired by the memory of personal events and history. In our practice, we will look at different strategies for writing with meaning and insight about the events in our lives. We will read a variety of models by published authors who have made sense of the personal alongside the profound: the sad, joyful, simple and complicated stuff of living and being alive. Our learning will be discussion-driven. You should expect to do daily writing in the class, and to write and read widely between our class meetings. We will read, discuss, and imitate excerpts of memoirs by such authors as Augustine, Andrew Solomon, Joyce Carol Oates, Tim O'Brien, Joan Didion, and Eavan Boland, among many others. At least half of our class time will be devoted to the discussion of participants' work. The course will address issues ranging from how we select and write about events from our personal lives, to the ethical obligations of memoirists, to the ways we can explore new understanding about the past, as well as our own courage and reluctance to share personal writing. Writers at all levels of experience and comfort with creative writing are very welcome.

**ENGLISH 92. Reading and Writing Poetry. 5 Units.**

Prerequisite: PWR 1. Issues of poetic craft. How elements of form, music, structure, and content work together to create meaning and experience in a poem. May be repeated for credit.

**ENGLISH 93Q. The American Road Trip. 3 Units.**

From Whitman to Kerouac, Alec Soth to Georgia O'Keeffe, the lure of travel has inspired many American artists to pack up their bags and hit the open road. In this course we will be exploring the art and literature of the great American road trip. We will be reading and writing in a variety of genres, workshopping our own personal projects, and considering a wide breadth of narrative approaches. Assignments will range from reading Cormac McCarthy's novel, *The Road*, to listening to Bob Dylan's album, *Highway 61 Revisited*. We will be looking at films like *Badlands* and *Thelma and Louise*, acquainting ourselves with contemporary photographers, going on a number of campus-wide field trips, and finishing the quarter with an actual road trip down the California coast. Anyone with a sense of adventure is welcome!

**ENGLISH 94. Creative Writing Across Genres. 5 Units.**

For minors in creative writing. The forms and conventions of the contemporary short story and poem. How form, technique, and content combine to make stories and poems organic. Prerequisite: 90, 91, or 92.

**ENGLISH 9CE. Creative Expression in Writing. 3 Units.**

Primary focus on giving students a skill set to tap into their own creativity. Opportunities for students to explore their creative strengths, develop a vocabulary with which to discuss their own creativity, and experiment with the craft and adventure of their own writing. Students will come out of the course strengthened in their ability to identify and pursue their own creative interests. For undergrads only.

**ENGLISH 9CT. Special Topics in Creative Expression. 3 Units.**

Focus on a particular topic or process of creative expression. Primary focus on giving students a skill set to tap into their own creativity. Opportunities for students to explore their creative strengths, develop a vocabulary with which to discuss their own creativity, and experiment with the craft and adventure of their own writing. Students will come out of the course strengthened in their ability to identify and pursue their own creative interests. For undergrads only. May repeat for credit.

**ENGLISH 9CV. Creative Expression in Writing. 3 Units.**

Online workshop whose primary focus is to give students a skill set to tap into their own creativity. Opportunities for students to explore their creative strengths, develop a vocabulary with which to discuss their own creativity, and experiment with the craft and adventure of their own writing. Students will come out of the course strengthened in their ability to identify and pursue their own creative interests. For undergrads only.

# Environment and Resources (ENVRES)

## **ENVRES 201. Designing and Evaluating Community Engagement Programs for Social and Environmental Change. 3 Units.**

Non-profit organizations seeking to achieve social and environmental change often run outreach and education programs to engage community members in their cause. Effective application of social science theory and methods may improve the design and evaluation of such community engagement programs. In this class, we partner with environmental and social justice organizations in the Bay Area to explore two questions: 1) How can recent findings from the social sciences be applied to design more effective community engagement programs? 2) How can we rigorously evaluate outreach and education programs to ensure they are achieving the desired objectives? The course will include an overview of key theories from psychology, sociology, and education, field trips to partnering organizations, and a term-long community-engaged research project focused on designing and/or evaluating a local outreach or educational program that is meant to achieve social and environmental change.

Same as: EARTHSYS 130

## **ENVRES 220. The Social Ocean: Ocean Conservation, Management, and Policy. 1-2 Unit.**

This interdisciplinary seminar addresses current coastal and marine topics through a series of readings, discussions, and guest lecturer presentations. Through classic and contemporary scientific literature, news articles, and multimedia sources, students will examine the challenges of coastal and marine policy and management and investigate the human dimensions of potential solutions. The course will begin with global scale topics and conclude with the individual stories of human connection to the ocean. This seminar is open to advanced undergraduate and graduate students.

## **ENVRES 221. New Frontiers and Opportunities in Sustainability. 1 Unit.**

Interdisciplinary exploration of how companies, government and non-profit organizations address some of the world's most significant environmental & resource sustainability challenges. Each week we will explore with an experienced sustainability practitioner new frontiers and opportunities in clean tech, policy, energy, transportation, consumer goods, agriculture, food, and sustainable built environments.

## **ENVRES 222. Climate Law and Policy. 3 Units.**

This course offers an interdisciplinary, graduate-level survey of historical and current efforts to regulate emissions of greenhouse gases in the United States. Students will read primary legal documents, including statutes, regulations, and court cases, in order to evaluate the forces and institutions shaping American climate policy. Although the class will focus on the intersection of climate policy and the legal system, no specific background in law is necessary.

## **ENVRES 225. E-IPER Current Topics Seminar. 1 Unit.**

For E-IPER Ph.D and Joint M.S. students only. Weekly presentations of E-IPER students' research and other program-related projects. Occasional guest speakers. Individual or team presentation, active participation, and regular attendance required for credit. May be taken for credit a maximum of two times.

## **ENVRES 230. Field Survey Data Collection & Analysis. 3 Units.**

In this course we will examine a range of issues related to the collection and analysis of survey data. Topics will include initiating a survey, designing an instrument, conducting enumeration, converting data from questionnaires to digital files, data analysis, empirical modeling and presenting results. Technical components will also be highly focused on application and implementation, and while prior training in econometrics would be useful, it will not be a prerequisite. The course will be tailored so that some of the specific topics covered will be based on the needs and interests of the students.

## **ENVRES 240. Environmental Decision-Making and Risk Perception. 1-3 Unit.**

Mobilizing successful conservation efforts to mitigate climate change and preserve both local and global ecosystems requires a new way of thinking. This course will investigate the barriers to pro-environmental behavior and the heuristics and biases that cloud our ability to respond effectively to environmental problems, using insights from behavioral economics, neuroeconomics, and environmental risk perception. Emphasis on interdisciplinary applications of recent research, and implications for environmental policymaking and persuasive messaging.

## **ENVRES 250. Environmental Governance. 3 Units.**

How do we work together to solve environmental problems? Across the globe, who has a voice, and who ultimately decides how to balance conservation and development? How do we build governance institutions that facilitate both environmental sustainability and social equity? This seminar on environmental governance will focus on the challenges and opportunities for managing common-pool resources, like fisheries, forests, and water. Because managing environmental resources is often about managing people, we will explore the motivations underlying human behavior towards the environment. We will discuss how institutions encode our cultural values and beliefs, and how we can reshape these institutions to achieve more sustainable outcomes. Coursework includes foundational readings and a pragmatic exploration of case studies. Teaching cases address topics in community-based conservation, international protected areas, market-based approaches, coping with environmental risk, and other themes. Interested undergraduate and graduate students from any discipline are welcome.

## **ENVRES 270. Graduate Practicum in Environment and Resources. 1-5 Unit.**

Opportunity for E-IPER students to pursue areas of specialization in an institutional setting such as a laboratory, clinic, research institute, governmental agency, non-governmental organization, or multilateral organization. Meets US CIS requirements for off-campus employment with endorsement from designated school official.

## **ENVRES 276. Water Resources: Culture and Context. 3-5 Units.**

Students in this discussion-based seminar will examine both the social and environmental challenges of managing California's freshwater resources. The multidisciplinary team of instructors will introduce a range of textual sources - engineering, cartographic, art historical, and ecological, to name a few - and the class will engage directly with Cantor's 'Art of Water' exhibition as well as local feats of water infrastructure. Students will gain historically-grounded insights through tailored weekly assignments and develop creative solutions for freshwater security as the final project.

Same as: AMSTUD 276

## **ENVRES 280. Topics in Environment and Resources. 2 Units.**

Required core course restricted to E-IPER Joint M.S. students. This course functions as a gateway to fundamental concepts in environment, energy and sustainability. Topics include climate change, ecosystem services, life cycle assessment, energy systems, food systems, and others. Students engage with affiliated faculty, and begin to develop ways to integrate science and technology with business, law and other professional skills to solve environment and resource problems.

## **ENVRES 290. Capstone Project Seminar in Environment and Resources. 1-3 Unit.**

Required for and limited to E-IPER Joint M.S. students. Propose, conduct and publicly present final individual or team projects demonstrating the integration of professional (M.B.A., J.D., or M.D.) and M.S. in Environment and Resources degrees. Presentation and submission of final product required. 3 total units required; can all be taken during one quarter or divided over two sequential quarters.

**ENVRES 300. Introduction to Resource, Energy and Environmental Economics. 3 Units.**

Required core course restricted to first year E-IPER Ph.D. students. Examination of environmental, energy and natural resource management problems through the lens of economics, with an emphasis on hands-on practical problem-solving. Topics include market failure, cost-benefit analysis, finance, risk & uncertainty, non-market valuation, regulation, green accounting, rent, renewable resources, exhaustible resources, including energy, and biodiversity. Prerequisite: proficiency in multivariate calculus. Knowledge of basic microeconomics helpful but not essential.

**ENVRES 315. Environmental Research Design Seminar. 1 Unit.**

Required core course restricted to first year E-IPER Ph.D. students. Series of faculty presentations and student-led discussions on interdisciplinary research design as exemplars of the research design theories discussed in ENVRES 320. Designing Environmental Research. Topics parallel the ENVRES 320 syllabus. Corequisite: ENVRES 320.

**ENVRES 320. Designing Environmental Research. 3-4 Units.**

Required core course restricted to first year E-IPER Ph.D. students. Research design options for causal inference in environmentally related research. Major philosophies of knowledge and how they relate to research objectives and design choices. Identification of critical elements within a broad range of research designs. Evaluation of the types of research questions for which different designs are suited, emphasizing fit between objectives, design, methods, and argument. Development of individual research design proposals, including description and justification understandable to a non-specialist.

**ENVRES 330. Research Approaches for Environmental Problem Solving. 3 Units.**

Required core course restricted to first year E-IPER Ph.D. students. How to develop and implement interdisciplinary research in environment and resources. Assignments include development of research questions, a preliminary literature review, and a summer funding proposal. Course is structured on peer critique and student presentations of work in progress. Corequisite: ENVRES 398 with a faculty member chosen to explore a possible dissertation topic.

**ENVRES 340. E-IPER PhD Writing Seminar. 1-2 Unit.**

Required core course restricted to second-year E-IPER PhD students. Actively pursue one or more writing goals relevant to this stage in their graduate studies in a structured setting. Set specific writing goals, create and follow a plan for reaching these goals, and receive substantive feedback on their written products from their peers. Examples of writing products include, but are not limited to, the student's dissertation proposal, E-IPER Fields of Inquiry essay, a literature review, or a grant or fellowship application. By the end of the course, students are expected to have completed or have made substantial progress toward their writing goal.

**ENVRES 380. Innovating Large Scale Sustainable Transformations. 4 Units.**

This class establishes innovation of systemic transformations as a crucial leadership modality. It gives students the mindsets, theoretical framework, and hands-on experience in shaping innovative interventions that bring about scaled and profound transformations in the face of complex multi-factorial challenges. Students are immersed in the Deep Change Methodology, which combines systems thinking, strategy, design thinking, behavioral sciences, resilience theory, diffusion theory, decision theory, and a theoretical framework around scaled multistakeholder interventions. Tools and theories introduced in class will be used to structure large-scale transformations that simultaneously create sustainability and resilience on environmental, societal, and economic fronts. This project-based team-based class challenges students to find solutions for complex real world challenges. Consent of instructor required. Class meets Fridays starting week 2 (April 13th), for 8 weeks at 9.30am - 4.20pm. Week 9 presentations (June 1st) 3.00pm - 8.00pm. Same as: SUST 230

**ENVRES 398. Directed Reading in Environment and Resources. 1-10 Unit.**

Under supervision of an E-IPER affiliated faculty member on a subject of mutual interest. Joint M.S. students must submit an Independent Study Agreement for approval. May be repeat for credit.

**ENVRES 399. Directed Research in Environment and Resources. 1-15 Unit.**

For advanced graduate students. Under supervision of an E-IPER affiliated faculty member. Joint M.S. students must submit an Independent Study Agreement for approval.

**ENVRES 801. TGR Project. 0 Units.**

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**ENVRES 802. TGR Dissertation. 0 Units.**

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## Ethics in Society (ETHICSOC)

**ETHICSOC 103X. Contemporary Muslim Political Thought. 4 Units.**

This course aims to provide an introduction to contemporary Muslim political thought. It presents post-nineteenth century Muslim contributions to political thought. It is designed as a survey of some major thinkers that sought to interpret Islam's basic sources and Islamic intellectual legacy from the Arab world to Iran and Southeast Asia, from Turkey to North America. Our readings include primary texts by Tahtawi, Tunisi, Afghani, Rida, Iqbal, Qutb, Maududi, Shariati, and some current figures. We will approach the texts as just other works of political theory rather than a study of intellectual history. We will analyze the recurring ideas in this body of thought such as decline, civilization, rationality, ijihad (Islamic independent reasoning), shura (deliberative decision-making), democracy, secularism, Muslim unity, khilafah (caliphate and vicegerency), freedom, equality, and justice. We will discuss their current significance from the ongoing theoretical debates in Muslim political thought and comparative political theory.

Same as: GLOBAL 136

**ETHICSOC 104X. Introduction to Disability Studies and Disability Rights. 4 Units.**

Disability Studies is a relatively new interdisciplinary academic field that examines disability as a social, cultural and political phenomenon. This is an introductory course to the field of disability studies and it aims to investigate the complex concept of disability through a variety of prisms and disciplines including social psychology, the humanities, legal studies and media studies. This course also focuses on the multiple connections between the study of disability and other identities including class, race, ethnicity, gender and sexual orientation, and also includes a comparative look at how disability is treated across cultures. Some of the topics covered in the class are disability and the family, the history of the disability rights movement, the development of disability identity and its intersectionality, antidiscrimination law, the UN Convention on the Rights of People with Disabilities, bioethical dilemmas pertaining to disability and more.

Same as: FEMGEN 94H, HUMRTS 104, SOC 186

**ETHICSOC 10SC. The Meaning of Life: Moral and Spiritual Inquiry through Literature. 2 Units.**

Short novels and plays will provide the basis for reflection on ethical values and the purpose of life. Some of the works to be studied are F. Scott Fitzgerald's *The Great Gatsby*, George Bernard Shaw's *Major Barbara*, Hermann Hesse's *Siddhartha*, Jane Smiley's *Good Will*, Robert Bolt's *A Man for All Seasons*, John Steinbeck's *Of Mice and Men*, and Nadine Gordimer's *None to Accompany Me*. We will read for plot, setting, character, and theme using a two-text method; looking at the narrative of the literary work and students' own lives, rather than either deconstructing the literature or relating it to the author's biography and psychology. The questions we will ask have many answers. Why are we here? How do we find meaningful work? What can death teach us about life? What is the meaning of success? What is the nature of true love? How can one find balance between work and personal life? How free are we to seek our own destiny? What obligations do we have to others? We will draw from literature set in the United States and elsewhere; secular and religious world views from a variety of traditions will be considered. The authors chosen are able to hold people up as jewels to the light, turning them around to show all of their facets, both blemished and pure, while at the same time pointing to any internal glow beneath the surface. Classes will be taught in a Socratic, discussion-based style. Study questions will accompany each reading and provide a foundation for class discussion. Grading will be based 50 percent on class participation, 25 percent on one-page reflection papers on reading assignments, and 25 percent on a four-page final paper due on September 15. Field trips will include an overnight camping experience.

**ETHICSOC 111. Leadership Challenges. 4-5 Units.**

This course will examine the responsibilities and challenges for those who occupy leadership roles in professional, business, non-profit, and academic settings. Topics will include characteristics and styles of leadership, organizational dynamics, forms of influence, decision making, diversity, social change, and ethical responsibilities. Class sessions will include visitors who have occupied prominent leadership roles. Readings will include excerpts of relevant research, problems, exercises, and case studies. Requirements will include class participation and short written weekly reflection papers (2 to 3 pages) on the assigned readings. The class will be capped at 50 students.  
Same as: PUBLPOL 111

**ETHICSOC 131S. Modern Political Thought: Machiavelli to Marx and Mill. 5 Units.**

This course offers an introduction to the history of Western political thought from the late fifteenth through the nineteenth centuries. We will consider the development of ideas like individual rights, government by consent, and the protection of private property. We will also explore the ways in which these ideas continue to animate contemporary political debates. Thinkers covered will include: Niccolò Machiavelli, Thomas Hobbes, John Locke, Jean-Jacques Rousseau, Edmund Burke, John Stuart Mill, and Karl Marx.  
Same as: POLISCI 131L

**ETHICSOC 131X. Ethics in Bioengineering. 3 Units.**

Bioengineering focuses on the development and application of new technologies in the biology and medicine. These technologies often have powerful effects on living systems at the microscopic and macroscopic level. They can provide great benefit to society, but they also can be used in dangerous or damaging ways. These effects may be positive or negative, and so it is critical that bioengineers understand the basic principles of ethics when thinking about how the technologies they develop can and should be applied. On a personal level, every bioengineer should understand the basic principles of ethical behavior in the professional setting. This course will involve substantial writing, and will use case-study methodology to introduce both societal and personal ethical principles, with a focus on practical applications.  
Same as: BIOE 131

**ETHICSOC 133. Ethics and Politics of Public Service. 3-5 Units.**

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford.  
Same as: CSRE 178, HUMBIO 178, PHIL 175A, PHIL 275A, POLISCI 133, PUBLPOL 103D, URBANST 122

**ETHICSOC 134R. The Ethics of Elections. 5 Units.**

Do you have a duty to vote? How should you choose whom to vote for? Should immigrants be allowed to vote? Should we make voting mandatory? How (if at all) should we regulate campaign finance? Should we even have elections at all? In this course, we will explore these and other ethical questions related to electoral participation and the design of electoral institutions. We will evaluate arguments from political philosophers, political scientists, and politicians to better understand how electoral systems promote important democratic values and how this affects citizens' and political leaders' ethical obligations. We will focus, in particular, on questions that are particularly relevant to the 2016 U.S. presidential election, though many of the ethical issues we will discuss in this course will be relevant in any electoral democracy.  
Same as: POLISCI 132A

**ETHICSOC 135R. The Ethics of Democratic Citizenship. 5 Units.**

We usually think about democratic citizenship in terms of rights and opportunities, but are these benefits of democracy accompanied by special obligations? Do citizens of a democracy have an obligation to take an interest in politics and to actively influence political decision making? How should citizens respond when a democracy's laws become especially burdensome? Do citizens of a democracy have a special obligation to obey the law? In this course, we will read classical and contemporary political philosophy including Plato's *Crito* and King's "Letter from a Birmingham Jail" to explore how political thinkers have understood and argued for the ethics of citizenship. Students in this course will draw on these materials to construct their own arguments, and to identify and assess implicit appeals to the ethics of citizenship in popular culture and contemporary public discourse, from The Simpsons to President Obama's speeches.  
Same as: POLISCI 135D

**ETHICSOC 136R. Introduction to Global Justice. 4 Units.**

This course provides an overview of core ethical problems in international politics, with special emphasis on the question of what demands justice imposes on institutions and agents acting in a global context. The course is divided into three sections. The first investigates the content of global justice, and comprises of readings from contemporary political theorists and philosophers who write within the liberal contractualist, utilitarian, cosmopolitan, and nationalist traditions. The second part of the course looks at the obligations which global justice generates in relation to a series of real-world issues of international concern: global poverty, human rights, natural resources, climate change, migration, and the well-being of women.. The final section of the course asks whether a democratic international order is necessary for global justice to be realized.  
Same as: INTNLREL 136R, PHIL 76, POLISCI 136R, POLISCI 336

**ETHICSOC 145. The Ethics of Migration. 4 Units.**

How should states treat immigrants and would-be immigrants? On what grounds can immigration be justly restricted, and through what means? This module engages with these complex questions by offering a broad overview of key issues in the ethics of migration and their relation to public policy. Guided by the tools of contemporary political philosophy, you will reflect closely upon a series of pressing issues including the basis of the state's right to exclude non-citizens, the prospect of open borders and their tensions with egalitarian justice, the human right to free movement, and the rights of refugees and undocumented migrants.

**ETHICSOC 155. The Ethics And Politics of Effective Altruism. 4-5 Units.**

What should I do? How should I live? These are the central questions that practical ethics seeks to answer. "Effective altruism" (EA), a growing school of thought and popular social movement, offers a clear and attractive response. It holds that we should try to do the best that we can for the world, and that we should do so on the basis of careful reasoning and reliable evidence. In a short amount of time, effective altruism has become a popular theoretical framework for thinking about our duties to others, and for navigating difficult practical questions. How much do I owe to others? To whom do I have obligations? How should I choose amongst different strategies for discharging these obligations? The course examines the theoretical assumptions behind effective altruism, its internal debates, external criticisms, and rival alternatives. We explore these questions in part by focusing on certain case studies that highlight different elements of the EA approach: organ donation, career choice, animal treatment, and global poverty. Guest lecturers, representing prominent advocates and critics of effective altruism, may also be added to the schedule, pending availability.

**ETHICSOC 170. Ethical Theory. 4 Units.**

How should we live our lives? Should you love your neighbour as yourself? Should you be digging wells rather than taking philosophy classes? Is taxation just? What obligations do we have to the not-yet-born, and to the dead? And says who? Are there really any answers to these questions? If so, what explains why they are one way rather than another? The will of God? Perhaps we need rules to ensure mutual benefits. But then, can I break them if no-one will find out? Can it be appropriate to blame you for doing something that you thought was the right thing to do (perhaps rejecting a blood transfusion)? Or to praise you for doing something you thought was the wrong thing to do (like Huck Finn)? By the end of this semester, you will be developing answers to these questions and many more. A more challenging version of Phil 2 designed primarily for juniors and seniors (may also be appropriate for some freshmen and sophomores - contact professor). Fulfills the Ethical Reasoning requirement. Graduate section (270) will include supplemental readings and discussion, geared for graduate students new to moral philosophy, as well as those with some background who would like more. Same as: PHIL 170, PHIL 270

**ETHICSOC 171. Justice. 4-5 Units.**

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors. Same as: PHIL 171, POLISCI 103, POLISCI 336S, PUBLPOL 103C, PUBLPOL 307

**ETHICSOC 173. Introduction to Feminist Philosophy. 4 Units.**

If feminism is a political practice aimed at ending the patriarchy, what is the point of feminist philosophy? This course provides an introduction to feminist philosophy by exploring how important theoretical questions around sex and gender bear on practical ethical and political debates. The first part of the course will examine some of the broader theoretical approaches in feminist philosophy, including: the metaphysics of gender, standpoint epistemology, and feminist critiques of liberal political philosophy. Questions will include: how should we understand the category 'woman'? How does gender intersect with other axes of oppression? Does experience of gendered oppression give one better knowledge of social reality? Are political liberalism and capitalism compatible with feminism? The second part of the course will address more specific ethical and political topics within feminist philosophy, such as: objectification, pornography, consent, markets in women's sexual and reproductive labor, and the institution of marriage. Same as: PHIL 90R

**ETHICSOC 174A. Moral Limits of the Market. 4 Units.**

Morally controversial uses of markets and market reasoning in areas such as organ sales, procreation, education, and child labor. Would a market for organ donation make saving lives more efficient; if it did, would it thereby be justified? Should a nation be permitted to buy the right to pollute? Readings include Walzer, Arrow, Rawls, Sen, Frey, Titmuss, and empirical cases.

Same as: PHIL 174A, PHIL 274A, POLISCI 135P

**ETHICSOC 174L. Betrayal and Loyalty, Treason and Trust. 2 Units.**

The main topic of the seminar is Betrayal: its meaning as well as its moral, legal and political implications. We shall discuss various notions of betrayal: Political (military) betrayal such as treason, Religious betrayal with Judas as its emblem, but also apostasy (converting one's religion) which is regarded both as a basic human right and also as an act of betrayal, social betrayal - betraying class solidarity as well as Ideological betrayal - betraying a cause. On top of political betrayal we shall deal with personal betrayal, especially in the form of infidelity and in the form of financial betrayal of the kind performed by Madoff. The contrasting notions to betrayal, especially loyalty and trust, will get special consideration so as to shed light or cast shadow, as the case may be, on the idea of betrayal. The seminar will focus not only on the normative aspect of betrayal - moral or legal, but also on the psychological motivations for betraying others. The seminar will revolve around glaring historical examples of betrayal but also use informed fictional novels, plays and movies from Shakespeare and Pinter, to John Le Carre. SAME AS LAW 520.

Same as: ETHICSOC 274L, PHIL 174L, PHIL 274L

**ETHICSOC 174X. Universal Basic Income: the philosophy behind the proposal. 4 Units.**

The past three decades have seen the elaboration of a vast body of literature on unconditional basic income a radical policy proposal Philippe Van Parijs referred to as a disarmingly simple idea. It consists of a monthly cash allowance given to all citizens, regardless of personal desert and without means test to provide them with a standard of living above the poverty line. The seminar will seek to engage students in normative debates in political theory (feminism, liberalism, republicanism, communism, libertarianism, etc.) by appealing to the concrete example of basic income. It will allow students to learn a great deal about a policy that is gaining tremendous currency in academic and public debates, while discussing and learning about prominent political theorists - many of whom have written against or for basic income at one point in their career. The seminar is open to undergraduate and graduate students in all departments. There are no pre-requisites. We will ask questions such as: is giving people cash no strings attached desirable and just? Would basic income promote a more gender equal society through the remuneration of care-work, or would it risks further entrenching the position of women as care-givers? Would alternative policies be more successful (such as the job guarantees, stakeholder grants or a negative income tax)? How can we test out basic income? What makes for a reliable and ethical basic income pilot? Students in Politics, Philosophy, Public Policy, Social Work, and Sociology should find most of those questions relevant to their interests. Some discussions on how to fund basic income, on the macro-economic implications of basic income and on the existing pilots projects (in Finland, Namibia, India, Canada and the US) may be of interest to Economists; while our readings on the impact of new technologies and artificial intelligence on the future of work and whether a basic income could be a solution, are likely to be of interest to computer scientists and engineers. By the end of the class, students will have an in depth knowledge of the policy and will have developed skills in the normative analysis of public policy. They will be able to deploy those critical and analytical skills to assess a broad range of other policies. Same as: ETHICSOC 274X, PHIL 174B, PHIL 274B, POLISCI 338

**ETHICSOC 178M. Introduction to Environmental Ethics. 4-5 Units.**

How should human beings relate to the natural world? Do we have moral obligations toward non-human animals and other parts of nature? And what do we owe to other human beings, including future generations, with respect to the environment? The first part of this course will examine such questions in light of some of our current ethical theories: considering what those theories suggest regarding the extent and nature of our environmental obligations; and also whether reflection on such obligations can prove informative about the adequacy of our ethical theories. In the second part of the course, we will use the tools that we have acquired to tackle various ethical questions that confront us in our dealings with the natural world, looking at subjects such as: animal rights; conservation; economic approaches to the environment; access to and control over natural resources; environmental justice and pollution; climate change; technology and the environment; and environmental activism.

Same as: ETHICSOC 278M, PHIL 178M, PHIL 278M, POLISCI 134L

**ETHICSOC 180M. The Ethics and Politics of Collective Action. 3-4 Units.**

Collective action problems arise when actions that are individually rational give rise to results that are collectively irrational. Scholars have used such a framework to shed light on various political phenomena such as revolutions, civil disobedience, voting, climate change, and the funding of social services. We examine their findings and probe the theoretical foundations of their approach. What does this way of thinking about politics bring into focus, and what does it leave out? What role do institutions play in resolving collective action problems? And what if the required institutions are absent? Can we, as individuals, be required to cooperate even if we expect that others may not play their part? Readings drawn from philosophy, political science, economics, and sociology.

Same as: PHIL 73, POLISCI 131A, PUBLPOL 304A

**ETHICSOC 181. Architecture, Space, and Politics. 4-5 Units.**

We spend most of our lives in buildings and cities that are planned by architects and urbanists. What are the normative considerations that should guide how these spaces are designed? What social role should architecture aim to play? and what criteria should we use to assess whether an architectural intervention is successful or not? This course seeks to address these questions by bringing architecture in conversation with contemporary normative political theory. It examines both how political theory can inform our thinking about architecture, and how the work of architects – with its attention to the specificities of the built environment – can advance our thinking about politics.

**ETHICSOC 185M. Contemporary Moral Problems. 4-5 Units.**

Conflict is a natural part of human life. As human beings we represent a rich diversity of conflicting personalities, preferences, experiences, needs, and moral viewpoints. How are we to resolve or otherwise address these conflicts in a way fair to all parties? In this course, we will consider the question as it arises across various domains of human life, beginning with the classroom. What are we to do when a set of ideas expressed in the classroom offends, threatens, or silences certain of its members? What is it for a classroom to be safe? What is it for a classroom to be just? We will then move from the classroom to the family, considering a difficult set of questions about how we are to square the autonomy rights of children, elderly parents, and the mentally ill with our desire as family members to keep them safe. Finally, we will turn to the conflicts of citizenship in a liberal democratic society in which the burdens and benefits of citizenship have not always been fairly distributed. We will consider, among others, the question of whether or not civil disobedience is ever morally permissible, of whether there is a right to healthcare, and of whether or not some citizens are owed reparations for past injustices.

Same as: PHIL 72, POLISCI 134P

**ETHICSOC 190. Ethics in Society Honors Seminar. 4 Units.**

For students planning honors in Ethics in Society. Methods of research. Students present issues of public and personal morality; topics chosen with advice of instructor.

Same as: PHIL 178

**ETHICSOC 195. Ethics in Society Workshop. 1 Unit.**

Workshop for Ethics in Society seniors completing their honors thesis.

**ETHICSOC 199. Independent Studies in Ethics in Society. 1-15 Unit.**

May be repeated for credit.

**ETHICSOC 2. The Ethics of Anonymity. 1 Unit.**

When is it ethical to conceal your identity or to permit another to remain anonymous? What is the value to remaining unknown, and what might be the cost? Does anonymity free you to think, act, or be in ways you wouldn't otherwise? What else might it allow or constrain? How might your answers differ depending on the circumstances or context? In this one-unit lunchtime seminar, guest speakers will discuss topics that might include: anonymous sources in journalism; anonymity online; the history of anonymous authorship and attribution; whistleblowers and confidential informants; anonymous egg or sperm donors and birth parents; anonymity vs. confidentiality for research participants; anonymity and art; technology and anonymity.

Same as: COMM 127X, CSRE 127X

**ETHICSOC 20. Introduction to Moral Philosophy. 5 Units.**

What should I do with my life? What kind of person should I be? How should we treat others? What makes actions right or wrong? What is good and what is bad? What should we value? How should we organize society? Is there any reason to be moral? Is morality relative or subjective? How, if at all, can such questions be answered? Intensive introduction to theories and techniques in contemporary moral philosophy.

Same as: PHIL 2

**ETHICSOC 200A. Ethics in Society Honors Thesis. 1-5 Unit.**

Limited to Ethics in Society honors students, who must enroll once in 200A, once in 200B, and once in 200C in their senior year. Students enrolling in 200A for less than 3 units must get approval from the faculty director.

**ETHICSOC 200B. Ethics in Society Honors Thesis. 1-5 Unit.**

Limited to Ethics in Society honors students, who must enroll once in 200A, once in 200B, and once in 200C in their senior year. Students enrolling in 200B for less than 3 units must get approval from the faculty director.

**ETHICSOC 200C. Ethics in Society Honors Thesis. 1-5 Unit.**

Limited to Ethics in Society honors students, who must enroll once in 200A, once in 200B, and once in 200C in their senior year. Students enrolling in 200C for less than 3 units must get approval from the faculty director.

**ETHICSOC 202. EMOTIONS: MORALITY AND LAW. 2 Units.**

If emotions are the stuff of life, some emotions are the stuff of our moral and legal life. Emotions such as: guilt, shame, revenge, indignation, resentment, disgust, envy, jealousy and humiliation, along with forgiveness, compassion, pity, mercy and patriotism, play a central role in our moral and legal life. The course is about these emotions, their meaning and role in morality and law. Issues such as the relationship between punishment and revenge, or between envy and equality, or St. Paul's contrast between law and love, or Nietzsche's idea that resentment is what feeds morality, will be discussed alongside other intriguing topics.

Same as: ETHICSOC 302, PHIL 177B, PHIL 277B

**ETHICSOC 202R. Ethics and Politics. 5 Units.**

A discussion of critical ethical issues faced by American and other national leaders. Case studies of 20th- and 21st-century decisions, including those involved with violence (e.g., the use of drone missiles or torture to extract information from enemies), whistle-blowing in government (e.g., decisions to expose what was known about 9/11 in advance), disobedience of those in authority (e.g., Daniel Ellsberg's release of the Pentagon Papers), policies on distributing scarce goods in society (e.g. rationing health care), policies involving justice and equal treatment (e.g. affirmative action or gay marriage), policies regarding life and death (e.g., abortion and euthanasia laws), and others. Students will debate some of the key issues, relying on ethical principles that will be discussed each week, and develop their own case studies.

**ETHICSOC 203R. Ethics in Real Life: How Philosophy Can Make Us Better People. 4 Units.**

Socrates thought that philosophy was supposed to be practical, but most of the philosophy we do today is anything but. This course will convince you that philosophy actually is useful outside of the classroom—and can have a real impact on your everyday decisions and how to live your life. We'll grapple with tough practical questions such as: 'Is it selfish if I choose to have biological children instead of adopting kids who need homes?' 'Am I behaving badly if I don't wear a helmet when I ride my bike?' 'Should I major in a subject that will help me make a lot of money so I can then donate most of it to overseas aid instead of choosing a major that will make me happy?' Throughout the course, we will discuss philosophical questions about blame, impartiality, the force of different 'shoulds,' and whether there are such things as universal moral rules that apply to everyone.

**ETHICSOC 205R. JUST AND UNJUST WARS. 2 Units.**

War is violent, but also a means by which political communities pursue collective interests. When, in light of these features, is the recourse to armed force justified? Pacifists argue that because war is so violent it is never justified, and that there is no such thing as a just war. Realists, in contrast, argue that war is simply a fact of life and not a proper subject for moral judgment, any more than we would judge an attack by a pack of wolves in moral terms. In between is just war theory, which claims that some wars, but not all, are morally justified. We will explore these theories, and will consider how just war theory comports with international law rules governing recourse to force. We will also explore justice in war, that is, the moral and legal rules governing the conduct of war, such as the requirement to avoid targeting non-combatants. Finally, we will consider how war should be terminated; what should be the nature of justified peace? We will critically evaluate the application of just war theory in the context of contemporary security problems, including: (1) transnational conflicts between states and nonstate groups and the so-called "war on terrorism"; (2) civil wars; (3) demands for military intervention to halt humanitarian atrocities taking place in another state. Same as LAW 751.

Same as: ETHICSOC 305R, PHIL 205R, PHIL 305R

**ETHICSOC 207R. Democratic Accountability and Transparency. 5 Units.**

This course critically examines two related democratic values, accountability and transparency. We begin with historical perspectives on accountability, tracing its centrality to democratic politics to ancient Athens and early modern debates about the nature and function of political representation. But the bulk of the course deals with contemporary issues and problems: how should we conceive of accountability, both conceptually and normatively, and what is its relationship to other values such as transparency and publicity? What forms of accountability are appropriate for modern democratic politics? Is accountability only for elites, or should ordinary citizens be accountable to one another? In what contexts are transparency and publicity valuable, and when might we instead find their operation counter-productive and troubling? Readings draw from canonical texts as well as contemporary political theory, philosophy, and political science.

**ETHICSOC 217X. Free Speech, Academic Freedom, and Democracy. 3 Units.**

The course examines connected ideas of free speech, academic freedom, and democratic legitimacy that are still widely shared by many of us but have been subject to skeptical pressures both outside and inside the academy in recent years. The course explores the principled basis of these ideas, how well they might (or might not) be defended against skeptical challenge, and how they might be applied in particular controversies about the rights of students, instructors, and researchers. Same as: EDUC 217, PHIL 278C

**ETHICSOC 21N. Ethics of Sports. 3 Units.**

This seminar will be focused on the ethical challenges that are encountered in sport. We will focus on the moral and political issues that affect the world of sport and which athletes, coaches, sports commentators and fans are faced with. For instance, we will ask questions such as: what is a fair game (the ethics of effort, merit, success)? Is it ethical to train people to use violence (the ethics of martial arts)? Are divisions by gender categories justified and what should we think of gender testing? Is the use of animals in sport ever justified? Which forms of performance enhancements are acceptable in sport (the ethics of drug use and enhancements through technologies)? Should we ban sports that damage the players' health? Does society owe social support to people who hurt themselves while practicing extreme sports? The class will be structured around small group discussions and exercises as well as brief lectures to introduce key moral and political concepts (such as fairness, equality, freedom, justice, exploitation, etc.). I will also bring guests speakers who are involved in a sport activity at Stanford or who have worked on sports as part of their academic careers. By the end of the seminar, students will have a good understanding of the various ethical challenges that surround the world of sport. They will be able to critically discuss sport activities, norms, modes of assessments and policies (on campus and beyond). They will also be prepared to apply the critical ethical thinking that they will have deployed onto other topics than sports. They will have been introduced to the normative approach to social issues, which consists in asking how things should be rather than describing how things are. They will be prepared to take more advanced classes in ethics, political theory, as well as moral and political philosophy.

Same as: PHIL 21N

**ETHICSOC 232T. Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector. 5 Units.**

What is the basis of private action for the public good? How are charitable dollars distributed and what role do nonprofit organizations and philanthropic dollars play in a modern democracy? In the  $\zeta$ Philanthropy Lab $\zeta$  component of the course, students will award \$100,000 in grants to local nonprofits. Students will explore how nonprofit organizations operate domestically and globally as well as the historical development and modern structure of civil society and philanthropy. Readings in political philosophy, history, political sociology, and public policy. WIM for PoliSci students who enroll in PoliSci 236S. Same as: POLISCI 236, POLISCI 236S

**ETHICSOC 233R. The Ethics of Religious Politics. 5 Units.**

Is it possible for a deeply committed religious person to be a good citizen in a liberal, pluralistic democracy? Is it morally inappropriate for religious citizens to appeal to the teachings of their tradition when they support and vote for laws that coerce fellow citizens? Must the religiously committed be prepared to defend their arguments by appealing to 'secular reasons' ostensibly accessible to all 'reasonable' citizens? What is so special about religious claims of conscience and expression that they warrant special protection in the constitution of most liberal democracies? Is freedom of religion an illusion when it is left to ostensibly secular courts to decide what counts as religion? Exploration of the debates surrounding the public role of religion in a religiously pluralistic American democracy through the writings of scholars on all sides of the issue from the fields of law, political science, philosophy, and religious studies.



**ETHICSOC 234R. Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals. 3 Units.**

(Same as LAW 7020) The objective of the course is to explore the increasing ethical challenges in a world in which technology, global risks, and societal developments are accelerating faster than our understanding can keep pace. We will unravel the factors contributing to the seemingly pervasive failure of ethics today among organizations and leaders across all sectors: business, government and non-profit. A framework for ethical decision-making underpins the course. The relationship between ethics and culture, global risks (poverty, cyber-terrorism, climate change, etc.) leadership, law and policy will inform discussion. Prominent guest speakers will attend certain sessions interactively. A broad range of international case studies might include: the Rohingya crisis in Myanmar; civilian space travel (Elon Musk's Mars plans); designer genetics; social media ethics (e.g. Facebook and Russia and on-line sex trafficking); free speech on University campuses (and Gawker type cases); artificial intelligence; Brexit; corporate and financial sector scandals (Epi pen pricing, hedge funds, Wells Fargo, Volkswagen emissions testing manipulation); and non-profit sector ethics challenges (e.g. should NGOs engage with ISIS). Final project in lieu of exam on a topic of student's choice. Attendance required. Class participation important (with multiple opportunities to earn participation credit beyond speaking in class). Strong emphasis on rigorous analysis, critical thinking and testing ideas in real-world contexts. Students wishing to take the course who are unable to sign up within the enrollment limit should contact Dr. Susan Liautaud at susanl1@stanford.edu. The course offers credit toward Ethics in Society, Public Policy core requirements (if taken in combination with PUBLPOL 103E or PUBLPOL 103F), and Science, Technology and Society majors and satisfies the undergraduate Ways of Thinking requirement. The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. Everyone will be challenged. Distinguished Career Institute Fellows are welcome and should contact Dr. Susan Liautaud directly at susanl1@stanford.edu. \*Public Policy majors taking the course to complete the core requirements must obtain a letter grade. Other students may take the course for a letter grade or C/NC. Same as: PUBLPOL 134, PUBLPOL 234

**ETHICSOC 237. Civil Society and Democracy in Comparative Perspective. 5 Units.**

A cross-national approach to the study of civil societies and their role in democracy. The concept of civil society—historical, normative, and empirical. Is civil society a universal or culturally relative concept? Does civil society provide a supportive platform for democracy or defend a protected realm of private action against the state? How are the norms of individual rights, the common good, and tolerance balanced in diverse civil societies? Results of theoretical exploration applied to student-conducted empirical research projects on civil societies in eight countries. Summary comparative discussions. Prerequisite: a course on civil society or political theory. Students will conduct original research in teams of two on the selected nations. Enrollment limited to 18. Enrollment preference given to students who have taken PoliSci 236S/EthicSoc 232T. Same as: POLISCI 237S

**ETHICSOC 237M. Politics and Evil. 5 Units.**

In the aftermath of the Second World War, the political theorist Hannah Arendt wrote that the problem of evil will be the fundamental question of postwar intellectual life in Europe. This question remains fundamental today. The acts to which the word 'evil' might apply—genocide, terrorism, torture, human trafficking, etc.—persist. The rhetoric of evil also remains central to American political discourse, both as a means of condemning such acts and of justifying preventive and punitive measures intended to combat them. In this advanced undergraduate seminar, we will examine the intersection of politics and evil by considering works by philosophers and political theorists, with occasional forays into film and media. The thinkers covered will include: Hannah Arendt, Immanuel Kant, Niccolò Machiavelli, Friedrich Nietzsche, and Michael Walzer. Same as: POLISCI 237M

**ETHICSOC 274L. Betrayal and Loyalty, Treason and Trust. 2 Units.**

The main topic of the seminar is Betrayal: its meaning as well as its moral, legal and political implications. We shall discuss various notions of betrayal: Political (military) betrayal such as treason, Religious betrayal with Judas as its emblem, but also apostasy (converting one's religion) which is regarded both as a basic human right and also as an act of betrayal, social betrayal - betraying class solidarity as well as Ideological betrayal - betraying a cause. On top of political betrayal we shall deal with personal betrayal, especially in the form of infidelity and in the form of financial betrayal of the kind performed by Madoff. The contrasting notions to betrayal, especially loyalty and trust, will get special consideration so as to shed light or cast shadow, as the case may be, on the idea of betrayal. The seminar will focus not only on the normative aspect of betrayal - moral or legal, but also on the psychological motivations for betraying others. The seminar will revolve around glaring historical examples of betrayal but also use informed fictional novels, plays and movies from Shakespeare and Pinter, to John Le Carre. SAME AS LAW 520.

Same as: ETHICSOC 174L, PHIL 174L, PHIL 274L

**ETHICSOC 274X. Universal Basic Income: the philosophy behind the proposal. 4 Units.**

The past three decades have seen the elaboration of a vast body of literature on unconditional basic income a radical policy proposal Philippe Van Parijs referred to as a disarmingly simple idea. It consists of a monthly cash allowance given to all citizens, regardless of personal desert and without means test to provide them with a standard of living above the poverty line. The seminar will seek to engage students in normative debates in political theory (feminism, liberalism, republicanism, communism, libertarianism, etc.) by appealing to the concrete example of basic income. It will allow students to learn a great deal about a policy that is gaining tremendous currency in academic and public debates, while discussing and learning about prominent political theorists - many of whom have written against or for basic income at one point in their career. The seminar is open to undergraduate and graduate students in all departments. There are no pre-requisites. We will ask questions such as: is giving people cash no strings attached desirable and just? Would basic income promote a more gender equal society through the remuneration of care-work, or would it risks further entrenching the position of women as care-givers? Would alternative policies be more successful (such as the job guarantees, stakeholder grants or a negative income tax)? How can we test out basic income? What makes for a reliable and ethical basic income pilot? Students in Politics, Philosophy, Public Policy, Social Work, and Sociology should find most of those questions relevant to their interests. Some discussions on how to fund basic income, on the macro-economic implications of basic income and on the existing pilots projects (in Finland, Namibia, India, Canada and the US) may be of interest to Economists; while our readings on the impact of new technologies and artificial intelligence on the future of work and whether a basic income could be a solution, are likely to be of interest to computer scientists and engineers. By the end of the class, students will have an in depth knowledge of the policy and will have developed skills in the normative analysis of public policy. They will be able to deploy those critical and analytical skills to assess a broad range of other policies. Same as: ETHICSOC 174X, PHIL 174B, PHIL 274B, POLISCI 338

**ETHICSOC 278M. Introduction to Environmental Ethics. 4-5 Units.**

How should human beings relate to the natural world? Do we have moral obligations toward non-human animals and other parts of nature? And what do we owe to other human beings, including future generations, with respect to the environment? The first part of this course will examine such questions in light of some of our current ethical theories: considering what those theories suggest regarding the extent and nature of our environmental obligations; and also whether reflection on such obligations can prove informative about the adequacy of our ethical theories. In the second part of the course, we will use the tools that we have acquired to tackle various ethical questions that confront us in our dealings with the natural world, looking at subjects such as: animal rights; conservation; economic approaches to the environment; access to and control over natural resources; environmental justice and pollution; climate change; technology and the environment; and environmental activism.

Same as: ETHICSOC 178M, PHIL 178M, PHIL 278M, POLISCI 134L

**ETHICSOC 280. Transitional Justice, Human Rights, and International Criminal Tribunals. 3-5 Units.**

Historical backdrop of the Nuremberg and Tokyo Tribunals. The creation and operation of the Yugoslav and Rwanda Tribunals (ICTY and ICTR). The development of hybrid tribunals in East Timor, Sierra Leone, and Cambodia, including evaluation of their success in addressing perceived shortcomings of the ICTY and ICTR. Examination of the role of the International Criminal Court and the extent to which it will succeed in supplanting all other ad hoc international justice mechanisms and fulfill its goals. Analysis focuses on the politics of creating such courts, their interaction with the states in which the conflicts took place, the process of establishing prosecutorial priorities, the body of law they have produced, and their effectiveness in addressing the needs of victims in post-conflict societies.

Same as: HUMRTS 103, INTNLREL 180A, IPS 280

**ETHICSOC 301. Conflicts, Ethics, and the Academy. 1-3 Unit.**

(Same as LAW 684) This course looks at conflicts of interest and ethical issues as they arise within academic work. The participants will be drawn from schools and departments across the University so that the discussion will prompt different examples of, and perspectives on, the issues we discuss. Topics will include the conflicts that arise from sponsored research, including choices of topics, shaping of conclusions, and nondisclosure agreements; issues of informed consent with respect to human subjects research, and the special issues raised by research conducted outside the United States; peer review, co-authorship, and other policies connected to scholarly publication; and the ethics of the classroom and conflicts of interest implicating professor-student relationships. Representative readings will include Marcia Angell's work, *Drug Companies and Doctors: A Story of Corruption*, N.Y. Rev. Books, Jan. 15, 2009, and *Is Academic Medicine for Sale?* 342 N. Engl. J. Med. 1516 (2000) (and responses); William R. Freudenburg, *Seeding Science, Courting Conclusions: Reexamining the Intersection of Science, Corporate Cash, and the Law*, 20 Sociological Forum 3 (2005); Max Weber, *Science as a Vocation*; legal cases; and conflict-of-interest policies adopted by various universities and professional organizations. The course will include an informal dinner at the end of each session. The goal of the course is to have students across disciplines think about the ethical issues they will confront in an academic or research career. Non-law students should enroll in ETHICSOC 301.

**ETHICSOC 302. EMOTIONS: MORALITY AND LAW. 2 Units.**

If emotions are the stuff of life, some emotions are the stuff of our moral and legal life. Emotions such as: guilt, shame, revenge, indignation, resentment, disgust, envy, jealousy and humiliation, along with forgiveness, compassion, pity, mercy and patriotism, play a central role in our moral and legal life. The course is about these emotions, their meaning and role in morality and law. Issues such as the relationship between punishment and revenge, or between envy and equality, or St. Paul's contrast between law and love, or Nietzsche's idea that resentment is what feeds morality, will be discussed alongside other intriguing topics.

Same as: ETHICSOC 202, PHIL 177B, PHIL 277B

**ETHICSOC 303R. Ethics, Economics and the Market. 4 Units.**

Economic analysis inevitably raises moral questions. Getting clear on those moral questions, and the competing answers to them, can help improve both economic analysis and our understanding of the values involved in alternative social policies. This course focuses on a central economic institution: the market. How have the benefits and costs of using markets been understood? For example, it is often claimed that markets are good for welfare, but how is welfare to be understood? What is the connection between markets and different values such as equality and autonomy? What, if anything is wrong with markets in everything? Are there moral considerations that allow us to, distinguish different markets? This course examines competing answers to these questions, drawing on historical and contemporary literature. Readings include Adam Smith, JS Mill, Karl Marx, Michael Walzer, Dan Hausman and Michael McPherson and Debra Satz among others. For graduate students only.

Same as: PHIL 375, POLISCI 434A

**ETHICSOC 305R. JUST AND UNJUST WARS. 2 Units.**

War is violent, but also a means by which political communities pursue collective interests. When, in light of these features, is the recourse to armed force justified? Pacifists argue that because war is so violent it is never justified, and that there is no such thing as a just war. Realists, in contrast, argue that war is simply a fact of life and not a proper subject for moral judgment, any more than we would judge an attack by a pack of wolves in moral terms. In between is just war theory, which claims that some wars, but not all, are morally justified. We will explore these theories, and will consider how just war theory comports with international law rules governing recourse to force. We will also explore justice in war, that is, the moral and legal rules governing the conduct of war, such as the requirement to avoid targeting non-combatants. Finally, we will consider how war should be terminated; what should be the nature of justified peace? We will critically evaluate the application of just war theory in the context of contemporary security problems, including: (1) transnational conflicts between states and nonstate groups and the so-called "war on terrorism"; (2) civil wars; (3) demands for military intervention to halt humanitarian atrocities taking place in another state. Same as LAW 751.

Same as: ETHICSOC 205R, PHIL 205R, PHIL 305R

**ETHICSOC 371R. INEQUALITY: Economic and Philosophical Perspectives. 5 Units.**

The nature of and problem of inequality is central to both economics and philosophy. Economists study the causes of inequality, design tools to measure it and track it over time, and examine its consequences. Philosophers are centrally concerned with the justification of inequality and the reasons why various types of inequality are or are not objectionable. In this class we bring both of these approaches together. Our class explores the different meanings of and measurements for understanding inequality, our best understandings of how much inequality there is, its causes, its consequences, and whether we ought to reduce it, and if so, how. This is an interdisciplinary graduate seminar. We propose some familiarity with basic ideas in economics and basic ideas in contemporary political philosophy; we will explain and learn about more complex ideas as we proceed. The class will be capped at 20 students.

Same as: ECON 380, PHIL 371D, POLISCI 431L

**ETHICSOC 372R. Ending Wars: A Just Peace or Just a Peace. 2 Units.**

Much of just war theory focuses on the justifications for resorting to armed force and the conduct of hostilities. But what are the ethical and legal principles that govern ending wars and making peace? This course will explore the theory of "just peace," including such problems as when a party to war may demand the unconditional surrender of its adversary and what kinds of compromises are ethically permissible in order to end it or to avoid it armed conflict. We will also consider the terms and practices the winning party in war may impose on the loser, such as reparations and occupation (particularly transformative occupation). In addition, we will examine the topic of transitional justice, including issues related to amnesty, forgiveness, criminal and other forms of accountability, and reconciliation. Elements used in grading: Class Participation, Written Assignments, Final Exam.

Same as: PHIL 372M

**ETHICSOC 374R. Science, Religion, and Democracy. 3-5 Units.**

How should conflicts between citizens with science-based and religion-based beliefs be handled in modern liberal democracies? Are religion-based beliefs as suitable for discussion within the public sphere as science-based beliefs? Are there still important conflicts between science and religion, e.g., Darwinian evolution versus creationism or intelligent design? How have philosophy and recent theology been engaged with such conflicts and how should they be engaged now? What are the political ramifications? This is a graduate-level seminar; undergraduates must obtain permission of the instructors.

Same as: PHIL 374F, RELIGST 374F

**ETHICSOC 432X. Selections in Modern Political Thought. 3-5 Units.**

This graduate-level seminar explores selections from the canon of Western political thought from the late fifteenth through nineteenth centuries. Throughout the course, we will engage in close textual readings of individual thinkers and consider some of the larger questions raised by political modernity. The Fall 2015 offering of the course will focus on the three modern social contract thinkers: Thomas Hobbes, John Locke, and Jean-Jacques Rousseau.

Same as: POLISCI 432R

**ETHICSOC 75X. Philosophy of Public Policy. 4 Units.**

From healthcare to parliamentary reforms to educational policies, social and public policies are underpinned by normative justifications - that is by different conceptions of what is right, wrong or required by justice. By analyzing these assumptions and justifications, we can in turn challenge the policies in question - asking: Is workfare ever justified? What is wrong with racial profiling? When (if ever) is compulsory voting justified? Should children have the right to vote? Does affirmative action promote equality? Should freedom of expression ever be restricted? What are the duties of citizens of affluent countries toward asylum seekers and economic migrants? Do we have a right to privacy? The course aims to train students in the normative analysis of public policies. At the end of this class, students should be able to critically examine diverse policy proposals from the perspective of ethics, moral and political philosophy. Students will be introduced to a broad range of normative approaches to politics, and the seminars will be organized around debates and small-group exercises to train students in the concrete ways in which one argues normatively. Through concrete and important policy examples each week, students will be introduced to the main debates in moral and political theory. There are no prerequisites. Undergraduates and graduates from all departments are welcome to attend. After taking this class, students will be prepared to take more advanced classes in ethics, political theory, as well as moral and political philosophy. They will have developed competences in the normative analysis of public policy and they will be able to deploy those competences in other ethics classes.

Same as: PHIL 175B, PHIL 275B

## Feminist, Gend, & Sex. Studies (FEMGEN)

**FEMGEN 100X. Grassroots Community Organizing: Building Power for Collective Liberation. 3-5 Units.**

Taught by long-time community organizer, Beatriz Herrera. This course explores the theory, practice and history of grassroots community organizing as a method for developing community power to promoting social justice. We will develop skills for 1-on-1 relational meetings, media messaging, fundraising strategies, power structure analysis, and strategies organizing across racial/ethnic difference. And we will contextualize these through the theories and practices developed in the racial, gender, queer, environmental, immigrant, housing and economic justice movements to better understand how organizing has been used to engage communities in the process of social change. Through this class, students will gain the hard skills and analytical tools needed to successfully organize campaigns and movements that work to address complex systems of power, privilege, and oppression. As a Community-Engaged Learning course, students will work directly with community organizations on campaigns to address community needs, deepen their knowledge of theory and history through hands-on practice, and develop a critical analysis of inequality at the structural and interpersonal levels. Placements with community organizations are limited. Enrollment will be determined on the first day through a simple application process. Students will have the option to continue the course for a second quarter in the Winter, where they will execute a campaign either on campus or in collaboration with their community partner.

Same as: AFRICAAM 100, CSRE 100, URBANST 108

**FEMGEN 101. Introduction to Feminist, Gender, and Sexuality Studies. 4-5 Units.**

Introduction to interdisciplinary approaches to gender, sexuality, queer, trans and feminist studies. Topics include the emergence of sexuality studies in the academy, social justice and new subjects, science and technology, art and activism, history, film and memory, the documentation and performance of difference, and relevant socio-economic and political formations such as work and the family. Students learn to think critically about race, gender, and sexuality from local and global perspectives.

Same as: AMSTUD 107, CSRE 108, TAPS 108

**FEMGEN 102. Art and Social Criticism. 5 Units.**

Visual artists have long been in the forefront of social criticism in America. Since the 1960s, various visual strategies have helped emergent progressive political movements articulate and represent complex social issues. Which artists and particular art works/projects have become key anchors for discourses on racism, sexism, economic and social inequality, immigrant rights and climate change? We will learn about a spectrum of political art designed to raise social awareness, spark social change and rouse protest. The Art Workers Coalition's agit-prop opposing the Vietnam War and ACT-UP's emblematic signs and symbols during the AIDS/HIV crisis of the 1980s galvanized a generation into action. Works such as Judy Chicago's *The Dinner Party* (1979), Fred Wilson's *Mining the Museum* (1992), and Glenn Ligon's paintings appropriating fragments from African-American literature all raised awareness by excavating historical evidence of the long legacy resisting marginalization. For three decades feminist artists Barbara Kruger and the Guerilla Girls have combined institutional critique and direct address into a provocative form of criticality. Recent art for social justice is reaching ever broadening publics by redrawing the role of artist and audience exemplified by the democratization of poster making and internet campaigns of Occupy and the Movement for Black Lives. We will also consider the collective aesthetic activism in the Post-Occupy era including Global Ultra Luxury Faction, Climate Justice art projects, and the visual culture of Trump era mass protests. Why are each of these examples successful as influential and enduring markers of social criticism? What have these socially responsive practices contributed to our understanding of American history?

Same as: AFRICAAM 102B, AMSTUD 102, ARTHIST 162B, CSRE 102A

**FEMGEN 103. Feminist and Queer Theories and Methods Across the Disciplines. 2-5 Units.**

(Graduate Students register for PHIL 279A or FEMGEN 203) This course is an opportunity to explore the difference feminist and queer perspectives make in creative arts, humanities, and social science research. Prerequisites: Feminist Studies 101 or equivalent with consent of instructor. NOTE: This course must be taken for a letter grade and a minimum of 3 units to be eligible for WAYS credit. The 2 unit option is for graduate students only.

Same as: FEMGEN 203, PHIL 179A, PHIL 279A

**FEMGEN 103S. Gender in Native American Societies. 5 Units.**

Seminar examines the impact of colonialism on gender roles & gender relations in American Indian communities beginning with the 17th century to the present. Topics include demographic changes; social, political & economic transformations associated with biological & spiritual assaults; the dynamism & diversity of native societies. Sources include history, ethnography, biography, autobiography, the novel & film. Same as: CSRE 103S, NATIVEAM 103S

**FEMGEN 104A. Junior Seminar and Practicum. 1 Unit.**

Preference to and required of Feminist Studies majors; others require consent of instructor. Feminist experiential learning projects related to critical studies in gender and sexuality. Identifying goals, grant proposal writing, and negotiating ethical issues in feminist praxis. Developing the relationship between potential projects and their academic focus in the major.

**FEMGEN 104B. Senior Seminar and Practicum. 2 Units.**

Required for Feminist Studies majors. Non-majors enrolled with consent of instructor. Students develop oral reports on their practicum and its relationship to their academic work, submit a report draft and revised written analysis of the practicum, and discuss applications of feminist scholarship. May be repeated once for credit.

**FEMGEN 105. Honors Work. 1-15 Unit.**

(Staff).

**FEMGEN 105P. FGSS Honors Preparation Seminar. 1 Unit.**

This 2 unit course will provide students the opportunity to explore possible honors topics, project design, advisor options, and university resources including grants, libraries, and faculty. Over the 10 weeks, students will review related research, potential methodologies, explore creative genres, and consider summer research and preparation. Students will use their findings to write a proposal to submit to the honors program as well as a proposal to submit to UAR for undergraduate funding. After completing the proposal, students will have more clear next steps for their honors projects, including summer research needs, spring course selection as it relates to their topic, and building advisor relationships.

**FEMGEN 107A. Ripped from the Headlines: Current Feminist, Gender, and Sexuality Issues and Questions. 1-2 Unit.**

Discussion of current issues and questions related to Feminist, Gender, and Sexuality Studies.

**FEMGEN 107C. You're Majoring in What?! Why Feminism is Still Relevant. 1-2 Unit.**

Stanford Feminist Study alum and community activists will join this weekly seminar to share how studying feminism has helped them professionally. Together speakers and students will explore answers to questions such as: Why study feminism, sexuality, or gender studies? Why is feminism still relevant?

**FEMGEN 107G. Sisterhood, Brotherhood, & Gender Identity: The Histories, Stories, and Constructs of Greek Life. 1 Unit.**

In this course, we will explore the history, the development, the critiques and praise of sororities and fraternities. We'll pay particular attention to how gender and sexuality are framed in those discussions by outsiders as well as ones by insiders. How do Greek organizations present their activities and goals? What values and roles do they highlight during recruitment? Who joins them? What expectations are there for participants? What are the perceived benefits that come with joining? What does it mean to be a fraternity brother or a sorority sister in modern Greek organizations? How are sorority women and fraternity men discussed by outsiders? How do the stereotypes of Greek life impact perceptions of individuals as well as particular sororities and fraternities? To consider these questions, we'll look at historical documents and analyze how groups described themselves as they were establishing; we'll also analyze recent documents (websites, books, etc.) to consider current ways organizations describe themselves, their activities, and their values. We'll use both to consider how the messages created by and about Greek organizations shape public perceptions as well as individuals' experiences of gender and sexuality identity.

**FEMGEN 107M. College Culture & Masculinity. 1-2 Unit.**

Students in this course will interrogate masculinity and its impacts on culture broadly, with a focus on college campuses. Some questions considered will include: How do structures and expectations of masculinity impact sexual assault and response to sexual assault? Where on campus do we see pressure to perform masculinity? What expectations do some campus communities, such as athletics and Greek life, have of their members to perform and maintain masculinity? How are male identifying individuals expected to behave in communities shaped by masculinity? What spaces are there for gender non-conforming folks in communities shaped by masculinity? How do structures of masculinity impact expectations of femininity and femme in these spaces and others?

**FEMGEN 107S. Barbie Girls vs Sea Monsters: Gender, Sexuality, & Identity in American Culture. 1-2 Unit.**

Incoming students bring widely varying experiences of intimate relationships, whether romantic, familial, platonic, or sexual. This course provides students an opportunity to examine sexuality as a broad concept encompassing a dimension of our humanity and its surrounding cultural systems, impacting how we relate with one another: our experience of sex, gender, intimacy, and worldview. Activities, readings, and discussions will prompt students to reflect on society constructs sex, gender, and intimacy. Themes will include intersectional feminism and codes of masculinity, concepts and practicalities of affirmative consent in straight and LGBTQIA contexts, gender and sexual identity spectrums, and the lived experience of dating, romance, and relationships.

**FEMGEN 108. Internship in Feminist Studies. 1-5 Unit.**

Supervised field, community, or lab experience in law offices, medical research and labs, social service agencies, legislative and other public offices, or local and national organizations that address issues related to gender and/or sexuality. One unit represents approximately three hours work per week. Required paper. May be repeated for credit. Service Learning Course (certified by Haas Center). Feminist, Gender, and Sexuality Majors may not receive 108 credit for their required practicum, as they are to sign up for FEMGEN 104 A & B instead. Prerequisites: Course work in Feminist, Gender, and Sexuality Studies, written proposal and application form submitted for approval by program office, written consent of faculty sponsor. Course may be taken 3 times total, for a max of 15 units.

**FEMGEN 108B. Gender in the Arab and Middle Eastern City. 5 Units.**

What are the components of gendered experience in the city, and how are these shaped by history and culture? How do meanings attributed to Islam and the Middle East obscure the specificity of women's and men's lives in Muslim-majority cities? This course explores gender norms and gendered experience in the major cities of Arab-majority countries, Iran and Turkey. Assigned historical and sociological readings contextualize feminism in these countries. Established and recent anthropological publications address modernity, mobility, reproduction, consumption, and social movements within urban contexts. Students will engage with some of the key figures shaping debates about gender, class, and Islam in countries of the region typically referenced as North Africa and the Middle East (MENA). They will also evaluate regional media addressing concerns about gender in light of the historical content of the course and related political concepts.

Same as: ANTHRO 108B, URBANST 108B

**FEMGEN 109. Looking Back, Moving Forward: Raising Critical Awareness in Gender and Sports. 3-5 Units.**

In 1972, Title IX legislation opened up a vast range of opportunities for women in sports. Since then, women's sports have continued to grow yet the fight for recognition and equality persists. Simply put, men's sports are more popular than women's—so much so, in fact, that people often make the hierarchical distinction between "sports" and "women's sports." But what would it take to get more women's sports featured on ESPN or more female athletes on the cover of Sports Illustrated? And, given the well-documented corruption at the highest levels of men's sports, should such an ascent in popularity be the goal for women's sports? This course will map out and respond to the multifaceted issues that emerge when women enter the sports world. Throughout the quarter, we will explore the fight for gender equality in sports through historical, cultural, and rhetorical lenses.

Same as: FEMGEN 209

**FEMGEN 10A. BAY AREA DOMESTIC WORKERS: RIGHTS: A GRASSROOTS CAMPAIGN FOR SOCIAL JUSTICE. 1 Unit.**

In this Alternative Spring Break course and trip, we will examine how our society and institutions allow for and perpetuate the exploitation and oppression of domestic workers. Historically, domestic workers have largely been excluded from basic labor protections. We cannot think critically about the issues domestic workers face without considering the roles of gender, race and ethnicity, immigration status, and language play in the industry. We will use a conceptual framework based on citizenship and reproductive labor theory to address themes in the context of Bay Area migrant women of color who are vehemently campaigning for equal labor rights. Through collaborations with domestic worker organizations based in San Francisco and Oakland, ASB participants will learn how this movement seeks to transform the domestic work industry through multilingual and multicultural alliances.

**FEMGEN 10SC. LGBT History and Culture in the Bay Area. 2 Units.**

Since at least World War II, the San Francisco Bay Area has served as a center for LGBTQ life in the United States. It emerged early as a place where queer people could congregate and interact more freely, but it also was frequently at the vanguard when it came to organizing around issues of gender and sexuality. At the same time, as some queer communities of the Bay Area have done extremely well, others have continued to have to struggle for their rights, their place and their say. This course explores the genesis and legacy of different queer communities and explores their impact on Bay Area culture. Topics discussed will include the Beats, lesbian separatism, the response to AIDS, the relationship between different LGBTQ communities and the police, trans activism, prostitution and sex worker rights. The course combines literature, art and poetry of seven decades with historical documents, as well as local visits and walking tours. The last third of the course allows students to pursue archival or oral history research projects, as students unearth their own stories of queer San Francisco.

**FEMGEN 110J. Romance, Desire, and Sexuality in Modern Japanese Literature. 3-4 Units.**

This class is structured around three motifs: love suicide (as a romantic ideal), female desire, and same-sex sexuality. Over the course of the quarter we will look at how these motifs are treated in the art and entertainment from three different moments of Japanese history: the Edo period (1615-1868), the modern period (1920-65), and the contemporary period (1965-present). We will start by focusing on the most traditional representations of these topics. Subsequently, we will consider how later artists and entertainers revisited the conventional treatments of these motifs, informing them with new meanings and social significance. We will devote particular attention to how this material comments upon issues of gender, sexuality, and human relationships in the context of Japan. Informing our perspective will be feminist and queer theories of reading and interpretation.

Same as: FEMGEN 210J, JAPAN 110, JAPAN 210

**FEMGEN 110X. Introduction to Comparative Queer Literary Studies. 3-5 Units.**

Introduction to the comparative literary study of important gay, lesbian, queer, bisexual, and transgender writers and their changing social, political, and cultural contexts from the 1880s to today: Oscar Wilde, Rachilde, Radclyffe Hall, Djuna Barnes, James Baldwin, Jean Genet, Audre Lorde, Cherrie Moraga, Jeanette Winterson, Alison Bechdel and others, discussed in the context of 20th-century feminist and queer literary and social theories of gender and sexuality.

Same as: COMPLIT 110, COMPLIT 310, FEMGEN 310X

**FEMGEN 111. Reproductive Politics in the United States and Abroad. 3-5 Units.**

Course description: This course examines the issues and debates surrounding women's reproduction in the United States and beyond. It pays special attention to how knowledge and technology travel across national/cultural borders and how women's reproductive functions are deeply connected to international politics and events abroad. Topics include: birth control, population control, abortion, sex education, sex trafficking, genetic counseling, assisted reproductive technologies, midwifery, breastfeeding, menstruation, and reproductive hazards. Same as: AMSTUD 111

**FEMGEN 112. "When We Dead Awaken": Breakthroughs in Conceptions of the Gendered Self in Literature and the Arts. 4-5 Units.**

Remarkable breakthroughs in conceptions of the gendered self are everywhere evident in literature and the arts, beginning primarily with the Early Modern world and continuing into today. Many of these works inhere in innovations in literary and artistic forms in order to capture and even evoke the strong cognitive, or psychological, dimension of such awakenings. The reader, or viewer, is often challenged to adapt her or his mind to new forms of thought, such as John Donne's seventeenth century creation of the Dramatic Monologue, a form popular with modern writers, which requires the reader's cognitive presence in order to fill out the dramatic scene. In so doing, the reader often supplies the presence of the female voice and thereby enters into her self-consciousness and inner thoughts. Adrienne Rich, for example, specifically rewrites one of Donne's major poems from the female perspective. This can be, in Rich's words, an awakening for the active reader, as he or she assumes that often-unspoken female perspective. The course will also explore male conceptions of the self and how such conceptions are often grounded in cultural attitudes imposed on male subjects, which can contribute to gender-bias toward women, a subject often neglected in exploring gendered attitudes, but which is now gaining more study, for example, in Shakespeare's *Othello*. Readings from recent developments in the neurosciences and cognitive studies will be included in our study of artistic forms and how such forms can activate particular mindsets. Writers and artists will include Shakespeare, Michelangelo, John Donne, Virginia Woolf, Adrienne Rich, Gertrude Stein, Picasso, June Wayne, and Edward Albee's 1960's play, *Who's Afraid of Virginia Woolf?*.

Same as: ENGLISH 182J, FEMGEN 212

**FEMGEN 113. Transgender Studies. 3-4 Units.**

Transgender and gender-expansive identities are the subject of growing attention and (often sensationalist) interest in the media as well as in the healthcare field, yet there exists a dearth of legitimate academic courses, research and writing that reflect and explore gender identity and expression as a fluid spectrum rather than a fixed binary. This course will address transgender and gender expansive identities from historical, medical, literary, developmental and sociopolitical perspectives.

Same as: FEMGEN 213

**FEMGEN 113X. Feminist Poetry in the U.S., 1973-2017. 3-5 Units.**

Traces the development of feminist poetry in the United States from second wave feminists like Adrienne Rich, Audre Lorde, and Alicia Ostriker to contemporary poetry of Anne Boyer, Steph Burt, and Eileen Myles, among others. We will think broadly about the relationship between politics and poetry, and focus specifically on the influences of second- and third- wave feminism on poetry produced by women in the U.S. from the 1970s until today.

Same as: COMPLIT 113

**FEMGEN 114. Sexual Diversity and Health. 1 Unit.**

Explores multiple aspects of sexual diversity and health, including: kink/BDSM, polyamory, trans\* sexuality, asexuality, high-risk sex, inter-sexuality, questioning gender and sexual binaries, and more. The format includes a one-day conference featuring a variety of expert speakers covering different aspects of sexual diversity and health, followed by a debriefing and discussion session to integrate what has been heard and learned.

Same as: FEMGEN 214

**FEMGEN 115. Queer Reading and Queer Writing in Early Modern England. 5 Units.**

Considers the possibility of identifying queer reading and writing practices in early modern England as well the theoretical and historical obstacles such a project necessarily encounters. Focus on the role which Renaissance discourses of desire continue to play in our negotiations of homo/erotic subjectivity, identity politics, and sexual and gender difference. Study of Renaissance queerness in relation to the classical tradition on the one hand and the contemporary discourses of religion, law, and politics on the other. Readings include plays, poems, and prose narratives as well as letters, pamphlets, and ephemeral literature. Both major and minor authors will be represented.

**FEMGEN 116. Narrating Queer Trauma. 4-5 Units.**

Psychiatrist Dori Laub has argued that the process of narrating trauma is essential to the healing process. Not only is telling the story important, but it is also crucial to have someone else bear witness to the narrative. But how do people even begin to narrate stories of violence and pain, and how do we become good listeners? How are these stories told and heard in the specific context of queer world making? This course will explore narratives of trauma in queer lives through literature, film, media, and performance in conjunction with trauma theory and psychoanalysis. We will pay specific attention to questions of community, healing, violence, and affect at the intersections of queerness and race, sex, disability, class, gender, and nationality.

Same as: FEMGEN 216X

**FEMGEN 117. Expanding Engineering Limits: Culture, Diversity, and Gender. 2-3 Units.**

This course investigates how culture, and diversity, including gender, shape who becomes an engineer, what problems get solved, and the quality of designs, technology, and products. We first examine the characteristics of engineering cultures – what are the interactions, symbols and ideas, and practices that define engineering? We then investigate how gender and other markers of diverse identities are interdependent and culturally constructed, how gender and other kinds of diversity are experienced in engineering cultures, and how these experiences have consequence for engineering innovation and the engineering profession. Finally, we analyze examples of cultural change in engineering and implications for engineering knowledge and practice. The course involves weekly presentations by distinguished scholars and engineers, readings, short writing assignments, small-group discussion, and exercises around one's own experiences in and related to engineering. Those taking the course for 3 units will also complete a research-based project, and must take the course for a letter grade to meet the undergraduate WAY-ED requirement.

Same as: CSRE 117, CSRE 217, ENGR 117, FEMGEN 217

**FEMGEN 117Q. Queer Arts: Remembering and Imagining Social Change. 4-5 Units.**

This interdisciplinary fine arts course is designed to examine the nature of artistic imagination, sources of creativity and the way this work helps shape social change. We will consider the relationship among muses, mentors and models for queer artists engaged in such fields as visual art, music, theatre, film, creative writing and dance. Exploring various cultures, lands and times, we will study the relationship between memory and vision in serious art. We will ask questions about the role of the artist in the academy and the broader social responsibility of the artist. We will locate some of the similarities and differences among artists, engage with different disciplines, and discover what we can learn from one another. This seminar requires the strong voices of all participants. To encourage students to take their ideas and questions beyond the classroom, we will be attending art events (performances, exhibits, readings) individually and in groups. The learning goals include a serious exploration of individual students' creativity, a more nuanced appreciation of diverse arts and a stronger understanding of the multifaceted nature of gender, race and class. Students will develop their abilities to write well-argued papers. They will stretch their imaginations in the written and oral assignments. And they will grow more confident as public speakers and seminar participants.

Same as: CSRE 117Q

**FEMGEN 118. Transgender Cultural Studies. 4-5 Units.**

In the United States, we seem to be in a transgender moment, or we've reached what Time magazine has called the transgender tipping point. In this course, we will explore what this cultural moment means for the representation of transgender, nonbinary, and gender non-conforming people. We will look historically and globally at differences in representation in order to better understand our current cultural moment. We will explore multiple genres, formats, and authorial points of view to critically think through how and by whom trans stories are told. How do interlocking systems of oppression continue to dictate and drive trans representation and narrative; how do trans authors and artists push back against these systems to (re)construct their own narrative and image? Through a critical engagement with film, memoir, graphic narrative, poetry, and fiction created by and/or about trans\* people, this course will engage students with an intersectional approach to trans identity and representation in concert with racial identity, sexuality, disability, socio-economic status, age, gender, and citizenship.

**FEMGEN 115I. Protecting your Bubble: Self Defense Strategies for College Students. 1 Unit.**

This course will offer self defense training for students, with a focus on mental and physical defense, primarily against sexual assault. The course will focus on an "empowerment" method of self defense, seeking to provide tools and build confidence in students for a variety of situations. Students will participate in group discussions on the topic of sexual assault on college campuses, as well as physical and mental self defense tactics both to build confidence in any situation, prevent assault, and to employ in dangerous situations.

**FEMGEN 121. Intro to Queer Studies. 4-5 Units.**

This course provides an interdisciplinary grounding in historical and theoretical foundations of queer culture and theory. A critical interrogation of sex, gender, sexuality, pleasure, and embodiment will provide students with a framework for producing their own queer cultural critique. We will explore LGBTQ history alongside contemporary queer issues in popular culture, health, science, government policy, and politics. This course will also address the intersections of sexuality and gender with race, class, ability, age, nationality, and religion. Students will engage with multiple disciplinary approaches that have both shaped queer studies and have been shaped by queer methodology.

**FEMGEN 123. Sex and Love in Modern U.S. Society. 3 Units.**

Social influences on private intimate relations involving romantic love and sexuality. Topics include the sexual revolution, contraception, dating, hook-ups, cohabitation, sexual orientation, and changing cultural meanings of marriage, gender, and romantic love.

Same as: SOC 123, SOC 223

**FEMGEN 124. Challenging Sex and Gender Dichotomies in Medicine. 1 Unit.**

Explores and challenges the traditional physiological bases for distinguishing human males from females, as well as the psychosocial factors that play a role in experiencing and expressing gender and sexuality. Topics include the influence of sociocultural (gender) norms and behaviors on human biology, the interactions of sex and gender on medical outcomes, the importance of understanding the spectrum of sex, gender, and sexuality in clinical practice.

Same as: FEMGEN 224, SOMGEN 257

**FEMGEN 126D. Victorian Sex. 5 Units.**

How can we make sense of a culture of extraordinary sexual repression that nevertheless seemed fully preoccupied with sex? Examination of the depictions of sex in Victorian literary and cultural texts. Authors include: Collins, Braddon, the Brownings, Swinburne, Stoker and Wilde.

**FEMGEN 129. Critical Issues in International Women's Health. 4 Units.**

Facilitated discussion about women's lives, from childhood through adolescence, reproductive years, and aging. Economic, social, and human rights factors, and the importance of women's capacities to have good health and manage their lives in the face of societal pressures and obstacles. Emphasis is on life or death issues of women's health that depend on women's capacity to exercise their human rights including maternal mortality, violence, HIV/AIDS, reproductive health, and sex trafficking. Organizations addressing these issues. A requirement of this class is participation in public blogs. Prerequisites: Human Biology core or equivalent or consent of instructor.

Same as: HUMBIO 129

**FEMGEN 125I. Beyond the Athlete: Intersection of Diversity, Storytelling, and Athletics. 1-2 Unit.**

This course explores the interaction of one's identities within the context of athletics. With an emphasis on the importance of self-awareness and storytelling, we will navigate how all identities intersect and affect the privilege we receive within current society. We will specifically look at how race, ethnicity, sexual orientations, religion, socioeconomic status, mental health, and disabilities interact with the sphere of athletics. Beyond the Athlete: Intersection of Storytelling, Diversity, and Athletics will help students find their voice and use it for positive social change within their communities.

**FEMGEN 13. Stanford Anti-Violence Educator Training. 2 Units.**

The Stanford Anti-Violence Educators (SAVE) Program seeks to cultivate a more resilient, supportive, and safe Stanford culture by engaging students in peer-to-peer dialogues about sexuality and consent, equipping them with skills to better relate with others. In this class, you will develop the knowledge and skill to facilitate peer education workshops with a variety of groups on campus throughout the year, including the required frosh curriculum. We will engage in conversations about sexuality, gender, identity, boundaries, and communication. We will examine social discourses, campus norms, systems of oppression, as well as explore new ways for the community to engage itself on these topics. The class will offer the structure and guidance to 1) gain in-depth knowledge of SAVE curricula content, 2) facilitate with presence, authenticity, and connection, and 3) increase self-efficacy as a leader for cultural change.

**FEMGEN 130. Sex and Gender in Judaism and Christianity. 3 Units.**

What role do Jewish and Christian traditions play in shaping understandings of gender differences? Is gender always imagined as dual, male and female? This course explores the variety of ways in which Jewish and Christian traditions - often in conversation with and against each other - have shaped gender identities and sexual politics. We will explore the central role that issues around marriage and reproduction played in this conversation. Perhaps surprisingly, early Jews and Christian also espoused deep interest in writing about 'eunuchs' and 'androgynes,' as they thought about Jewish and Christian ways of being a man or a woman. We will examine the variety of these early conversations, and the contemporary Jewish and Christian discussions of feminist, queer, trans- and intersex based on them.

Same as: JEWISHST 120, RELIGST 130

**FEMGEN 130S. Sex and the Novel. 5 Units.**

How do novels represent sexual life? This course reads texts from the eighteenth century to the present day, and considers how novelists represent the discombobulating effects of desire in fictional prose. Authors may include: S. Richardson, N. Hawthorne, J. Austen, E. Brontë, G. Gissing, H. James, D.H. Lawrence, J. Joyce, V. Nabokov, J. Baldwin, A. Hollinghurst and Z. Smith.

Same as: ENGLISH 130

**FEMGEN 131. Introduction to Queer Theory. 3-5 Units.**

What can Queer Theory help us do and undo? Emerging at the intersections of feminist theory, queer activism, and critical race studies in the 1990's, Queer Theory has become a dynamic interdisciplinary field that informs a wide range of cultural and artistic practices. This course will introduce students to the development of queer theory as well as core concepts and controversies in the field. While considering theoretical frames for thinking gender, sexuality, and sex, we will explore the possibilities--and limitations--of queer theory with a focus on doing and undoing identity, knowledge, and power.

**FEMGEN 132. Intersectional Feminism. 4 Units.**

This course is focused on the feminist concept of intersectionality. As a mode of Black feminist thought, lived activist practice, and interdisciplinary research methodology, intersectionality allows us to think about overlapping forms of identity and the interlocking power structures that produce systematic oppression and discrimination. We will examine the origins and development of intersectional feminism and consider its far-reaching impact in social justice work and contemporary activist movements. As we learn the language, methods, and critiques of intersectionality, we will cover issues related to rights, ethics, privilege, and globalization while discussing social difference on micro- and macro-levels.

**FEMGEN 133. Transgender Performance and Performativity. 4 Units.**

This course examines theater, performance art, dance, and embodied practice by transgender artists. Students will learn the history and politics of transgender performance while considering the creative processes and formal aesthetics trans artists use to make art. We will analyze creative work in conversation with critical and theoretical texts from the fields of performance studies, art history, and queer studies.

Same as: TAPS 133T

**FEMGEN 134. The Marriage Plot. 5 Units.**

The centrality of the marriage plot in the development of the British novel beginning in the 18th century with Samuel Richardson's *Pamela* and ending with Woolf's modernist novel *Mrs. Dalloway*. The relationship between novelistic plotting and the development of female characters into marriageable women. What is the relationship between the novel and feminine subjectivity? What aspects of marriage make it work as a plotting device? What kinds of marriages do marriage plots allow? Is the development of women's political agency related to their prominence in the novel form?

Same as: ENGLISH 134

**FEMGEN 135. Body Politics. 1-2 Unit.**

This weekly course facilitates conversations on issues of the body across a wide spectrum of contemporary experiences, controversies, and contexts. Informed by gender studies, critical race theory, and feminist theory, we will explore current events related to racialized violence, size liberation, reproductive rights, HIV criminalization, rape culture, disability, transgender rights, and health and fitness.

**FEMGEN 138. Men's Violence Against Women in Literature: A Critical and Social Analysis. 3-5 Units.**

Literature, as a social and cultural product of its time, can inform and deepen our understanding of oppression. Using literature as a vehicle, this course will explore the impact of and responses to men's violence against women. Students will critically assess how the author has portrayed the topic of sexual assault and relationship abuse, how the characters and/or author exhibits victim blaming, and, if the characters were living today, would current policies adequately hold the perpetrator responsible, provide safety and justice for the survivor, and challenge rape culture. In dialogue with theoretical texts, we will analyze the literary representations of patriarchy that inform societal acceptance of gender-based violence, identify the historical prevalence of victim blaming and impunity in these works, and assess the implications on policy making at the individual, community and political level. Students will critically examine literature including Shakespeare's *Taming of the Shrew*, Thomas Hardy's *Tess of the D'Urbervilles*, Zora Neale Hurston's *Their Eyes Were Watching God*, Louise Erdrich's *The Round House* and Joyce Carol Oates' *We Were the Mulvaney's*. There is an optional service-learning component.

Same as: FEMGEN 238

**FEMGEN 139. Rereading Judaism in Light of Feminism. 4 Units.**

During the past three decades, Jewish feminists have asked new questions of traditional rabbinic texts, Jewish law, history, and religious life and thought. Analysis of the legal and narrative texts, rituals, theology, and community to better understand contemporary Jewish life as influenced by feminism.

Same as: JEWISHST 139

**FEMGEN 13N. Women Making Music. 3 Units.**

Preference to freshmen. Women's musical activities across times and cultures; how ideas about gender influence the creation, performance, and perception of music.

Same as: MUSIC 14N

**FEMGEN 140A. Destroying Dichotomies: Exploring Multiple Sex, Gender, and Sexual Identities. 3-5 Units.**

This course is designed to broaden the student's awareness of the human experience by introducing scholarly debates about sex, gender and sexual identities and expressions. We will consider the socially constructed nature of sex, gender and sexuality and examine the history and community of those who identify as intersexual, transgender, homosexual, bisexual, asexual, pansexual and/or queer through texts, discussion, films, and class presentations.

**FEMGEN 140D. LGBT/Queer Life in the United States. 4-5 Units.**

An introductory course that explores LGBT/Queer social, cultural, and political history in the United States. By analyzing primary documents that range from personal accounts (private letters, autobiography, early LGBT magazines, and oral history interviews) to popular culture (postcards, art, political posters, lesbian pulp fiction, and film) to medical, military, and legal papers, students will understand how the categories of gender and sexuality have changed over the past 150 years. This class investigates the relationship among queer, straight and transgender identities. Seminar discussions will question how the intersections of race, class, gender, and sexuality influenced the construction of these categories.

Same as: FEMGEN 240D, HISTORY 257C



**FEMGEN 140H. New Citizenship: Grassroots Movements for Social Justice in the U.S.. 5 Units.**

Focus is on the contributions of immigrants and communities of color to the meaning of citizenship in the U.S. Citizenship, more than only a legal status, is a dynamic cultural field in which people claim equal rights while demanding respect for differences. Academic studies of citizenship examined in dialogue with the theory and practice of activists and movements. Engagement with immigrant organizing and community-based research is a central emphasis.

Same as: ANTHRO 169A, CHILATST 168, CSRE 168

**FEMGEN 141. Intersectionality and Social Movements: Gender, Race, Sexuality and Collective Organizing. 4 Units.**

This course explores U.S. social movements from an intersectional perspective. How is social movement emergence related to participants' identities and experiences with inequality? How are the dynamics, targets and tactics of mobilized participants related to race, class, gender, age and/or sexuality? How have social movement scholars addressed the intersectional nature of identity and community? Readings include empirical and theoretical social movement texts, and discussion topics include feminist and civil rights movements, queer/LGBT movements, Occupy Wall Street and Black Lives Matter.

Same as: AFRICAAM 141X, CSRE 141X, SOC 153

**FEMGEN 142. Sociology of Gender. 3 Units.**

The aim of this course is to provide students with an understanding of the sociological conceptualization of gender. Through the sociological lens, gender is not an individual attribute or a role, but rather a system of social practices that constructs two different categories of people men and women and organizes social interaction and inequality around this difference. First we will explore what 'gender' is according to sociologists and the current state of gender inequality in the labor market, at home, and at school. We will then investigate how gender structures our everyday lives through the individual, interactional, and institutional levels. Finally, we will discuss avenues for reducing gender inequality. Throughout the course, we will prioritize reading, evaluating, and questioning sociological theory and research on gender."

Same as: FEMGEN 242, SOC 142, SOC 242

**FEMGEN 143. One in Five: The Law, Politics, and Policy of Campus Sexual Assault. 3-5 Units.**

**TRIGGER WARNING:** Over the past three years, the issue of campus sexual assault has exploded into the public discourse. While definitive figures are difficult to obtain due to the necessarily private nature of these events, several recent studies estimate that between 20-25% of college women (and a potentially higher proportion of students identifying as transgender and gender-nonconforming, as well as around 5-10% of male students) experience sexual assault. People of color, LGBT students, disabled individuals and other vulnerable groups are at increased risk. This is also a significant problem in K12 education. Survivors have come forward across the country with harrowing stories of assault followed by what they describe as an insensitive or indifferent response from college administrators. These survivors have launched one of the most successful, and surprising, social movements in recent memory. As a result, the federal government under President Obama stepped up its civil rights enforcement in this area, with over 300 colleges and universities under investigation for allegedly mishandling student sexual assault complaints as of July 2017. At the same time, this heightened response has led to a series of high-profile lawsuits by accused students who assert that they were falsely accused or subjected to mishandled investigations that lacked sufficient due process protections. The one thing that survivors and accused students appear to agree on is that colleges are not handling these matters appropriately. Colleges have meanwhile complained of being whipsawed between survivors, accused students, interest groups, and enforcement authorities. The election of President Trump has now created significant uncertainty about how this issue will be handled by the Department of Education going forward. The Trump Administration took the extraordinary step this September of rolling back all of the Obama Administration guidance on this subject. Meanwhile Congress has been unable to pass legislation addressing the issue, though there are several bipartisan bills under consideration. This course focuses on the legal, policy, and political issues surrounding sexual assault on college campuses. We will learn background about sexual violence and the efforts to implement legal protections for survivors in the educational context. We will also study the basic legal frameworks governing campus assault, focusing on the relevant federal laws such as Title IX and the Clery Act. We will hear from guest speakers who are actively involved in shaping policy and advocating in this area, including lawyers, lobbyists, filmmakers, journalists, and policymakers. The subject matter of this course is sensitive and students are expected to treat the material with sensitivity. Much of the reading and subject matter may be upsetting and/or triggering for students who identify as survivors. There is no therapeutic component for this course, although supportive campus resources and Title IX staff are available for those who need them. This course was previously a Sophomore College Class that is now being offered as a regular quarter-length course. Enrollment is by INSTRUCTOR PERMISSION. Access the consent form here [feminist.stanford.edu/academics/undergraduate-program/forms](http://feminist.stanford.edu/academics/undergraduate-program/forms) or email [rmeisels@stanford.edu](mailto:rmeisels@stanford.edu) to request a form via email. Cross-listed with Law 7065. Elements used in grading: Attendance, Class Participation, Written Assignment, Final Paper or Project.

Same as: SOC 188

**FEMGEN 144F. Female Modernists: Women Writers in Paris Between the Wars. 5 Units.**

The course will focus on expatriate women writers - American and British - who lived and wrote in Paris between the wars. Among them: Edith Wharton, Gertrude Stein and Alice B. Toklas, H.D., Djuna Barnes, Margaret Anderson, Janet Flanner, Natalie Barney, Kay Boyle, Mina Loy, Romaine Brooks, Mary Butts, Radclyffe Hall, Colette, and Jean Rhys. A central theme will be Paris as a lure and inspiration for bohemian female modernists, and the various alternative and emancipatory literary communities they created.

**FEMGEN 144G. Pop Feminism: Unrest and Unease in the Contemporary Feminist Moment. 3-5 Units.**

This course examines feminist reaction/expression/ to and in German and American pop culture. We will examine a feminist approach using a variety of different media, including film, music videos, and literature. We will consider the intersections of race and gender constructions, as well as the cultural aspects of each iteration of "pop." The course will be taught in English, but German-speaking students are encouraged to read in the original. nNote: This course contains sexually explicit content. Same as: CSRE 144G, GERMAN 144

**FEMGEN 144X. Transforming Self and Systems: Crossing Borders of Race, Nation, Gender, Sexuality, and Class. 5 Units.**

Exploration of crossing borders within ourselves, and between us and them, based on a belief that understanding the self leads to understanding others. How personal identity struggles have meaning beyond the individual, how self healing can lead to community healing, how the personal is political, and how artistic self expression based in self understanding can address social issues. The tensions of victimization and agency, contemplation and action, humanities and science, embracing knowledge that comes from the heart as well as the mind. Studies are founded in synergistic consciousness as movement toward meaning, balance, connectedness, and wholeness. Engaging these questions through group process, journaling, reading, drama, creative writing, and storytelling. Study is academic and self-reflective, with an emphasis on developing and presenting creative works in various media that express identity development across borders. Same as: ASNAMST 144, CSRE 144

**FEMGEN 145. Culture Wars: Art and Social Conflict in the USA, 1890-1950. 4 Units.**

This course examines social conflicts and political controversies in American culture through the lens of visual art and photography. We consider how visual images both reflect and participate in the social and political life of the nation and how the terms of citizenship have been represented, and, at times, contested, by artists throughout the first half of the 20th century. The class explores the relation between American art and the body politic by focusing on issues of poverty, war, censorship, consumerism, class identity, and racial division. Same as: AMSTUD 145M, ARTHIST 145, ARTHIST 345

**FEMGEN 149. Gender Violence: Critical Race, Feminist, and Queer Perspectives. 5 Units.**

This course examines the problem of domestic violence, sexual violence, and other forms of gender violence using critical race, legal, feminist, and queer theory. Readings reflect an interdisciplinary approach to understanding gender violence as it is understood in U.S. law, history, culture, and politics. We will explore foundational theories for why gender violence persists as well as its relationship to structural power along axes of race, gender, class, sexuality, and nation. This course will also consider feminist anti-violence social movements and debates within legal and philosophical approaches to gender violence.

**FEMGEN 150. Sex, Gender, and Power in Modern China. 3-5 Units.**

Investigates how sex, gender, and power are entwined in the Chinese experience of modernity. Topics include anti-footbinding campaigns, free love/free sex, women's mobilization in revolution and war, the new Marriage Law of 1950, Mao's iron girls, postsocialist celebrations of sensuality, and emergent queer politics. Readings range from feminist theory to China-focused historiography, ethnography, memoir, biography, fiction, essay, and film. All course materials are in English. Same as: CHINA 115, CHINA 215, FEMGEN 250

**FEMGEN 150A. Minaret and Mahallah: Women and Islam in Central Asia. 3-5 Units.**

Introduction to women's culture and art in Muslim countries of Central Asia. Women, bearers of family rites and folklore, are the key figures in transmission of traditional culture and guardians of folk Islam. Women helped to keep the continuity of Islamic education in Central Asia during the harsh times of Communist dominance. The whole wealth of women's oral tradition will be demonstrated and examined to the extent possible. The course will make broad use of audio-visual materials. Same as: ANTHRO 150A, REES 250A

**FEMGEN 150G. Performing Race, Gender, and Sexuality. 4 Units.**

This theory and practice-based course will examine performances by and scholarly texts about artists who critically and mindfully engage race, gender, and sexuality. Students will cultivate their skills as artist-scholars through written assignments and the creation of performance-based works in response to the assigned material. Attendance and written reflection on the TAPS Vital Signs: Performance Art in the 21st Century performance art series are required. The practical component of the class will also incorporate meditation into the process of preparing for, making, and critiquing performance. We will approach mindfulness as method and theory in our own practice, as well in relation to the works studied, while attending to the ethics and current debates concerning its use. Examples of artists studied include James Luna, Nao Bustamante, William Pope.L, Yoko Ono, Cassils, Adrian Piper, Guillermo Gomez-Peña, Nikki S. Lee, and Ana Mendieta. Same as: CSRE 150G, TAPS 150G

**FEMGEN 150J. Queer Poetry in America. 3-5 Units.**

Some poets are known for portraying alternative sexualities in their poetry. Others seem to cover sexuality up. Can we use a poem to determine whether a poet is gay, lesbian, bisexual, transgender, or questioning? Or do some poets simply defy categorization? What makes a poem queer? Is poetry somehow more or less queer than other literary forms? Even if we can answer these questions, what would they tell us about literature in general? This course will investigate such topics and more by tracking queer poetry in twentieth-century America. We'll start with nineteenth-century figures Walt Whitman and Emily Dickinson, then move on to Gertrude Stein, Hart Crane, Langston Hughes, Countee Cullen, Elizabeth Bishop, Allen Ginsberg, Frank O'Hara, and others. We'll ask what their poetry meant in their own times, as well as what it means to us in our present era of expanding civil rights and changing sexual attitudes. Same as: AMSTUD 150J, ENGLISH 150J

**FEMGEN 152. 'Tis all in pieces: Space and Gender on the Threshold of the Modern World. 5 Units.**

These dramatic words, spoken by the British poet John Donne, signal the onset of the Early Modern world and the profound reconfigurations of space and related structures of thought, including conceptions of the self and the encoding of gender roles. We will explore the vibrant Early Modern world in the context of space and representations of gender, sexuality, and race as manifest in unprecedented literary and artistic forms, such as Shakespeare's *Othello*, Marlowe's *Doctor Faustus*, the poetry of John Donne, the art of Michelangelo and Caravaggio as well as key historical and cultural texts. And we will visit the Cantor Arts Center (on campus) for a guided tour and lecture on art and perspective. We also will read and discuss selected texts from the modern world, such as Samuel Beckett's *Waiting for Godot* and poetry and commentary by Adrienne Rich, to study both changes and continuities with the Early Modern period. We will consider the vital cognitive role of the reader or viewer in the formation of particular instances of artistic form, including recent—and highly thought-provoking—material from the neurosciences and cognitive studies. nNote: Instructor will consider changes in meeting times/days to accommodate student schedules if feasible. Please send request to: hbrooks@stanford.edu. Same as: FEMGEN 252

**FEMGEN 153Q. Reading and Writing the Gendered Story. 4-5 Units.**

Exploration of novels, stories, memoirs and micro-narratives in which gender plays a major role. The texts are by writers of varied genders and sexual orientations as well as varied class, racial and national backgrounds. Written assignments present a mixture of academic and creative options.

**FEMGEN 154. Black Feminist Theory. 5 Units.**

This course will examine black feminist theoretical traditions, marking black women's analytic interventions into sexual and pleasure politics, reproduction, citizenship, power, violence, agency, art, representation, and questions of the body. Exploring concepts like intersectionality, matrices of violence, the politics of respectability, womanism, and other contours of a black feminist liberation politic, we will look to black feminist scholars, activists, and artists from the 19th century to today. Same as: AFRICAAM 154

**FEMGEN 154E. Black Feminist Epistemology and Analytics. 5 Units.**

Building from the foundational canon of black feminist theory and praxis, this seminar will explore more recent advances in black feminist epistemologies and modes of analysis. Students will engage black feminist conceptions of the human and the self; love and relationality in precarious conditions; speculative queer, sexual, and body politics; aesthetics and cultural theory; and contemporary proposals for radical freedom and social transformation. We will consider how black feminist theory not only engages, builds on, critiques, and transforms other schools of thought, but also produces its own systems of reason and interpretation.

Same as: AFRICAAM 139

**FEMGEN 154G. Black Magic: Ethnicity, Race, and Identity in Performance Cultures. 3-4 Units.**

In 2013, CaShawn Thompson devised a Twitter hashtag, #blackgirlmagic, to celebrate the beauty and intelligence of black women. Twitter users quickly adopted the slogan, using the hashtag to celebrate everyday moments of beauty, accomplishment, and magic. In contrast, #blackmagic is used to describe everything from the uncanny to the personal. This course examines the discursive phenomenon of "black magic" and its permutations throughout Anglo-American histories. We will investigate the binaries of black/dark, white/light magic that has entered our contemporary lexicon, reading material on religion, magic performance, and theater.

Same as: AFRICAAM 154G, CSRE 154D, TAPS 154G

**FEMGEN 155. The Changing American Family. 4 Units.**

Family change from historical, social, demographic, and legal perspectives. Extramarital cohabitation, divorce, later marriage, interracial marriage, and same-sex cohabitation. The emergence of same-sex marriage as a political issue. Are recent changes in the American family really as dramatic as they seem? Theories about what causes family systems to change.

Same as: FEMGEN 255, SOC 155, SOC 255

**FEMGEN 156H. Women and Medicine in US History: Women as Patients, Healers and Doctors. 5 Units.**

Women's bodies in sickness and health, and encounters with lay and professional healers from the 18th century to the present. Historical construction of thought about women's bodies and physical limitations; sexuality; birth control and abortion; childbirth; adulthood; and menopause and aging. Women as healers, including midwives, lay physicians, the medical profession, and nursing.

Same as: AMSTUD 156H, HISTORY 156G

**FEMGEN 156X. Language and Gender. 3-5 Units.**

The role of language in the construction of gender, the maintenance of the gender order, and social change. Field projects explore hypotheses about the interaction of language and gender. No knowledge of linguistics required.

Same as: LINGUIST 156

**FEMGEN 157. Language as Political Tool: Feminist and LGBTQ Movements and Impacts. 3-5 Units.**

How does a social or political movement gain traction? For example, how did 20th-century movements of the disenfranchised, such as the Civil Rights movement, LGBTQ movements, or feminist movements, gain a voice and eventually enact change? In the mediascape of today, where everyone with access to a computer could have a voice, how does a movement change the national conversation? How do written and verbal choices of the movements impact their success and outreach to supporters? In this course, students will write and revise their own arguments in order to best understand the rhetorical potential in these movements; choices and to consider how those rhetorical moves are incorporated into political discourse. We'll examine the role of rhetoric, the use of argument to persuade, in social movements working toward social justice, party platforms, and public policy.

Same as: AMSTUD 157X, FEMGEN 257

**FEMGEN 157P. Solidarity and Racial Justice. 4-5 Units.**

Is multiracial solidarity necessary to overcome oppression that disproportionately affects certain communities of color? What is frontline leadership and what role should people play if they are not part of frontline communities? In this course we will critically examine practices of solidarity and allyship in movements for collective liberation. Through analysis of historical and contemporary movements, as well as participation in movement work, we will see how movements have built multiracial solidarity to address issues that are important to the liberation of all. We will also see how racial justice intersects with other identities and issues. This course is for students that want to learn how to practice solidarity, whether to be better allies or to work more effectively with allies. There will be a community engaged learning option for this course. Students who choose to participate in this option will either work with Stanford's DGen Office or a community organization that is explicitly devoted to multiracial movement-building.

Same as: AFRICAAM 157P, AMSTUD 157P, CSRE 157P

**FEMGEN 158. Black Queer Theory. 5 Units.**

This course takes a multifaceted approach to black queer theory, not only taking up black theories of gender and queer sexuality, but queer theoretical interrogations of blackness and race. The course will also examine some of the important ways that black queer theory reads and is intersected with issues like affect, epistemology, space and geography, power and subjectivity, religion, economy, the body, and the law, asking questions like: How have scholars critiqued the very language of queer and the ways it works as a signifier of white marginality? What are the different spaces we can find queer black relationality, eroticism, and kinship? How do we negotiate issues like trans\*misogyny or tensions around gender and sexuality in the context of race? Throughout the course, students will become versed in foundational and emerging black queer theory as we engage scholars like Sharon Holland, Cathy Cohen, Hortense Spillers, Marlon B. Ross, Aliyyah Abdur-Rahman, Barbara Smith, Roderick Ferguson, Robert Reid-Pharr, E. Patrick Johnson, and many others. Students will also gain practice applying black queer theory as an interpretive lens for contemporary social issues and cultural production including film, music, art, and performance.

Same as: AFRICAAM 158

**FEMGEN 159. James Baldwin & Twentieth Century Literature. 5 Units.**

Black, gay and gifted, Baldwin was hailed as a "spokesman for the race", although he personally, and controversially, eschewed titles and classifications of all kinds. This course examines his classic novels and essays as well as his exciting work across many lesser-examined domains - poetry, music, theatre, sermon, photo-text, children's literature, public media, comedy and artistic collaboration. Placing his work in context with other writers of the 20C (Faulkner, Wright, Morrison) and capitalizing on a resurgence of interest in the writer (NYC just dedicated a year of celebration of Baldwin and there are 2 new journals dedicated to study of Baldwin), the course seeks to capture the power and influence of Baldwin's work during the Civil Rights era as well as his relevance in the "post-race" transnational 21st century, when his prescient questioning of the boundaries of race, sex, love, leadership and country assume new urgency.

Same as: AFRICAAM 159, ENGLISH 159

**FEMGEN 160. Performance and History: Rethinking the Ballerina. 4 Units.**

The ballerina occupies a unique place in popular imagination as an object of over-determined femininity as well as an emblem of extreme physical accomplishment for the female dancer. This seminar is designed as an investigation into histories of the ballerina as an iconographic symbol and cultural reference point for challenges to political and gender ideals. Through readings, videos, discussions and viewings of live performances this class investigates pivotal works, artists and eras in the global histories of ballet from its origins as a symbol of patronage and power in the 15th century through to its radical experiments as a site of cultural obedience and disobedience in the 20th and 21st centuries.

Same as: DANCE 160, TAPS 160, TAPS 260

**FEMGEN 160M. Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture. 3-4 Units.**

This course will introduce students to the ways in which the Middle East has been represented and performed by/in the 'West' through dance, performance, and popular culture in both historical and contemporary contexts. A brief look through today's media sources exposes a wide range of racialized and gendered representations of the Middle East that shape the way the world imagines the Middle East to be. As postcolonial theorist Edward Said explains, the framework we call Orientalism establishes the ontological character of the Orient and the Oriental as inherently 'Other'. Starting with 19th century colonialism and continuing into the post-9/11 era, this course will trace the Western production, circulation, and consumption of representations of the Middle East as 'Other' in relation to global geopolitics. We will further examine dance forms produced in mid-twentieth century Iran and Egypt, with particular attention to nation-state building and constructions of gender. Finally, we will examine artistic productions and practices from the Middle East and Middle Eastern diasporic communities that respond to colonialism, war, displacement, secularism, and Euro-American Empire. Using dance studies, postcolonial feminist, and critical race theoretical frameworks, we will consider the gender, racial, political, and cultural implications of selected performance works and practices in order to analyze how bodies produce meaning in dance, performance art, theater, film, photography, and new media. Students will engage in multiple modes of learning; the course will include lectures, engaged group discussions, viewing of live and recorded performance, embodied participation in dance practice, student oral presentations, and a variety of writing exercises. Course assignments will culminate in a final research project related to class themes and methods.

Same as: CSRE 160M, DANCE 160M, TAPS 160M

**FEMGEN 161. The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History. 3-5 Units.**

This course explores the transition from Victorian to modern American womanhood by asking how Native, European, African, Mexican, and Asian American women navigated the changing sexual, economic, and political landscapes of the twentieth century. Through secondary readings, primary sources, films, music, and literature we explore the opportunities and boundaries on groups of women in the context of historical events that included immigration, urbanization, wartime, depression, the Cold War, as well as recurrent feminist and conservative political movements. Same as: AMSTUD 161, CSRE 162, HISTORY 61, HISTORY 161

**FEMGEN 161D. Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders. 3-4 Units.**

This introduction to dance studies course explores dance practice and performance as means for producing cultural meaning. Through theoretical and historical texts and viewing live and recorded dance, we will develop tools for analyzing dance and understanding its place in social, cultural, and political structures. This uses dance and choreography as a lens to more deeply understand a wide range of identity and cultural formations, such as gender, race, sexuality, (dis)ability, (trans)nationality, and empire. We will analyze dancing bodies that move across stages, dance clubs, film screens, and border zones. We will examine dance from diverse locales and time periods including ballet, modern and contemporary dance, contact improvisation, folkloric dance, burlesque, street dance, queer club dance, drag performance, music videos, TV dance competitions, and intermedia/new media performance. In addition to providing theoretical and methodological grounding in dance studies, this course develops performance analysis skills and hones the ability to write critically and skillfully about dance. No previous experience in dance is necessary to successfully complete the course. Same as: CSRE 61, DANCE 161D, TAPS 161D

**FEMGEN 163. Queer America. 4 Units.**

This class explores queer art, photography and politics in the United States since 1930. Our approach will be grounded in close attention to the history and visual representation of sexual minorities in particular historical moments and social contexts. We will consider the cultural and political effects of World War II, the Cold War, the civil rights movement, psychedelics, hippie culture and sexual liberation, lesbian separatism, the AIDS crisis, and marriage equality.

Same as: AMSTUD 163, ARTHIST 163

**FEMGEN 166. The Divine Feminine in India. 4 Units.**

What happens when God is a woman? Is the Goddess a feminist? The Goddess, in her numerous incarnations, is foundational to much of Indian religiosity, whether Hindu, Buddhist, or even Jain; and in turn, without her story, much of the theology and practice of these religions remains incomprehensible. This course examines the principal expressions of the theology and ritual worship of the Goddess in Indian history, from the Vedas to the Hindu Epics, to Indian philosophy, tantric ritual practice and modern global and new age movements in order to understand how the gendering of divinity affects theological speculation, religious experience, and embodied religious identity.

Same as: RELIGST 166

**FEMGEN 17. Gender and Power in Ancient Greece. 4 Units.**

(Formerly CLASSGEN 17.) Introduction to the sex-gender system of ancient Greece, with comparative material from modern America. How myths, religious rituals, athletics, politics and theater reinforced gender stereotypes and sometimes undermined them. Skills: finding clues, identifying patterns and making connections amongst the components of a strange and beautiful culture very different from our own. Weekly participation in a discussion section is required.

**FEMGEN 176. Feminism and Contemporary Art. 4 Units.**

(Same as ARTHIST 176) The impact of second wave feminism on art making and art historical practice in the 70s, and its reiteration and transformation in contemporary feminist work. Topics: sexism and art history, feminist studio programs in the 70s, essentialism and self-representation, themes of domesticity, the body in feminist art making, bad girls, the exclusion of women of color and lesbians from the art historical mainstream, notions of performativity.

Same as: ARTHIST 176, ARTHIST 376, CSRE 167

**FEMGEN 177. Dramatic Writing: The Fundamentals. 4 Units.**

Course introduces students to the basic elements of playwriting and creative experimentation for the stage. Topics include: character development, conflict and plot construction, staging and setting, and play structure. Script analysis of works by contemporary playwrights may include: Marsha Norman, Patrick Shanley, August Wilson, Suzan-Lori Parks, Paula Vogel, Octavio Solis and others. Table readings of one-act length work required by quarter's end.

Same as: CSRE 177, TAPS 177, TAPS 277

**FEMGEN 180. Gender Relations in Islam. 4 Units.**

This course investigates the ways in which gender identities and relationships between men and women have been articulated, constructed, and refashioned throughout the Muslim world. Starting with problematizing the fixed notions of gender and sexuality, we map the attitudes toward these notions through visiting a diverse array of sources from the Qurʾān, Sunna, and legal documents to historical and anthropological case studies, literature, and film from South East Asia to Europe and North America. We examine the notions of femininity and masculinity in the Qurʾān, family laws, and attitudes toward homosexuality and transgendered populations. We read examples of ambiguous use of language with regards to gender and sexuality in Persian poetry and mystical traditions. We study the dynamic relationship between Islam and Feminism in the Muslim world. Finally, we witness the implications of these attitudes in our case studies and stories, from a divorce court in Iran to a wedding in Sudan.

Same as: RELIGST 180

**FEMGEN 180A. Sex and Power. 5 Units.**

From hook-up culture to pornography and sex work and even Beyoncé's latest album, "Lemonade," our struggles with consent, betrayal, and violence evince collective confusions about the relationship between sex and power in our societies. A quick Google search for news articles on the topic reveals that we must communally brace ourselves, usually through a Public Service Announcement pun, Let's Talk About Sex, and then a warning, Talking about sex can be hard. Cultural and social analyses can help us un-brace ourselves and get closer to meaningfully, and respectfully, talking about how cultural difference and social hierarchies fuel, and our fueled by, ideologies about sex and sexuality. This course examines sex as a nexus of socio-cultural, economic, and political relations of power for individuals and groups across local and global and national and transnational boundaries. And because a lot of the difficulties in talking about sex entail difficulties about seeing sex, this class relies on visual culture and documentary filmmaking alongside ethnographies and theoretical scholarship.

Same as: ANTHRO 180A

**FEMGEN 181A. Gender in the Middle East: Iran, Turkey, and Egypt. 4 Units.**

This course explores the construction of gender in the Middle East. Drawing on the historical, sociological and anthropological research in the region, the course aims to question the stereotypes about the subordination of Muslim women and to offer students a systematic reading and analytical discussion of the political, economic and cultural structures that inform gender relations and practices in the region. The course starts with an examination of early Islam and religious sources with regard to women's status, then moves on to nationalist and modernization movements in the 19th and 20th centuries, and finally explores women's and men's lives in contemporary Egypt, Turkey and Iran. In this framework, we will pay special attention to Islamist mobilizations, family and sexual relations, as well as women's changing livelihoods and labor.

Same as: ANTHRO 181A

**FEMGEN 183. Re- Imagining American Borders. 5 Units.**

How novelists, filmmakers, and poets perceive racial, ethnic, gender, sexual orientation, and class borders in the context of a current volatile national discussion about the place of Americans both here and in the world. How Anna Deavere Smith, Sherman Alexie, Shailja Patel or Ta-Nehisi Coates consider redrawing such lines so that center and margin, or self and other, do not remain fixed and divided. How linguistic borderlines within multilingual literature by Caribbean, Arab, and Asian Americans function. Can Anzaldúa's 1986 conception of borderlands be constructed through the matrix of language, dreams, music, and cultural memories in these recent American narratives? Course includes creatively examining one's own identity.

Same as: AMSTUD 183, CSRE 183

**FEMGEN 187X. Sex, Gender, and Violence: French Women Writers Today. 3-5 Units.**

Long before the 2017 #MeToo campaign, French women writers have explored through powerful fictions and autobiographies the different shades of economic, social, psychological, physical, or sexual violence that are exerted against, but also by and between, women. How does literature - the power of words - address, deconstruct or comfort power dynamics (during sex and between the sexes) that are usually silenced, taboo or unspeakable? We will contrast these narrative to debates among French feminist writers (Beauvoir, Badinter, Mona Ozouf, Françoise Héritier, Michelle Perrot) around the theory (or myth?) of a specifically French kind of gender relation (ex: "galanterie," "séduction"). Themes explored: sex and gender, sex and power, rape culture, sexual and moral taboos (incest, abortion, pornography, infanticide), the body as social stigma or source of meaning, identity, power. Special attention will be given to narrative and descriptive strategies designed to avert, expose, deconstruct or account for specifically feminine experiences (rape, orgasm, pregnancy). Award-winning author Leila Slimani will participate in person in the class discussion of her novel on infanticide. Authors include Marie Darrieusecq, Christine Angot, Annie Ernaux, Marie NDiaye, Virginie Despentes, Leila Slimani, Ivan Jablonka. Taught in French.

Same as: FEMGEN 287X, FRENCH 187, FRENCH 287, FRENCH 387

**FEMGEN 188Q. Imagining Women: Writers in Print and in Person. 4-5 Units.**

Gender roles, gender relations and sexual identity explored in contemporary literature and conversation with guest authors. Weekly meetings designated for book discussion and meeting with authors. Interest in writing and a curiosity about diverse women's lives would be helpful to students. Students will use such tools as close reading, research, analysis and imagination. Seminar requires strong voice of all participants. Oral presentations, discussion papers, final projects.

Same as: CSRE 188Q

**FEMGEN 191Q. Writing Women's Lives. 2 Units.**

Creative writing through dialogue focusing on prose about the lives of women in different cultures and generations. Novels, short stories, and micro-narrative including fiction and memoir. Students produce work using research, memory, imagination, and metaphor.

**FEMGEN 192. Women in French Cinema: 1958-. 3-5 Units.**

Women as objects and subjects of the voyeuristic gaze inherent to cinema. The myth of the feminine idol in French films in historical and cultural context since the New Wave until now. The mythology of stars as the imaginary vehicle that helped France to change from traditional society to modern, culturally mixed nation. The evolution of female characters, roles, actresses, directors in the film industry. Filmmakers include Vadim, Truffaut, Varda, Godard, Ozon, Coline Serreau, Tonie Marshall, Mäiwen. Discussion in English; films in French with English subtitles. 3 units, 4 units or 5 units. NOTE: FILMSTUD students must take this course for 3 units only.

Same as: FILMSTUD 112, FRENCH 192

**FEMGEN 193. The Chinese Empire from the Mongol Invasion to the Boxer Uprising. 5 Units.**

(Same as HISTORY 93. History majors and others taking 5 units, register for 193.) A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

Same as: CHINA 183, HISTORY 193

**FEMGEN 193G. Psychological Well-Being on Campus: A Focus on Gender and Sexual Identities. 1 Unit.**

This course examines mental health and psychological well-being across the spectrum of gender and sexual identities. It addresses the unique challenges that face LGBTQ-identified students, and provides tools for supporting peers as they navigate these challenges. Discussion topics include current conceptualizations of gender identity and sexual orientation, including sexual and gender fluidity; the intersection of queer identities with multiple identities such as ethnic/racial identity and faith/spirituality; unpacking stereotypes; queer relationships and sexuality, coming out and disclosure, and mental health issues.

Same as: EDUC 193G

**FEMGEN 195. Directed Reading. 1-15 Unit.**

May be repeated for credit. (Staff).

**FEMGEN 195X. Research in Feminist, Gender, & Sexuality Studies. 1-5 Unit.**

Independent research conducted under faculty or graduate student supervision. May be taken for a maximum of 3 quarters of credit.

**FEMGEN 199A. Feminist, Gender, and Sexuality Studies Honors Workshop. 2-3 Units.**

Required of seniors in the Feminist, Gender, and Sexuality Studies honors program. Participants share ongoing work on their honors theses. Prerequisite: consent of instructor.

**FEMGEN 199B. Feminist, Gender, and Sexuality Studies Honors Workshop. 2-3 Units.**

Required of seniors in the Feminist, Gender, and Sexuality Studies honors program. Participants share ongoing work on their honors theses. Prerequisite: consent of instructor.

**FEMGEN 199C. Feminist, Gender, and Sexuality Studies Honors Workshop. 2-3 Units.**

Required of seniors in the Feminist, Gender, and Sexuality Studies honors program. Participants share ongoing work on their honors theses. Prerequisite: consent of instructor.

**FEMGEN 199X. Preparation for Senior Thesis. 2-3 Units.**

This course is designed for juniors (majors, minors, and those seeking Interdisciplinary Honors in CSRE or FGSS) who intend to write a senior thesis in one of the CSRE Family of Programs or FGSS Interdisciplinary Honors. The course offers resources and strategies for putting together a significant and original senior thesis. Topics to be covered include: getting funding; finding an advisor; navigating the institutional review board; formulating an appropriate question; and finding the right data/medium/texts.

Same as: CSRE 199

**FEMGEN 203. Feminist and Queer Theories and Methods Across the Disciplines. 2-5 Units.**

(Graduate Students register for PHIL 279A or FEMGEN 203) This course is an opportunity to explore the difference feminist and queer perspectives make in creative arts, humanities, and social science research. Prerequisites: Feminist Studies 101 or equivalent with consent of instructor. NOTE: This course must be taken for a letter grade and a minimum of 3 units to be eligible for WAYS credit. The 2 unit option is for graduate students only.

Same as: FEMGEN 103, PHIL 179A, PHIL 279A

**FEMGEN 205. Songs of Love and War: Gender, Crusade, Politics. 3-5 Units.**

Analysis of medieval love, satirical and Crusade lyrics of the troubadours. Study of deictic address, corporeal subjectivity, the female voice, love debates, and the body as a figure of political conflict. Course readings include medieval treatises on lyric and modern translations of the troubadour tradition. Works by Ovid, Bernart de Ventadorn, Bertran de Born, La Comtesse de Dia, Thibaut de Champagne, Raimon Vidal, Dante, and Pound. Taught in English. Course includes a lab component for creation of multi-media translation projects: trobar. stanford.edu.

Same as: FRENCH 205

**FEMGEN 206. Global Medical Issues Affecting Women. 1 Unit.**

This course probes the principal issues affecting women and girls medically around the world. Through interactive discussions, guest lectures, case studies, and academic readings, students become acquainted with the most critical challenges to women's health globally, and use selected analytical tools to assess how these may be addressed efficiently, cost-effectively, and sustainably. Topics include women's cancer, birth control, infertility, female genital mutilation, midwifery, obstetric fistula, breastfeeding, violence against women, and women's representation in biomedical research. The aim is to cultivate in students a nuanced appreciation of women's unique needs, roles, and challenges in the contemporary global health landscape.

Same as: SOMGEN 206

**FEMGEN 208B. Women Activists' Response to War. 4-5 Units.**

Theoretical issues, historical origins, changing forms of women's activism in response to war throughout the 20th century, and contemporary cases, such as the Russian Committee of Soldiers Mothers, Bosnian Mothers of Srebrenica, Serbian Women in Black, and the American Cindy Sheehan. Focus is on the U.S. and Eastern Europe, with attention to Israel, England, and Argentina.

Same as: HISTORY 208B, HISTORY 308B

**FEMGEN 209. Looking Back, Moving Forward: Raising Critical Awareness in Gender and Sports. 3-5 Units.**

In 1972, Title IX legislation opened up a vast range of opportunities for women in sports. Since then, women's sports have continued to grow yet the fight for recognition and equality persists. Simply put, men's sports are more popular than women's—so much so, in fact, that people often make the hierarchical distinction between "sports" and "women's sports." But what would it take to get more women's sports featured on ESPN or more female athletes on the cover of Sports Illustrated? And, given the well-documented corruption at the highest levels of men's sports, should such an ascent in popularity be the goal for women's sports? This course will map out and respond to the multifaceted issues that emerge when women enter the sports world. Throughout the quarter, we will explore the fight for gender equality in sports through historical, cultural, and rhetorical lenses.

Same as: FEMGEN 109

**FEMGEN 210J. Romance, Desire, and Sexuality in Modern Japanese Literature. 3-4 Units.**

This class is structured around three motifs: love suicide (as a romantic ideal), female desire, and same-sex sexuality. Over the course of the quarter we will look at how these motifs are treated in the art and entertainment from three different moments of Japanese history: the Edo period (1615-1868), the modern period (1920-65), and the contemporary period (1965-present). We will start by focusing on the most traditional representations of these topics. Subsequently, we will consider how later artists and entertainers revisited the conventional treatments of these motifs, informing them with new meanings and social significance. We will devote particular attention to how this material comments upon issues of gender, sexuality, and human relationships in the context of Japan. Informing our perspective will be feminist and queer theories of reading and interpretation.

Same as: FEMGEN 110J, JAPAN 110, JAPAN 210

**FEMGEN 212. "When We Dead Awaken": Breakthroughs in Conceptions of the Gendered Self in Literature and the Arts. 4-5 Units.**

Remarkable breakthroughs in conceptions of the gendered self are everywhere evident in literature and the arts, beginning primarily with the Early Modern world and continuing into today. Many of these works inhere in innovations in literary and artistic forms in order to capture and even evoke the strong cognitive, or psychological, dimension of such awakenings. The reader, or viewer, is often challenged to adapt her or his mind to new forms of thought, such as John Donne's seventeenth century creation of the Dramatic Monologue, a form popular with modern writers, which requires the reader's cognitive presence in order to fill out the dramatic scene. In so doing, the reader often supplies the presence of the female voice and thereby enters into her self-consciousness and inner thoughts. Adrienne Rich, for example, specifically rewrites one of Donne's major poems from the female perspective. This can be, in Rich's words, an awakening for the active reader, as he or she assumes that often-unspoken female perspective. The course will also explore male conceptions of the self and how such conceptions are often grounded in cultural attitudes imposed on male subjects, which can contribute to gender-bias toward women, a subject often neglected in exploring gendered attitudes, but which is now gaining more study, for example, in Shakespeare's *Othello*. Readings from recent developments in the neurosciences and cognitive studies will be included in our study of artistic forms and how such forms can activate particular mindsets. Writers and artists will include Shakespeare, Michelangelo, John Donne, Virginia Woolf, Adrienne Rich, Gertrude Stein, Picasso, June Wayne, and Edward Albee's 1960's play, *Who's Afraid of Virginia Woolf?*

Same as: ENGLISH 182J, FEMGEN 112

**FEMGEN 213. Transgender Studies. 3-4 Units.**

Transgender and gender-expansive identities are the subject of growing attention and (often sensationalist) interest in the media as well as in the healthcare field, yet there exists a dearth of legitimate academic courses, research and writing that reflect and explore gender identity and expression as a fluid spectrum rather than a fixed binary. This course will address transgender and gender expansive identities from historical, medical, literary, developmental and sociopolitical perspectives.

Same as: FEMGEN 113

**FEMGEN 214. Sexual Diversity and Health. 1 Unit.**

Explores multiple aspects of sexual diversity and health, including: kink/BDSM, polyamory, trans\* sexuality, asexuality, high-risk sex, inter-sexuality, questioning gender and sexual binaries, and more. The format includes a one-day conference featuring a variety of expert speakers covering different aspects of sexual diversity and health, followed by a debriefing and discussion session to integrate what has been heard and learned.

Same as: FEMGEN 114

**FEMGEN 216. Women and the Book: Scribes, Artists, and Readers from Late Antiquity through the Fourteenth Century. 4-5 Units.**

This course examines the cultural worlds of medieval women through particular attention to the books that they owned, commissioned, and created. Beginning with the earliest Christian centuries, the course proceeds chronologically, charting women's book ownership, scribal and artistic activity, and patronage from Late Antiquity through the fourteenth century. In addition to examining specific manuscripts (in facsimile, or digitally), we will consider ancillary questions to do with women's authorship, education and literacy, reading patterns, devotional practices, and visual traditions and representation.

Same as: ARTHIST 206H, HISTORY 216, HISTORY 316

**FEMGEN 216X. Narrating Queer Trauma. 4-5 Units.**

Psychiatrist Dori Laub has argued that the process of narrating trauma is essential to the healing process. Not only is telling the story important, but it is also crucial to have someone else bear witness to the narrative. But how do people even begin to narrate stories of violence and pain, and how do we become good listeners? How are these stories told and heard in the specific context of queer world making? This course will explore narratives of trauma in queer lives through literature, film, media, and performance in conjunction with trauma theory and psychoanalysis. We will pay specific attention to questions of community, healing, violence, and affect at the intersections of queerness and race, sex, disability, class, gender, and nationality.

Same as: FEMGEN 116

**FEMGEN 217. Expanding Engineering Limits: Culture, Diversity, and Gender. 2-3 Units.**

This course investigates how culture, and diversity, including gender, shape who becomes an engineer, what problems get solved, and the quality of designs, technology, and products. We first examine the characteristics of engineering cultures – what are the interactions, symbols and ideas, and practices that define engineering? We then investigate how gender and other markers of diverse identities are interdependent and culturally constructed, how gender and other kinds of diversity are experienced in engineering cultures, and how these experiences have consequence for engineering innovation and the engineering profession. Finally, we analyze examples of cultural change in engineering and implications for engineering knowledge and practice. The course involves weekly presentations by distinguished scholars and engineers, readings, short writing assignments, small-group discussion, and exercises around one's own experiences in and related to engineering. Those taking the course for 3 units will also complete a research-based project, and must take the course for a letter grade to meet the undergraduate WAY-ED requirement.

Same as: CSRE 117, CSRE 217, ENGR 117, FEMGEN 117

**FEMGEN 21S. StoryCraft: On Relationships. 2 Units.**

This class prepares students to tell their stories in front of the audience for *Beyond Sex Ed: Intimacy & Relationships* in Spring 2018. Do we need love? And if so, what does it look like? In this class, students will learn about relationships from the inside-out: through an examination and telling of their lived experiences. We will explore various perspectives on intimacy and relationships that illuminate different aspects of our lives, and then dive into our own stories to discover the many facets of intimacy. Due to the personal nature of the topic, we will emphasize safety, trust, and confidentiality throughout. The class offers the structure and guidance to 1) mine your life for stories, 2) craft the structure and shape of your stories, and 3) perform with presence, authenticity, and connection.

Same as: TAPS 21S

**FEMGEN 21T. StoryCraft: On Sexuality. 2 Units.**

What is "sexuality education", and what could it be? How do I tell a compelling story? In this class, students will learn about sexuality and storytelling from the inside out. We will explore various perspectives on sexuality that illuminate different aspects of our lives and then dive into our own stories to discover the richness and vibrancy of human sexuality. Due to the personal nature of the topic, we will emphasize safety, trust, and confidentiality throughout. The class offers the structure and guidance to 1) mine your life for stories, 2) craft the structure and shape of your stories, and 3) perform with presence, authenticity, and connection. Students will be selected from this class to tell their stories in *Beyond Sex Ed: Consent & Sexuality* at Stanford during NSO 2018. Before enrolling, ensure that you will be on campus Sept 20-22, 2018 for rehearsal and performance. Email the TA, Eisa, with any questions, [equalshamma@stanford.edu](mailto:equalshamma@stanford.edu). Class will be held in KINGSCOTE Gardens First Floor Conference Room.

Same as: TAPS 21T

**FEMGEN 223X. The Politics of Gender in the United States. 5 Units.**

Gender is one of the most recognizable and important identities in daily life. Yet it has been paid scant attention by political scientists in terms of its role on access to political power, opinion formation, group identity politics, election outcomes, and political representation. This class provides a survey of the literature on gender in American politics. We begin with the interdisciplinary research on the social construction of gender to understand what gender is and is not. Throughout the course we will use these theories to analyze and critique the approaches of quantitative research on gender politics.

Same as: POLISCI 223

**FEMGEN 224. Challenging Sex and Gender Dichotomies in Medicine. 1 Unit.**

Explores and challenges the traditional physiological bases for distinguishing human males from females, as well as the psychosocial factors that play a role in experiencing and expressing gender and sexuality. Topics include the influence of sociocultural (gender) norms and behaviors on human biology, the interactions of sex and gender on medical outcomes, the importance of understanding the spectrum of sex, gender, and sexuality in clinical practice.

Same as: FEMGEN 124, SOMGEN 257

**FEMGEN 230. Sexual Function and Diversity in Medical Disciplines. 2 Units.**

(Same as FEMGEN 230). Focus is on development of personal and professional skills to interact with people across the diverse range of human sexuality, from childhood (pediatric) to older ages (geriatric), with consideration of gender identity, sexual orientation, sociocultural (predominantly U.S., not global) and religious values, and selected medical issues (e.g. hormonal therapy, disabilities, e.g. spinal cord injury, etc. with discussion of sexual taboos and unusual sexual practices that you might encounter in a general medical setting.

Same as: CHPR 230, FEMGEN 230X, SOMGEN 230

**FEMGEN 230X. Sexual Function and Diversity in Medical Disciplines. 2 Units.**

(Same as FEMGEN 230). Focus is on development of personal and professional skills to interact with people across the diverse range of human sexuality, from childhood (pediatric) to older ages (geriatric), with consideration of gender identity, sexual orientation, sociocultural (predominantly U.S., not global) and religious values, and selected medical issues (e.g. hormonal therapy, disabilities, e.g. spinal cord injury, etc. with discussion of sexual taboos and unusual sexual practices that you might encounter in a general medical setting.

Same as: CHPR 230, FEMGEN 230, SOMGEN 230

**FEMGEN 237. Health Impact of Sexual Assault and Relationship Abuse across the Lifecourse. 1-3 Unit.**

Cross-listed with HUMBIO 28 and AFRICAAM 28. An overview of the acute and chronic physical and psychological health impact of sexual abuse through the perspective of survivors of childhood, adolescent, young and middle adult, and elder abuse, including special populations such as pregnant women, military and veterans, prison inmates, individuals with mental or physical impairments. Also addresses: race/ethnicity, gender identity, sexual orientation, and other demographic and societal factors, including issues specific to college culture. Professionals with expertise in sexual assault present behavioral and prevention efforts such as bystander intervention training, medical screening, counseling and other interventions to manage the emotional trauma of abuse. HumBio students must enroll in HUMBIO 28 or AFRICAAM 28 for 3 units. For Ways eligibility, undergraduates must enroll in HUMBIO 28 or AFRICAAM 28 for 3 units and must be taken as a letter grade. Medical and graduate students may enroll for 1 to 3 units.

Same as: SOMGEN 237

**FEMGEN 238. Men's Violence Against Women in Literature: A Critical and Social Analysis. 3-5 Units.**

Literature, as a social and cultural product of its time, can inform and deepen our understanding of oppression. Using literature as a vehicle, this course will explore the impact of and responses to men's violence against women. Students will critically assess how the author has portrayed the topic of sexual assault and relationship abuse, how the characters and/or author exhibits victim blaming, and, if the characters were living today, would current policies adequately hold the perpetrator responsible, provide safety and justice for the survivor, and challenge rape culture. In dialogue with theoretical texts, we will analyze the literary representations of patriarchy that inform societal acceptance of gender-based violence, identify the historical prevalence of victim blaming and impunity in these works, and assess the implications on policy making at the individual, community and political level. Students will critically examine literature including Shakespeare's *Taming of the Shrew*, Thomas Hardy's *Tess of the D'Urbervilles*, Zora Neale Hurston's *Their Eyes Were Watching God*, Louise Erdrich's *The Round House* and Joyce Carol Oates' *We Were the Mulvaney's*. There is an optional service-learning component.

Same as: FEMGEN 138

**FEMGEN 24. Sexuality, Gender, and Religion. 2 Units.**

From ancient times to the present, religious texts, authority figures, adherents, and critics have had a great deal to say about sexuality and gender, with powerful impacts in personal, social and political spheres. Today these debates are more wide ranging and public than ever. In this lecture and discussion series, distinguished scholars from within and beyond Stanford will consider how sexuality and gender become *religious* in Judaism, Islam, Christianity, Hinduism, and Buddhism.

Same as: RELIGST 24

**FEMGEN 240D. LGBT/Queer Life in the United States. 4-5 Units.**

An introductory course that explores LGBT/Queer social, cultural, and political history in the United States. By analyzing primary documents that range from personal accounts (private letters, autobiography, early LGBT magazines, and oral history interviews) to popular culture (postcards, art, political posters, lesbian pulp fiction, and film) to medical, military, and legal papers, students will understand how the categories of gender and sexuality have changed over the past 150 years. This class investigates the relationship among queer, straight and transgender identities. Seminar discussions will question how the intersections of race, class, gender, and sexuality influenced the construction of these categories.

Same as: FEMGEN 140D, HISTORY 257C



**FEMGEN 241. Sex and Gender in Human Physiology and Disease. 2-3 Units.**

(HumBio students must enroll in HumBio 140.) Chromosomal, hormonal and environmental influences that lead to male and female reproductive systems and neuroendocrine regulation and intersex variants. Masculinizing and feminizing effects of endogenous and exogenous sex hormones and other factors, in particular gender, on the musculoskeletal, neurological, cardiovascular, immunological and other systems and tissues, e.g. adipose, skin, etc. over the lifecourse, from conception to puberty, through reproductive phases (including changes during the menstrual cycle up to and beyond menopause in women, and with aging in both sexes). Transgender health issues. Guest lecturers. Prerequisite: Human Biology core or equivalent, or consent of instructor. HUMBIO students must enroll for 3 units. Same as: HUMBIO 140, MED 240

**FEMGEN 241W. Eighteenth-Century Women Writers. 5 Units.**

The course will deal with a number of eighteenth-century English women writers—primarily novelists, but also poets, critics and playwrights. Authors to be studied in depth will include both relatively well-known writers such as Behn and Wollstonecraft, and lesser-known authors such as Sarah Scott, Elizabeth Inchbald and Anna Seward. Considerable attention will be paid to recent feminist scholarship on eighteenth-century women's writing, generic issues and the question of a "women's literary tradition," the material conditions of female authorship in the period, and the history of the eighteenth-century literary marketplace. Same as: ENGLISH 241

**FEMGEN 242. Sociology of Gender. 3 Units.**

The aim of this course is to provide students with an understanding of the sociological conceptualization of gender. Through the sociological lens, gender is not an individual attribute or a role, but rather a system of social practices that constructs two different categories of people men and women and organizes social interaction and inequality around this difference. First we will explore what "gender" is according to sociologists and the current state of gender inequality in the labor market, at home, and at school. We will then investigate how gender structures our everyday lives through the individual, interactional, and institutional levels. Finally, we will discuss avenues for reducing gender inequality. Throughout the course, we will prioritize reading, evaluating, and questioning sociological theory and research on gender." Same as: FEMGEN 142, SOC 142, SOC 242

**FEMGEN 24N. Sappho: Erotic Poetess of Lesbos. 3 Units.**

(Formerly CLASSGEN 24N.) Preference to freshmen. Sappho's surviving fragments in English; traditions referring to or fantasizing about her disputed life. How her poetry and legend inspired women authors and male poets such as Swinburne, Baudelaire, and Pound. Paintings inspired by Sappho in ancient and modern times, and composers who put her poetry to music. Same as: CLASSICS 16N

**FEMGEN 250. Sex, Gender, and Power in Modern China. 3-5 Units.**

Investigates how sex, gender, and power are entwined in the Chinese experience of modernity. Topics include anti-footbinding campaigns, free love/free sex, women's mobilization in revolution and war, the new Marriage Law of 1950, Mao's iron girls, postsocialist celebrations of sensuality, and emergent queer politics. Readings range from feminist theory to China-focused historiography, ethnography, memoir, biography, fiction, essay, and film. All course materials are in English. Same as: CHINA 115, CHINA 215, FEMGEN 150

**FEMGEN 252. 'Tis all in pieces: Space and Gender on the Threshold of the Modern World. 5 Units.**

These dramatic words, spoken by the British poet John Donne, signal the onset of the Early Modern world and the profound reconfigurations of space and related structures of thought, including conceptions of the self and the encoding of gender roles. We will explore the vibrant Early Modern world in the context of space and representations of gender, sexuality, and race as manifest in unprecedented literary and artistic forms, such as Shakespeare's *Othello*, Marlowe's *Doctor Faustus*, the poetry of John Donne, the art of Michelangelo and Caravaggio as well as key historical and cultural texts. And we will visit the Cantor Arts Center (on campus) for a guided tour and lecture on art and perspective. We also will read and discuss selected texts from the modern world, such as Samuel Beckett's *Waiting for Godot* and poetry and commentary by Adrienne Rich, to study both changes and continuities with the Early Modern period. We will consider the vital cognitive role of the reader or viewer in the formation of particular instances of artistic form, including recent—and highly thought-provoking—material from the neurosciences and cognitive studies. Note: Instructor will consider changes in meeting times/days to accommodate student schedules if feasible. Please send request to: hbrooks@stanford.edu. Same as: FEMGEN 152

**FEMGEN 255. The Changing American Family. 4 Units.**

Family change from historical, social, demographic, and legal perspectives. Extramarital cohabitation, divorce, later marriage, interracial marriage, and same-sex cohabitation. The emergence of same-sex marriage as a political issue. Are recent changes in the American family really as dramatic as they seem? Theories about what causes family systems to change. Same as: FEMGEN 155, SOC 155, SOC 255

**FEMGEN 256. Current Topics and Controversies in Women's Health. 2-3 Units.**

Interdisciplinary. Focus is primarily on the U.S., with selected global women's health topics. Topics include: leading causes of morbidity and mortality across the life course; reproductive (e.g. gynecologic & obstetric) health issues; sexual function; importance of lifestyle (e.g. diet, exercise, weight control), including eating disorders; mental health; sexual and relationship abuse; issues for special populations. In-class Student Debates on key controversies in women's health. Guest lecturers. For Ways credit eligibility, students must enroll in HUMBIO 125 for a minimum of 3 units and a letter grade. PhD minor in FGSS, enroll in FEMGEN 256 for 2 - 3 units and for a letter grade. Med students enroll in OBGYN 256 for 2 units. Undergraduate prerequisite: Human Biology Core or equivalent or consent of instructor. Same as: HUMBIO 125, OBGYN 256

**FEMGEN 257. Language as Political Tool: Feminist and LGBTQ Movements and Impacts. 3-5 Units.**

How does a social or political movement gain traction? For example, how did 20th-century movements of the disenfranchised, such as the Civil Rights movement, LGBTQ movements, or feminist movements, gain a voice and eventually enact change? In the mediascape of today, where everyone with access to a computer could have a voice, how does a movement change the national conversation? How do written and verbal choices of the movements impact their success and outreach to supporters? In this course, students will write and revise their own arguments in order to best understand the rhetorical potential in these movements; choices and to consider how those rhetorical moves are incorporated into political discourse. We'll examine the role of rhetoric, the use of argument to persuade, in social movements working toward social justice, party platforms, and public policy. Same as: AMSTUD 157X, FEMGEN 157

**FEMGEN 258X. Black Feminist Theater and Theory. 4 Units.**

From the rave reviews garnered by Angelina Weld Grimke's lynching play, Rachel to recent work by Lynn Nottage on Rwanda, black women playwrights have addressed key issues in modern culture and politics. We will analyze and perform work written by black women in the U.S., Britain and the Caribbean in the 20th and 21st centuries. Topics include: sexuality, surrealism, colonialism, freedom, violence, colorism, love, history, community and more. Playwrights include: Angelina Grimke, Lorraine Hansberry, Winsome Pinnock, Adrienne Kennedy, Suzan-Lori Parks, Ntozake Shange, Pearl Cleage, Sarah Jones, Anna DeVeare Smith, Alice Childress, Lydia Diamond and Zora Neale Hurston.). Same as: AFRICAAM 258, CSRE 258, TAPS 258

**FEMGEN 260. Disability, Gender, and Identity: Women's Personal Experiences. 5 Units.**

This course explores visible and invisible disabilities, focusing on issues of gender and identity in the personal experiences of women. The course emphasizes psychological as well as physical health, the diversity of disability experiences, self-labeling, caretaking, stigma and passing, and social and political aspects. Disabilities covered include blindness, multiple sclerosis, diabetes, arthritis, emotional and learning disabilities, and conditions requiring wheelchairs and other forms of assistance. The readings draw from the disability studies literature and emphasize women's personal narratives in sociological perspective. Note: Instructor Consent Required.

Same as: AMSTUD 260, FEMGEN 360

**FEMGEN 261. Personal Narratives in Feminist, Gender, and Sexuality Studies. 4-5 Units.**

This course explores the contribution of personal narratives to knowledge in the field of feminist, gender, and sexuality studies. Each week, students do extensive readings of exemplary personal narratives that have contributed in substance and method to the field and that have opened up new areas of inquiry. These narratives deal especially with issues of individual and group identity; gender, sexuality, racial and ethnic diversity; and disability. Students select a topic of special interest to them to focus their readings and guide individual research during the quarter. The approach of the course is feminist, ethnographic, and welcoming of a variety of approaches to personal narrative. Instructor consent required; students apply at the first class meeting.

Same as: AMSTUD 261, FEMGEN 361

**FEMGEN 262. Sex and the Early Church. 4 Units.**

Sex and the Early Church examines the ways first- through sixth-century Christians addressed questions regarding human sexuality. We will pay particular attention to the relationship between sexuality and issues of gender, culture, power, and resistance. We will read a Roman gynecological manual, an ancient dating guide, the world's first harlequin romance novels, ancient pornography, early Christian martyrdom accounts, stories of female and male saints, instructions for how to best battle demons, visionary accounts, and monastic rules. These will be supplemented by modern scholarship in classics, early Christian studies, gender studies, queer studies, and the history of sexuality. The purpose of our exploration is not simply to better understand ancient views of gender and sexuality. Rather, this investigation of a society whose sexual system often seems so surprising aims to denaturalize many of our own assumptions concerning gender and sexuality. In the process, we will also examine the ways these first centuries of what eventually became the world's largest religious tradition has profoundly affected the sexual norms of our own time. The seminar assumes no prior knowledge of Judaism, Christianity, the bible, or ancient history.

Same as: RELIGST 262, RELIGST 362

**FEMGEN 266. Women's Voices in Contemporary Italian Literature. 3-5 Units.**

The traditional canon of Italian literature consists almost exclusively of male authors. Yet Italian women writers have been active since the time of Dante. This course presents an overview of women's prose fiction of the last 100 years, from Sibilla Aleramo's groundbreaking feminist novel *Una donna* (1906) to Elena Ferrante's *La figlia oscura* (2015). We will examine such concerns as the central issue of sexual violence in many female autobiographies; the experience of motherhood; the conflict between maternal love and the desire for self-determination and autonomy; paths to political awareness; reinventing the historical novel. Taught in English.

Same as: ITALIAN 266

**FEMGEN 287G. A Woman's Life: 20th- (and 21st-) Century Memoirs by Women. 5 Units.**

Why do women write memoirs? Why has the memoir form become such a popular genre for American female authors? What do such books reveal, more broadly, about the condition of women in Contemporary Society? We will approach these questions by reading autobiographical works by some if not all of the following writers: Gertrude Stein, Joan Didion, Kathryn Harris, Audre Lorde, Patti Smith, Lucy Grealy, Michelle Tea, Jeannette Walls, Carrie Fisher, and Alison Bechdel.

Same as: ENGLISH 287G

**FEMGEN 287X. Sex, Gender, and Violence: French Women Writers Today. 3-5 Units.**

Long before the 2017 #MeToo campaign, French women writers have explored through powerful fictions and autobiographies the different shades of economic, social, psychological, physical, or sexual violence that are exerted against, but also by and between, women. How does literature - the power of words - address, deconstruct or comfort power dynamics (during sex and between the sexes) that are usually silenced, taboo or unspeakable? We will contrast these narrative to debates among French feminist writers (Beauvoir, Badinter, Mona Ozouf, Françoise Héritier, Michelle Perrot) around the theory (or myth?) of a specifically French kind of gender relation (ex: "galanterie," "séduction"). Themes explored: sex and gender, sex and power, rape culture, sexual and moral taboos (incest, abortion, pornography, infanticide), the body as social stigma or source of meaning, identity, power. Special attention will be given to narrative and descriptive strategies designed to avert, expose, deconstruct or account for specifically feminine experiences (rape, orgasm, pregnancy). Award-winning author Leila Slimani will participate in person in the class discussion of her novel on infanticide. Authors include Marie Darrieusecq, Christine Angot, Annie Ernaux, Marie NDiaye, Virginie Despentes, Leila Slimani, Ivan Jablonka. Taught in French. Same as: FEMGEN 187X, FRENCH 187, FRENCH 287, FRENCH 387

**FEMGEN 28N. Queer Lives in Music. 3 Units.**

Queer Lives in Music examines music by queer musicians in genres including punk, opera, rock, symphony, musical theater, folk, and jazz. We will study lesbian, gay, bisexual, transgender, and queer composers, performers, and listeners, to learn how queer people have expressed individual identity and built communities through music. We will learn how sexual stigma, taboo, oppression, and resistance have impacted musical creativity and music history. Class is designed for students interested in music, social history, cultural studies, and gender/sexuality studies.

Same as: MUSIC 28N

**FEMGEN 293E. Female Divinities in China. 4-5 Units.**

This course examines the fundamental role of powerful goddesses in Chinese religion. It covers the entire range of imperial history and down to the present. It will look at, among other questions, what roles goddesses played in the spirit world, how this is related to the roles of human women, and why a civilization that excluded women from the public sphere granted them a dominant place, in the religious sphere. It is based entirely on readings in English.

Same as: HISTORY 293E, HISTORY 393E, RELIGST 257X, RELIGST 357X

**FEMGEN 297. Gender and Education in Global and Comparative Perspectives. 4 Units.**

Theories and perspectives from the social sciences relevant to the role of education in changing, modifying, or reproducing structures of gender differentiation and hierarchy. Cross-national research on the status of girls and women and the role of development organizations and processes. As class meets just nine times, attendance at the first class meeting is required and no more than one absence is allowed in order to pass.

Same as: EDUC 197, SOC 134

**FEMGEN 299. Graduate Workshop: Feminist, Gender, and Sexuality Studies. 1-3 Unit.**

Theory, methods, and research in feminist, gender, and sexuality studies, through presentations of ongoing work by students, faculty, and guest speakers, and discussion of recent literature and controversies, feminist pedagogy and career development issues. Restricted to doctoral students. Repeatable for credit. Required for PhD Minors in Feminist, Gender, and Sexuality Studies (3 quarters min.).

**FEMGEN 310X. Introduction to Comparative Queer Literary Studies. 3-5 Units.**

Introduction to the comparative literary study of important gay, lesbian, queer, bisexual, and transgender writers and their changing social, political, and cultural contexts from the 1880s to today: Oscar Wilde, Rachilde, Radclyffe Hall, Djuna Barnes, James Baldwin, Jean Genet, Audre Lorde, Cherrie Moraga, Jeanette Winterson, Alison Bechdel and others, discussed in the context of 20th-century feminist and queer literary and social theories of gender and sexuality.

Same as: COMPLIT 110, COMPLIT 310, FEMGEN 110X

**FEMGEN 313. Performance and Performativity. 1-4 Unit.**

Performance theory through topics including: affect/trauma, embodiment, empathy, theatricality/performativity, specular/visibility, liveness/disappearance, belonging/abjection, and utopias and dystopias. Readings from Schechner, Phelan, Austin, Butler, Conquergood, Roach, Schneider, Silverman, Caruth, Fanon, Moten, Anzaldúa, Agamben, Freud, and Lacan. May be repeated for credit.

Same as: ENGLISH 313, TAPS 313

**FEMGEN 314. Performing Identities. 4 Units.**

This course examines claims and counter-claims of identity, a heated political and cultural concept over the past few decades. We will consider the ways in which theories of performance have offered generative discursive frameworks for the study of identities, variously shaped by vectors of race, gender, sexuality, religion, class, nation, ethnicity, among others. How is identity as a social category different from identity as a unique and personal attribute of selfhood? Throughout the course we will focus on the inter-locking ways in which certain dimensions of identity become salient at particular historical conjunctures. In addition, we will consider the complex discourses of identity within transnational and historical frameworks. Readings include Robin Bernstein, Ann Pellegrini, Tavia Nyong'o, Jose Munoz, Michael Taussig, Wendy Brown, Talal Asad, Jasbir Puar, among others.

Same as: TAPS 314

**FEMGEN 344F. Beyond Pink and Blue: Gender in Tech. 1 Unit.**

This d-school seminar prototypes concepts and methods for "inclusive" design. From the moment we arrive on the planet, gender shapes our perception of the world. Examples of products (including objects, services, and systems) gone awry will serve as prompts for design activities, challenges, and discussions on gender issues to illustrate the different needs of women, men, and gender-fluid people. Class sessions mix use case explorations with design methodology, design thinking abilities, and guest speakers from technology, design, and academia. Students will be asked to work in interdisciplinary teams on several design challenges, culminating in the development of a toolkit for inclusive design. Methods will interact in crucial ways to create "intersectional thinking" (i.e., to consider how gender, ethnicity, sexuality, socio-economic status, etc. work together to require new solutions in design). Topics include: algorithms, media, seat belts for pregnant women, robotics, assistive technologies, tech for developing worlds, video games, urban/rural design, software development, and many more. Admission by application only. Visit [d.school.stanford.edu/classes](http://d.school.stanford.edu/classes) for more information.

Same as: HISTORY 244F, HISTORY 344F

**FEMGEN 360. Disability, Gender, and Identity: Women's Personal Experiences. 5 Units.**

This course explores visible and invisible disabilities, focusing on issues of gender and identity in the personal experiences of women. The course emphasizes psychological as well as physical health, the diversity of disability experiences, self-labeling, caretaking, stigma and passing, and social and political aspects. Disabilities covered include blindness, multiple sclerosis, diabetes, arthritis, emotional and learning disabilities, and conditions requiring wheelchairs and other forms of assistance. The readings draw from the disability studies literature and emphasize women's personal narratives in sociological perspective. Note: Instructor Consent Required.

Same as: AMSTUD 260, FEMGEN 260

**FEMGEN 361. Personal Narratives in Feminist, Gender, and Sexuality Studies. 4-5 Units.**

This course explores the contribution of personal narratives to knowledge in the field of feminist, gender, and sexuality studies. Each week, students do extensive readings of exemplary personal narratives that have contributed in substance and method to the field and that have opened up new areas of inquiry. These narratives deal especially with issues of individual and group identity; gender, sexuality, racial and ethnic diversity; and disability. Students select a topic of special interest to them to focus their readings and guide individual research during the quarter. The approach of the course is feminist, ethnographic, and welcoming of a variety of approaches to personal narrative. Instructor consent required; students apply at the first class meeting.

Same as: AMSTUD 261, FEMGEN 261

**FEMGEN 363D. Feminist Theory: Thinking Through/With/About the Gendered Body. 5 Units.**

Organized around a series of case studies, this graduate feminist theory course will consider issues related to the complex relationship between sex, gender, sexuality, biological reproduction, violence, and social power. It is a core course for the PhD minor in Feminist, Gender, and Sexuality Studies. Enrollment is limited to PhD-level students.

**FEMGEN 36N. Gay Autobiography. 4 Units.**

Preference to freshmen. Gender, identity, and solidarity as represented in nine autobiographies: Isherwood, Ackerley, Duberman, Monette, Louganis, Barbin, Cammermeyer, Gingrich, and Lorde. To what degree do these writers view sexual orientation as a defining feature of their selves? Is there a difference between the way men and women view identity? What politics follow from these writers' experiences?

Same as: HISTORY 36N

**FEMGEN 37S. Love and Lust in the French Empire, 1830-1962. 5 Units.**

Can we write the history of private life? Throughout this course, we will try out different historical approaches to the history of intimate matters in the French Empire. Beyond a more complete understanding of what colonialism was like, studying the intimate draws attention to the societal norms and anxieties of the nineteenth and twentieth centuries. Patriarchy, racism, and classism the power structures inherent in colonialism produce fruitful sites for prying into intimate matters. To that end, we will probe a wide variety of primary sources, including novels, films, paintings, letters, diaries, travel accounts produced by male and female Europeans, Africans, Arabs, and East Asians. Topics covered through these sources include, colonial masculinity and femininity; divorce; homosexuality; prostitution; and sexual violence. We will transcend racial and class divides, and cover a diverse geography including, France, North and West Africa, and Vietnam.

Same as: FRENCH 157, HISTORY 37S

**FEMGEN 395. Graduate Independent Study. 1-15 Unit.**

Students pursue a special subject of investigation under supervision of an affiliated faculty member. May be repeated for credit.

**FEMGEN 395J. Gender and Sexuality in Chinese History. 4-5 Units.**

Same as: CHINGEN 395, HISTORY 395J

**FEMGEN 3B. Transhistory: Gender Diversity from Medieval to Modern. 1-3 Unit.**

This series of six lectures explores the history of gender crossings and transgressions, broadly defined. Several Stanford faculty members and one visitor will present historical interpretations of how and why individuals crossed gender boundaries in the past, as well as how different societies have reacted to gender crossing. The topics range from medieval to modern times and across geographic regions, including Europe, China, South Asia and the Americas.

Same as: HISTORY 3B

**FEMGEN 3E. Michelle Obama in American Culture. 1 Unit.**

Never before has the United States had a First Lady like Michelle Obama. During her eight years in the White House, Michelle Obama transformed traditional meanings of womanhood, marriage, motherhood, and style and created new possibilities for what it means to be strong and what it means to be beautiful. No First Lady has ever been so scrutinized but also so beloved: from her J. Crew dresses to her Let's Move campaign, from her vegetable gardens to her chiseled arms, and from her powerful speeches to her casual and always authentic personality. This class examines the impact on American culture of the most popular First Lady in American history.

Same as: AFRICAAM 3E, AMSTUD 3E, CSRE 3E, HISTORY 3E

**FEMGEN 434. Gender and Performance. 5 Units.**

This seminar seeks to investigate relationships between performance, gender, and the body politic through a discussion of embodiment, body cultures, queerness, desire, representation. Through a weekly engagement with film texts from across the world as well as theoretical perspectives on gender and performance in various geo-political contexts, we will explore the intersections of gender with race, class, national discourse, and performance traditions. The seminar is conceived to be interdisciplinary and participants are encouraged to introduce and work with texts from other disciplines, including visual arts, theatre, dance, literature etc. No prior engagement with film studies is required. Screening times may range from 90 to 180 minutes.

Same as: FILMSTUD 434, MUSIC 434, TAPS 344A

**FEMGEN 444. Graduate Research Seminar: Gender in Science, Medicine, and Engineering. 5 Units.**

Theory and practice of gender in STEM. 1. "Fix the Numbers of Women" focuses on increasing women's participation; 2. "Fix the Institutions" promotes gender equality in careers through structural change in research organizations; 3. "Fix the Knowledge" or "gendered innovations" stimulates excellence in science and technology by integrating gender analysis into research. Seminar explores harnessing the creative power of gender analysis to enhance knowledge and spark innovation.

Same as: HISTORY 444

**FEMGEN 461A. Graduate Research Seminar on the History of Women, Gender, the Family, and Sexuality. 4-5 Units.**

Instructor consent required for non-History graduate students. Seminar introduces graduate students to current issues and methods in the history of women, gender, the family, and sexuality in the United States. After an initial period of working on secondary and primary source bibliographies, and some discussion of secondary readings, each student will choose a topic for an original research paper (20-30 pages) based on primary sources. Each student will complete a first draft of the paper by late May and a revised paper by the end of Spring Quarter.

Same as: HISTORY 461A

**FEMGEN 461B. Graduate Research Seminar on the History of Women, Gender, the Family, and Sexuality Part II. 4-5 Units.**

Prerequisite: 461A. Instructor consent required for non-History graduate students.

Same as: HISTORY 461B

**FEMGEN 466. Queer America. 5 Units.**

This class explores queer art, photography and politics in the United States since 1930. Our approach will be grounded in close attention to the history and visual representation of sexual minorities in particular historical moments and social contexts. We will consider the cultural and political effects of World War II, the Cold War, the civil rights movement, psychedelics, hippie culture and sexual liberation, lesbian separatism, the AIDS crisis, and marriage equality.

Same as: ARTHIST 466

**FEMGEN 50Q. Life and Death of Words. 4 Units.**

In this course, we explore the world of words: their creation, evolution, borrowing, change, and death. Words are the key to understanding the culture and ideas of a people, and by tracing the biographies of words we are able to discern how the world was, is, and might be perceived and described. We trace how words are formed, and how they change in pronunciation, spelling, meaning, and usage over time. How does a word get into the dictionary? What do words reveal about status, class, region, and race? How is the language of men and women critiqued differently within our society? How does slang evolve? How do languages become endangered or die, and what is lost when they do? We will visit the Facebook Content Strategy Team and learn more about the role words play in shaping our online experiences. Together, the class will collect Stanford language and redesign the digital dictionary of the future. Trigger Warning: Some of the subject matter of this course is sensitive and may cause offense. Please consider this prior to enrolling in the course.

Same as: CSRE 50Q, ENGLISH 50Q, LINGUIST 50Q, NATIVEAM 50Q

**FEMGEN 52N. Spoken Sexuality: Language and the Social Construction of Sexuality. 3 Units.**

The many ways language is used in the construction of sexuality and sexual identity. How language is used as a resource for performing and perceiving sexual identity. Drawing on linguistic analyses of pronunciation, word choice, and grammar, questions such as: Is there a gay accent? Why isn't there a lesbian accent? How do transgendered people modify their linguistic behavior when transitioning? How are unmarked (heterosexual) identities linguistically constructed? Sexuality as an issue of identity, as well as of desire. Iconic relations between elements of language such as breathy voice quality and high pitch, and aspects of desire such as arousal and excitement. How language encodes ideologies about sexuality; how language is used to talk about sexuality in public discourses about gay marriage and bullying, as well as in personal narratives of coming out. How language encodes dominant ideologies about sexuality, evident in labels for sexual minorities as well as terminology for sex acts. Discussions of readings, explorations of how sexuality is portrayed in popular media, and analyses of primary data. Final research paper on a topic of student choice.

Same as: LINGUIST 52N

**FEMGEN 54N. African American Women's Lives. 3 Units.**

This course encourages students to think critically about historical sources and to use creative and rigorous historical methods to recover African American women's experiences, which often have been placed on the periphery of American history and American life.

Same as: AFRICAAM 54N, AMSTUD 54N, CSRE 54N, HISTORY 54N

**FEMGEN 63N. The Feminist Critique: The History and Politics of Gender Equality. 3-4 Units.**

This course explores the long history of ideas about gender and equality. Each week we read, dissect, compare, and critique a set of primary historical documents (political and literary) from around the world, moving from the 15th century to the present. We tease out changing arguments about education, the body, sexuality, violence, labor, politics, and the very meaning of gender, and we place feminist critics within national and global political contexts.

Same as: AMSTUD 63N, CSRE 63N, HISTORY 63N

**FEMGEN 86Q. Love as a Force for Social Justice. 3 Units.**

Preference to sophomores. Biological, psychological, religious, social and cultural perspectives on the concept of agape love. How love is conceptualized across cultures; agape love as the basis of many religions; different kinds of love; the biology of love; love in action for social justice; the languages of love, including art, literature, music, and poetry. Emphasis is on blog writing, participation, and oral presentation.

Same as: HUMBIO 86Q

**FEMGEN 93. The Chinese Empire from the Mongol Invasion to the Boxer Uprising. 3 Units.**

(Same as HISTORY 193. History majors and others taking 5 units, register for 193.) A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

Same as: CHINA 93, HISTORY 93

**FEMGEN 94H. Introduction to Disability Studies and Disability Rights. 4 Units.**

Disability Studies is a relatively new interdisciplinary academic field that examines disability as a social, cultural and political phenomenon. This is an introductory course to the field of disability studies and it aims to investigate the complex concept of disability through a variety of prisms and disciplines including social psychology, the humanities, legal studies and media studies. This course also focuses on the multiple connections between the study of disability and other identities including class, race, ethnicity, gender and sexual orientation, and also includes a comparative look at how disability is treated across cultures. Some of the topics covered in the class are disability and the family, the history of the disability rights movement, the development of disability identity and its intersectionality, antidiscrimination law, the UN Convention on the Rights of People with Disabilities, bioethical dilemmas pertaining to disability and more.

Same as: ETHICSOC 104X, HUMRTS 104, SOC 186

**FEMGEN 97. Bow Down: Queer Hip-Hop Pedagogy. 3 Units.**

Although Hip-Hop is frequently associated with homophobia, violence, sexism, and misogyny it continues to resonate with people the world over. By going beyond a surface level critique of Hip-Hop culture, this course explores the ways that queerness operates in and in conjunction with Hip-Hop culture. Topics covered include Hip-Hop and feminism, tensions between Hip-Hop and queerness, the role of commercialization of Hip-Hop in queer representation and inclusion with the culture, and how the intersections of Hip-Hop and queer theory can speak to issues of identity, power and privilege.

**FEMGEN 99. Seeds of Change. 1 Unit.**

This course is a required training for student leaders of the Seeds of Change initiative. This initiative takes an interdisciplinary approach to STEM education, infusing students' technical training with leadership training through a lens of gender inequality - bringing together key components of feminist pedagogy, service-learning, and experiential education to create a transformational learning experience. In this three-quarter course (Fall, Winter, Spring), student leaders will: learn the core content featured in the Seeds of Change curriculum, reflect on their experiences as both learners and teachers of this content, hone their own leadership and group facilitation skills, and engage as researchers in the initiative's evaluation efforts. NOTE: Instructor Consent Required. Please email [kpedersen@stanford.edu](mailto:kpedersen@stanford.edu) \*Cardinal Course certified by the Haas Center. See syllabus for adjusted course schedule and times.

**FEMGEN 9SI. A Road to Diversity inclusion: Learning to Embrace the Intersection of Identities within Athletics. 1 Unit.**

This course explores the interaction of one's identities within the context of athletics. With an emphasis on the importance of self-awareness and story telling, we will navigate how all identities intersect and affect the privilege we receive within current society. We will specifically look at how race, ethnicity, sexual orientation, religion, socioeconomic status, mental health, and disabilities interact with our identity as athletes. A Road to Diversity Inclusion: Learning to Embrace the Intersection of Identities within Athletics will help athletes find their voice and use it for positive social change within their communities.

## Film Production (FILMPROD)

**FILMPROD 101. Screen Writing I: Visual Writing. 4 Units.**

A writing workshop that is an exploration of visual storytelling. Beginning with visual literacy, the class progresses from basic cinematic techniques through scene exercises to revisions and ultimately to connecting scenes in order to build sequences of script pages. Open to all majors; may substitute for ENGL 190F prerequisite for FP101.

**FILMPROD 101T. Writing the Television Pilot. 5 Units.**

A writing workshop in which students are introduced to the basic structures and genre of television pilots and to writing within the screenwriting/television writing form. Students will develop, outline, and workshop their own original pilot episode and series bible. Serves as a prerequisite for FP104 Intermediate Screenwriting. Enrollment by decision of instructor.

**FILMPROD 103. Adaptation. 4 Units.**

A close analysis of film adaptation, using various source materials to examine the demands form makes on content and the creative choices made in adaptation to film. Source materials will include plays, fiction, biography, history, graphic novels, and reference to video games and amusement park rides. A weekly film screening is a requirement of the course.

**FILMPROD 104. Screenwriting II: Intermediate Screenwriting. 5 Units.**

Priority to Film and Media Studies majors and minors, and seniors. Craft, form, and approaches to writing for the screen. Students will write, workshop and rewrite the first act of a feature screenplay and create rough outline material for the rest of the film. Prerequisites: FP101, FP101T or ENGL190F and consent of the instructor. Same as: FILMPROD 301

**FILMPROD 105. Script Analysis. 4 Units.**

Analysis of screenplay and film from the writer's perspective, with focus on ideation, structure, and dramatic tension in narrative features. Sources include screenplays and screenings. Same as: FILMPROD 305

**FILMPROD 106. Image and Sound: Filmmaking for the Digital Age. 3 Units.**

Despite the rise of emerging forms like two-minute YouTube videos, six second Vines, or interactive storytelling modules, many core principles of visual storytelling remain unchanged. In this hands-on film production class students will learn a broad set of filmmaking fundamentals (basic history, theory, and practice) and will apply them creating film projects using tools such as iPhones, consumer cameras and FCPX.

**FILMPROD 106S. Image and Sound: Filmmaking for the Digital Age. 3 Units.**

Despite the rise of emerging forms like two-minute YouTube videos, six second Vines, or interactive storytelling modules, many core principles of visual storytelling remain unchanged. In this hands-on film production class students will learn a broad set of filmmaking fundamentals (basic history, theory, and practice) and will apply them creating film projects using tools such as iPhones, consumer cameras and FCPX.

**FILMPROD 110. Screen Writing III: Advanced Screenwriting. 5 Units.**

Advanced writing workshop in which students develop and complete a feature-length screenplay. Prerequisites: FP101 Screenwriting and approval of the instructor. Enrollment is limited.

**FILMPROD 114. Introduction to Film and Video Production. 5 Units.**

Hands-on. Techniques of film and video making including conceptualization, visualization, story structure, cinematography, sound recording, and editing. Enrollment limited to 12 students. Priority to junior/senior Film & Media Studies majors. Admission determined on the first day of class.

**FILMPROD 12AX. Write and Shoot: Narrative Filmmaking. 2 Units.**

Write and Shoot: Narrative Filmmaking is a hybrid writing/production course that guides students through the process of completing a 2-3 minute narrative film. Students will write scripts for short fiction films, and then, by filming them, learn to apply the fundamentals of digital video production. Initial classwork will include visual writing exercises, DSLR cinematography instruction, script work, and basic fiction film production. Students will continue on in groups of three to develop, film, edit, and critique 2-3 minute narrative films based on a shared class theme or narrative premise. This course is truly INTENSIVE and requires a significant amount of work (including nights and weekends) outside of class and daily deadlines for submission of creative work.

**FILMPROD 148. Archival Cinema: Excavating the Future. 4 Units.**

This course examines the practices of appropriation of archival material in cinema, and the problems of representation inherent to them. The practical component consists of a series of creative assignments in which students are asked to use archival material, including some from Stanford's collections, to produce short moving image pieces. Same as: FILMPROD 348, FILMSTUD 148, FILMSTUD 348

**FILMPROD 301. Screenwriting II: Intermediate Screenwriting. 5 Units.**

Priority to Film and Media Studies majors and minors, and seniors. Craft, form, and approaches to writing for the screen. Students will write, workshop and rewrite the first act of a feature screenplay and create rough outline material for the rest of the film. Prerequisites: FP101, FP101T or ENGL190F and consent of the instructor. Same as: FILMPROD 104

**FILMPROD 305. Script Analysis. 4 Units.**

Analysis of screenplay and film from the writer's perspective, with focus on ideation, structure, and dramatic tension in narrative features. Sources include screenplays and screenings. Same as: FILMPROD 105

**FILMPROD 348. Archival Cinema: Excavating the Future. 4 Units.**

This course examines the practices of appropriation of archival material in cinema, and the problems of representation inherent to them. The practical component consists of a series of creative assignments in which students are asked to use archival material, including some from Stanford's collections, to produce short moving image pieces. Same as: FILMPROD 148, FILMSTUD 148, FILMSTUD 348

**FILMPROD 400. Film/Video Writing and Directing. 4 Units.**

Restricted to M.F.A. documentary students. Emphasis is on the development of the research, conceptualization, visualization, and preproduction skills required for nonfiction filmmaking. Prerequisite: consent of instructor.

**FILMPROD 401. Nonfiction Film Production. 4 Units.**

Restricted to M.F.A. documentary students. 16mm production techniques and concepts. Final project is a short black-and-white film with multitrack sound design. Prerequisite: consent of instructor.

**FILMPROD 402. Digital Video. 4 Units.**

Restricted to M.F.A. documentary students. Fundamentals of digital storytelling. Working with small format cameras, interviewing techniques, and nonlinear editing skills. Prerequisite: consent of instructor.

**FILMPROD 403. Advanced Documentary Directing. 4 Units.**

Restricted to M.F.A. documentary students. Further examination of structure, emphasizing writing and directing nonfiction film. Prerequisite: consent of instructor.

**FILMPROD 404. Advanced Video Production. 4 Units.**

Restricted to M.F.A. documentary students. Techniques of visual storytelling and observational shooting. Final quarter of professional training in documentary video production. Prerequisite: consent of instructor.

**FILMPROD 405. Producing Practicum. 4 Units.**

Restricted to M.F.A. documentary students. Advanced producing principles through the preproduction of the M.F.A. thesis project, including development of a professional film proposal. Practical training in fundraising. Prerequisite: consent of instructor.

**FILMPROD 406A. Documentary M.F.A. Thesis Seminar I. 4 Units.**

Restricted to M.F.A. documentary students. Production of film or video project. Focus is on shooting strategies, ethical challenges, and practical production issues. Prerequisite: consent of instructor.

**FILMPROD 406B. Documentary M.F.A. Thesis Seminar II. 4 Units.**

Restricted to M.F.A. documentary students. Editing and post-production of film or video project. Emphasis is on aesthetic choices (structure, narration, music), distribution, contracts, and audience. Prerequisite: consent of instructor.

FILMPROD 801. TGR Project. 0 Units.

## Finance (FINANCE)

### FINANCE 121. Undergraduate Finance Research and Discussion Seminar. 1 Unit.

This seminar is designed to provide some experience with research methods and topics in finance, and to assist undergraduates with career interests in financial research, whether academic or not, with preparation for those careers. The seminar meetings are weekly and discussion based, covering a range of issues and methods in financial economics. Students are expected to prepare a 30-minute research presentation once during the quarter.

### FINANCE 201. Finance I. 3 Units.

This course covers the foundations of finance with an emphasis on applications that are vital for corporate managers. We will discuss many of the major financial decisions made by corporate managers, both within the firm and in their interactions with investors. Essential in most of these decisions is the process of valuation, which will be an important emphasis of the course. Topics include criteria for making investment decisions, valuation of financial assets and liabilities, relationships between risk and return, capital structure choice, payout policy, the use and valuation of derivative securities, and risk management. This course is targeted to those students who are new to finance and for those with little quantitative background.

### FINANCE 204. Finance I - Accelerated. 3 Units.

This course covers the foundations of finance with an emphasis on applications that are vital for corporate managers. We will discuss many of the major financial decisions made by corporate managers, both within the firm and in their interactions with investors. Essential in most of these decisions is the process of valuation, which will be an important emphasis of the course. Topics include criteria for making investment decisions, valuation of financial assets and liabilities, relationships between risk and return, capital structure choice, the use and valuation of derivative securities (e.g., options and convertible securities), and risk management. No previous background in finance is required or expected, but in comparison with Finance 201, less time will be spent in class on the steps involved in solving basic problems. Therefore, students choosing this course should be relatively comfortable with basic mathematical operations (e.g., expressions involving multiplication of multiple terms, summation of multiple terms, etc.), though familiarity with the underlying finance concepts is not expected. A good diagnostic is to skim Section 4.2 "Rules for Time Travel" (pp. 98-104) in the course textbook, *Corporate Finance* by Berk and DeMarzo. If you are comfortable with the level of basic mathematics involved (even if the concepts are new), 204 is a good choice. If not, you should consider Finance 201.

### FINANCE 205. Accelerated Managerial Finance. 3 Units.

This course covers the foundations of finance with an emphasis on applications that are vital for corporate managers. We will discuss many of the major financial decisions made by corporate managers, both within the firm and in their interactions with investors. Essential in most of these decisions is the process of valuation, which will be an important emphasis of the course. Topics include criteria for making investment decisions, valuation of financial assets and liabilities, relationships between risk and return, capital structure choice, payout policy, the use and valuation of derivative securities, and risk management. This course is targeted to those students who are new to finance and for those with little quantitative background. No previous background in finance is required or expected for this course. Content will be comparable to F201, but the majority of course lecture material will be delivered online, with in-class sessions devoted to applications of key concepts. This "flipped classroom" version of the course is intended for self-motivated students with an interest in applications. Prerequisite material for the course will be posted online in the fall.

Same as: Lab-based Pilot

### FINANCE 207. Corporations, Finance, and Governance in the Global Economy. 3 Units.

As entrepreneurs, global leaders, and change agents tasked with developing transformative solutions of tomorrow, you will need certain skills and tools to interact with and navigate the complex and ever-changing financial landscape. This course focuses on the development of these skills and tools through the analysis of concise real-world financial situations around the globe. Topics include valuation of cash flows and control; the capital structure, payout policy and governance of both mature and entrepreneurial firms; restructuring and managing financial distress; the use of public markets to obtain liquidity and multiple share classes to retain control; financing and governance in venture capital and private equity; the rise of activism; and social responsibility and debates about the objectives of the firms of the present and future. This course is taught jointly by Professors Rauh and Seru.

### FINANCE 211. Corporate Finance: Applications, Techniques, and Models. 3 Units.

This course will develop and apply the basic tools and models of corporate finance to real-world corporate decisions. This course is designed to be the second course in the standard finance sequence; that is, it is designed to be the natural follow-up to the Winter Managerial Finance course. This course will develop and extend standard tools and techniques of financial analysis, valuation, and model-building, and apply these methods to a wide range of cases. Case topics will include mergers and acquisitions, private equity, corporate governance, capital structure, agency conflicts, and corporate restructuring. For all of these applications, this course will emphasize the central importance of financial analysis, valuation, and modeling to guiding optimal decision making.

### FINANCE 214. Accelerated Corporate Finance: Applications, Techniques, and Models. 3 Units.

This course will develop and apply the basic tools and models of corporate finance to real-world corporate decisions. This course is designed to be the second course in the standard finance sequence; that is, it is designed to be the natural follow-up to the Winter Managerial Finance course. This course will develop and extend standard tools and techniques of financial analysis, valuation, and model-building, and apply these methods to a wide range of cases. Case topics will include mergers and acquisitions, private equity, corporate governance, capital structure, agency conflicts, and corporate restructuring. For all of these applications, this course will emphasize the central importance of financial analysis, valuation, and modeling to guiding optimal decision making.

### FINANCE 229. MSx: Finance. 3 Units.

This course covers the foundations of corporate finance including the management of capital structure, financial forecasting, dividend policy, financial distress, cost of capital and capital budgeting. It discusses the major financial decisions made by corporate managers and the impact of those decisions on investors and the value of the firm. Topics include criteria for understanding the valuation of financial assets and liabilities, relationships between risk and return, market efficiency, and the role of derivative securities, including options. The course also provides coverage of the role of financial markets in the operations of the firm.

### FINANCE 305. Capital Markets and Institutional Investing. 3 Units.

This course teaches recent advances in asset allocation and management. We focus on the practical implementation of asset allocation and management tools in allocating assets, selecting asset managers and managing risk. Students apply these tools to real-time data in the computer lab. Topics covered include Asset Allocation; Delegated Asset Management and Manager Selection applied to Mutual Funds, Hedge Funds and Private Equity Funds; Multi-factor models and Factor Investing. The class will be co-taught by Kevin Mak, the director of the Real-Time Investment and Analysis Lab at Stanford. Robert Wallace, the CEO of Stanford Management Company, will guest-lecture.

**FINANCE 310. Finance - Advanced. 3 Units.**

This advanced applications course brings recent advances in finance to bear on real-world challenges in investment management and corporate finance. The goal of this course is to develop a deeper understanding of how capital markets actually work, drawing on recent advances in modern finance. We discuss the implications for financial decision making by managers and investors. The course is intended for MBA1 students who are familiar with the foundations of finance, including discounted cash flow (DCF) analysis, internal rate of return (IRR) calculations, mean-variance analysis and the Capital Asset Pricing Model (CAPM). Examples of broad topics covered in the class include corporate capital structure decisions, challenges in portfolio management, performance analysis of mutual funds, hedge funds and private equity, IPOs, hedging of currency and interest rate risk, etc. To be eligible, students must have passed the placement exam in Week Zero, must have solid quantitative skills and have a willingness to analyze data.

**FINANCE 315. Innovating for Financial Inclusion. 3 Units.**

This is a new MBA elective exploring innovative ways start-ups are altering household participation in financial services, by overcoming financial frictions and/or changing behaviors. "Inclusion" will be viewed broadly to encompass individuals/households from all socioeconomic classes in all aspects of their financial lives. The focus will be predominantly on start-ups that are disrupting financial services within the US legal and regulatory environment, though we will frequently draw upon lessons learned from welfare-enhancing innovations in the international FinTech sphere.

**FINANCE 319. Private Equity Investing Seminar. 4 Units.**

This PE Investing seminar launched in 1993 focuses on private equity investing, including investments with control, buyouts, and minority investments at various stages in a company's life. Private equity investing activity has grown significantly over the past 2 decades. This seminar explores selected topics in private equity investing for those MBA students who take the co-requisite course FINANCE 321.01, Investment Management and Entrepreneurial Finance. Private equity includes both established and early stage companies. The course extends and deepens the entrepreneurial finance area for those with an interest in private equity, venture capital and principal investing, taking a global view. Utilization will be made of original case studies and lecture-discussions, building on the framework of FINANCE 321. The Seminar meets with many outstanding investors. All those registered in F321.01 will also be registered in F319. See yellow Term Sheet put in MBA Boxes in late April. Note: All those registered in F321.02 will also be registered in F329.

**FINANCE 320. Debt Markets. 3 Units.**

This course is intended for those who plan careers that may involve debt financing for their businesses or other investments, or involve trading or investing in debt instruments and their derivatives, including money-market instruments including central bank deposits, government bonds, repurchase agreements, interest-rate swaps, mortgage-backed securities (MBS), corporate bonds, structured credit products, and credit derivatives. We will emphasize institutional features of the markets, including trading, pricing, and hedging. There is a special focus on distressed debt. Most lectures will start with a cold-called student presentation of an un-graded short homework calculation. There will also be a series of graded homework, a take-home mid-term, and about six graded 'pop quizzes' of 10 minutes or less.

**FINANCE 321. Investment Management and Entrepreneurial Finance. 3 Units.**

Our focus is fundamental value investing. Equity investment in companies, common stocks, early/growth stage ventures and private equity, deals, partnerships, hedge funds, or other entrepreneurial opportunities will be immediately or eventually important for most MBAs—either on the investing side or on the fund-raising financing side. This investment course discusses many practical and conceptual factors influencing the analysis and value of companies and deals, including publicly listed and private equity investments, and on success of investment approaches. The focus of this course is on quoted and private equity investments and on entrepreneurial finance. The format of the class is primarily case discussions and lecture discussions led by the professor and investors/principals who were involved in the case. This course enables MBA students to learn a broad investing skill-set and to study outstanding investors. See yellow Term Sheet put in MBA Boxes in late April.

**FINANCE 322. Financial Intermediaries and Capital Markets. 4 Units.**

This course focuses on financial markets, institutions, and instruments. We consider when and how firms raise capital through the life cycle, beginning with the capital-raising decisions and transactions for young firms and then discussing the decisions facing older, listed firms. We concentrate mainly on the firm's perspective while also considering the perspective of financial intermediaries. Issues to be considered in this course include the role of financial intermediaries like banks, the decision to go public, the pricing and role of investment banks in IPOs, bank debt, project finance, public debt, private placements, securitizations, convertibles, and markets for junk bonds.

**FINANCE 324. Practical Corporate Finance. 4 Units.**

The focus of this course is to apply the fundamental ideas of corporate finance to real-world problems. This course is a follow-up to the Fall course in Managerial Finance in which the basics of finance and valuation were covered. We will explore both how to make the acquired knowledge practical as well as to deepen our understanding of the core principles of finance. During the course we will analyze cases covering a wide range of topics such as capital structure, private equity and venture capital, mergers and acquisitions, hostile takeovers and leveraged buyouts, as well as bankruptcy and financial distress. These cases provide an opportunity to bridge the gap between theory and real-life situations. Students are expected to develop their own spreadsheets and provide recommendations based on their analysis of the case material. This course was formerly known as FINANCE 224. An accelerated version of this course is offered as FINANCE 331.

**FINANCE 326. Derivative Securities. 4 Units.**

This course is an introduction to options, futures and other derivative securities. The goal is to learn a core set of principles that underlie the pricing and use of derivatives. In particular, we will cover the valuation and use, both for risk management and for speculation, of forwards, futures, swaps, and options; the Black-Scholes option-pricing formula; delta-hedging; credit derivatives; financial risk management; and the role of derivatives in the recent financial crisis.



**FINANCE 327. Financial Markets. 4 Units.**

The aim of this course is to develop a thorough understanding of financial markets. We explore how investors make decisions about risk and return, how financial markets price risky assets in equilibrium, and how financial markets can sometimes malfunction. The course puts particular emphasis on the role of real-world imperfections that are absent from the standard textbook view of financial markets. For example, we explore the role of illiquidity: Why are there liquid markets for some types of assets but not for others? Why does liquidity often disappear in times of market turmoil? We will also study recent insights from behavioral finance about investor psychology and market inefficiencies. Moreover, we will look at financial innovations such as credit-default swaps, securitization, and hedge funds that play important roles in financial markets these days. We use cases to develop these topics in the context of practical decision-problems in the areas of asset allocation, risk management, and financing.

**FINANCE 329. Investment Seminar. 4 Units.**

F329 - Investment Seminar: "Global Principal Investing/Hedge Funds" is a seminar focused on selected topics in masterful investing in publicly traded with some private equity capital investments, with emphasis on the principal's point of view. We study hedge funds and mutual funds and meet with outstanding investors. The scope and context is global including emerging markets. The Seminar is taught by a founding director of one of the largest international investment funds. See yellow Term Sheet put in MBA Boxes in late April. All those registered in F321.02 will also be registered in F329. nnNote: All those registered in F321.01 will also be registered in F319.

**FINANCE 331. Practical Corporate Finance. 4 Units.**

(Note: this course was formerly known as FIN 230) The main aim of this course is to enable students to apply the fundamental ideas of finance to problems in the area of corporate finance with all the complexities the real world entails. The course is a follow-up to the Fall Managerial Finance course where students learnt basics of valuation tecyhniques and various finance applications. We will explore both how to make all this knowledge practical as well as how to deepen our knowledge of fundamental finance ideas. nnnThe main focus of this course is on the corporate financial manager and how he/she reaches decisions as to investments, dividends and financing of all sorts. Topics include leveraged buyouts, hostile takeovers, private equity financing and venture capital, financial distress and bankruptcy, mergers and acquisitions, managing working capital. The cases will be used to motivate our discussion of how to bridge the gap between rigorous finance theory and its application to practical problems in corporate finance.nnnThe course is case-based and more advanced than FINANCE 324. "Advanced" means that we will discuss a lot of subtle qualitative issues as well as explore deeper fundamental applications of core finance ideas. The course is intensive and will require students to prepare carefully all cases, read and understand a lot of materials, and actively participate in the class discussion. The main teaching method is cold calling. Same as: Accelerated

**FINANCE 332. Finance and Society. 3 Units.**

This interdisciplinary course explores how market and non-market forces shape the financial system and, through this system, affect the broad economy and society. You will gain an in-depth understanding of the interactions between individuals, corporations in the financial and non-financial sector, and governments around the globe, in an environment that is rife with conflicts of interests and differences in information and control. Topics include the structure and role of various financial institutions and the financial system, housing, credit and securities markets, central banks, regulation, global cooperation and competition, governance and accountability, and the role of the media.

**FINANCE 335. Corporate Valuation, Governance and Behavior. 4 Units.**

This course will develop a detailed knowledge of corporate valuation techniques, together with an understanding of the role such valuations play in a wide range of corporate financing decisions. First, the course will carefully consider different valuation techniques, the assumptions that underlie each of these methods, how they are applied in practice, how they are related to one another, and how to decide which method of valuation is appropriate for a given application. After developing these tools, they will then be applied to a wide range of corporate finance settings. Among the applications to be considered are mergers and acquisitions, international valuation, corporate governance, financial distress, agency conflicts, asymmetric information, and overvaluation. For all of these applications, this course will emphasize the central importance of valuation to understanding observed phenomena and to guiding optimal decision making, as well as the unique challenges to valuation posed by the particular application.

**FINANCE 336. The Finance of Retirement and Pensions. 4 Units.**

The financial economics of how retirement is financed, particularly in the US. Topics: basic finance concepts necessary for understanding individual retirement savings. Properties of financial instruments such as bonds and stocks. Optimization of individual retirement account or 401 (k) portfolios. Defined benefit pensions. Measuring defined benefit pension liabilities. Impact of defined benefit pension liabilities on corporate, state, and local budgeting. The economics of national retirement policy including Social Security and government treatment of private retirement savings.

**FINANCE 341. Modeling for Investment Management. 3 Units.**

This course will combine practical and up-to-date investment theory with modeling applications. Understanding beautiful theory, without the ability to apply it, is essentially useless. Conversely, creating state-of-the-art spreadsheets that apply incorrect theory is a waste of time. Here, we try to explicitly combine theory and application. The course will be divided into 6 modules, or topics. The first day of each module will be a lecture on an investment topic. Also provided is a team modeling project on the topic. The second day of each module will be a lab. The lab day will begin with modeling concepts (tips) designed to help you use Excel to implement the module's investment topic. After the tips are provided, the remainder of the lab day is devoted to teams working on their modeling project and allowing for Q&A. On the third day of each module will be presentations and wrap-up.

**FINANCE 345. History of Financial Crises. 3 Units.**

Financial crises are as old as financial markets themselves. There are many similarities between historical events. The 2007/8 credit crisis, for example, is far from unique. More often than not financial crises are the result of bubbles in certain asset classes or can be linked to a specific form of financial innovation. This course gives an overview of the history of financial crises. We go back almost 400 years and start with the Tulip mania of 1636. From there we will slowly make our way back to today, encountering many crisis episodes that are relevant from today;s point of view. The purpose of the course is to understand the causes of past crises and to develop a conceptual framework that ties common elements together. We will discuss the lessons that we can draw for financial markets today.

**FINANCE 346. Institutional Money Management. 3 Units.**

The object of this course is to study the money management industry from the perspective of the user — an investor who wants to invest money. This course will study the main components of the money management industry: mutual funds, hedge funds, private equity funds and venture capital funds. It will also examine important users of the industry such as non profits, endowments and defined benefit pension funds. The emphasis of the course will not be on how fund managers make money, but rather on how the industry is organized, how managerial skill is assessed, how compensation is determined, and how economic rents are divided between managers and investors. The course will explore how competitive market forces interact with managerial skill and other market frictions to give rise to the observed organization of the industry.

**FINANCE 347. Money and Banking. 3 Units.**

This course is designed to help students understand the connections between money (the Federal Reserve), financial markets, and the macroeconomy. How are interest rates determined, and how does the Federal Reserve conduct monetary policy? What economic factors drive the yield curves in different bond markets? We will pay particular attention to the banking system, with an eye toward understanding the function and importance of banks. Topics will include the role of the Federal Reserve as a lender of last resort during the recent, and prior, financial crises, unconventional monetary policy tools such as quantitative easing and forward guidance. We discuss new developments in payment and clearing including cryptocurrencies. We will often begin class with a discussion of current macro-financial market events in the context of our course coverage. The course is appropriate for anyone trying to gain a macroeconomic perspective on capital markets, from investors to bankers, or those simply interested in the linkages between interest rates, banks and the economy.

**FINANCE 350. Corporate Financial Modeling. 4 Units.**

This course will expose students to the fundamentals, best practices, and advanced techniques of corporate financial modeling. We begin with basic operating and integrated financial statement models, and ultimately develop financial models to analyze major corporate transactions, including venture capital funding, mergers and acquisitions, and leverage buyouts. We will integrate theories presented throughout the MBA core, particularly those from accounting and finance, and take a hands-on approach to understand how the theory is implemented in practice. The focus of the course will be on developing critical financial modeling skills, understanding best practices, and recognizing common pitfalls. Students will work on a series of cases and build models that can be used for earnings and pro-forma financial statement forecasts, valuation, the assessment of financing needs, merger analysis, and LBO evaluation. Students will also gain experience presenting financial models and critically assessing them. By the conclusion of the course, students will develop the skills to construct complex financial models and the logical frameworks to utilize them for various organizational applications.

**FINANCE 351. Advanced Corporate Financial Modeling. 4 Units.**

Students will engage in the development of corporate financial modeling cases and solutions. Students will also develop materials to aid others in building financial models, and serve as case leaders during lab workshops. Extensive background in financial modeling and experience with Excel is required.

**FINANCE 361. Behavioral Finance. 4 Units.**

This course provides an introduction to behavioral finance, a discipline which integrates insights from psychology into the study of financial decisions and markets. There will be a focus on understanding the psychological underpinnings of financial decision-making as well as the institutional frictions that may allow these psychological mechanisms to influence economic outcomes. Applications include the pricing of assets relative to fundamental value, trading strategies, managerial behavior, and household savings and investment decisions. Conceptual issues will be emphasized through a mix of case discussions and lectures, and quantitative exercises will serve to develop analytical tools for making financial choices.

**FINANCE 362. Financial Trading Strategies. 3 Units.**

The purpose of this course is to familiarize students with the different types of trading strategies employed by various money management institutions. These financial trading strategies are used to manage the risk and return profiles of specific portfolios. Throughout the sessions, students will be challenged to understand and explore the application and implementation of these different strategies. Trading simulations employed on the Rotman Interactive Trader and Rotman Portfolio Manager (using real market data and computer generated data) will be used extensively in this course as a way to learn and test different strategies. All classes will be held in the new Real-time Analytics and Investment Lab (RAIL), located on the third floor of the Bass Building (B312). Students are expected to attend all sessions. Grades are based on in-class simulation results, class participation, and two written assignments.

**FINANCE 373. Entrepreneurial Finance. 3 Units.**

This is a course about the financial decision-making process largely from the point of view of the CEO of an entrepreneurial venture, ranging from very early to very late stages. The course takes a two-pronged approach: First, we develop tools and concepts of corporate finance related to modeling, valuation, control, and investment decisions within an entrepreneurial context. Second, we use cases with firms at different stages of their life cycles from initial angel or venture capital investments through exit decisions, in order to see the issues that arise when these principles are applied in practice. In some cases we show the viewpoint of the entrepreneur and in others the perspective of the investor. After all, as an entrepreneur, one cannot negotiate effectively without understanding an investor's motivations. Conversely, an investor cannot evaluate a potential investment opportunity without appreciating the entrepreneur's perspective and incentives. Finally, we explore new developments in entrepreneurial finance such as crowdfunding and early liquidity provisions.

**FINANCE 377. China's Financial System. 3 Units.**

This course is a survey of China's financial system, including its banking industry, monetary policy structure, and financial markets (bonds, derivatives, equities, foreign exchange, alternative asset management, and related markets). The goal is an integrated view of how capital, risk, and liquidity are intermediated within China and cross-border. Current trends (including liberalization of markets) will be emphasized. Coverage will be through lectures, reading of both primary source documents and secondary (journalistic and analyst) commentary, as well as a range of subject-matter-expert speakers. Using our special High Immersion Classrooms at Stanford and at the Stanford Center at PKU, this course meets jointly with a parallel course offered at Beijing University. Students will participate actively in class discussion, make a 5-minute topical presentation, and submit a short (10-page) paper.

**FINANCE 381. Private Equity in Frontier Markets: Creating a New Investible Asset Class. 4 Units.**

In 2001, Jim O'Neil of Goldman Sachs wrote a research note which underscored the importance of so-called Emerging Markets to a well-balanced investment portfolio. Still today, most investors have little or no investment exposure beyond North America, Europe, Japan and more recently India, China and Brazil. All of this is just beginning to change. The not yet fully formed investment category called frontier market private equity is emerging and within the next decade is likely to be an asset class of its own. Private equity investments are being made in southeast Asia, in MENA (Middle East/ North Africa), in sub-Saharan countries beyond South Africa and in Latin America. Even fund of funds are appearing across these markets. At the same time, investors face a world of diminished returns expectations in developed economies just as aging demographics and the need for continued growth, innovation and infrastructure renewal places increasing demands for payout. Suffice it to say, investors will be looking beyond traditional asset classes and geographies for sources of return. This new course is designed to expose you to the still emerging, not yet fully formed world of frontier market private equity. To set the context we will start by reviewing the fundamentals of economic growth and development globally. In addition we will discuss the fundamental concepts involved in constructing and evaluating the performance of a large scale investment portfolio. We will then review cases on the elements of the private equity cycle/process and specifically address the special demands of frontier markets in general. We will also focus on issues that are specific to various markets (e.g. Nigeria, Vietnam, etc.). Students taking the course will be given the opportunity to make important contributions to the knowledge base of this still very young field by working in small teams to research topics of personal and general interest, the results of which will be reported to the rest of the class. This course will not be offered next academic year, 2017-2018.

**FINANCE 385. Angel and Venture Capital Financing for Entrepreneurs and Investors. 3 Units.**

This course covers all the stages of funding for early stage high-growth companies, from seed funding to venture capital rounds to a successful exit. We will concentrate on how entrepreneurs and investors make and should make important decisions. Examples of issues that we will cover are: How can entrepreneurs raise funding successfully? What are typical mistakes entrepreneurs make in raising capital and negotiating with investors? How to choose your investor? How to pitch to an investor? How do angels and VCs generate and process their deal flow and select companies? How are VCs involved in business decisions such as recruiting talent and replacing CEOs? What are the important provisions of financial contracts between VCs and founders? How to value early-stage companies? The course is very applied and mostly case-based. We will discuss a lot of nitty-gritty details that is a must for founders and investors. Case protagonists, founders, angels, and VCs will be among guest speakers. No prior knowledge of the VC industry is needed.

**FINANCE 548. The Political Economy of Banking Regulation in US and Europe. 1 Unit.**

The 2007-09 financial crisis exposed the extreme fragility of the financial system and the harm financial crises can cause. Have regulatory reforms in the US and Europe been effective and, if not, how and why? Does it matter if some institutions are "too big to fail," and, if so, how and why? This course will discuss the economic and political forces that are shaping the financial system in US and Europe and evaluate recent and current events that will have important implications for the economy for many years. We will see how politics trumps economics in Washington, London and Brussels in different but broadly predictable ways.

**FINANCE 555. Private Wealth Management and Personal Investing. 2 Units.**

The Private Wealth Management and Personal Investing course will address issues that relate to the management of personal assets as opposed to institutional investing. It will cover the origins and growth of private wealth management as an industry, investment planning, risk management, inter-generational transfers of wealth, philanthropy and tax planning. Special emphasis is on issues surrounding the selection of a wealth manager, how managers may be evaluated, including potential conflicts of interest, and performance measurement. Classes will focus on case studies and various readings. Two instructors will lead the class, one from the GSB and one from the private wealth management industry. Most classes will be augmented by visits from professionals in the wealth management and private banking business. Active class participation and a group project are required.

**FINANCE 559. The World of Investing. 1 Unit.**

This course is a speaker series, exposing students to the world of first-class investors and their philosophies. Each week will have a different visitor describing their investment strategy and experience. Attendance at all sessions is a requirement to pass the course.

**FINANCE 562. Financial Trading Strategies. 2 Units.**

The purpose of this course is to familiarize students with the different types of trading strategies employed by various money management institutions. These financial trading strategies are used to manage the risk and return profiles of specific portfolios. Throughout the sessions, students will be challenged to understand and explore the application and implementation of these different strategies. Trading simulations employed on the Rotman Interactive Trader and Rotman Portfolio Manager (using real market data and computer generated data) will be used extensively in this course as a way to learn and test different strategies. All classes will be held in the new Real-time Analytics and Investment Lab (RAIL), located on the third floor of the Bass Building (B312). Students are expected to attend all sessions. Graded are based on in-class simulation results, class participation, and two written assignments. This course is designed to have a fast learning curve and is a pre-requisite for FIN563, the advanced extension of this course.

**FINANCE 563. Financial Trading Strategies 2. 2 Units.**

This course is an extension of FIN562, Financial Trading Strategies. Students will expand on introductory topics from the Financial Trading Strategies Course and be required to build extensive live-market models and risk management models. Class discussions will closely link current market events and pricing anomalies to theoretical and simulated markets and we will closely study the deviations between them.

**FINANCE 587. Private Equity - An Overview of the Industry. 2 Units.**

This 2-unit elective at the GSB is an overview of the private equity industry including its reason for being and its growth. The course looks at all aspects of private equity partnerships and private equity investing. The course may be of particular interest to five groups of students: (i) students who aspire to be employed in private equity as a career; (ii) students who plan to be employed by companies that are owned by private equity firms; (iii) students who may invest in private equity partnerships as a limited partner; (iv) students who find private equity to be an interesting part of the financial services industry, and (v) students who expect to participate in corporate business development or mergers and acquisitions. The course will meet for nine classes. Each class will have at least one senior partner from a private equity firm to comment on the activities of his firm. In years past, some of the true leaders of the industry have participated. One class will be a mock investment review committee presentation as a final project.

**FINANCE 620. Financial Markets I. 3 Units.**

This course is an introductory PhD level course in financial economics. We begin with individual choice under uncertainty, then move on to equilibrium models, the stochastic discount factor methodology, and no-arbitrage pricing. We will also address some empirical puzzles relating to asset markets, and explore the models that have been developed to try to explain them.

**FINANCE 621. Financial Markets II. 3 Units.**

This course continues F620 and covers a number of main concepts in market microstructure. Among the topics that are covered are (i) Rational Expectations models and their foundations (ii) strategic trading models (iii) models of market and funding liquidity. In addition to the discussion of theoretic models time will be allotted to empirical applications.

**FINANCE 622. Dynamic Asset Pricing Theory. 4 Units.**

This course is an introduction to multiperiod models in finance, mainly pertaining to optimal portfolio choice and asset pricing. The course begins with discrete-time models for portfolio choice and security prices, and then moves to a continuous-time setting. The topics then covered include advanced derivative pricing models, models of the term structure of interest rates, the valuation of corporate securities, portfolio choice in continuous-time settings, and finally general-equilibrium and over-the-counter asset pricing models. Students should have had some previous exposure to general equilibrium theory and some basic courses in investments. Strong backgrounds in calculus, linear algebra, and probability theory are recommended. Problem assignments are frequent and, for most students, demanding. Prerequisite: F620 and MGTECON600 (or equivalent), or permission of instructor.

**FINANCE 624. Corporate Finance Theory. 4 Units.**

This course considers a wide range of topics in theoretical corporate finance (broadly interpreted). Topics include capital structure decisions, agency conflicts in the firm, dividend policy, security design, optimal financial contracting, the theory of the firm, the market for corporate control, and banking and financial intermediation, among others. The primary focus is on how asymmetric information, agency conflicts, strategic interactions, and incomplete contracting affect corporate financial decision-making. The course aims both to familiarize students with influential papers and current research, and to promote new research ideas in the area.

**FINANCE 625. Empirical Asset Pricing. 3 Units.**

This course is an introduction to empirical research in asset pricing. The focus of the course is on the interplay between financial economic theory, econometric method, and that analysis of financial market data. Topics include tests of asset pricing models, return predictability in time-series and cross-section, empirical studies of asset market imperfections, and studies of individual and professional investor behavior. Class discussions will draw on textbooks/monographs and original articles and working papers.

**FINANCE 626. Advanced Corporate Finance. 3 Units.**

This is a course on contemporary theoretical and empirical issues in corporate finance. Building upon the first-year courses in corporate finance theory and empirical methods in finance, we will examine issues in asset pricing applications to corporate finance, dynamic capital structure (dynamic financing decisions), financial distress, financing and investment interactions, and behavioral corporate finance. Both conceptual economic frameworks and econometric methods will be developed as needed. A requirement for this course is that students complete two written projects, one theoretical and one empirical, and at least one of these projects will be presented to the class.

**FINANCE 628. Finance Pre-Seminar Reading Course. 1 Unit.**

Finance Pre-Seminar Reading.

**FINANCE 630. Empirical Corporate Finance. 3 Units.**

This course provides an introduction to empirical research in corporate finance, with an emphasis on the application of cross-sectional and panel data econometric techniques for causal inference. Topics include investment policy, entrepreneurship and innovation, financing decisions, firm ownership, corporate governance, managerial incentives, financial contracting, and the structure and internal organization of firms. The course assumes knowledge of econometrics at the level of MGTECON 603.

**FINANCE 632. Empirical Dynamic Asset Pricing. 3 Units.**

This course explores the interplay between dynamic asset pricing theory, statistical assumptions about sources of risk, and the choice of econometric methods for analysis of asset return data. Therefore, the lectures will be a blend of theory, econometric method, and critical review of empirical studies. Both arbitrage-free and equilibrium preference-based pricing models will be discussed, with particular emphasis given to recent developments and outstanding puzzles in the literature. The prerequisites for F632 are MGTECON 603 - 604, Finance 620, Finance 622, and Finance 625. In particular, I will assume familiarity with dynamic asset pricing theory, at the level of F622; and large-sample theory for least-squares, generalized method-of-moments, and maximum likelihood estimation methods. We will review these methods in the context of specific applications, but this material will not be developed in depth.

**FINANCE 633. Advanced Empirical Corporate Finance. 3 Units.**

This class is devoted to recent developments in the empirical corporate finance literature. Topics include: financial contracting, liquidation and renegotiation, taxation and capital structure, the role of labor markets, leveraged buyouts, executive compensation, the causes and consequences of the financial crisis, and implications of finance for the public sector. The class is very interactive. Many of the sessions will consist of student presentations about the papers from the reading list. We will also further explore empirical methods relevant for applied research in corporate finance, with a focus on identification and panel data issues.

**FINANCE 635. Advanced Topics in Empirical Asset Pricing. 3 Units.**

This course will survey current research topics in empirical asset pricing. The emphasis will be on giving students exposure to active research areas and open questions rather than well-established areas and empirical techniques. Topics may include liquidity, capital market frictions, money management, volatility, investment-based asset pricing, return predictability, bubbles, and consumption-macro asset pricing models.

**FINANCE 637. Macroeconomics and Financial Markets. 3 Units.**

This PhD course will cover research topics at the boundary between macroeconomics and finance. Topics will include the study of macroeconomic models with financial frictions, the term structure of interest rates, conventional and unconventional monetary policy, sovereign debt crises, search frictions and segmentation in housing markets, (over)leveraging by households, heterogeneous expectations, excess volatility, financial bubbles and crises. Student presentations and course paper requirement. Designed for second year PhD students in economics or finance.

**FINANCE 691. PhD Directed Reading. 1-15 Unit.**

This course is offered for students requiring specialized training in an area not covered by existing courses. To register, a student must obtain permission from the faculty member who is willing to supervise the reading.

Same as: ACCT 691, GSBGEN 691, HRMGT 691, MGTECON 691, MKTG 691, OB 691, OIT 691, POLECON 691, STRAMGT 691

**FINANCE 692. PhD Dissertation Research. 1-15 Unit.**

This course is elected as soon as a student is ready to begin research for the dissertation, usually shortly after admission to candidacy. To register, a student must obtain permission from the faculty member who is willing to supervise the research.

Same as: ACCT 692, GSBGEN 692, HRMGT 692, MGTECON 692, MKTG 692, OB 692, OIT 692, POLECON 692, STRAMGT 692

**FINANCE 698. Doctoral Practicum in Teaching. 1 Unit.**

Doctoral Practicum in Teaching.

**FINANCE 699. Doctoral Practicum in Research. 1 Unit.**

Doctoral Practicum in Research.

**FINANCE 802. TGR Dissertation. 0 Units.**

Same as: ACCT 802, GSBGEN 802, HRMGT 802, MGTECON 802, MKTG 802, OB 802, OIT 802, POLECON 802, STRAMGT 802

**French (FRENCH)****FRENCH 112. Oscar Wilde and the French Decadents. 3-5 Units.**

Close reading of Oscar Wilde's work together with major texts and authors of 19th-century French Decadence, including Symbolism, l'art pour l'art, and early Modernism. Points of contact between Wilde and avant-garde Paris salons; provocative, creative intersections between (homo)erotic and aesthetic styles, transgression; literary and cultural developments from Baudelaire to Mallarmé, Huysmans, Flaubert, Rachilde, Lorrain, and Proust compared with Wilde's *Salomé*, *Picture of Dorian Gray*, and critical writings; relevant historical and philosophical contexts. All readings in English; all student levels welcome.

Same as: FRENCH 312

**FRENCH 12. Humanities Core: Great Books, Big Ideas -- Europe, Middle Ages and Renaissance. 3-4 Units.**

This three-quarter sequence asks big questions of major texts in the European and American tradition. What is a good life? How should society be organized? Who belongs? How should honor, love, sin, and similar abstractions govern our actions? What duty do we owe to the past and future? The second quarter focuses on the transition from the Middle Ages to Modernity, Europe's re-acquaintance with classical antiquity and its first contacts with the New World. Authors include Dante, Shakespeare, Machiavelli, Cervantes, and Milton.

Same as: DLCL 12, ENGLISH 112A, HUMCORE 12

**FRENCH 129. Camus. 4-5 Units.**

"The Don Draper of Existentialism" for Adam Gopnik, "the ideal husband of contemporary letters" for Susan Sontag, and "the admirable conjunction of a man, of an action, and of a work" for Sartre, Camus embodies the very French figure of the "intellectuel engagé," or public intellectual. From his birth in 1913 into a poor family in Algeria to the Nobel Prize in Literature in 1957, from Saint Germain-des-Prés to his predilection for the mediterranean culture, Camus captured the quest for universalism, for the politics of justice, and engaged in the great ethical battles of his time, from the fight against nazism and communism, from questioning colonial rules to the haunting Algerian War, and his complex "silence" over the war. Camus the Algerian, Camus the moralist, Camus the Resistant: through readings and films, we will explore his multiple, long-lasting legacies. Readings from Albert Camus, Kamel Daoud, Mouloud Feraoun, Alice Kaplan, Orhan Pamuk, A.B. Yehoshua, Assia Djebar, Jean-Paul Sartre, Yasmina Khadra. Movies include "The Stranger," and "Far from Men." This course is a gateway for French Studies, with special emphasis on oral proficiency. Taught in French.

Same as: CSRE 129, HISTORY 235F

**FRENCH 13. Humanities Core: Great Books, Big Ideas -- Europe, Modern. 3-4 Units.**

This three-quarter sequence asks big questions of major texts in the European and American tradition. What is a good life? How should society be organized? Who belongs? How should honor, love, sin, and similar abstractions govern our actions? What duty do we owe to the past and future? This third and final quarter focuses on the modern period, from the rise of revolutionary ideas to the experiences of totalitarianism and decolonization in the twentieth century. Authors include Locke, Mary Shelley, Marx, Nietzsche, Freud, Weber, Primo Levi, and Frantz Fanon.

Same as: DLCL 13, HISTORY 239C, HUMCORE 13, PHIL 13

**FRENCH 130. Introduction to Medieval and Renaissance French Literature. 4 Units.**

Introduction to the Middle Ages and the Renaissance. The birth of a national literature and its evolution. Literature as addressing cultural, philosophical, and artistic issues which question assumptions on love, ethics, art, and the nature of the self. Readings: epics (*La Chanson de Roland*), medieval romances (*Tristan, Chrétien de Troyes' Yvain*), post-Petrarchan poetics (*Du Bellay, Ronsard, Labé*), and prose humanists (*Rabelais, Montaigne*). Taught in French. Prerequisite: FRENLANG 124 or consent of instructor.

**FRENCH 131. Absolutism, Enlightenment, and Revolution in 17th- and 18th-Century France. 4 Units.**

The literature, culture, and politics of France from Louis XIV to Olympe de Gouges. How this period produced the political and philosophical foundations of modernity. Readings may include *Corneille, Molière, Racine, Lafayette, Voltaire, Diderot, Rousseau, Beaumarchais, and Gouges*. Taught in French. Prerequisite: FRENLANG 124 or consent of instructor.

**FRENCH 132. Literature, Revolutions, and Changes in 19th- and 20th-Century France. 4 Units.**

This course will explore several important texts of 19th- and 20th-Century French literature, with the aim of following the evolution of the main literary movements during those centuries of important cultural and social changes. We will study texts related to movements such as Romanticism, Realism, Naturalism, Surrealism, the Absurd, the Nouveau Roman in all major genres (prose, poetry, theater, film) and will regularly refer to other arts, such as painting and music. Authors include Chateaubriand, Musset, Balzac, Flaubert, Maupassant, Baudelaire, Rimbaud, Apollinaire, Proust, Céline, Radiguet, Ionesco, Robbe-Grillet, Duras, Gary. All readings, discussion, and assignments are in French.

**FRENCH 133. Literature and Society in Africa and the Caribbean. 4 Units.**

This course aims to equip students with an understanding of the cultural, political and literary aspects at play in the literatures of Francophone Africa and the Caribbean. Our primary readings will be Francophone novels and poetry, though we will also read some theoretical texts. The assigned readings will expose students to literature from diverse French-speaking regions of the African/Caribbean world. This course will also serve as a "literary toolbox," with the intention of facilitating an understanding of literary forms, terms and practices. Students can expect to work on their production of written and spoken French (in addition to reading comprehension) both in and outside of class. Special guest: LEILA SLIMANI (Goncourt Prize 2016). Required readings include: Leila Slimani, *Le Sexe et Mensonges au Maroc*, Albert Memmi, "La Statue de Sel," Kaouther Adimi, "L'Envers des autres", Maryse Condé, "La Vie sans fards". Movies include "Goodbye Morocco", "Aya de Yopougon", *Les Baies d'Alger*. nTaught in French. Prerequisite: FRENLANG 124 or consent of instructor.

Same as: AFRICAAM 133, AFRICAST 132, JEWISHST 143

**FRENCH 140. Paris: Capital of the Modern World. 4-5 Units.**

This course explores how Paris, between the eighteenth and twentieth centuries, became the political, cultural, and artistic capital of the modern world. It considers how the city has both shaped and been shaped by the tumultuous events of modern history- class conflict, industrialization, imperialism, war, and occupation. It will also explore why Paris became the major world destination for intellectuals, artists and writers. Sources will include films, paintings, architecture, novels, travel journals, and memoirs.

Same as: FRENCH 340, HISTORY 230C, URBANST 184

**FRENCH 145B. The African Atlantic. 3-5 Units.**

This course explores the central place Africa holds in prose writing emerging during early and modern periods of globalization across the Atlantic, including the middle passage, exploration and colonialism, black internationalism, decolonization, immigration, and diasporic return. We will begin with Equiano's *Interesting Narrative* (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of self-making or new citizenship, to evoke histories of racial unity or examine psychic and social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Conrad, Condé, Olinto), epic and prose poetry (Césaire, Walcott), theoretical reflection (Gilroy, Glissant, Mudimbe, Benitez-Rojo), and literary autobiography (Barack Obama, Saidiya Hartman). Note: To be eligible for WAYS credit, you must take COMPLIT 145B for a minimum of 3 Units and a Letter Grade.

Same as: AFRICAAM 148, AFRICAST 145B, COMPLIT 145B, COMPLIT 345B, CSRE 145B, FRENCH 345B

**FRENCH 156. Global May 1968. 3-5 Units.**

In April 1968, a group of students occupied their university residences, and were later forced out by the police who had stormed the campus. The students were protesting the university's links with the army. This student occupation did not take place in the 5th arrondissement of central Paris, home to the famous Sorbonne University at the heart of the student protests of May '68, but in Harlem at Columbia University in New York. May 1968 in Paris has come to symbolize - not just in France, but across the globe - the critical role of the young and of workers in the greatest upheavals in social, political and cultural life to take place since the Second World War. This course, which coincides with the 50th anniversary of this global event, will introduce students to the movements and happenings that took place in France and worldwide in and around May 1968. It will explore how these events and their afterlives shaped then and now French and global conversations around nationalism, imperialism, capital, gender, culture, globalization, and aesthetics. NOTE: To be eligible for WAYS credit, you must take FRENCH 136 for a minimum of 3 Units and a Letter Grade.

Same as: FRENCH 356

**FRENCH 157. Love and Lust in the French Empire, 1830-1962. 5 Units.**

Can we write the history of private life? Throughout this course, we will try out different historical approaches to the history of intimate matters in the French Empire. Beyond a more complete understanding of what colonialism was like, studying the intimate draws attention to the societal norms and anxieties of the nineteenth and twentieth centuries. Patriarchy, racism, and classism the power structures inherent in colonialism; produce fruitful sites for prying into intimate matters. To that end, we will probe a wide variety of primary sources, including novels, films, paintings, letters, diaries, travel accounts produced by male and female Europeans, Africans, Arabs, and East Asians. Topics covered through these sources include, colonial masculinity and femininity; divorce; homosexuality; prostitution; and sexual violence. We will transcend racial and class divides, and cover a diverse geography including, France, North and West Africa, and Vietnam.

Same as: FEMGEN 37S, HISTORY 37S

**FRENCH 166. Food, Text, Music: A Multidisciplinary Lab on the Art of Feasting. 3-5 Units.**

Students cook a collection of unfamiliar recipes each week while learning about the cultural milieus in which they originated. The course focuses on the fourteenth and fifteenth centuries, a time of great banquets that brought together chefs, visual artists, poets, musicians, and dancers. Students read late-medieval cookbooks under the guidance of professional chefs, learn songs and poetry with the help of visiting performers, and delve into a burgeoning scholarly literature on food history and sensory experience. We will also study trade routes and food networks, the environmental impact of large-scale banquets, the science of food, and the politics of plenty. This course may count towards the Medieval component of the French major, and corresponds to DLCL 121, a course requirement for the Medieval Studies Minor. Students interested in applying for course need to email Professors Galvez and Rodin (mailto:mgalvez@stanford.edu and mailto:jrodin@stanford.edu) with a statement of intent and dietary restrictions/preferences. Same as: FRENCH 366, MUSIC 133, MUSIC 333

**FRENCH 175. CAPITALS: How Cities Shape Cultures, States, and People. 3-5 Units.**

This course takes students on a trip to eight capital cities, at different moments in time: Renaissance Florence, Golden Age Madrid, Colonial Mexico City, Enlightenment and Romantic Paris, Existential and Revolutionary St. Petersburg, Roaring Berlin, Modernist Vienna, and bustling Buenos Aires. While exploring each place in a particular historical moment, we will also consider the relations between culture, power, and social life. How does the cultural life of a country intersect with the political activity of a capital? How do large cities shape our everyday experience, our aesthetic preferences, and our sense of history? Why do some cities become cultural capitals? Primary materials for this course will consist of literary, visual, sociological, and historical documents (in translation); authors we will read include Boccaccio, Lope de Vega, Sor Juana, Montesquieu, Baudelaire, Dostoyevsky, Irmgard Keun, Freud, and Borges. Note: To be eligible for WAYS credit, you must take the course for a minimum of 3 Units and a Letter Grade.

Same as: COMPLIT 100, DLCL 100, GERMAN 175, HISTORY 206E, ILAC 175, ITALIAN 175, URBANST 153

**FRENCH 181. Philosophy and Literature. 5 Units.**

Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track. Majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature, with particular focus on the question of value: what, if anything, does engagement with literary works do for our lives? Issues include aesthetic self-fashioning, the paradox of tragedy, the paradox of caring, the truth-value of fiction, metaphor, authorship, irony, make-believe, expression, edification, clarification, and training. Readings are drawn from literature and film, philosophical theories of art, and stylistically interesting works of philosophy. Authors may include Sophocles, Chaucer, Dickinson, Proust, Woolf, Borges, Beckett, Kundera, Charlie Kaufman; Barthes, Foucault, Nussbaum, Walton, Nehamas; Plato, Montaigne, Schopenhauer, Nietzsche, and Sartre. Taught in English.

Same as: CLASSICS 42, COMPLIT 181, ENGLISH 81, GERMAN 181, ITALIAN 181, PHIL 81, SLAVIC 181

**FRENCH 187. Sex, Gender, and Violence: French Women Writers Today. 3-5 Units.**

Long before the 2017 #MeToo campaign, French women writers have explored through powerful fictions and autobiographies the different shades of economic, social, psychological, physical, or sexual violence that are exerted against, but also by and between, women. How does literature - the power of words - address, deconstruct or comfort power dynamics (during sex and between the sexes) that are usually silenced, taboo or unspeakable? We will contrast these narrative to debates among French feminist writers (Beauvoir, Badinter, Mona Ozouf, Françoise Héritier, Michelle Perrot) around the theory (or myth?) of a specifically French kind of gender relation (ex: "galanterie," "séduction"). Themes explored: sex and gender, sex and power, rape culture, sexual and moral taboos (incest, abortion, pornography, infanticide), the body as social stigma or source of meaning, identity, power. Special attention will be given to narrative and descriptive strategies designed to avert, expose, deconstruct or account for specifically feminine experiences (rape, orgasm, pregnancy). Award-winning author Leila Slimani will participate in person in the class discussion of her novel on infanticide. Authors include Marie Darrieusecq, Christine Angot, Annie Ernaux, Marie NDiaye, Virginie Despentes, Leila Slimani, Ivan Jablonka. Taught in French. Same as: FEMGEN 187X, FEMGEN 287X, FRENCH 287, FRENCH 387

**FRENCH 192. Women in French Cinema: 1958-. 3-5 Units.**

Women as objects and subjects of the voyeuristic gaze inherent to cinema. The myth of the feminine idol in French films in historical and cultural context since the New Wave until now. The mythology of stars as the imaginary vehicle that helped France to change from traditional society to modern, culturally mixed nation. The evolution of female characters, roles, actresses, directors in the film industry. Filmmakers include Vadim, Truffaut, Varda, Godard, Ozon, Coline Serreau, Tonie Marshall, Maiwén. Discussion in English; films in French with English subtitles. 3 units, 4 units or 5 units. NOTE: FILMSTUD students must take this course for 3 units only. Same as: FEMGEN 192, FILMSTUD 112

**FRENCH 199. Individual Work. 1-12 Unit.**

Restricted to French majors with consent of department. Normally limited to 4-unit credit toward the major. May be repeated for credit.

**FRENCH 205. Songs of Love and War: Gender, Crusade, Politics. 3-5 Units.**

Analysis of medieval love, satirical and Crusade lyrics of the troubadours. Study of deictic address, corporeal subjectivity, the female voice, love debates, and the body as a figure of political conflict. Course readings include medieval treatises on lyric and modern translations of the troubadour tradition. Works by Ovid, Bernart de Ventadorn, Bertran de Born, La Comtesse de Dia, Thibaut de Champagne, Raimon Vidal, Dante, and Pound. Taught in English. Course includes a lab component for creation of multi-media translation projects: trobar. stanford.edu. Same as: FEMGEN 205

**FRENCH 219. The Renaissance Body in French Literature and Medicine. 3-5 Units.**

If the Renaissance is famous for discovering unknown continents and ancient texts the body too was a new territory of conquest. How did literature respond to the rise of an anatomical gaze in the arts and in medicine and how did it stage the aesthetic religious philosophical and moral issues related to such a promotion or deconstruction of the body? Does literature aim at representing the body or does it use it instead as a ubiquitous signifier for intellectual emotional and political ideas? The locus of desire, pleasure and disease, the body also functioned as a reminder of human mortality and was caught in the web of gender issues, religious controversies and new norms of behavior. Texts from prose fiction (Rabelais) poetry (Scève Ronsard Labé D'Aubigné) essays (Montaigne) and emblem literature. Extra documents include music scores tapestries paintings philosophical and anatomical plates from medical treatises. Taught in English; readings in French and English. Same as: FRENCH 319

**FRENCH 228. Science, technology and society and the humanities in the face of the looming disaster. 3-5 Units.**

How STS and the Humanities can together help think out the looming catastrophes that put the future of humankind in jeopardy. Same as: ITALIAN 228, POLISCI 233F

**FRENCH 229. Literature and Global Health. 3-5 Units.**

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with a call made by the editor-in-chief of The Lancet for a literature of global health, namely fiction modeled on the social reform novels of the nineteenth century, understood to have helped readers develop a conscience for public health as the field emerged as a modern medical specialty. We will then spend the quarter understanding how colonial, postcolonial, and world literatures have answered and complicated this call. Readings will include prose fiction by Albert Camus, Joseph Conrad, Tsitsi Dangaremba, Amitav Ghosh, Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese, Paul Farmer. And each literary reading will be paired with medical, philosophical, and policy writings that deeply inform the field of global health. Note: To be eligible for WAYS credit, you must take the course for a Letter Grade.

Same as: AFRICAAM 229, AFRICAST 229, COMPLIT 229, CSRE 129B, HUMBIO 175L, MED 234

**FRENCH 230. Giambattista Vico & Claude Lévi-Strauss. 3-5 Units.**

An intensive reading of Vico's New Science with special emphasis on Vico's theory of anthropogenesis, myth, and the poetic origins of human consciousness. Vico's thought will be placed in relation to Lévi-Strauss's theories of myth and so-called "primitive thought". Readings include Vico's New Science and Lévi-Strauss's "The Structural Study of Myth", and the first chapters of his book The Savage Mind. Taught in English. Same as: FRENCH 330, ITALIAN 327

**FRENCH 239. The Afterlife of the Middle Ages. 3-5 Units.**

Literary works that evoke a medieval past in contrast to a historical present, and critical texts that treat aspects of the medieval or medievalism. How does the concept of medievalism emerge and evolve through the ages? Topics include periodization, philology, critical theory, the study of Gothic architecture, and the use of the term medieval in modern political discourse and postcolonial studies. Authors include Burckhardt, Camille, Chateaubriand, Chrétien de Troyes, Didi-Huberman, Jauss, Michelet, Panofsky, Pound, films by Dreyer and Bergman, and contemporary poetry. Taught in English. Same as: FRENCH 339

**FRENCH 246. Body over Mind. 3-5 Units.**

How does modern fiction, aided by modern philosophy, give the lie to Descartes' famous "I think therefore I am"? And how does writing convey the desire for a different, perhaps stronger, integration of mind and body? Does the body speak a particular truth that we must learn to hear, that the mind is not always connected to? How do modern metaphors for the mind-body connection shape our experience? These questions will be explored via the works of major French and Italian writers and thinkers, including Pirandello, Calvino, Camus, Houellebecq, Sartre, and Agamben. Same as: FRENCH 346, ITALIAN 346

**FRENCH 249. The Algerian Wars. 3-5 Units.**

From Algiers the White to Algiers the Red, Algiers, the Mecca of the Revolutionaries in the words of Amílcar Cabral, this course offers to study the Algerian Wars since the French conquest of Algeria (1830-) to the Algerian civil war of the 1990s. We will revisit the ways in which the war has been narrated in literature and cinema, popular culture, and political discourse. A special focus will be given to the Algerian War of Independence (1954-1962). The course considers the racial representations of the war in the media, the continuing legacies surrounding the conflict in France, Africa, and the United States, from Che Guevara to the Black Panthers. A key focus will be the transmission of collective memory through transnational lenses, and analyses of commemorative events and movies. Readings from James Baldwin, Assia Djebar, Albert Camus, Frantz Fanon, Mouloud Feraoun. Movies include "The Battle of Algiers," "Days of Glory," and "Viva Laldjérie."

NTaught in English.

Same as: CSRE 249, HISTORY 239G, JEWISHST 249

**FRENCH 252. Art and Power: From Royal Spectacle to Revolutionary Ritual. 3-5 Units.**

From the Palace of Versailles to grand operas to Jacques-Louis David's portraits of revolutionary martyrs, rarely have the arts been so powerfully mobilized by the State as in early modern France. This course examines how the arts were used from Louis XIV to the Revolution in order to broadcast political authority across Europe. We will also consider the resistance to such attempts to elicit shock-and-awe through artistic patronage. By studying music, architecture, garden design, the visual arts, and theater together, students will gain a new perspective on works of art in their political contexts. But we will also examine the libelous pamphlets and satirical cartoons that turned the monarchy's grandeur against itself, ending the course with an examination of the new artistic regime of the French Revolution. The course will be taught in English with the option of French readings for departmental majors.

Same as: ARTHIST 252A

**FRENCH 254. Was Deconstruction an Illusion?. 3-5 Units.**

A both systematic and historical presentation of "Deconstruction" as a philosophical and intellectual movement that dominated academic and general culture in many western societies during the final decades of the twentieth century, with special focus on the writings of Jacques Derrida and Paul de Man. Deconstruction's specific reception history obliges us to ask the question of whether the extremely high esteem that it enjoyed over two decades was intellectually justified or the result of a misunderstanding. Participation through English translations is possible.

**FRENCH 260. Italy, France, and Postcolonialism. 3-5 Units.**

The starting point for our seminar is the question of how postcolonial thought enhances our possible understandings of Italy - as a nation, as a territorial unit coalescing cultural parts that remain disparate to this day, and as a population that has not come fully to terms with its fascist history, its crimes in World War II, or the atrocities it perpetrated as a colonizing state. The Italian case is unusual compared to others, in that the country's colonial past in north and east Africa is still being uncovered after a long period of public silence and government suppression; and what might be called the postcolonial Italian project has begun only recently, driven by a distinct minority of scholars, 'migrant' authors, and activists. French cultural politics and history are often taken as a point of reference from which to analyze Italian phenomena. In this case, we will make use of the French postcolonial tradition as a point of both comparison and differentiation. Among other things, we will focus on the different meanings of 'postcolonial' in a country that is strongly centralized (France) and another which is unremittingly fragmented (Italy). As just one example, we will scrutinize how Gramsci's work has been understood in Anglophone and Francophone criticism (cultural studies, Subaltern studies, and so on), as opposed to how it may be read in its original Italian context, where it concerned subalterns within the nation-state. Asking what is postcolonial, for whom, when, and where?, ultimately our goal is to discern the specific contours of Italy's postcolonialism by juxtaposing it with France's, and to simultaneously ask what light can be shed on French postcolonial particularities by placing it in this dialogue. Beginning with fundamental historical readings (Gramsci, Fanon, Memmi) and touching on some early Anglophone postcolonial critics (Said, Bhabha), the seminar will then be structured around key literary and theoretical readings from Italy and France. Ideally, readings will be in the original language, but as often as possible they will be selected such that they will be accessible in English translation as well. Taught in English.

**FRENCH 261. War and Peace: Writings by and about Veterans in the 20th and 21st Centuries. 2-5 Units.**

Since the aftermath of World War One, and with increasing urgency in contemporary America, stories about and by veterans are assigned a double role: that of exposing the horror of war yet also defending the possibility of a just war, and that of healing both veterans themselves and the society they return to. Key questions for this course are: Given the current practice of using writing and the hero's journey as a model for healing veterans and making their voices heard in our culture, can we look back to post-World-War-One culture and see if writing fulfills a similar function? And given how many post-World-War-One veterans became famous writers, how do we assess the interplay between literature, poetry, memoir, journalism, personal letters, photo accounts? Is there a connection between artistic innovation and the capacity to heal? Same as: FRENCH 361, ITALIAN 261, ITALIAN 361

**FRENCH 270. Les Misérables. 3-5 Units.**

*Les Misérables* is a true monument to XIXth century France. Yet, though everyone has heard of it, few have actually read it. In this seminar, we will correct this by reading the whole tome and by discussing its relevance to both its historical context and our current world. A monstrous novel spanning about 1800 pages, *Les Misérables* also spans a whole century of political conflict, social strife, cultural transformations, a personal drama. During the course of the quarter, we will go slowly through the novel, by turning our attention during each session to a specific topic present in the reading for the day. Those topics will include, among others, religion, the role of women in society, romanticism, war, Paris in the XIXth century, revolution, and justice. Taught in French. Same as: FRENCH 370



**FRENCH 272. Body Doubles: From the Fantastic Short Story to Science-Fiction. 2-5 Units.**

How do we imagine our bodies through language, at times almost completely refashioning a physical double, be it idealized or abject? How do such body doubles intersect with our sense of self, defining or redefining sexual identity, spiritual aspirations, illness and recovery, and the senses themselves, as our window into reality? This course focuses on short stories from the late 19th- and early 20th-century fantastic genre, and science fiction stories from the following turn of the century, 100 years later: in these revealing instances, body doubles often seem to acquire a will of their own, overwhelming normal physical identity. Same as: FRENCH 372, ITALIAN 272, ITALIAN 372

**FRENCH 287. Sex, Gender, and Violence: French Women Writers Today. 3-5 Units.**

Long before the 2017 #MeToo campaign, French women writers have explored through powerful fictions and autobiographies the different shades of economic, social, psychological, physical, or sexual violence that are exerted against, but also by and between, women. How does literature - the power of words - address, deconstruct or comfort power dynamics (during sex and between the sexes) that are usually silenced, taboo or unspeakable? We will contrast these narrative to debates among French feminist writers (Beauvoir, Badinter, Mona Ozouf, Françoise Héritier, Michelle Perrot) around the theory (or myth?) of a specifically French kind of gender relation (ex: "galanterie," "séduction"). Themes explored: sex and gender, sex and power, rape culture, sexual and moral taboos (incest, abortion, pornography, infanticide), the body as social stigma or source of meaning, identity, power. Special attention will be given to narrative and descriptive strategies designed to avert, expose, deconstruct or account for specifically feminine experiences (rape, orgasm, pregnancy). Award-winning author Leïla Slimani will participate in person in the class discussion of her novel on infanticide. Authors include Marie Darrieusecq, Christine Angot, Annie Ernaux, Marie NDiaye, Virginie Despentes, Leïla Slimani, Ivan Jablonka. Taught in French. Same as: FEMGEN 187X, FEMGEN 287X, FRENCH 187, FRENCH 387

**FRENCH 312. Oscar Wilde and the French Decadents. 3-5 Units.**

Close reading of Oscar Wilde's work together with major texts and authors of 19th-century French Decadence, including Symbolism, l'art pour l'art, and early Modernism. Points of contact between Wilde and avant-garde Paris salons; provocative, creative intersections between (homo)erotic and aesthetic styles, transgression; literary and cultural developments from Baudelaire to Mallarmé, Huysmans, Flaubert, Rachilde, Lorrain, and Proust compared with Wilde's *Salomé*, *Picture of Dorian Gray*, and critical writings; relevant historical and philosophical contexts. All readings in English; all student levels welcome. Same as: FRENCH 112

**FRENCH 319. The Renaissance Body in French Literature and Medicine. 3-5 Units.**

If the Renaissance is famous for discovering unknown continents and ancient texts the body too was a new territory of conquest. How did literature respond to the rise of an anatomical gaze in the arts and in medicine and how did it stage the aesthetic religious philosophical and moral issues related to such a promotion or deconstruction of the body? Does literature aim at representing the body or does it use it instead as a ubiquitous signifier for intellectual emotional and political ideas? The locus of desire, pleasure and disease, the body also functioned as a reminder of human mortality and was caught in the web of gender issues, religious controversies and new norms of behavior. Texts from prose fiction (Rabelais) poetry (Scève Ronsard Labé D'Aubigné) essays (Montaigne) and emblem literature. Extra documents include music scores tapestries paintings philosophical and anatomical plates from medical treatises. Taught in English; readings in French and English. Same as: FRENCH 219

**FRENCH 320. The Posthumanistic Subject. 3-5 Units.**

The course will examine the need to rethink the traditional western idea of the strong subject. Through close readings of works by Agamben, Braidotti, Derrida, Deleuze, Hall, Haraway, Latour, Wolfe, among others, this course will explore posthumanist theories of individual and collective subjectivity that challenge traditional ways of defining the human and the non-human subject/person and promote fundamental reconsideration of issues such as agency, autonomy, essence, freedom, dignity, otherness, substance, personhood, sociality, and life itself. The course would consider, how we can empower the subject and community in order to develop a desired model of participatory democracy. Prerequisite: graduate standing or consent of instructor.

**FRENCH 322. Decadence and Modernism from Mallarmé to Marinetti. 1-2 Unit.**

One hundred years ago, artists feared their work was incompatible with modern economic systems, secular bourgeois values, and materialist science. Accused of being decadent, they took up this term of derision and made it into a program of rebellion that has shaped modern art. This course explores decadent rebellion, with an eye toward how the last turn of the century might be similar to our current one. Writers include Huysmans, Poe, Mallarmé, Nietzsche, Nordau, d'Annunzio, Valéry, Ungaretti, Marinetti, and Breton; we will also consider parallels in the visual arts.

**FRENCH 330. Giambattista Vico & Claude Lévi-Strauss. 3-5 Units.**

An intensive reading of Vico's *New Science* with special emphasis on Vico's theory of anthropogenesis, myth, and the poetic origins of human consciousness. Vico's thought will be placed in relation to Lévi-Strauss's theories of myth and so-called "primitive thought". Readings include Vico's *New Science* and Lévi-Strauss's "The Structural Study of Myth", and the first chapters of his book *The Savage Mind*. Taught in English. Same as: FRENCH 230, ITALIAN 327

**FRENCH 331. The Craft of Confession and Its Cultural Contexts. 5 Units.**

Course examines medieval treatises and literature relating to the practice of confession as well as modern examples, with a focus on medieval concern with a sincere and authentic confession in theological, ethical, and aesthetic terms. Study includes expressions of subjectivity, institutional frameworks of confession, and the phenomenon as an instrument for political activity such as crusade. Texts: Augustine's *Confessions*, pastoral treatises, Aquinas, Arthurian romances concerning the grail legend, crusade lyric, and Foucault; films such as Dreyer and martyrdom videos. Taught in French.

**FRENCH 335A. Animism and Alter-Native Modernities. 5 Units.**

For many years indigenous knowledges were treated as a field of research for anthropologists and as "mistaken epistemologies," i. e., unscientific and irrational folklore and childish worldviews. This old view of animism was a product of the evolutionist and anthropocentric worldview of the Enlightenment. However within the framework of ecological humanities, current interest in posthumanism, postsecularism and discussions on building altermodernity (Michael Hardt and Antonio Negri), indigenous thought is used to critique modern epistemology and develop an alternative to the Western worldview. Treating native thought as an equivalent to Western knowledge is presented as a decolonizing and liberating practice. The term alter-native modernities as response to the challenges of Euromodernity and suggests modernities that might emerge out of indigenous ways of being in the world. Comparison between literature on indigenous cultures from Latin America and from Russia (animism in Amazonia and Siberia). Following recent works by anthropologists and archaeologists such as Nurit Bird-Rose, Philippe Descola, Graham Harvey, Tim Ingold and Viveiros de Castro, new animism is treated as an alternative (relational) ontology that allows rethinking the problem of matter and agency, goes beyond human exceptionalism and embraces non-humans. Topics include: alternative and alter-native modernities; Jean Piaget's theory of childhood animism; problem of anthropomorphism and personification; indigenous knowledge and the problem of epistemic violence; vitalist materialism (Jane Bennett, Rosi Braidotti); connectedness as the principle of life (relational epistemologies and ontologies); non-human agency (Bruno Latour). Same as: ANTHRO 335A, REES 335A

**FRENCH 339. The Afterlife of the Middle Ages. 3-5 Units.**

Literary works that evoke a medieval past in contrast to a historical present, and critical texts that treat aspects of the medieval or medievalism. How does the concept of medievalism emerge and evolve through the ages? Topics include periodization, philology, critical theory, the study of Gothic architecture, and the use of the term medieval in modern political discourse and postcolonial studies. Authors include Burckhardt, Camille, Chateaubriand, Chrétien de Troyes, Didi-Huberman, Jauss, Michelet, Panofsky, Pound, films by Dreyer and Bergman, and contemporary poetry. Taught in English. Same as: FRENCH 239

**FRENCH 339A. Technologies of Extinctions: Ecocides and Genocides. 5 Units.**

This course will explore the relationship between history, ecological evolution and mass killing in the age of humanly caused species extinction. It will explore the universalization of the notion of the Jewish Holocaust, its use to integrate into genocide studies the Native American "spiritual" holocaust, the Japanese nuclear holocaust and the Rwandan genocide, and the ethical dilemmas posed by the ideas of biotic, animal and ecological holocausts. Anthropology and history of genocides and extinctions as well as posthumanist, multispecies theories will provide theoretical frames for the course. Same as: ANTHRO 339A

**FRENCH 340. Paris: Capital of the Modern World. 4-5 Units.**

This course explores how Paris, between the eighteenth and twentieth centuries, became the political, cultural, and artistic capital of the modern world. It considers how the city has both shaped and been shaped by the tumultuous events of modern history- class conflict, industrialization, imperialism, war, and occupation. It will also explore why Paris became the major world destination for intellectuals, artists and writers. Sources will include films, paintings, architecture, novels, travel journals, and memoirs.

Same as: FRENCH 140, HISTORY 230C, URBANST 184

**FRENCH 341A. Post-secular Humanities: Religion and Spirituality in the Contemporary World. 5 Units.**

The term "postsecularism" refers to various theories and approaches regarding the revival of religion in the present, as well as current reevaluations of the relationship between faith and reason in knowledge building. When thinking about a postsecular humanities, the course would follow scholars that are usually associated with this trend (like Agamben, Badiou, Derrida, Habermas), on the one hand, and discuss Braidotti's ideas of a new vitalism, Chakrabarty's postcolonial postsecularism, and Harvey's new animism, on the other. The course will examine the way interactions and collisions among various worldviews can provoke the rethinking of key ideas of our times: what it means to be secular, religious, a citizen, a hybrid, an indigenous, a non-human. Same as: ANTHRO 340A, REES 340A

**FRENCH 343. In Defense of Poetry. 3-5 Units.**

Beginning with the account of the quarrel between philosophy and poetry in Plato's Republic, we will read definitions and defenses of poetry by authors such as Cicero, Horace, Petrarch, Boccaccio, Sidney, Shelley, and Pound, among others. While we will try to historicize these authors' defenses as much as possible, we will also read them from the perspective of contemporary efforts to defend literature and the humanities. Topics of central concern will be the connection between poetry and ethics, the conflict between poetry and the professions of business, law, and medicine, poetry's place in the university, the political role of the poet, questions of poetic language and form, and the relevance of defenses of poetry to literary theory.

**FRENCH 345B. The African Atlantic. 3-5 Units.**

This course explores the central place Africa holds in prose writing emerging during early and modern periods of globalization across the Atlantic, including the middle passage, exploration and colonialism, black internationalism, decolonization, immigration, and diasporic return. We will begin with Equiano's Interesting Narrative (1789), a touchstone for the Atlantic prose tradition, and study how writers crossing the Atlantic have continued to depict Africa in later centuries: to dramatize scenes of departure and arrival in stories of self-making or new citizenship, to evoke histories of racial unity or examine psychic and social fragmentation, to imagine new national communities or question their norms and borders. Our readings will be selected from English, French, Portuguese and Spanish-language traditions. And we will pay close attention to genres of prose fiction (Conrad, Condé, Olinto), epic and prose poetry (Césaire, Walcott), theoretical reflection (Gilroy, Glissant, Mudimbe, Benitez-Rojo), and literary autobiography (Barack Obama, Saidiya Hartman). Note: To be eligible for WAYS credit, you must take COMPLIT 145B for a minimum of 3 Units and a Letter Grade.

Same as: AFRICAAM 148, AFRICAST 145B, COMPLIT 145B, COMPLIT 345B, CSRE 145B, FRENCH 145B

**FRENCH 346. Body over Mind. 3-5 Units.**

How does modern fiction, aided by modern philosophy, give the lie to Descartes' famous "I think therefore I am"? And how does writing convey the desire for a different, perhaps stronger, integration of mind and body? Does the body speak a particular truth that we must learn to hear, that the mind is not always connected to? How do modern metaphors for the mind-body connection shape our experience? These questions will be explored via the works of major French and Italian writers and thinkers, including Pirandello, Calvino, Camus, Houellebecq, Sartre, and Agamben. Same as: FRENCH 246, ITALIAN 346

**FRENCH 356. Global May 1968. 3-5 Units.**

In April 1968, a group of students occupied their university residences, and were later forced out by the police who had stormed the campus. The students were protesting the university's links with the army. This student occupation did not take place in the 5th arrondissement of central Paris, home to the famous Sorbonne University at the heart of the student protests of May '68, but in Harlem at Columbia University in New York. May 1968 in Paris has come to symbolize - not just in France, but across the globe - the critical role of the young and of workers in the greatest upheavals in social, political and cultural life to take place since the Second World War. This course, which coincides with the 50th anniversary of this global event, will introduce students to the movements and happenings that took place in France and worldwide in and around May 1968. It will explore how these events and their afterlives shaped then and now French and global conversations around nationalism, imperialism, capital, gender, culture, globalization, and aesthetics. NOTE: To be eligible for WAYS credit, you must take FRENCH 136 for a minimum of 3 Units and a Letter Grade.

Same as: FRENCH 156

**FRENCH 36. Dangerous Ideas. 1 Unit.**

Ideas matter. Concepts such as race, progress, and evil have inspired social movements, shaped political systems, and dramatically influenced the lives of individuals. Others, like religious tolerance, voting rights, and wilderness preservation play an important role in contemporary debates in the United States. All of these ideas are contested, and they have a real power to change lives, for better and for worse. In this one-unit class we will examine these dangerous ideas. Each week, a faculty member from a different department in the humanities and arts will explore a concept that has shaped human experience across time and space. Some weeks will have short reading assignments, but you are not required to purchase any materials.

Same as: ARTHIST 36, COMPLIT 36A, EALC 36, ENGLISH 71, HISTORY 3D, MUSIC 36H, PHIL 36, POLISCI 70, RELIGST 21X, SLAVIC 36

**FRENCH 361. War and Peace: Writings by and about Veterans in the 20th and 21st Centuries. 2-5 Units.**

Since the aftermath of World War One, and with increasing urgency in contemporary America, stories about and by veterans are assigned a double role: that of exposing the horror of war yet also defending the possibility of a just war, and that of healing both veterans themselves and the society they return to. Key questions for this course are: Given the current practice of using writing and the hero's journey as a model for healing veterans and making their voices heard in our culture, can we look back to post-World-War-One culture and see if writing fulfills a similar function? And given how many post-World-War-One veterans became famous writers, how do we assess the interplay between literature, poetry, memoir, journalism, personal letters, photo accounts? Is there a connection between artistic innovation and the capacity to heal?.

Same as: FRENCH 261, ITALIAN 261, ITALIAN 361

**FRENCH 366. Food, Text, Music: A Multidisciplinary Lab on the Art of Feasting. 3-5 Units.**

Students cook a collection of unfamiliar recipes each week while learning about the cultural milieus in which they originated. The course focuses on the fourteenth and fifteenth centuries, a time of great banquets that brought together chefs, visual artists, poets, musicians, and dancers. Students read late-medieval cookbooks under the guidance of professional chefs, learn songs and poetry with the help of visiting performers, and delve into a burgeoning scholarly literature on food history and sensory experience. We will also study trade routes and food networks, the environmental impact of large-scale banquets, the science of food, and the politics of plenty. This course may count towards the Medieval component of the French major, and corresponds to DLCL 121, a course requirement for the Medieval Studies Minor. Students interested in applying for course need to email Professors Galvez and Rodin (mailto:mgalvez@stanford.edu and mailto:jrodin@stanford.edu) with a statement of intent and dietary restrictions/preferences.

Same as: FRENCH 166, MUSIC 133, MUSIC 333

**FRENCH 369. Introduction to the Profession of Literary Studies. 1-2 Unit.**

A survey of how literary theory and other methods have been made institutional since the nineteenth century. The readings and conversation are designed for entering Ph.D. students in the national literature departments and comparative literature.

Same as: COMPLIT 369, DLCL 369, GERMAN 369, ITALIAN 369

**FRENCH 370. Les Misérables. 3-5 Units.**

*Les Misérables* is a true monument to XIXth century France. Yet, though everyone has heard of it, few have actually read it. In this seminar, we will correct this by reading the whole tome and by discussing its relevance to both its historical context and our current world. A monstrous novel spanning about 1800 pages, *Les Misérables* also spans a whole century of political conflict, social strife, cultural transformations, a personal drama. During the course of the quarter, we will go slowly through the novel, by turning our attention during each session to a specific topic present in the reading for the day. Those topics will include, among others, religion, the role of women in society, romanticism, war, Paris in the XIXth century, revolution, and justice. Taught in French.

Same as: FRENCH 270

**FRENCH 372. Body Doubles: From the Fantastic Short Story to Science-Fiction. 2-5 Units.**

How do we imagine our bodies through language, at times almost completely refashioning a physical double, be it idealized or abject? How do such body doubles intersect with our sense of self, defining or redefining sexual identity, spiritual aspirations, illness and recovery, and the senses themselves, as our window into reality? This course focuses on short stories from the late 19th- and early 20th-century fantastic genre, and science fiction stories from the following turn of the century, 100 years later: in these revealing instances, body doubles often seem to acquire a will of their own, overwhelming normal physical identity.

Same as: FRENCH 272, ITALIAN 272, ITALIAN 372

**FRENCH 387. Sex, Gender, and Violence: French Women Writers Today. 3-5 Units.**

Long before the 2017 #MeToo campaign, French women writers have explored through powerful fictions and autobiographies the different shades of economic, social, psychological, physical, or sexual violence that are exerted against, but also by and between, women. How does literature - the power of words - address, deconstruct or comfort power dynamics (during sex and between the sexes) that are usually silenced, taboo or unspeakable? We will contrast these narrative to debates among French feminist writers (Beauvoir, Badinter, Mona Ozouf, Françoise Héritier, Michelle Perrot) around the theory (or myth?) of a specifically French kind of gender relation (ex: "galanterie," "séduction"). Themes explored: sex and gender, sex and power, rape culture, sexual and moral taboos (incest, abortion, pornography, infanticide), the body as social stigma or source of meaning, identity, power. Special attention will be given to narrative and descriptive strategies designed to avert, expose, deconstruct or account for specifically feminine experiences (rape, orgasm, pregnancy). Award-winning author Leila Slimani will participate in person in the class discussion of her novel on infanticide. Authors include Marie Darrieusecq, Christine Angot, Annie Ernaux, Marie NDiaye, Virginie Despentes, Leila Slimani, Ivan Jablonka. Taught in French.

Same as: FEMGEN 187X, FEMGEN 287X, FRENCH 187, FRENCH 287

**FRENCH 395. Philosophical Reading Group. 1 Unit.**

Discussion of one contemporary or historical text from the Western philosophical tradition per quarter in a group of faculty and graduate students. For admission of new participants, a conversation with H. U. Gumbrecht is required. May be repeated for credit. Taught in English.

Same as: COMPLIT 359A, ITALIAN 395

**FRENCH 398. Intensive Reading in French/Italian. 10 Units.**

Enrollment is limited to French/Italian Ph.D. students. Course is designed for French/Italian Ph.D. students to prepare for department milestone exams.

Same as: ITALIAN 398

**FRENCH 399. Individual Work. 1-12 Unit.**

For students in French working on special projects or engaged in pre-dissertation research.

**FRENCH 75N. Narrative Medicine and Near-Death Experiences. 3 Units.**

Even if many of us don't fully believe in an afterlife, we remain fascinated by visions of it. This course focuses on Near-Death Experiences and the stories around them, investigating them from the many perspectives pertinent to the growing field of narrative medicine: medical, neurological, cognitive, psychological, sociological, literary, and filmic. The goal is not to understand whether the stories are veridical but what they do for us, as individuals, and as a culture, and in particular how they seek to reshape the patient-doctor relationship. Materials will span the 20th century and come into the present. Taught in English.

Same as: ITALIAN 75N

**FRENCH 801. TGR Project. 0 Units.****FRENCH 802. TGR Dissertation. 0 Units.****FRENCH 87N. The New Wave: How The French Reinvented Cinema. 3-4 Units.**

Focus on the French New Wave's cinematic revolution of 1959-1962. In a few years, the Nouvelle Vague delivered landmark works such as Truffaut's *400 Blows*, Godard's *Breathless*, Chabro's *Le Beau Serge* or Resnais' *Hiroshima mon amour*, and changed forever the way we make and think about movies. Why did these films look so radically fresh? What do they say about France's youth culture in the early 60s? How is the author's theory behind them still influencing us today? Focus is on cultural history, aesthetic analysis, interpretation of narrative, sound and visual forms. Taught in English.

## Genetics (GENE)

**GENE 104Q. Law and the Biosciences. 3 Units.**

Preference to sophomores. Focus is on human genetics; also assisted reproduction and neuroscience. Topics include forensic use of DNA, genetic testing, genetic discrimination, eugenics, cloning, pre-implantation genetic diagnosis, neuroscientific methods of lie detection, and genetic or neuroscience enhancement. Student presentations on research paper conclusions.

**GENE 199. Undergraduate Research. 1-18 Unit.**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

**GENE 19SI. Impact Investing in Neuroscience. 2 Units.**

The course will feature seminar-style lectures to examine various scenarios of investing for impact, incorporating both social and financial return metrics. Primary focus will be on developing ideas on best practices that will guide efficient allocation of funding in research, and early and later stage ventures for the advancement of the neuroscience sector and its impact on patients worldwide. Students will be able to engage with invited guest speakers, professionals within academia, non-profit and for-profit sectors, and learn about current practices in impact investing.

**GENE 200. Genetics and Developmental Biology Training Camp. 1 Unit.**

Open to first year Department of Genetics and Developmental Biology students, to others with consent of instructors. Introduction to basic manipulations, both experimental and conceptual, in genetics and developmental biology.

Same as: DBIO 200

**GENE 202. Human Genetics. 4 Units.**

Utilizes lectures and small group activities to develop a working knowledge of human genetics as applicable to clinical medicine. Basic principles of inheritance, risk assessment, and population genetics are illustrated using examples drawn from diverse areas of medical genetics practice including prenatal, pediatric, adult and cancer genetics. Practical aspects of molecular and cytogenetic diagnostic methods are emphasized. Existing and emerging treatment strategies for single gene disorders are also covered. Prerequisites: basic genetics. Only available to MD and MOM students.

**GENE 204. Essentials of Multidimensional Flow Cytometry. 1 Unit.**

Keep pace with automated flow cytometry data analysis via hands-on training. Learn how to design multicolor flow cytometry experiments. Elements of quantitative flow cytometry. Course for all students, staff and faculty. Prerequisite is background in topic.

**GENE 205. Advanced Genetics. 3 Units.**

For PhD students in any of the Biosciences Departments and Programs at Stanford University. Emphasis on developing the ability to solve problems using genetic ideas and methods, to understand the nature and reliability of genetic inference, and to apply genetic reasoning to biological research. Weekly paper discussions based on original research papers that define or illustrate the ideas and techniques covered in the lecture.

**GENE 207. Microfluidic Device Laboratory. 3-4 Units.**

This course exposes students to the design, fabrication, and testing of microfluidic devices for biological applications through combination of lectures and hands-on lab sessions. In teams of two, students will produce a working prototype devices designed to address specific design challenges within the biological community using photolithography, soft lithography, and imaging techniques.

Same as: BIOE 301D

**GENE 208. Gut Microbiota in Health and Disease. 2-3 Units.**

Preference to graduate students. Focus is on the human gut microbiota. Students enrolling for 3 units receive instruction on computational approaches to analyze microbiome data and must complete a related project.

Same as: BIOE 221G, MI 221

**GENE 209. Current Topics in Human, Population, and Statistical Genomics. 2 Units.**

Intensive seminar/workshop. Topics, drawn from current and past literature, may include: assessing and population genetic analysis of genomic variation; genome-to-phenome mapping; reconstructing demographic history from genome sequence data; domestication genomics; host-pathogen genome evolution; detecting signatures of selection; experimental design in human genetics; linkage and association mapping; ethical and social issues in human, plant, and animal genetics research. Emphasis on analysis and logic or experimental and observational genomics research. Faculty-led discussion with evaluation of response papers, problem sets, and intensive course project. May be repeated for credit.

**GENE 210. Genomics and Personalized Medicine. 3 Units.**

Principles of genetics underlying associations between genetic variants and disease susceptibility and drug response. Topics include: genetic and environmental risk factors for complex genetic disorders; design and interpretation of genome-wide association studies; pharmacogenetics; full genome sequencing for disease gene discovery; population structure and genetic ancestry; use of personal genetic information in clinical medicine; ethical, legal, and social issues with personal genetic testing. Hands-on workshop making use of personal or publicly available genetic data. Prerequisite: GENE 202, Gene 205 or BIOS 200.

Same as: DBIO 220

**GENE 211. Genomics. 3 Units.**

The goal of this course is to explore different genomic approaches and technologies, to learn how they work from a molecular biology view point, and to understand how they can be applied to understanding biological systems. In addition, we teach material on how the data generated from these approaches can be analyzed, from an algorithmic perspective. The papers that are discussed are a mixture of algorithmic papers, and technological papers. Finally, the course has a strong programming component, with Python being the language that we teach. All of our problem sets require Python programming - while beginning programmers succeed in our course, it is a steep learning curve, and the problem sets can require a significant time investment.

**GENE 212. Introduction to Biomedical Informatics Research Methodology. 3-5 Units.**

Capstone Biomedical Informatics (BMI) experience. Hands-on software building. Student teams conceive, design, specify, implement, evaluate, and report on a software project in the domain of biomedicine. Creating written proposals, peer review, providing status reports, and preparing final reports. Issues related to research reproducibility. Guest lectures from professional biomedical informatics systems builders on issues related to the process of project management. Software engineering basics. Because the team projects start in the first week of class, attendance that week is strongly recommended. Prerequisites: BIOMEDIN 210 or 214 or 215 or 217 or 260. Preference to BMI graduate students. Consent of instructor required.

Same as: BIOE 212, BIOMEDIN 212, CS 272

**GENE 214. Representations and Algorithms for Computational Molecular Biology. 3-4 Units.**

Topics: introduction to bioinformatics and computational biology, algorithms for alignment of biological sequences and structures, computing with strings, phylogenetic tree construction, hidden Markov models, basic structural computations on proteins, protein structure prediction, protein threading techniques, homology modeling, molecular dynamics and energy minimization, statistical analysis of 3D biological data, integration of data sources, knowledge representation and controlled terminologies for molecular biology, microarray analysis, machine learning (clustering and classification), and natural language text processing. Prerequisite: CS 106B; recommended: CS161; consent of instructor for 3 units.

Same as: BIOE 214, BIOMEDIN 214, CS 274

**GENE 215. Frontiers in Biological Research. 1 Unit.**

Students analyze cutting edge science, develop a logical framework for evaluating evidence and models, and enhance their ability to design original research through exposure to experimental tools and strategies. The class runs in parallel with the Frontiers in Biological Research seminar series. Students and faculty meet on the Tuesday preceding each seminar to discuss a landmark paper in the speaker's field of research. Following the Wednesday seminar, students meet briefly with the speaker for a free-range discussion which can include insights into the speakers' paths into science and how they pick scientific problems.

Same as: BIOC 215, DBIO 215

**GENE 216. Practical Considerations and Industry Perspective on Academic-Industry Collaborations. 1 Unit.**

Provides an overview, fundamentals and practical considerations for different aspects of academic-industry collaborations by inviting current industrial experts to share their views and to answer questions. The different aspects include collaboration models, proposal building, IP right sharing, funding opportunities, sabbatical and internship in industry, industry job searching, etc. This class also serves as a platform to connect with Bay Area biotech and pharmaceutical executives and experts.

**GENE 217. Translational Bioinformatics. 4 Units.**

Computational methods for the translation of biomedical data into diagnostic, prognostic, and therapeutic applications in medicine. Topics: multi-scale omics data generation and analysis, utility and limitations of public biomedical resources, machine learning and data mining, issues and opportunities in drug discovery, and mobile/digital health solutions. Case studies and course project. Prerequisites: programming ability at the level of CS 106A and familiarity with biology and statistics.

Same as: BIOE 217, BIOMEDIN 217, CS 275

**GENE 218. Computational Analysis of Biological Information: Introduction to Python for Biologists. 2 Units.**

Computational tools for processing, interpretation, communication, and archiving of biological information. Emphasis is on sequence and digital microscopy/image analysis. Intended for biological and clinical trainees without substantial programming experience.

Same as: MI 218, PATH 218

**GENE 221. Current Issues in Aging. 2 Units.**

Current research literature on genetic mechanisms of aging in animals and human beings. Topics include: mitochondria mutations, insulin-like signaling, sirtuins, aging in flies and worms, stem cells, human progeria, and centenarian studies. Prerequisite: GENE 203, 205 or BIOS 200.

**GENE 224. Principles of Pharmacogenomics. 3 Units.**

This course is an introduction to pharmacogenomics, including the relevant pharmacology, genomics, experimental methods (sequencing, expression, genotyping), data analysis methods and bioinformatics. The course reviews key gene classes (e.g., cytochromes, transporters) and key drugs (e.g., warfarin, clopidogrel, statins, cancer drugs) in the field. Resources for pharmacogenomics (e.g., PharmGKB, Drugbank, NCBI resources) are reviewed, as well as issues implementing pharmacogenomics testing in the clinical setting. Reading of key papers, including student presentations of this work; problem sets; final project selected with approval of instructor. Prerequisites: two of BIO 41, 42, 43, 44X, 44Y or consent of instructor.

Same as: BIOMEDIN 224

**GENE 232. Advanced Imaging Lab in Biophysics. 4 Units.**

Laboratory and lectures. Advanced microscopy and imaging, emphasizing hands-on experience with state-of-the-art techniques. Students construct and operate working apparatus. Topics include microscope optics, Koehler illumination, contrast-generating mechanisms (bright/dark field, fluorescence, phase contrast, differential interference contrast), and resolution limits. Laboratory topics vary by year, but include single-molecule fluorescence, fluorescence resonance energy transfer, confocal microscopy, two-photon microscopy, microendoscopy, and optical trapping. Limited enrollment. Recommended: basic physics, Biology core or equivalent, and consent of instructor.

Same as: APPPHYS 232, BIO 132, BIO 232, BIOPHYS 232

**GENE 233. The Biology of Small Modulatory RNAs. 2 Units.**

Open to graduate and medical students. Explores recent progress and unsolved questions in the field of RNA interference and microRNA biology. Students are required to read assigned primary literature before each class and actively participate in guided discussions on related technical and conceptual issues during class meetings. Assignments include critiques of assigned papers and developing a novel research proposal.

Same as: MI 233, PATH 233

**GENE 234. Fundamentals of RNA Biology. 2 Units.**

For graduate or medical students and (if space allows) to active participants from other segments of the Stanford Community (e.g., TGR students); undergraduates by instructor consent. Fundamental issues of RNA biology, with the goal of setting a foundation for students to explore the expanding world of RNA-based regulation. Each week a topic is covered by a faculty lecture and journal club presentations by students.

Same as: MI 234, PATH 234

**GENE 235. C. Elegans Genetics. 2 Units.**

Genetic approaches to *C. elegans*, practice in designing experiments and demonstrations of its growth and anatomy. Probable topics include: growth and genetics, genome map and sequence, mutant screens that start with a desired phenotype, reverse genetics and RNAi screens, genetic duplications, uses of null phenotype non-null alleles, genetic interactions and pathway analysis, and embryogenesis and cell lineage. Focus of action, mosaic analysis, and interface with embryological and evolutionary approaches.

**GENE 236. Deep Learning in Genomics and Biomedicine. 3 Units.**

Recent breakthroughs in high-throughput genomic and biomedical data are transforming biological sciences into "big data" disciplines. In parallel, progress in deep neural networks are revolutionizing fields such as image recognition, natural language processing and, more broadly, AI. This course explores the exciting intersection between these two advances. The course will start with an introduction to deep learning and overview the relevant background in genomics and high-throughput biotechnology, focusing on the available data and their relevance. It will then cover the ongoing developments in deep learning (supervised, unsupervised and generative models) with the focus on the applications of these methods to biomedical data, which are beginning to produce dramatic results. In addition to predictive modeling, the course emphasizes how to visualize and extract interpretable, biological insights from such models. Recent papers from the literature will be presented and discussed. Students will be introduced to and work with popular deep learning software frameworks. Students will work in groups on a final class project using real world datasets. Prerequisites: College calculus, linear algebra, basic probability and statistics such as CS109, and basic machine learning such as CS229. No prior knowledge of genomics is necessary. Same as: BIODS 237, BIOMEDIN 273B, CS 273B

**GENE 243. Intellectual Property: Scientific Evidence in Patent Litigation. 3 Units.**

(Same as LAW 343) Open to clinical MD and graduate students. Explores the role of scientific experts in patent infringement litigation. In other areas of the law where scientific experts are used – medical malpractice, environmental law, criminal law – the science itself is often in dispute. In patent cases, however, the parties generally agree on the science. This affects the relationship between the lawyer and the expert and the substantive content of their interactions. Patent experts need to be able to explain science to the judge and jury. But they also must help the litigators choose which legal issues to press and which to concede, and to be aware of how the complications of the science might help, hurt, obscure or reveal how the law should be applied to the facts. The class examines judicial decisions and trial documents involving scientific evidence in patent litigation, followed by work in teams on final projects: simulations of expert testimony in a patent case. Simulations are performed at the end of the quarter before panels of practicing patent lawyers. Prerequisite: graduate students must have completed their required coursework and have TGR status.

**GENE 244. Introduction to Statistical Genetics. 3 Units.**

Statistical methods for analyzing human genetics studies of Mendelian disorders and common complex traits. Probable topics include: principles of population genetics; epidemiologic designs; familial aggregation; segregation analysis; linkage analysis; linkage-disequilibrium-based association mapping approaches; and genome-wide analysis based on high-throughput genotyping platforms. Prerequisite: STATS 116 or equivalent or consent of instructor. Same as: STATS 344

**GENE 245. Statistical and Machine Learning Methods for Genomics. 3 Units.**

Introduction to statistical and computational methods for genomics. Sample topics include: expectation maximization, hidden Markov model, Markov chain Monte Carlo, ensemble learning, probabilistic graphical models, kernel methods and other modern machine learning paradigms. Rationales and techniques illustrated with existing implementations used in population genetics, disease association, and functional regulatory genomics studies. Instruction includes lectures and discussion of readings from primary literature. Homework and projects require implementing some of the algorithms and using existing toolkits for analysis of genomic datasets. Same as: BIO 268, BIOMEDIN 245, CS 373, STATS 345

**GENE 260. Supervised Study. 1-18 Unit.**

Genetics graduate student lab research from first quarter to filing of candidacy. Prerequisite: consent of instructor.

**GENE 267. Molecular Mechanisms of Neurodegenerative Disease. 4 Units.**

The epidemic of neurodegenerative disorders such as Alzheimer's and Parkinson's disease occasioned by an aging human population. Genetic, molecular, and cellular mechanisms. Clinical aspects through case presentations. This class is open to both graduate and undergraduate students, but requires sufficient backgrounds in college level genetics, cell biology and biochemistry. Undergraduates who are interested are required to contact the course director first. Same as: BIO 267, NENS 267

**GENE 268. Biology and Applications of CRISPR/Cas9: Genome Editing and Epigenome Modifications. 1 Unit.**

This course is designed to provide a broad overview of the biology and applications of the revolutionary CRISPR/Cas9 system, with detailed exploration of several areas: / / –Basic biology of the CRISPR/Cas9 system / –High-throughput screening using CRISPR/Cas9 / –Epigenetic modifications and transcriptional regulation using dCas9 / –Therapeutic applications of gene editing with CRISPR / –Disease modeling with CRISPR / –Ethical considerations of the use of CRISPR/Cas9 / / The course will be geared toward advanced undergraduates and graduate students, and will assume a basic background in molecular biology and genetics. The course will be lecture-based, with frequent opportunities for discussion and questions. Same as: BIOS 268

**GENE 271. Human Molecular Genetics. 3 Units.**

For genetic counseling students, graduate students in genetics, medical students, residents, and postdoctoral fellows interested in the practice of medical genetics and genomics. Gene structure and function; the impact of mutation and polymorphism as they relate to developmental pathways and human disease; mitochondrial genetics; approaches to the study of complex genetic conditions; GWAS and genome sequencing technologies; variant interpretation; gene therapy, stem cell biology, and pharmacogenetics. Undergraduates require consent of instructor and a basic genetics course. Same as: CHPR 271

**GENE 272. Introduction to Medical Genetics. 2 Units.**

For genetic counseling students, graduate students in human genetics, medical students, residents, and fellows; undergraduates with consent of instructor. Principles of medical genetics practice, including taking a family history, modes of inheritance and risk assessment, and mathematical principles of medical genetics (Bayes theorem, population genetics). An additional problem set is required for 3 units. Same as: CHPR 272

**GENE 273. Introduction to Clinical Genetics Testing. 2 Units.**

For genetic counseling students, medical students, residents, and fellows. Uses a combination of case based assignments, laboratory observation and didactic lectures to introduce techniques and technology used in cytogenetics, molecular genetics and biochemical genetic testing, and to introduce clinical features of common genetic conditions that are commonly diagnosed through genetic testing.

**GENE 274A. A Case Based Approach to Clinical Genetics. 2 Units.**

For genetic counseling students, graduate students in genetics, medical students, residents and fellows. Case-based scenarios and guest expert lectures. Students learn skills in case preparation, management, and presentation, as well as content around common genetic disorders.

Same as: CHPR 274A

**GENE 274B. A Case Based Approach to Clinical Genetics. 2 Units.**

For genetic counseling students, graduate students in genetics, medical students, residents, and fellows. Case-based scenarios and guest expert lectures. Students learn skills in case preparation, management, and presentation, as well as content around common genetic disorders. This course is a continuation of GENE 274A, but may be taken individually with instructor permission.

Same as: CHPR 274B

**GENE 275. Role Play and Genetic Counseling Observations. 2 Units.**

Students role play aspects of genetic counseling sessions and learn through clinical observations. Observation includes genetic counseling sessions in prenatal, pediatric, and specialty settings.

**GENE 276. Genetic Counseling Clinical Rotations. 1-7 Unit.**

For genetic counseling students only. Supervised clinical experiences. May be repeated for credit. Prerequisite: GENE 275.

**GENE 278. Prenatal Genetic Counseling. 1 Unit.**

Internet-based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows; genetic counseling students should take this course in conjunction with their initial prenatal genetics rotation. Topics include prenatal genetic screening and diagnosis in the first and second trimesters, ultrasound, teratology, and genetic carrier screening.

Same as: CHPR 278

**GENE 279. Pediatric and Adult Genetic Counseling. 1 Unit.**

Internet based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows; genetic counseling students should take this course in conjunction with their initial general genetics rotation. Topics include: common genetic conditions, assessment of child development and medical history in the context of a genetic workup, the pediatric genetics medical examination, dysmorphology, introduction to laboratory genetic testing, development of a differential diagnosis, and resources for case management and family support.

Same as: CHPR 279

**GENE 280. Metabolic Genetic Counseling. 1 Unit.**

Internet based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows genetic counseling students should take this course in conjunction with their metabolic genetics rotation. Topics include: overview of metabolic diseases; common pathways; diagnosis, management, and treatment of metabolic disorders; and newborn screening.

Same as: CHPR 280

**GENE 281. Cancer Genetic Counseling. 1 Unit.**

Internet based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellows; genetic counseling students should take this course in conjunction with their initial cancer genetics rotation. Topics include: cancer biology and cytogenetics; diagnosis and management of common cancer genetic syndromes; predictive testing; psychology of cancer genetic counseling; and topics recommended by ASCO guidelines.

Same as: CHPR 281

**GENE 282A. Genetic Counseling Research Seminar. 1 Unit.**

For genetic counseling students only. Facilitated discussions on identifying a topic and mentor for genetic counseling departmental research projects.

**GENE 282B. Genetic Counseling Research Seminar. 1 Unit.**

For genetic counseling students only. Lectures and facilitated discussions on research methodology for genetic counseling departmental research projects. Prerequisite: GENE 282A.

**GENE 283. Genetic Counseling Research. 1-8 Unit.**

Genetic counseling students conduct clinical research projects as required by the department for graduation. May be repeated for credit. Pre- or corequisite: GENE 282.

**GENE 284. Medical Genetics Seminar. 1 Unit.**

Presentation of research and cases. Students enrolling for 2 units also attend and report on external seminars. May be repeated for credit. Non-GC students: please contact the instructor when you enroll.

Same as: CHPR 284

**GENE 285A. Genetic Counseling Seminar. 3 Units.**

Year-long seminar primarily for genetic counseling students. Autumn: basics of medical communication; crosscultural and disability sensitive communication about genetics, and principles of providing genetic counseling. Undergraduates may enroll in Autumn Quarter with consent of instructor.

**GENE 285B. Genetics Counseling Seminar. 3 Units.**

Year-long seminar primarily for genetic counseling students. Winter: the impact of chronic illness and genetic disease in a developmental manner.

**GENE 285C. Genetic Counseling Seminar. 3 Units.**

Year-long seminar primarily for genetic counseling students. Spring: applying therapeutic counseling approaches to the practice of genetic counseling.

**GENE 286. Advanced Genetic Counseling Seminar. 2 Units.**

For genetic counseling students only. Psychosocial issues associated with genetic counseling cases are discussed through presentation of cases that students have seen throughout their training. Professional development topics will be included. Must be taken for 3 quarters. Prerequisites: GENE 285 A,B,C and 276.

**GENE 286C. Advanced Genetic Counseling Seminar. 3 Units.**

Continuation of 286A/B. For genetic counseling students only. Psychosocial issues associated with genetic counseling cases are discussed through presentation of cases that students have seen throughout their training. Professional development topics including: the expanding roles of genetic counselors; billing, reimbursement, and licensing; the role of genetic counseling in the changing healthcare system; the incorporation of genetics into all areas of medicine and public health; and implications of direct-to-consumer genetic testing. Prerequisites: GENE 285 A,B,C and 276.

**GENE 287. CARDIOVASCULAR GENETICS. 1 Unit.**

Internet-based course for genetic counseling students, graduate students in genetics, medical students, residents, and fellow; genetic counseling students should take this course in conjunction with their cardiovascular genetics rotation. Topics include: Basic cardiology principles, including relevant anatomy and physiology; diagnosis, management and genetic testing as it relates to common inherited cardiovascular conditions in both the pediatric and adult setting; predictive genetic testing issues specific to inherited cardiovascular conditions; psychologic issues related to sudden death conditions. This course is designed for genetic counseling students, medical students, residents, post-doctoral fellows and nurses interested in inherited cardiovascular conditions.

Same as: CHPR 287

**GENE 288. Neurogenetics. 1 Unit.**

The Neurogenetics Course is a flipped classroom, just-in-time, modular design which will be available online for genetic counseling students, medical students, residents and fellows with an interest in inherited neurologic conditions. It will encompass an introductory to neurology for beginners, including an overview of neurologic exam and localization, to provide non-neurologist trainees a foundation for understanding the differential diagnosis process in neurology. The course will cover common and exemplary neurogenetics disorders spanning the adult and pediatric neurologic sub-specialties, with a core set of lectures for all learners to watch and a set of optional lectures for a minimum of 10 content hours. Talks will exemplify key genetic concepts such as triple repeat disorders and FSHD. It will also cover ethical and psychological topics as well as gene-targets therapeutics. This course will prepare students so classroom and clinical experiences can begin at a more advanced level and integrate concepts from the online course. Medical students and graduate students outside of genetic counseling should obtain permission from instructor prior to enrollment. No prerequisite for genetic counseling students, genetics or neurology residents/fellows or post-docs.

**GENE 299. Directed Reading in Genetics. 1-18 Unit.**

Prerequisite: consent of instructor.

**GENE 346. Advanced Seminar on Prokaryotic Molecular Biology. 1 Unit.**

Enrollment limited to PhD students associated with departmental research groups in genetics or molecular biology.  
Same as: BIO 346, CSB 346

**GENE 399. Graduate Research. 1-18 Unit.**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

**GENE 801. TGR Project. 0 Units.**

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**GENE 802. TGR Dissertation. 0 Units.**

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## German Language (GERLANG)

**GERLANG 1. First-Year German, First Quarter. 5 Units.**

Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which German is spoken.

**GERLANG 10. Elementary German for Seniors and Graduate Students. 4 Units.**

Intensive. For students who need to acquire reading ability in German for the Ph.D. or for advanced research in their own field. 250 fulfills Ph.D. reading exam.

**GERLANG 105. Advanced Business German. 4 Units.**

For students planning to work in a German-speaking country and for preparation of the International Business German exams. Case studies of typical business situations with accompanying videos, listening comprehension exercises, and class simulations. Business correspondence and reports in German. Prerequisite: Placement Test, GERLANG 22.

**GERLANG 10SC. German Immersion: Contemporary Issues in the German-Speaking World. 2 Units.**

We designed this course for students who have some German, but who want to jumpstart their language acquisition through an intense and immersive experience. If you have taken two or three quarters of German, or if you took German in high school, this course will allow you to dramatically improve your proficiency, all while you and classmates immerse yourselves in German-speaking cultures from Germany, Austria, Switzerland, Liechtenstein, Luxembourg and beyond. We will actively engage our German through exploration of contemporary, socio-political issues in the German-speaking world, including, but not limited to, the current refugee crisis, issues of identity and language, the environment, pop cultural trends and more. Working with various forms of media (film, music, texts), guest lectures, as well as class excursions to a local German immersion school, the Goethe Institute San Francisco, and other local cultural events, you will progress more quickly towards gaining Advanced proficiency in German. Students will develop their ability to more actively start and participate in culturally nuanced discussions and gain greater confidence and linguistic and cultural dexterity in giving presentations. Students from all disciplines with interest in this type of linguistic immersion and intellectual engagement are encouraged to apply!

**GERLANG 111. Television News from Germany. 3-4 Units.**

For intermediate and advanced students. Current news reports and features for listening comprehension and vocabulary. Extra listening, speaking, or writing practice for fourth unit.

**GERLANG 199. Individual Reading. 1-5 Unit.**

Prerequisite: consent of instructor.

**GERLANG 1A. Accelerated First-Year German, Part 1. 5 Units.**

Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. Completes first-year sequence in two rather than three quarters.

**GERLANG 2. First-Year German, Second Quarter. 5 Units.**

Continuation of GERLANG 1. Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which German is spoken. Prerequisite: Placement Test, GERLANG 1.

**GERLANG 205A. Intensive First-Year German for Stanford Grads. 3-5 Units.**

Equivalent to GERLANG 5A. For Stanford graduate students only. Stanford graduate students restricted to 9 units; may take 205A, B and C for a total of 9 units.

**GERLANG 205B. Intensive First-Year German for Stanford Grads. 3-5 Units.**

Equivalent to GERLANG 5B. For Stanford graduate students only. Continuation of 205A. Stanford graduate students restricted to 9 units; may take 205A, B and C for a total of 9 units.

**GERLANG 205C. intensive First-Year German, Part C. 3-5 Units.**

Equivalent to GERLANG 5C. For Stanford graduate students only. Continuation of 205B. Stanford graduate students restricted to 9 units may take 205A, B and C for a total of 9 units.

**GERLANG 20A. Beginning German Conversation. 1 Unit.**

This course is for students with limited conversational abilities. Appropriate for students who are taking or have taken Gerlang 1. This course does not teach German from scratch, but is intended for students to practise basic conversations. Emphasis on everyday interactions. Attendance is required to receive course credit.

**GERLANG 20B. Intermediate German Conversation. 1 Unit.**

This course for students with some conversational abilities. Appropriate for students who are taking (or have taken) Gerlang 2, 3, or 21. Emphasis on conversational German, discussion of culture, exploring German media. Attendance is required to receive course credit.



**GERLANG 20C. Advanced German Conversation. 1 Unit.**

This course for students interested practising advanced-level conversation. Most appropriate for students who are taking Gerlang 21 or higher, heritage speakers, and students looking to practice professional German. Emphasis on discussion of cultural topics including politics, exploring media and news, and student interests. Attendance is required to receive course credit.

**GERLANG 20E. German Society in WWII. 1 Unit.**

German Society in WWII.

**GERLANG 20G. Fashion Through Film. 1 Unit.**

Modern German Fashion a film-based foray into several aspects of the history of modern German fashion. Topics from class to class will be somewhat sporadic, spanning the origins of traditional German attire, subcultural youth styles in Germany throughout the 20th century, and prominent German figures in the global fashion industry such as designer Karl Lagerfeld and photographer Helmut Newton, among others. May be repeat for credit.

**GERLANG 20J. Central European Brewing. 1 Unit.**

This is a general survey course of the variety of German Beers. All sessions take place at Haus Mitt, 620 Mayfield Ave. STUDENTS MUST BE 21 OR OLDER TO ENROLL-There will be a course fee (amount to be determined).

**GERLANG 20K. Kuche Mitt. 1 Unit.**

Explore the German art of baking by trying out a medley of traditional recipes. We will learn how to create delicious desserts, prepare hearty snacks and bake real bread so you can delight your friends with German tastes. The class will be held in Haus Mitt and enrollment is limited to 15 students.

Same as: German Cooking Class

**GERLANG 20M. German Film and Theater. 1 Unit.**

The German Film industry has transformed in recent years to highlight newfound race relations and demographics in Germany. Recent cinematography has captured changing dynamics from European Identity to Turkish Immigration. This course seeks to explore these topics through biweekly film viewings. All films will be shown in German with English subtitles and discussion will take place in English. Film selection from the following list pending feedback from students:.

**GERLANG 20P. Theme Project-Intermediate Dutch Conversation. 1 Unit.**

Dutch Conversation.

**GERLANG 20R. German Conversation through Drama. 1 Unit.**

Want to practice your German by playing improvisation games, reading dialogues and performing short scenes? In this German conversation course, for students anywhere from intermediate to advanced, we'll read scenes from Friedrich Dürrenmatt's *Die Physiker*, a hilarious dark comedy from the 1960's about three "scientists" in an insane asylum who want to save the world from the nuclear danger of scientific progress. We'll work through the play, discussing the broader issues and performing for each other different interpretations of important scenes. This is a great way to practice reading and speaking in German, learn new vocab, and play around with a fascinating, cold-war era text that has a lot to say about scientific ethics today.

**GERLANG 20T. Teaching German Conversation. 1 Unit.**

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**GERLANG 21. Intermediate German I. 4 Units.**

Continuation of Gerlang 3. Sequence integrating culture and language with emphasis on development of advanced oral and written proficiency. Targeted functional abilities include presentational and socioculturally appropriate language in formal and informal, academic and professional contexts. Prerequisite: Placement Test, Gerlang 3.

**GERLANG 210. Elementary German for Graduate Students. 3-4 Units.**

Restricted to Stanford graduate students. Prerequisite: consent of instructor.

**GERLANG 21S. Intermediate German. 4 Units.**

Reading short stories, and review of German structure. Discussions in German, short compositions, videos. Prerequisite: one year of college German; or two years high school German or equivalent, or AP German.

**GERLANG 21W. Intermediate German I: German for Business and International Relations. 4 Units.**

Equivalent to 21, but focus is on business and the political and economic geography of Germany. CDs and videos. For students planning to do a business internship in a German-speaking country. Prerequisite: placement test, 3.

**GERLANG 22. Intermediate German II. 4 Units.**

Continuation of GERLANG 21. Sequence integrating culture and language with emphasis on development of advanced oral and written proficiency. Targeted functional abilities include presentational and socioculturally appropriate language in formal and informal, academic and professional contexts. Prerequisite: Placement Test, Gerlang 21.

**GERLANG 22W. Intermediate German II: German for Business and International Relations. 4-5 Units.**

Equivalent to 22, but continuation of 21W. Recommended for students planning to do a business internship in a German-speaking country. Prerequisite: placement test, 21, 21W.

**GERLANG 23C. Second Year German, Third Quarter. 4 Units.**

Continuation of GERLANG 22. Sequence integrating culture and language with emphasis on development of advanced oral and written proficiency. Targeted functional abilities include presentational and socioculturally appropriate language in formal and informal, academic and professional contexts. Prerequisite: Placement Test, Gerlang 22.

**GERLANG 250. Reading German. 4 Units.**

For undergraduates and graduate students with a knowledge of German who want to acquire reading proficiency. Readings from scholarly works and professional journals. Recommended for students who need to pass the Ph.D. reading exam. Fulfills University reading requirement for advanced degrees if student earns a grade of 'B.' Prerequisite: one year of German, or 10, or equivalent.

**GERLANG 2A. Accelerated First-Year German, Part 2. 5 Units.**

Completes first-year sequence in two rather than three quarters. Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. For students with previous knowledge of German. Completion of 2A fulfills the Language Requirement.

**GERLANG 3. First-Year German, Third Quarter. 5 Units.**

Continuation of GERLANG 2. Speaking, reading, writing, and listening. Authentic materials. Interactive approach with emphasis on developing communicative expression. The cultural context in which German is spoken. Fulfills the University language requirement. Prerequisite: Placement Test, GERLANG 2.

**GERLANG 395. Graduate Studies in German. 1-5 Unit.**

Prerequisite: consent of instructor.

**GERLANG 399. Independent Study. 1-5 Unit.**

Prerequisite: consent of instructor.

**GERLANG 5A. Intensive First-Year German, Part A. 5 Units.**

Same as GERLANG 1. Accelerated. Written exercises, compositions, conversation practice, and daily work. Only Stanford students restricted to 9 units may register for 205A,B,C.

**GERLANG 5B. Intensive First-Year German, Part B. 5 Units.**

Same as GERLANG 2. Continuation of 5A. Accelerated. Written exercises, compositions, conversation practice, and daily work. Only Stanford students restricted to 9 units may register for 205A,B,C. Prerequisite 1 or 5A.

**GERLANG 5C. Intensive First-Year German, Part C. 5 Units.**

Same as GERLANG 3. Continuation of 5B. Accelerated. Written exercises, compositions, conversation practice, and daily work. Only Stanford students restricted to 9 units may register for 205A,B,C. Prerequisite 2 or 5B. Fulfills the University Foreign Language Requirement.

**GERLANG 99. Language Specials. 1-5 Unit.**

Prerequisite: consent of instructor.

## Health Research & Policy (HRP)

**HRP 199. Undergraduate Research. 1-18 Unit.**

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

**HRP 201A. Health Policy PhD Core Seminar I--First Year. 2 Units.**

Seminar series is the core tutorial for first-year Health Policy and Health Services Research graduate students. Major themes in fields of study including health insurance, healthcare financing and delivery, health systems and reform and disparities in the US and globally, health and economic development, health law and policy, resource allocation, efficiency and equity, healthcare quality, measurement and the efficacy and effectiveness of interventions. Blocks of session led by Stanford expert faculty in particular fields of study.

Same as: MED 215A

**HRP 201B. Health Policy PhD Core Seminar II--First Year. 2 Units.**

Second in a three-quarter seminar series is the core tutorial for first-year Health Policy and Health Services Research graduate students. Major themes in fields of study including health insurance, healthcare financing and delivery, health systems and reform and disparities in the US and globally, health and economic development, health law and policy, resource allocation, efficiency and equity, healthcare quality, measurement and the efficacy and effectiveness of interventions. Blocks of session led by Stanford expert faculty in particular fields of study.

Same as: MED 215B

**HRP 201C. Health Policy PhD Core Seminar III--First Year. 2 Units.**

Third in a three-quarter seminar series is the core tutorial for first-year Health Policy and Health Services Research graduate students. Major themes in fields of study including health insurance, healthcare financing and delivery, health systems and reform and disparities in the US and globally, health and economic development, health law and policy, resource allocation, efficiency and equity, healthcare quality, measurement and the efficacy and effectiveness of interventions. Blocks of session led by Stanford expert faculty in particular fields of study.

Same as: MED 215C

**HRP 206. Meta-research: Appraising Research Findings, Bias, and Meta-analysis. 3 Units.**

Open to graduate, medical, and undergraduate students. Appraisal of the quality and credibility of research findings; evaluation of sources of bias. Meta-analysis as a quantitative (statistical) method for combining results of independent studies. Examples from medicine, epidemiology, genomics, ecology, social/behavioral sciences, education. Collaborative analyses. Project involving generation of a meta-research project or reworking and evaluation of an existing published meta-analysis.

Prerequisite: knowledge of basic statistics.

Same as: CHPR 206, MED 206, STATS 211

**HRP 207. Introduction to Concepts and Methods in Health Services and Policy Research I. 2 Units.**

Primarily for medical students in the Health Services and Policy Research scholarly concentration. Topics include health economics, statistics, decision analysis, study design, quality measurement, cost benefit and effectiveness analysis, and evidence based guidelines.

**HRP 208. Introduction to Concepts and Methods in Health Services and Policy Research II. 2 Units.**

Primarily for medical students in the Health Services and Policy Research scholarly concentration; continuation of 207. Topics include health economics, statistics, decision analysis, study design, quality measurement, cost benefit and effectiveness analysis, and evidence based guidelines. Recommended: 207.

**HRP 209. Health Law: The FDA. 2-3 Units.**

(Same as LAW 3003) Open to law and medical students; other graduate students by consent of instructor. The FDA's regulatory authority over drugs, biologics, medical devices, and dietary supplements. The nature of the pharmaceutical, biotech, medical device, and nutritional supplement industries.

**HRP 210. Health Law and Policy. 3 Units.**

(Same as Law 313) Open to law, medicine, business, and graduate students. Focus this term is on the physician/patient relationship, medical ethics, and public health law.

**HRP 211. Law and the Biosciences: Neuroscience. 3 Units.**

(Same as LAW 3006) Legal, social, and ethical issues arising from advances in neuroscience, including effects upon law and society through improvements in predicting illnesses and behaviors, reading minds through neuroimaging, understanding responsibility and consciousness, treating criminal behavior, and cognitive enhancement.

**HRP 212. Cross Cultural Medicine. 3 Units.**

Developing interviewing and behavioral skills needed to facilitate culturally relevant health care across all population groups. Discussions focus on explicit and implicit cultural influences operating in formal and informal medical contexts.

**HRP 213. Writing in the Sciences. 2-3 Units.**

Primarily for medical students in the Clinical Research Scholarly concentration; open to graduate students except Epidemiology graduate students. Development of research questions and plans for statistical analysis. Study design, sample size and power calculations, and statistical analysis of study data. Analytic methods to carry out statistical power and sample size calculations. Prerequisites: 225, and 258 or 259, or consent of instructor.

**HRP 214. Scientific Writing. 2-3 Units.**

Step-by-step through the process of writing and publishing a scientific manuscript. How to write effectively, concisely, and clearly in preparation of an actual scientific manuscript. Students are encouraged to bring a manuscript on which they are currently working to develop and polish throughout the course. Please note 3-units students will additionally write and revise a manuscript.

**HRP 215. Scientific Writing for Basic and Translational Scientists. 2-3 Units.**

Teaches students in the basic sciences how to write clearly, concisely, and effectively. Focuses on the process of writing and publishing a scientific manuscript. 3 unit option requires work on a manuscript. Not intended for epidemiology graduate students.

**HRP 216. Analytical and Practical Issues in the Conduct of Clinical and Epidemiologic Research. 2-3 Units.**

Topics include: advanced aspects of study design and data analyses; evaluating confounding and interaction; modeling continuous characteristics of exposure; building prediction models; methods of summarizing literature and quantifying effect sizes (meta-analysis); handling missing data; and propensity score methods. 3 units requires a data analysis project. Prerequisites: 258 or 261, or consent of instructor.

**HRP 218. Methods for Health Care Delivery Innovation, Implementation and Evaluation. 2 Units.**

Preference given to postgraduate fellows and graduate students. Focus is on implementation science and evaluation of health care delivery innovations. Topics include implementation science theory, frameworks, and measurement principles; qualitative and quantitative approaches to designing and evaluating new health care models; hybrid design trials that simultaneously evaluate implementation and effectiveness; distinction between quality improvement and research, and implications for regulatory requirements and publication; and grant-writing strategies for implementation science and evaluation. Students will develop a mock (or actual) grant proposal to conduct a needs assessment or evaluate a Stanford/VA/community intervention, incorporating concepts, frameworks, and methods discussed in class. Priority for enrollment for CHPR 212 will be given to CHPR master's students. Same as: CHPR 212, MED 212

**HRP 219. Evaluating Technologies for Diagnosis, Prediction and Screening. 3 Units.**

New technologies designed to monitor and improve health outcomes are constantly emerging, but most fail in the clinic and in the marketplace because relatively few are supported by reliable, reproducible evidence that they produce a health benefit. This course covers the designs and methods that should be used to evaluate technologies to diagnose patients, predict prognosis or other health events, or screen for disease. These technologies can include devices, statistical prediction rules, biomarkers, gene panels, algorithms, imaging, or any information used to predict a future or a previously unknown health state. Specific topics to be covered include the phases of test development, how to frame a proper evaluation question, measures of test accuracy, Bayes theorem, internal and external validation, prediction evaluation criteria, decision analysis, net-utility, ROC curves, c-statistics, net reclassification index, decision curves and reporting standards. Examples of technology assessments and original methods papers are used. Software used in the course is R or Stata. Open to graduate students with a solid understanding of introductory biostatistics, epidemiologic and clinical research study design, and of medical conditions and related technologies required. Basic understanding of Stata or R is also required. Undergraduates may enroll with consent of instructor.

**HRP 220. BIOTECHNOLOGY LAW AND POLICY. 3 Units.**

(Same as LAW 440) Open to all law or medical students; other graduate students by consent of the instructor. Focuses on the biotechnology industry, with some discussion of the "med tech" or medical device industry and the pharmaceutical industry. The life cycle of a biotech firm, from a good idea to a start-up company to FDA approval and beyond. Guest speakers. In addition to a final exam, students are required to participate in a group project during the term, making law and business recommendations about a biotech firm.

**HRP 221. Law and the Biosciences: Genetics. 3 Units.**

(Same as LAW 3004) Open to all law or medical students; other graduate students by consent of the instructor. Focus is on ethical, legal, and social issues arising from advances in our knowledge of human genetics. Includes forensic uses of genetics, genetic testing, widespread whole genome sequencing, the consequences of genetics for human reproduction, and the ethics of genomic biobanks for research. Research paper required.

**HRP 222A. Advising Congress on Health Policy. 1 Unit.**

(Same as LAW 413L) Focus on conducting research on national health policy problems for the Medicare Payment Advisory Commission, or MedPAC. Students work in teams with lawyers and PhD economists from MedPAC, resident and fellow physicians from Stanford Hospital, and other students from throughout the University on expanding the healthcare workforce through reform of states' scope of practice regulation or designing antitrust policy to achieve the benefits of coordination and avoid the costs of consolidation. Application required.

**HRP 223. Introduction to Data Management and Analysis in SAS. 2 Units.**

Provides hands-on introduction to basic data management and analysis techniques using SAS. Data management topics include: Introduction to SAS and SAS syntax, importing data, creating and reading SAS datasets, data cleaning and validation, creating new variables, and combining data sets. Analysis techniques include: basic descriptive statistics (e.g., means, frequency) and bivariate procedures for continuous and categorical variables (e.g., t-tests, chi-squares).

**HRP 224. Social Entrepreneurship and Innovation Lab (SE Lab) - Global & Planetary Health. 3 Units.**

Social Entrepreneurship and Innovation Lab (SE Lab) - Global & Planetary Health is a new Collaboratory workshop for students/fellows to design/develop innovative social ventures/solutions addressing key challenges in public health and the environment, in support of the UN Sustainable Development Goals (SDGs 2030). SE Lab is open to students/fellows across Stanford and combines design thinking exercises, short lectures & case studies, workshops, small group teamwork, presentations, guest speakers, and faculty, practitioner and peer feedback to support/advance development of your ideas/plans. Join SE Lab with an idea or simply the desire to join a team. Enrollment limited to 50. Instructor's permission required.

Same as: MED 224, PUBLPOL 224

**HRP 225. Design and Conduct of Clinical and Epidemiologic Studies. 3-4 Units.**

Intermediate-level. The skills to design, carry out, and interpret epidemiologic studies, particularly of chronic diseases. Topics: epidemiologic concepts, sources of data, cohort studies, case-control studies, cross-sectional studies, sampling, measures of association, estimating sample size, and sources of bias. Prerequisite: A basic/introductory course in statistics or consent of instructor.

**HRP 226. Intermediate Epidemiologic and Clinical Research Methods. 3 Units.**

The principles of study design, measurement, confounding, effect modification, and strategies for minimizing bias in clinical and epidemiologic studies. Prerequisite: 225 or consent of instructor.

**HRP 228. Genetic Epidemiology. 2 Units.**

Provides framework for physicians, epidemiologists, and other scientists to interpret the literature and incorporate genetic information into human disease research. Topics include: common genetic measures, approaches to finding disease genes, study design and analysis issues, genome-wide association studies, meta-analysis of genetic studies, genetic risk prediction, and applications of new genomic technologies. Includes reading seminal papers in genetic epidemiology.

**HRP 229. Spectrum Scholars Seminar. 1 Unit.**

Preference to trainees awarded Stanford internal KL2, TL1 grants. Focus is on students and junior faculty who have received a Spectrum KL2 or TL1 Award. Discussions include progress and challenges involved in starting and conducting clinical research, current courses, time management and resources; support from peers; education and professional development. All scholars are required to attend a weekly seminar series meeting throughout the year that will cover an array of cross-cutting methodological topics with published examples of implementation. Prerequisite: Awarded a Spectrum KL2, TL1 Grant or Spectrum UL1.

**HRP 230. Cancer Epidemiology. 2-3 Units.**

Descriptive epidemiology and sources of incidence/mortality data; the biological basis of carcinogenesis and its implications for epidemiologic research; methodological issues relevant to cancer research; causal inference; major environmental risk factors; genetic susceptibility; cancer control; examples of current research; and critique of the literature. 3 units requires paper or project. Prerequisite: 225, or consent of instructor.

**HRP 231. Epidemiology of Infectious Diseases. 3 Units.**

Principles of the transmission of the infectious agents (viruses, bacteria, rickettsiae, mycoplasma, fungi, and protozoan and helminth parasites). The role of vectors, reservoirs, and environmental factors. Pathogen and host characteristics that determine the spectrum of infection and disease. Endemicity, outbreaks, and epidemics of selected infectious diseases. Principles of control and surveillance.

**HRP 234. Engineering Better Health Systems: modeling for public health. 4 Units.**

This course teaches engineering, operations research and modeling techniques to improve public health programs and systems. Students will engage in in-depth study of disease detection and control strategies from a "systems science" perspective, which involves the use of common engineering, operations research, and mathematical modeling techniques such as optimization, queuing theory, Markov and Kermack-McKendrick models, and microsimulation. Lectures and problem sets will focus on applying these techniques to classical public health dilemmas such as how to optimize screening programs, reduce waiting times for healthcare services, solve resource allocation problems, and compare macro-scale disease control strategies that cannot be easily evaluated through randomized trials. Readings will complement the lectures and problem sets by offering critical perspectives from the public health history, sociology, and epidemiology. In-depth case studies from non-governmental organizations, departments of public health, and international agencies will drive the course. Prerequisites: A course in introductory statistics, and a course in multivariable calculus including ordinarily differential equations. Open to upper-division undergraduate students and graduate students. Human Biology majors enroll in HUMBIO 154A.

Same as: HUMBIO 154A, MED 254

**HRP 235. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.**

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 135, AFRICAST 235, EDUC 135, EDUC 335, HUMBIO 26, MED 235

**HRP 236. Epidemiology Research Seminar. 1 Unit.**

Weekly forum for ongoing epidemiologic research by faculty, staff, guests, and students, emphasizing research issues relevant to disease causation, prevention, and treatment. May be repeated for credit.

**HRP 237. Practical Approaches to Global Health Research. 3 Units.**

How do you come up with an idea for health research overseas? How do you develop a research question, concept note, and get your project funded? How do you manage personnel in the field, difficult cultural situations, or unexpected problems? How do you create a sampling strategy, select a study design, and ensure ethical conduct with human subjects? This course takes students through the process of health research in under-resourced countries from the development of the initial research question and literature review to securing support and detailed planning for field work. Students progressively develop and receive weekly feedback on a concept note to support a funding proposal addressing a research question of their choosing. Aims at graduate students; undergraduates in their junior or senior year may enroll with instructor consent. This course is restricted to undergraduates unless they have completed 85 units or more.

Same as: IPS 290, MED 226

**HRP 238. Genes and Environment in Disease Causation: Implications for Medicine and Public Health. 2-3 Units.**

The historical, contemporary, and future research and practice among genetics, epidemiology, clinical medicine, and public health as a source of insight for medicine and public health. Genetic and environmental contributions to multifactorial diseases; multidisciplinary approach to enhancing detection and diagnosis. The impact of the Human Genome Project on analysis of cardiovascular and neurological diseases, and cancer. Ethical and social issues in the use of genetic information. Prerequisite: basic course in genetics; for undergraduates, Human Biology core or equivalent or consent of instructor. This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: HUMBIO 159

**HRP 239. Statistical Methods for Group Comparisons and Causal Inference. 3 Units.**

See <http://rogosateaching.com/stat209/>. Critical examination of statistical methods in social science and life sciences applications, especially for cause and effect determinations. Topics: mediating and moderating variables, potential outcomes framework, encouragement designs, multilevel models, heterogeneous treatment effects, matching and propensity score methods, analysis of covariance, instrumental variables, compliance, path analysis and graphical models, group comparisons with longitudinal data. Prerequisite: intermediate-level statistical methods.

Same as: EDUC 260A, STATS 209

**HRP 243. Health Policy Seminar: Population Health. 1 Unit.**

This seminar course is intended to introduce students to the role of policy in the delivery of healthcare in the United States. In addition to speakers from the law school, SIEPR, HRP, and School of Medicine, we will be bringing in speakers from outside organizations such as the Pacific Business Group on Health, managed care organizations, and the Palo Alto Medical Foundation. There will be no assignments and lunch will be provided.

**HRP 244. Developing Measurement Tools for Health Research. 2 Units.**

The focus of this course is on providing the skills necessary to develop, validate and administer both qualitative and quantitative measures and instruments. Topics will include creating valid measures, ensuring the measures used address and apply to the research questions, design and samples; determining when to use standardized measures or develop new ones; instrument validation techniques; factor analysis; and survey administration, including determining the most effective way of administering measures (e.g., online, paper-and-pencil, ACASI) and the best way to design the survey.

**HRP 245. Intensive Course in Clinical Research. 2 Units.**

The Intensive Course in Clinical Research (ICCR) is a one-week immersion course designed for new or aspiring clinical investigators, medical students, residents, graduate students, fellows and junior faculty interested in pursuing careers in clinical and transnational research. Students spend five days and four evenings immersed in all aspects of research study design and performance. The format combined didactic with intense group/team activities focused on practical issues in clinical research design - from selection of a researchable study question through actual writing of a research proposal. Lectures and panel discussions are presented by an accomplished faculty of Stanford clinical researchers and key leaders from the Stanford community. Every presentation includes a discussion of relevant issues. The course is supported by over 40 faculty and fellows from across the School of Medicine.

**HRP 246. Seminar in Healthcare Quality and Safety. 1 Unit.**

Primarily for medical students in the Quality and Safety Scholarly Concentration. Almost everyone will be a patient at some point in their lives. It is estimated that over 98,000 patients die in US hospitals each year due to medical errors and recent articles suggest that medical errors are the third leading cause of death in the US. Patient safety is the foundation of high-quality health care, which has become a critical issue in health policy discussions. This course will provide an overview of the quality & patient safety movement, the array of measurement techniques and issues, and perspectives of quality improvement efforts under the current policy landscape.

Same as: BIOMEDIN 246

**HRP 247. Epidemic Intelligence: How to Identify, Investigate and Interrupt Outbreaks of Disease. 4 Units.**

We will cover: the components of public health systems in the US; principles of outbreak investigation and disease surveillance; different types of study design for field investigation; visualization and interpretation of public health data, including identification and prevention of biases; and implementation of disease control by public health authorities. Students will meet with leaders of health departments of the state and the county and will be responsible for devising and conducting their own investigation of a health problem. HUMBIO students must enroll in HUMBIO 57. HRP students must enroll in HRP 247.

Same as: HUMBIO 57

**HRP 249. Topics in Health Economics I. 2-5 Units.**

Course will cover various topics in health economics, from theoretical and empirical perspectives. Topics will include public financing and public policy in health care and health insurance; demand and supply of health insurance and healthcare; physicians' incentives; patient decision-making; competition policy in healthcare markets, intellectual property in the context of pharmaceutical drugs and medical technology; other aspects of interaction between public and private sectors in healthcare and health insurance markets. Key emphasis on recent work and empirical methods and modelling. Prerequisites: Micro and Econometrics first year sequences (or equivalent). Curricular prerequisites (if applicable): First year graduate Microeconomics and Econometrics sequences (or equivalent).

Same as: ECON 249, MED 249

**HRP 251. Design and Conduct of Clinical Trials. 3 Units.**

The rationale for phases 1-3 clinical trials, the recruitment of subjects, techniques for randomization, data collection and endpoints, interim monitoring, and reporting of results. Emphasis is on the theoretical underpinnings of clinical research and the practical aspects of conducting clinical trials.

**HRP 252. Outcomes Analysis. 4 Units.**

Methods of conducting empirical studies which use large existing medical, survey, and other databases to ask both clinical and policy questions. Econometric and statistical models used to conduct medical outcomes research. How research is conducted on medical and health economics questions when a randomized trial is impossible. Problem sets emphasize hands-on data analysis and application of methods, including re-analyses of well-known studies. Prerequisites: one or more courses in probability, and statistics or biostatistics.

Same as: BIOMEDIN 251, MED 252

**HRP 254. Quality & Safety in U.S. Healthcare. 3 Units.**

The course will provide an in-depth examination of the quality & patient safety movement in the US healthcare system, the array of quality measurement techniques and issues, and perspectives of quality and safety improvement efforts under the current policy landscape.

Same as: BIOMEDIN 254, SURG 255

**HRP 256. Economics of Health and Medical Care. 5 Units.**

Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: demand for medical care and medical insurance; institutions in the health sector; economics of information applied to the market for health insurance and for health care; measurement and valuation of health; competition in health care delivery. Graduate students with research interests should take ECON 249. Prerequisites: ECON 50 and either ECON 102A or STATS 116 or the equivalent. Recommended: ECON 51.

Same as: BIOMEDIN 156, BIOMEDIN 256, ECON 126

**HRP 257. Advanced Topics in the Economics of Health and Medical Care. 2 Units.**

Emphasis is on research studies in health economics. Seminar style course focuses on Health Economics. To be taken with HRP 256. Students will be expected to read and present papers to the group and discuss concepts with faculty. Restricted to second year PhD students in economics & economics-related disciplines.

Same as: MED 265

**HRP 258. Introduction to Probability and Statistics for Clinical Research. 3 Units.**

Open to medical and graduate students; required of medical students in the Clinical Research Scholarly Concentration. Tools to evaluate medical literature. Topics include random variables, expectation, variance, probability distributions, the central limit theorem, sampling theory, hypothesis testing, confidence intervals, correlation, regression, analysis of variance, and survival analysis.

**HRP 259. Introduction to Probability and Statistics for Epidemiology. 3-4 Units.**

Topics: random variables, expectation, variance, probability distributions, the central limit theorem, sampling theory, hypothesis testing, confidence intervals. Correlation, regression, analysis of variance, and nonparametric tests. Introduction to least squares and maximum likelihood estimation. Emphasis is on medical applications. Differential between 3 and 4 units is the amount of out-of-class work required.

**HRP 261. Intermediate Biostatistics: Analysis of Discrete Data. 3 Units.**

Methods for analyzing data from case-control and cross-sectional studies: the 2x2 table, chi-square test, Fisher's exact test, odds ratios, Mantel-Haenzel methods, stratification, tests for matched data, logistic regression, conditional logistic regression. Emphasis is on data analysis in SAS. Special topics: cross-fold validation and bootstrap inference.

Same as: BIOMEDIN 233, STATS 261

**HRP 262. Intermediate Biostatistics: Regression, Prediction, Survival Analysis. 3 Units.**

Methods for analyzing longitudinal data. Topics include Kaplan-Meier methods, Cox regression, hazard ratios, time-dependent variables, longitudinal data structures, profile plots, missing data, modeling change, MANOVA, repeated-measures ANOVA, GEE, and mixed models. Emphasis is on practical applications. Prerequisites: basic ANOVA and linear regression.

Same as: STATS 262

**HRP 263. Advanced Decision Science Methods and Modeling in Health. 3 Units.**

Advanced methods currently used in published model-based cost-effectiveness analyses in medicine and public health, both theory and technical applications. Topics include: Markov and microsimulation models, model calibration and evaluation, and probabilistic sensitivity analyses. Prerequisites: a course in probability, a course in statistics or biostatistics, a course on cost-effectiveness such as HRP 392, a course in economics, and familiarity with decision modeling software such as TreeAge.

Same as: MED 263

**HRP 264. Foundations of Statistical and Scientific Inference. 1 Unit.**

The course will consist of readings and discussion of foundational papers and book sections in the domains of statistical and scientific inference. Topics to be covered include philosophy of science, interpretations of probability, Bayesian and frequentist approaches to statistical inference and current controversies about the proper use of p-values and research reproducibility. Recommended preparation: At least 2 quarters of biostatistics and one of epidemiology. Intended for second year Masters students, of PhD students with at least 1 year of preceding graduate training.

**HRP 265. Advanced Methods for Meta-Analysis. 2 Units.**

Meta-analysis is a method to quantitatively combine information from multiple studies; this combination is also called "research synthesis." Historically, it has been used to combine studies with a similar design, such as randomized controlled trials or observational studies examining similar interventions or exposures. However, evidence about a given relationship is often provided by many studies with different designs, or studies that can be "fit together" to create an evidence base. This can only be done with advanced meta-analytic methods. The course will cover advanced methods for research synthesis, including multivariate meta-analysis for multiple outcomes, generalized evidence synthesis of multiple study designs, and network meta-analysis for multiple interventions. These techniques are being increasingly used in evidence-based medicine, health technology assessments and policy making. Recommended preparation: HRP 206, and at least 2 quarters of biostatistics and one of epidemiology, including clinical research design. Familiarity with logistic and linear regression modeling required.

**HRP 267. Life Course Epidemiology. 2 Units.**

The focus of this course is on understanding the evidence for how exposure at multiple levels and at multiple ages influences an individual's health at any given time. The course emphasizes the primary theories used to examine life course determinants of health and how these theories both facilitate and impede research. A secondary focus is on understanding the methodological challenges to studying health from a life course perspective, as well as how knowledge of life course determinants of health can inform interventions to improve health from a population perspective.

**HRP 271. Preparation and Practice: Scientific Communication and Media. 1-2 Unit.**

Through tailored lecture, case study, and a practical final project, academic and professional leaders will help you gain insight into the science communications and media industry and the skills necessary to succeed within the various positions and levels available within it. Anticipated Learning Outcomes: To assist interdisciplinary graduate students, medical students, residents and fellows in all levels of training to develop and hone the communication skills necessary for post-training and internship success in a science communications/media field; To provide an understanding of the scope of career opportunities within the science communications sector, focusing on the development, organization, and management issues specific to it; To provide a forum for interacting with alumni, faculty, and other practitioners from a variety of fields and organizations who may assist candidates with defining and meeting their own professional goals; To increase awareness of industry terminology and theories, combined with hands-on experience with techniques and methodologies most useful for credential development on the job market; To develop and hone expertise in the areas of: publishing, editing, workflow, ethics, trends, principles of effective scholarly/news writing, interviewing techniques, and media/website management.

**HRP 273. Essentials of Clinical Research at Stanford. 1 Unit.**

The course will consist of an introduction to the fundamentals of clinical research at Stanford, including the science of clinical research (design and analysis) and logistics (GCP, data management, regulatory). Material will be covered in approximately 4-6 3 hour sessions per quarter.

**HRP 274. Design for Service Innovation. 4 Units.**

(Same as OIT 343/01) Open to graduate students from all schools and departments. An experiential project course in which students work in multidisciplinary teams to design new services to address the needs of medically patients. Project teams partner with "safety net" hospitals and clinics to find better ways to deliver care to the low income and uninsured patients these institutions serve. Students learn proven innovation processes from experienced GSB, d. school, and SoM faculty, interface with students from across the university, and have the opportunity to see their ideas translated into improvements in the quality and efficiency of healthcare in the real world. Prerequisite: admission to the course is by application only. Applications available at <http://DesignForService.stanford.edu>. Applications must be submitted by November 16, 2011.

Same as: BIOE 372, MED 274

**HRP 280. Spanish for Medical Students. 2 Units.**

First quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on taking the medical history. Topics include anatomy, general hospital procedures, pediatrics, nutrition, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Undergraduates are welcome to enroll.

Same as: SPANLANG 121M

**HRP 281. Spanish for Medical Students. 2 Units.**

Second quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on performing a physical examination. Topics include anatomy, general hospital procedures, reproductive health, emergency medicine, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Undergraduates are welcome to enroll.

Same as: SPANLANG 122M

**HRP 282. Spanish for Medical Students. 2 Units.**

Third quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on different specialties and medical conditions. Topics include anatomy, diagnostic procedures, HIV, diabetes, hypertension, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Undergraduates are welcome to enroll.

Same as: SPANLANG 123M

**HRP 283. Health Services Research Core Seminar. 1 Unit.**

Presentation of research in progress and tutorials in the field of health services research.

**HRP 28SI. Alternative Spring Break: Prevention, Treatment, and Policy Perspectives on Alzheimer's Disease. 1 Unit.**

Examines four aspects of Alzheimer's disease. Goal is to give participants a clearer sense of the struggle that patients actually feel and experience during the progression of the disease. Also explores difficulties and issues that many relatives face in assuming the responsibility of full-time caregiver for an Alzheimer's patient. Addresses ethical considerations on genetic testing, should these advances be embraced or should we be wary of the knowledge they may bring? Finally, explores the notion of service through engaged scholarship by exposing oneself to cutting-edge discoveries as researchers attempt to unravel the puzzle.

**HRP 290. Advanced Medical Spanish Oral Communication. 2 Units.**

Enrollment limited to medical students. Designed to further develop linguistic skills, covering all medical specialties according to student needs. Sessions also include topics on patient education and diseases, such as diabetes, asthma, TB, and CVDs.

**HRP 292. Advanced Statistical Methods for Observational Studies. 2-3 Units.**

Design principles and statistical methods for observational studies. Topics include: matching methods, sensitivity analysis, and instrumental variables. 3 unit registration requires a small project and presentation. Computing is in R. Pre-requisites: HRP 261 and 262 or STAT 209 (HRP 239), or equivalent. See <http://rogosateaching.com/somgen290/>. Same as: CHPR 290, EDUC 260B, STATS 266

**HRP 295. Advanced Topics in Epidemiologic and Clinical Research. 2 Units.**

Topics include alternative study designs, causal inference methods, instrumental variables, time-varying confounding, registry-based research, missing data, and repeated events. Weekly readings and discussions will consider how these methods apply to numerous substantive areas including pharmacoepidemiology, reproductive and perinatal epidemiology, and many areas of chronic disease epidemiology. Prerequisite: HRP 225 and HRP 226 or permission of instructor.

**HRP 299. Directed Reading in Health Research and Policy. 1-18 Unit.**

Epidemiology, health services research, preventive medicine, medical genetics, public health, economics of medical care, occupational or environmental medicine, international health, or related fields. May be repeated for credit. Prerequisite: consent of instructor.

**HRP 370. Medical Scholars Research. 4-18 Units.**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

**HRP 391. Health Law: Finance and Insurance. 3 Units.**

(SAME AS LAW 3001, MGTECON 331) This course provides the legal, institutional, and economic background necessary to understand the financing and production of health services in the U.S. We will discuss the Affordable Care Act, health insurance (Medicare and Medicaid, employer-sponsored insurance, the uninsured), the approval process and IP protection for pharmaceuticals, and antitrust policy. We may discuss obesity and wellness, regulation of fraud and abuse, and medical malpractice. The syllabus for this course can be found at <https://syllabus.stanford.edu>. Elements used in grading: Participation, attendance, class presentation, and final exam. Same as: PUBLPOL 231

**HRP 392. Analysis of Costs, Risks, and Benefits of Health Care. 4 Units.**

(Same as MGTECON 332) For graduate students. How to do cost/benefit analysis when the output is difficult or impossible to measure. How do M.B.A. analytic tools apply in health services? Literature on the principles of cost/benefit analysis applied to health care. Critical review of actual studies. Emphasis is on the art of practical application. Same as: BIOMEDIN 432

**HRP 399. Graduate Research. 1-18 Unit.**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

**HRP 800. Second Year Health Policy PHD Tutorial. 3 Units.**

The goal of the second year tutorial is to provide PHD students with advanced training in health policy research and to assist them in successfully developing research proposals.

**HRP 801. TGR Project. 0 Units.**

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**HRP 802. TGR Dissertation. 0 Units.**

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**HRP 89Q. Introduction to Cross Cultural Issues in Medicine. 3 Units.**

Preference to sophomores. Introduction to social factors that impact health care delivery, such as ethnicity, immigration, language barriers, and patient service expectations. Focus is on developing a framework to understand culturally unique and non-English speaking populations in the health care system.

# History (HISTORY)

**HISTORY 101. The Greeks. 4-5 Units.**

(Formerly CLASSHIS 101.) 250 years ago, for almost the first time in history, a few societies rejected kings who claimed to know what the gods wanted and began moving toward democracy. Only once before had this happened—in ancient Greece. This course asks how the Greeks did this, and what they can teach us today. It uses texts and archaeology to trace the material and military sides of the story as well as cultural developments, and looks at Greek slavery and misogyny as well as their achievements. Weekly participation in a discussion section is required. Same as: CLASSICS 83

**HISTORY 102. History of the International System. 5 Units.**

After defining the characteristics of the international system at the beginning of the twentieth century, this course reviews the primary developments in its functioning in the century that followed. Topics include the major wars and peace settlements; the emergence of Nazism and Communism; the development of the Cold War and nuclear weapons; the rise of China, India, and the EU; and the impact of Islamic terrorism. The role of international institutions and international society will also be a focus as will the challenge of environment, health, poverty, and climate issues to the functioning of the system. Same as: INTNLREL 102

**HISTORY 102A. The Romans. 3-5 Units.**

(Formerly CLASSHIS 60.) How did a tiny village create a huge empire and shape the world, and why did it fail? Roman history, imperialism, politics, social life, economic growth, and religious change. Weekly participation in a discussion section is required; enroll in sections on Coursework. Same as: CLASSICS 84

**HISTORY 103D. Human Society and Environmental Change. 4 Units.**

Interdisciplinary approaches to understanding human-environment interactions with a focus on economics, policy, culture, history, and the role of the state. Prerequisite: ECON 1. Same as: EARTHYSYS 112, EARTHYSYS 212, ESS 112

**HISTORY 103E. The International History of Nuclear Weapons. 5 Units.**

An introduction to the history of nuclear weapons from World War II to the present. The focus is on politics, but the role of technology transfer, whether legal or illicit, in the development of nuclear weapons will be examined; so too will the theories about the military and political utility of nuclear weapons. We will look at the efforts to control and abolish nuclear weapons and at the international institutions created to reduce the danger of nuclear war. Same as: POLISCI 116

**HISTORY 103F. The Changing Face of War: Introduction to Military History. 3-5 Units.**

Introduces students to the rich history of military affairs and, at the same time, examines the ways in which we think of change and continuity in military history. How did war evolve from ancient times, both in styles of warfare and perceptions of war? What is the nature of the relationship between war and society? Is there such a thing as a Western way of war? What role does technology play in transforming military affairs? What is a military revolution and can it be manufactured or induced? Chronologically following the evolution of warfare from Ancient Greece to present day so-called new wars, we will continuously investigate how the interdependencies between technological advances, social change, philosophical debates and economic pressures both shaped and were influenced by war. Same as: HISTORY 3F

**HISTORY 104. Introduction to Geospatial Humanities. 3-5 Units.**

This course introduces undergraduate students to the theory and methods of the geospatial humanities, understood broadly as the application of GIS techniques and other quantitative methods in the humanistic study of social and cultural patterns in past and present settings. Same as: HISTORY 4

**HISTORY 104D. International Security in a Changing World. 5 Units.**

This class examines the most pressing international security problems facing the world today: nuclear crises, nuclear non-proliferation, terrorism, and climate change. Alternative perspectives—from political science, history, and STS (Science, Technology, and Society) studies—are used to analyze these problems. The class includes an award-winning two-day international negotiation simulation.

Same as: IPS 241, POLISCI 114S

**HISTORY 106A. Global Human Geography: Asia and Africa. 5 Units.**

Global patterns of demography, economic and social development, geopolitics, and cultural differentiation, covering E. Asia, S. Asia, S.E. Asia, Central Asia, N. Africa, and sub-Saharan Africa. Use of maps to depict geographical patterns and processes.

**HISTORY 106B. Global Human Geography: Europe and Americas. 5 Units.**

Patterns of demography, economic and social development, geopolitics, and cultural differentiation. Use of maps to depict geographical patterns and processes.

**HISTORY 107D. Rise and Fall of Atlantic Slavery, 1500 to 1900. 3-5 Units.**

Between 1500 and 1900, about 12 million people were forcibly removed from Africa and transported to the Americas to work as slaves. This course explores the history of racial slavery in the Atlantic world and its lasting significance. Topics include the Middle Passage, the development of racism, the trans-Atlantic slave trade, the slave experience, resistance, African-American cultures, abolitionism, the process of emancipation, reparations, and the perpetuation of slavery and other forms of unfree labor.

Same as: AFRICAAM 107D, HISTORY 7D

**HISTORY 107E. Islamic Routes: Archaeology and Heritage of Muslim Societies. 3-5 Units.**

How has archaeology changed our knowledge of the spread of Islam and past Muslim societies? How does archaeology shape heritage debates, conflicts and ideas about Islam today? Topics include the city and urban change, secular and religious life, gender, economy, and globalization.

These topics are explored using archaeological and critical heritage approaches. Focus is on examples drawn from Syria-Palestine, Egypt, Iraq, Arabian Peninsula, India, and Africa. Sources include archaeological data and material culture, historical texts in translation, and photography.

Same as: ANTHRO 13A, ARCHLGY 13, HISTORY 7E

**HISTORY 107G. Making Anglo-American Capitalism. 3-5 Units.**

This course addresses capitalism in global perspective to identify the roots of our current economic system. We will consider theories about capitalism, the politics and policies of implementation, and the human and environmental consequences through topics such as the imperial political economy, consumerism, plantation economies, the East India Company, and the rise of credit. Embedding markets in a range of social relations, cultural practices, and institutional arrangements, reveals how capital became an -ism in specific and knowable historical circumstances.

Same as: HISTORY 7G

**HISTORY 108C. Sugar and Slavery, Race and Revolution: The Caribbean 1450-1888. 3-5 Units.**

This course examines race and slavery across British, French, and Spanish islands, plus Brazil. The intensity of Caribbean slavery produced societies where more people were enslaved than free. The idea of "black" was invented and contested as Caribbean inhabitants leaned on African roots to shape new cultures. Sugar production sparked global wars and planted the seed of modern financial systems. Black people fought back, in ways large and small, marking the beginning of emancipation with the Haitian Revolution.

Same as: AFRICAAM 18C, CSRE 108C, HISTORY 8C

**HISTORY 10B. Renaissance to Revolution: Early Modern Europe. 3 Units.**

(Same as HISTORY 110B. History majors and others taking 5 units, register for 110B.) Few historical settings offer a more illuminating perspective on our world today than old-regime Europe. Few cast a darker shadow. Science and the enlightened ambition to master nature and society, the emergence of statehood and its grasp for human mobility, bloodshed and coexistence in the face of religious fragmentation, as well as capitalism and the birth of modern finance: this course surveys some of the most consequential developments in European societies between the late fifteenth and the early nineteenth century.

**HISTORY 10N. Thinking About War. 3 Units.**

This course examines classic approaches to war as an intellectual problem, looking at how a matter of such great physical violence and passions can be subjected to understanding and used in philosophy, political theory, and art. Questions to be examined include the definition of war, its causes, its moral value, the nature of its participants, its use in the self-definition of individuals and societies, its relation to political authority, warfare and gender, and the problem of civil war.

**HISTORY 10SC. Biography in History, Fiction, and Elsewhere. 2 Units.**

How biographers, novelists, critics and others have written about the rhythms of life the lives of the famous as well as the obscure - will be explored in this course. Biographical writing can be frivolous, but at its best it has the capacity to undercover so much of life's richness, complexity, and confusions. We'll study biography with the use of some of the most resonant, compelling examples of the genre. Together we'll read books about poets Sylvia Plath and Ted Hughes, Henry James Aspern Papers, the brilliant novel on biographical writing, A. S. Byatt's Possession, and Norman Mailer on Marilyn Monroe. How one chooses one topic over another; the differences and similarities between the representation of lives in fiction and biography; the benefits and pitfalls of an intense identification with one's own subjects these and other matters will be examined. We'll meet in San Francisco with local writers wrestling with issues of this sort, and students will be encouraged to try their hands at writing about lives based on research, personal observation, or both.

**HISTORY 110B. Renaissance to Revolution: Early Modern Europe. 5 Units.**

(Same as HISTORY 10B. History majors and others taking 5 units, register for 110B.) Few historical settings offer a more illuminating perspective on our world today than old-regime Europe. Few cast a darker shadow. Science and the enlightened ambition to master nature and society, the emergence of statehood and its grasp for human mobility, bloodshed and coexistence in the face of religious fragmentation, as well as capitalism and the birth of modern finance: this course surveys some of the most consequential developments in European societies between the late fifteenth and the early nineteenth century.

**HISTORY 112. Medicine and Disease in the Ancient World. 5 Units.**

(Same as HISTORY 12. History majors and others taking 5 units, register for HISTORY 112.) This course explores medicine and disease through case studies from civilizations of the ancient world such as Egypt, Greece, and Peru. We will discuss how these cultures conceptualized disease, and in turn, how they contended with illnesses. Lectures will address different forms of illness through medical texts, art, and human remains. Weekly discussion will incorporate evidence from these sources to explore both their potential and their limitations.

**HISTORY 113. Before Globalization: Understanding Premodern World History. 3-5 Units.**

(Formerly CLASSHIS 147.) This course covers the history of the world from 60,000 years ago until 1500 by asking big questions: Why did civilizations develop the way they did? What factors were responsible for similarities and differences between different parts of the world? What does this mean for our newly globalized world?.



**HISTORY 115D. Europe in the Middle Ages, 300-1500. 3-5 Units.**

This course provides an introduction to Medieval Europe from the fall of Rome to the Renaissance. While the framework of the course is chronological, we'll concentrate particularly on the structure of medieval society. Rural and urban life, kingship and papal government, wars and plagues provide the context for our examination of the lives of medieval people, what they believed, and how they interacted with other, both within Christendom and beyond it.

Same as: HISTORY 15D, RELIGST 115X

**HISTORY 116. Traders and Crusaders in the Medieval Mediterranean. 3-5 Units.**

Trade and crusade were inextricably interconnected in the high Middle Ages. As merchant ships ferried knights and pilgrims across the Mediterranean, rulers borrowed heavily to finance their expeditions, while military expansion opened new economic opportunities. Course themes include the origins of the Crusading movement; the rise of Venice and other maritime powers; the pivotal roles of the Byzantine and Mongol Empires; relations between Christians, Muslims, and Jews; new military, maritime, and commercial technologies; and the modern legacy of the Crusades.

Same as: HISTORY 16

**HISTORY 116N. Howard Zinn and the Quest for Historical Truth. 3 Units.**

With more than two million copies in print, Howard Zinn's *A People's History* is a cultural icon. We will use Zinn's book to probe how we determine what was true in the past. *A People's History* will be our point of departure, but our journey will visit a variety of historical trouble spots: debates about whether the US was founded as a Christian nation, Holocaust denial, and the "Birther" controversy of President Obama.

Same as: EDUC 116N

**HISTORY 115C. How Is a Buddhist. 2 Units.**

Buddhism as a system of thought, a culture, a way of life, a definition of reality, a method for investigating it, and a mental, physical, and social practice. Buddhism as a total phenomenon. Readings, films, music, and art. How Buddhist practices constitute the world of the Buddhist.

**HISTORY 11W. Service-Learning Workshop on Issues of Education Equity. 1 Unit.**

Introduces students to a variety of issues at stake in the public education of at-risk high school youth in California. Participants will hear from some of the leading faculty in the School of Education as well as the Departments of Psychology, Sociology, and others, who will share perspectives on the problems and challenges of educating a diverse student body in the state's public school system. The service-learning component of the workshop is a mentoring project (Stanford Students for Educational Equity) with junior class history students from East Palo Alto Academy High School, a Stanford charter school.

Same as: CSRE 11W

**HISTORY 12. Medicine and Disease in the Ancient World. 3 Units.**

(Same as HISTORY 112. History majors and others taking 5 units, register for 112.) This course explores medicine and disease through case studies from civilizations of the ancient world such as Egypt, Greece, and Peru. We will discuss how these cultures conceptualized disease, and in turn, how they contended with illnesses. Lectures will address different forms of illness through medical texts, art, and human remains. Weekly discussion will incorporate evidence from these sources to explore both their potential and their limitations.

**HISTORY 120A. The Russian Empire, 1450-1800. 5 Units.**

(Same as HISTORY 20A. History majors and others taking 5 units, register for 120A.) Explores rise of Russian state and expanse of empire; patterns of governance of a Eurasian empire; strategies and institutions of governance; survey of various ethnic and religious groups in empire and their varied cultures and political economies; gender and family; serfdom; Russian Orthodox religion and culture; reforms and Europeanization of 18th century.

**HISTORY 120B. The Russian Empire. 5 Units.**

From Peter the Great to the Bolsheviks. Russia as an empire; its varied regions, including the Caucasus, Central Asia, Ukraine, Poland, and the Baltics. Focus is on the politics and cultures of empire. Sources include novels, political tracts, paintings, music, and other primary sources.

**HISTORY 120C. 20th-Century Russian and Soviet History. 5 Units.**

The Soviet polity from the 1917 Revolution to its collapse in 1991. Essentials of Marxist ideology; the Russian Empire in 1917. Causation in history; interpretations of the Revolution; state building in a socialist polity; social engineering through collectivization of agriculture, forced industrialization, and cultural revolution; terror as concept and practice; nationality policies in a multiethnic socialist empire; the routinization, decline, and collapse of the revolutionary ethos; and the legacy of the Soviet experiment in the new Russia.

**HISTORY 126B. Protestant Reformation. 3-5 Units.**

The emergence of Protestant Christianity in 16th-century Europe. Analysis of writings by evangelical reformers (Luther, Calvin, Zwingli, Sattler, Hubmeier, Müntzer) and study of reform movements (Lutheran, Reformed, Anabaptist, Spiritualist) in their medieval context and as expressions of new and influential visions of Christian belief, life, social order.

Same as: RELIGST 126

**HISTORY 12N. The Early Roman Emperors: History, Biography, and Fiction. 3 Units.**

Preference to freshmen. The politics, drama, and characters of the period after the fall of the Roman Republic in 49 B.C.E. Issues of liberty and autocracy explored by Roman writers through history and biography. The nature of history writing, how expectations about literary genres shape the materials, the line between biography and fiction, and senatorial ideology of liberty. Readings include: Tacitus' *Annals*, Suetonius' *Lives of the Caesars*, and Robert Graves' *I Claudius* and episodes from the BBC series of the same title.

**HISTORY 131G. From Oil to Opium: Commodities and Consumption In European and Global History, 1800-present. 5 Units.**

This course surveys the origins and impact of encounters at several sites of European empires: Qing China, India, Africa, the Pacific, and the Caribbean. The course conducts its inquiry from several angles, focusing on the way Western imperial systems affected politics, law, economics, and culture. Students will grapple with key concepts, including financial imperialism and neocolonialism; they will also learn about such specialized topics as the laws of imperial expansion. While the course will spend ample time covering the effects of imperialism at home, it will equally engage with its effects abroad.

**HISTORY 132. Ordinary Lives: A Social History of the Everyday in Early Modern Europe. 5 Units.**

What war meant for foot soldiers and the peasants across whose fields they marched. Ordinary people's lives in the eras of Machiavelli, Shakespeare, the Reformation, and the scientific revolution. Topics include: birth, marriage, and death; city life and peasant culture; lay encounters with religious and intellectual ideas; war and crime; and gender and sexuality.

**HISTORY 137. The Holocaust. 4-5 Units.**

The emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.

Same as: HISTORY 337, JEWISHST 183, JEWISHST 383

**HISTORY 139. Modern Britain and the British Empire. 5 Units.**

(Same as HISTORY 39. History majors and others taking 5 units, register in 139.) From American Independence to the latest war in Iraq. Topics include: the rise of the modern British state and economy; imperial expansion and contraction; the formation of class, gender, and national identities; mass culture and politics; the world wars; and contemporary racial politics. Focus is on questions of decline, the fortunes and contradictions of British liberalism in an era of imperialism, and the weight of the past in contemporary Britain.

**HISTORY 140. World History of Science. 5 Units.**

(Same as HISTORY 40. History majors and others taking 5 units, register for 140.) The earliest developments in science, the prehistoric roots of technology, the scientific revolution, and global voyaging. Theories of human origins and the oldest known tools and symbols. Achievements of the Mayans, Aztecs, and native N. Americans. Science and medicine in ancient Greece, Egypt, China, Africa, and India. Science in medieval and Renaissance Europe and the Islamic world including changing cosmologies and natural histories. Theories of scientific growth and decay; how science engages other factors such as material culture and religions.

**HISTORY 140A. The Scientific Revolution. 5 Units.**

What do people know and how do they know it? What counts as scientific knowledge? In the 16th and 17th centuries, understanding the nature of knowledge engaged the attention of individuals and institutions including Copernicus, Galileo, Descartes, Newton, the early Royal Society, and less well-known contemporaries. New meanings of observing, collecting, experimenting, and philosophizing, and political, religious, and cultural ramifications in early modern Europe.

**HISTORY 145A. Africa Until European Conquest. 5 Units.**

Episodes in African history from the earliest records up until European partition of the continent, focusing on how knowledge about the natural, social, and spiritual worlds was linked to the exercise of power. The effects of technological innovations on states and other forms of social complexity; use of religious beliefs and practices to legitimate or critique authority. The effects of slave trades and imperial conquest on these forms of authority.

**HISTORY 145B. Africa in the 20th Century. 5 Units.**

(Same as HISTORY 45B. History majors and others taking 5 units, register for 145B.) The challenges facing Africans from when the continent fell under colonial rule until independence. Case studies of colonialism and its impact on African men and women drawn from West, Central, and Southern Africa. Novels, plays, polemics, and autobiographies written by Africans.

Same as: AFRICAAM 145B

**HISTORY 146. History of Humanitarian Aid in sub-Saharan Africa. 4-5 Units.**

Explores humanitarian endeavors through the era of the slave trade, colonialism, the Cold War and the present. Our focus is both local and global examining international humanitarian policy and the effects and perceptions of humanitarian aid within different African localities. Assignments use primary and secondary sources including organizational reports, ethnographies, memoirs and film. Topics: anti-slave trade and abolition movements, `civilizing; missions, development, refugees, peacekeeping, famine and women's rights.

**HISTORY 147. History of South Africa. 5 Units.**

(Same as HISTORY 47. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis.

Same as: AFRICAAM 147, CSRE 174

**HISTORY 148. The Egyptians. 3-5 Units.**

Overview of ancient Egyptian pasts, from predynastic times to Greco-Roman rule, roughly 3000 BCE to 30 BCE. Attention to archaeological sites and artifacts; workings of society; and cultural productions, both artistic and literary. Participation in class is required.

Same as: AFRICAAM 30, CLASSICS 82, HISTORY 48

**HISTORY 149C. The Slave Trade. 5 Units.**

(Same as HISTORY 49C. History majors and others taking 5 units, enroll in 149C.) Slave trades and forms of slavery in W. Africa from 1000 to 1885; impacts on lives, social organization, and political structures. Slavery in Islam, the slave market in the Mediterranean and Middle East, and the Saharan slave trade. Slavery within Africa, growth of the Atlantic trade, the Middle Passage, and war and trade that produced slaves. Impact of the Industrial Revolution and European abolition movements on the use of slaves and warfare in Africa. The relationship between slaving and the European conquest of Africa.

**HISTORY 14N. Making the Middle Ages. 3 Units.**

Through hands-on engagement with Stanford's diverse collections of medieval artifacts-- from grungy coins to lavish manuscripts-- this course offers an introduction to the cultures of Europe and the Mediterranean world from 400-1400 CE. In addition, the course will explore competing contemporary understandings of the "Middle Ages" and the role of the "medieval" in shaping what it means to be "modern".

**HISTORY 150A. Colonial and Revolutionary America. 5 Units.**

(Same as HISTORY 50A. History majors and others taking 5 units, register for HISTORY 150A.) Survey of the origins of American society and polity in the 17th and 18th centuries. Topics: the migration of Europeans and Africans and the impact on native populations; the emergence of racial slavery and of regional, provincial, Protestant cultures; and the political origins and constitutional consequences of the American Revolution.

Same as: AMSTUD 150A

**HISTORY 150B. Nineteenth Century America. 5 Units.**

(Same as HISTORY 50B. History majors and others taking 5 units, register for 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture.

Same as: AFRICAAM 150B, AMSTUD 150B, CSRE 150S

**HISTORY 150C. The United States in the Twentieth Century. 5 Units.**

(Same as HISTORY 50C. History majors and others taking 5 units, register for 150C.) Covering the past century, this course will survey U.S. politics, culture, and social movements, tracing three recurrent themes: the growth of the federal government and ensuing political debates about its role; the development of the United States into a world power; and the contested expansion of American democracy. Lectures meet Mon, Tues, Wed. This is a Massive Multiplayer Humanities course: students will participate in two archival workshops held on Thursdays. Research workshops for 5 credit students will also be held on Thursdays. Suitable for non-majors and majors alike. Three and five credit options, with the choice of a research paper or proposal for 5 credit students.

Same as: AMSTUD 150C

**HISTORY 151. The American West. 5 Units.**

The American West is characterized by frontier mythology, vast distances, marked aridity, and unique political and economic characteristics. This course integrates several disciplinary perspectives into a comprehensive examination of Western North America: its history, physical geography, climate, literature, art, film, institutions, politics, demography, economy, and continuing policy challenges. Students examine themes fundamental to understanding the region: time, space, water, peoples, and boom and bust cycles.

Same as: AMSTUD 124A, ARTHIST 152, ENGLISH 124, POLISCI 124A

**HISTORY 152. History of American Law. 5 Units.**

(Formerly Law 318. Now Law 3504.) This course examines the growth and development of American legal institutions with particular attention to crime and punishment, slavery and race relations, the role of law in developing the economy, and the place of lawyers in American society, from colonial times to the present. Special Instructions: Any student may write a paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Final exam or paper. Automatic grading penalty waived for writers. Cross-listed with History (HISTORY 152 Consent of instructor required) & (HISTORY 352B). Same as: HISTORY 352B

**HISTORY 152K. America as a World Power: U.S. Foreign Relations, 1914 to Present. 5 Units.**

This course will examine the modern history of American foreign relations, from 1914 to the present. Beginning with the fateful decision to intervene in the First World War, it will examine the major crises and choices that have defined the "American Century." Our study of U.S. foreign relations will consider such key factors as geopolitics, domestic politics, bureaucracy, psychology, race, and culture. Students will be expected to undertake their own substantial examination of a critical episode in the era studied. Same as: INTNLREL 168

**HISTORY 153. CREATION OF THE CONSTITUTION. 5 Units.**

(Same as LAW 230.) The course begins with readings setting forth the intellectual and experiential background of the framing, including common law and natural rights theory, republicanism, economic & political scientific ideas, and colonial and post-Independence experience. We then study large parts of the debates at the Constitutional Convention, primarily using Madison's Notes. Next come the ratification debates, including readings from antifederalist writers, about half of *The Federalist*, and overviews of the Virginia and New York ratification conventions. We conclude with the addition of the Bill of Rights. Classes consist of a combination of lecture and extensive participation by students. Elements used in grading: Exam.

**HISTORY 154. American Intellectual and Cultural History to the Civil War. 5 Units.**

(Same as HISTORY 54. History majors and others taking 5 units, register for 154.) How Americans considered problems such as slavery, imperialism, and sectionalism. Topics include: the political legacies of revolution; biological ideas of race; the Second Great Awakening; science before Darwin; reform movements and utopianism; the rise of abolitionism and proslavery thought; phrenology and theories of human sexuality; and varieties of feminism. Sources include texts and images. Same as: AMSTUD 154

**HISTORY 155. American Constitutional History from the Civil War to the War on Poverty. 5 Units.**

(Same as LAW 7008.) This course addresses U.S. constitutional history from the post-Civil War Reconstruction period through the mid-20th century. Because of the breadth of the subject matter, the view will necessarily be partial. In particular we will take as our focus the way the Constitution has provided a point of political mobilization for social movements challenging economic and social inequality. Topics covered include: Civil War Reconstruction and restoration; the rise of corporate capitalism and efforts to constrain it; Progressive Era regulation; the New Deal challenge to federalism and the anti-New Deal backlash; government spending; WWII and the Japanese Internment; the Civil Rights Era, and the War on Poverty. Readings will include both legal and historical materials with a focus on the relationship between law and society. Readings will include both legal and historical materials with a focus on the relationship between law and society. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper. Paper extensions will be granted with instructor permission. No automatic grading penalty for late papers. Same as: AMSTUD 155

**HISTORY 155D. The Asian American Movement: A History of Activism. 3-5 Units.**

The "Asian American Movement" was born in the late 1960s inspired by other movements for social change and justice in the era. Activism among Asians in America has a longer history and a continuity to today. We will examine past, present, and future and consider issues of racial/ethnic identity, of inequality, and of injustice. And we will explore avenues that sought remedy and progress. Political, social, cultural, gender and sexuality, and international dimensions will be considered. Same as: AMSTUD 155D, ASNAMST 55D, ASNAMST 155D, HISTORY 55D

**HISTORY 156. American Economic History. 5 Units.**

The American economy from colonial times to the present, illustrating the role of history in economic life. Topics: U.S. economic development in global and comparative context; slavery as an economic system; emergence of American technology and business organization; economics of the Great Depression and the New Deal; post-World War II economic performance and social change; globalization, information technology, and inequality. Prerequisite: 1 or 1V. Same as: AMSTUD 116

**HISTORY 156G. Women and Medicine in US History: Women as Patients, Healers and Doctors. 5 Units.**

Women's bodies in sickness and health, and encounters with lay and professional healers from the 18th century to the present. Historical construction of thought about women's bodies and physical limitations; sexuality; birth control and abortion; childbirth; adulthood; and menopause and aging. Women as healers, including midwives, lay physicians, the medical profession, and nursing. Same as: AMSTUD 156H, FEMGEN 156H

**HISTORY 157. The Constitution: A Brief History. 5 Units.**

A broad survey of the Constitution, from its Revolutionary origins to the contemporary disputes over interpretation. Topics include the invention of the written constitution and interpretative canons; the origins of judicial review; the Civil War and Reconstruction as constitutional crises; the era of substantive due process; the rights revolution; and the Constitution in wartime. Same as: AMSTUD 157, POLISCI 128S

**HISTORY 158C. History of Higher Education in the U.S.. 3-5 Units.**

Major periods of evolution, particularly since the mid-19th century. Premise: insights into contemporary higher education can be obtained through its antecedents, particularly regarding issues of governance, mission, access, curriculum, and the changing organization of colleges and universities. Same as: AMSTUD 165, EDUC 165, EDUC 265

**HISTORY 15D. Europe in the Middle Ages, 300-1500. 3-5 Units.**

This course provides an introduction to Medieval Europe from the fall of Rome to the Renaissance. While the framework of the course is chronological, we'll concentrate particularly on the structure of medieval society. Rural and urban life, kingship and papal government, wars and plagues provide the context for our examination of the lives of medieval people, what they believed, and how they interacted with other, both within Christendom and beyond it. Same as: HISTORY 115D, RELIGST 115X

**HISTORY 15N. Inequality: the Last 100,000 Years. 3 Units.**

(Formerly CLASSHIS 13N.) This seminar traces the evolution of resource inequality from the Stone Age to the present. Only this long-term perspective reveals the forces that drive inequality and allows us to address two key questions: what causes inequality, and what factors have been capable of reducing it, at least for a while? We are going to confront challenging arguments: that inequality has been closely tied up with overall economic and human development, and that over the long course of history, war, revolution and pestilence were the most effective equalizers of income and wealth. This class will help you appreciate contexts and complexities that are usually obscured by partisan polemics and short-term thinking. Seminar participants will be directly involved in the instructor's current research project on the history of inequality. Same as: CLASSICS 28N

**HISTORY 16. Traders and Crusaders in the Medieval Mediterranean. 3-5 Units.**

Trade and crusade were inextricably interconnected in the high Middle Ages. As merchant ships ferried knights and pilgrims across the Mediterranean, rulers borrowed heavily to finance their expeditions, while military expansion opened new economic opportunities. Course themes include the origins of the Crusading movement; the rise of Venice and other maritime powers; the pivotal roles of the Byzantine and Mongol Empires; relations between Christians, Muslims, and Jews; new military, maritime, and commercial technologies; and the modern legacy of the Crusades.

Same as: HISTORY 116

**HISTORY 161. The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History. 3-5 Units.**

This course explores the transition from Victorian to modern American womanhood by asking how Native, European, African, Mexican, and Asian American women navigated the changing sexual, economic, and political landscapes of the twentieth century. Through secondary readings, primary sources, films, music, and literature we explore the opportunities and boundaries on groups of women in the context of historical events that included immigration, urbanization, wartime, depression, the Cold War, as well as recurrent feminist and conservative political movements. Same as: AMSTUD 161, CSRE 162, FEMGEN 161, HISTORY 61

**HISTORY 163. A History of North American Wests. 5 Units.**

The history, peoples, and natural systems of a region that has never been contained within a single empire or nation state, but has been united by the movement of peoples, species, and things. Topics include smallpox, horses, gold, salmon, rivers, coal, and oil.

**HISTORY 164C. From Freedom to Freedom Now: African American History, 1865-1965. 5 Units.**

(Same as HISTORY 64C. History majors and others taking 5 units, register for 164C.) Explores the working lives, social worlds, political ideologies and cultural expressions of African Americans from emancipation to the early civil rights era. Topics include: the transition from slavery to freedom, family life, work, culture, leisure patterns, resistance, migration and social activism. Draws largely on primary sources including autobiographies, memoirs, letters, personal journals, newspaper articles, pamphlets, speeches, literature, film and music.

Same as: AMSTUD 164C

**HISTORY 166B. Immigration Debates in America, Past and Present. 3-5 Units.**

Examines the ways in which the immigration of people from around the world and migration within the United States shaped American nation-building and ideas about national identity in the twentieth century. Focuses on how conflicting ideas about race, gender, ethnicity, and citizenship with respect to particular groups led to policies both of exclusion and integration. Part One begins with the ways in which the American views of race and citizenship in the colonial period through the post-Reconstruction Era led to the passage of the Chinese Exclusion Act in 1882 and subsequently to broader exclusions of immigrants from other parts of Asia, Southern and Eastern Europe, and Mexico. Explores how World War II and the Cold War challenged racial ideologies and led to policies of increasing liberalization culminating in the passage of the 1965 Immigration Act, which eliminated quotas based on national origins and opened the door for new waves of immigrants, especially from Asia and Latin America. Part Two considers new immigration patterns after 1965, including those of refugees, and investigates the contemporary debate over immigration and immigration policy in the post 9/11 era as well as inequalities within the system and the impact of foreign policy on exclusions and inclusions.

Same as: CSRE 166B, HISTORY 366B

**HISTORY 167A. Martin Luther King, Jr. and the Global Freedom Struggle. 3-5 Units.**

Using the unique documentary resources and publications of Stanford's King Research and Education Institute, this course will be taught by Professor Carson and his colleagues at the Institute. It will provide a general introduction to the life and legacy of Martin Luther King, Jr., as well as devote attention to the movements he inspired. In addition to lectures, the course will include presentations of documentaries such as *Eyes on the Prize*. Students will be expected to read the required texts, participate in class discussions, and take a final exam or submit a research paper (or an audio-visual project developed in consultation with the professor).

**HISTORY 168. American History in Film Since World War II. 3-4 Units.**

U.S. society, culture, and politics since WW II through feature films. Topics include: McCarthyism and the Cold War; ethnicity and racial identity; changing sex and gender relationships; the civil rights and anti-war movements; and mass media. Films include: *The Best Years of Our Lives*, *Salt of the Earth*, *On the Waterfront*, *Raisin in the Sun*, *Kramer v Kramer*, and *Falling Down*.

**HISTORY 168D. Martin Luther King, Jr.: The Inner Life and Global Vision. 3-5 Units.**

Martin Luther King, Jr., was the 20th-century's best-known African-American leader, but the religious roots of his charismatic leadership are far less widely known. The documents assembled and published by Stanford's King Research and Education Institute provide the source materials for this exploration of King's swift rise to international prominence as an articulate advocate of global peace and justice. Same as: AFRICAAM 68D, AMSTUD 168D, CSRE 68, HISTORY 68D

**HISTORY 170C. Modern Latin America. 3-5 Units.**

This course examines Latin American history from independence to the present day. Key issues include nationalism, urbanization, culture, and revolution. Sources include writings in the social sciences as well as primary documents, fiction, and film.

Same as: HISTORY 70C

**HISTORY 172A. Mexico: From Colony to Nation, or the History of an impossible Republic?. 5 Units.**

Was a republican form of government even possible in 19th-century Mexico after 300 years of colonial rule under the Spanish monarchy? Was the Spanish colonial heritage a positive or a negative legacy according to 19th-century Mexican politicians? How were they to forge a new national identity with so many ethnically and culturally diverse peoples throughout the territory? Just how *¿traditional¿* was, in fact, the colonial period? These are some of the questions we will explore in this course. Journeying from the late colonial period (c.1700) to the 35-year dictatorship known as El Porfiriato (1876-1911) we will examine how Mexico's diverse indigenous peoples adapted to both colonial and postcolonial rule, how they actively participated in politics and political discourse to preserve their cultures, customs and colonial privileges, and how after independence in 1821, a new republican political culture was forged. Mexico was not an impossible republic, but rather another kind of republic.

**HISTORY 177D. U.S. Intervention and Regime Change in 20th Century Latin America. 5 Units.**

Policy discussions of regime change by US politicians, journalists and pundits usually focus on Iraq, Iran, Syria and North Korea, often with little or no historical context or perspective. This course does the opposite and takes seriously the proverbial saying "if history is any guide..." by examining U.S. interventions in Latin America, a region where so-called preventive regime change (covert as well as overt) has been operative policy for well over a century. Investigates the rationales, motivations and strategies behind U.S.-backed or engineered regime changes in Mexico in the 1910s, Guatemala in the 1950s, Chile in the 1970s, and Nicaragua in the 1980s.

**HISTORY 180. The Ottoman Empire: Conquest, Coexistence, and Coffee. 3-5 Units.**

The Ottoman Empire ruled the Middle East, North Africa and Eastern Europe from the 15th to the early 20th centuries. How did the Ottoman enterprise appear in the frontier region between Christendom and the Islamic world? How were diverse peoples, religions, and regions integrated under the Ottoman order? Was there an Ottoman Mediterranean and Indian Ocean? How did reform movements in Islamic, Christian and Jewish thinking transform Ottoman societies? Topics include the Ottoman Empire between Europe and Eastern Islamic World; merchants and their markets; elite, urban, rural and nomadic lives; women, family, childhood and sexuality; life, afterlife and dreams. Special emphasis will be given to coffee and coffee houses which shaped public life in the Ottoman World since the 16th century. The survey ends with the rise of nationalisms, inter-communal violence and the disintegration of the Ottoman world.

Same as: HISTORY 80

**HISTORY 181B. Formation of the Contemporary Middle East. 5 Units.**

Focusing on the period from World War I to the recent past, the course emphasizes the eastern Arab world Egypt, greater Syria, and Iraq plus Saudi Arabia, Turkey, Iran, and Israel. Themes include: integration of the region into the world economy; imperialism and the formation of the contemporary state system; competing forms of identity (national states, pan-Arab nationalism, Islam) and ideology (liberalism, Marxism, fascism, Islamism); changing gender relations; Palestine/Israel, decolonization, the Cold War; the transition from British to U.S. hegemony; and several contemporary crises.

**HISTORY 182C. Making of the Islamic World, 600-1500. 5 Units.**

(Same as HISTORY 82C. Majors and other taking 5 units, register for 182C.) The History of Islam and Muslim peoples from 600-1500. Topics include Muhammad and his community; the early Arab conquests and empires; sectarian movements; formation of Islamic belief, thought, legal culture and religious institutions; transregional Sufi and learned networks; family and sexuality; urban, rural and nomadic life; non-Muslim communities; the development of Mediterranean and Indian Ocean trade; relations with Byzantium, the Latin West, China; the Crusades and the Mongols.

**HISTORY 182G. Making Palestine Visible. 3-5 Units.**

Israel-Palestine is one of the most difficult subjects to talk about, in large part because we in the United States do not have much exposure to Palestinian history, culture, and politics in their own terms. This course aims to humanize Palestinians and asks why Palestinian claims to rights are illegible for much of the American public. We begin to answer this question by examining a broad sampling of history, structures of power and law, culture, and contemporary political issues.

Same as: COMPLIT 82, COMPLIT 182, CSRE 82G, HISTORY 82G

**HISTORY 185B. Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility. 4-5 Units.**

(Same as HISTORY 85B.) This course explores the full expanse of Jewish life today and in the recent past. The inner workings of religious faith, the content of Jewish identity shorn of belief, the interplay between Jewish powerlessness and influence, the myth and reality of Jewish genius, the continued pertinence of antisemitism, the rhythms of Jewish economic life *¿* all these will be examined in weekly lectures, classroom discussion, and with the use of a widely diverse range of readings, films, and other material. Explored in depth will the ideas and practices of Zionism, the content of contemporary secularism and religious Orthodoxy, the impact Holocaust, the continued crisis facing Israel and the Palestinians. Who is to be considered Jewish, in any event, especially since so many of the best known (Spinoza, Freud, Marx) have had little if anything to do with Jewish life with their relationships to it indifferent, even hostile?.

Same as: CSRE 185B, HISTORY 385C, JEWISHST 185B, REES 185B

**HISTORY 190. Early Chinese Thought. 3-5 Units.**

This lecture course examines the emergence of critical thought in early China. After a brief study of the social and political changes that made this emergence possible, it looks at the nature and roles of the thinkers, and finally their ideas about the social order, the state, war and the army, the family, the cosmos, and the self (both physical and mental). Some brief comparisons with early Greek thought.

Same as: HISTORY 90

**HISTORY 191D. China: The Northern and Southern Dynasties. 5 Units.**

(Same as HISTORY 91D. History majors and others taking 5 units, register for 191D.) Examines one of the most dynamic periods of Chinese history with the emergence of the institutional religions (Buddhism and Daoism), the development of the garden as an art form, the rise of landscape as a theme of verse and art, the invention of lyric poetry, and the real beginnings of the southward spread of Chinese civilization.

**HISTORY 193. The Chinese Empire from the Mongol Invasion to the Boxer Uprising. 5 Units.**

(Same as HISTORY 93. History majors and others taking 5 units, register for 193.) A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

Same as: CHINA 183, FEMGEN 193

**HISTORY 194B. Japan in the Age of the Samurai. 5 Units.**

(Same as HISTORY 94B. History majors and others taking 5 units, register for 194B.) From the Warring States Period to the Meiji Restoration. Topics include the three great unifiers, Tokugawa hegemony, the samurai class, Neoconfucian ideologies, suppression of Christianity, structures of social and economic control, frontiers, the other and otherness, castle-town culture, peasant rebellion, black marketing, print culture, the floating world, National Studies, food culture, samurai activism, black ships, unequal treaties, anti-foreign terrorism, restorationism, millenarianism, modernization as westernization, Japan as imagined community.

**HISTORY 194G. Humanities Core: Technology and Media in Modern Japan. 3-5 Units.**

This course considers the political, economic, social, cultural, and artistic effects of the introduction of new technologies and media to modern China and Japan. The methodology will integrate techniques gleaned from the disciplines of history and literary studies. Our cross-discipline exploration will encompass printed books and images, language reform, communication technology, serialized fiction and commercial journalism, propaganda and censorship, cinema, comics, animation and television, gaming, and the internet. Through examination of these topics we will investigate a wide range of issues including nationality, ethnic identity, class, revolution, cultural identification, gender, sexuality, literacy, colonialism, imperialism, consumerism, materialism, and globalism, to name just a few. Throughout the course we will be attentive not only to the ways that new technology and media are represented in cultural materials but also how they are materialized in these products through the acts of adaptation, translation, transliteration, and remediation. Students will survey, collect, and synthesize archival materials, engage in media analysis, and undertake close readings to illuminate narrative strategies and other signifying effects. This work will in part be facilitated by the Massive Multiplayer Humanities pedagogical model, which involves flipped classrooms, faculty curated online archives, and student initiated group work.

Same as: HUMCORE 23, JAPAN 119

**HISTORY 195. Modern Korean History. 4-5 Units.**

(Same as HISTORY 95. History majors and others taking 5 units, register for 195.) This lecture course provides a general introduction to the history of modern Korea. Themes include the characteristics of the Chosŏn dynasty, reforms and rebellions in the nineteenth century, Korean nationalism; Japan's colonial rule and Korean identities; decolonization and the Korean War; and the different state-building processes in North and South, South Korea's democratization in 1980s, and the current North Korean crisis.

Same as: HISTORY 395

**HISTORY 195C. Modern Japanese History: From Samurai to Pokemon. 5 Units.**

(Same as HISTORY 95C. History majors and others taking 5 units, register for 195C.) Japan's modern transformation from the late 19th century to the present. Topics include: the Meiji revolution; industrialization and social dislocation; the rise of democracy and empire; total war and US occupation; economic miracle and malaise; Japan as soft power; and politics of memory. Readings and films focus on the lived experience of ordinary men and women across social classes and regions.

**HISTORY 198. The History of Modern China. 5 Units.**

(Same as HISTORY 98. History majors and others taking 5 units, register for 198.) Do you want to understand Modern China? If so, this course is for you. And even if you've studied China before, or grew up there, this course will deepen and challenge your perspectives. Through vivid and propulsive lectures - drawing on fiction, film, political essays, and more - Professor Tom Mullaney will chart out China's historical transformations from 1800 to today, equipping you to speak and write intelligently about Chinese politics, society, economy, culture, gender, ethnicity, and international affairs.

**HISTORY 198G. Beijing, Shanghai, and the Structure of China. 3-5 Units.**

China's modern history through the rivalry of its two most important cities. The course begins in the nineteenth century, contrasting Beijing, the classic imperial capital and a foreign foundation paradoxically celebrated as the embodiment of "traditional" China, with Shanghai, a treaty port and demographic/economic center of China, but identified as a "foreign" city. After following the cities' history through the warlord period, the "Shanghai decade" of Nationalist rule, and the Japanese occupation, the course examines the two cities' developments under Mao and Deng. The course concludes with a look at their current relations and roles, and the transformed nature of China's cities.

**HISTORY 1B. Global History: The Early Modern World, 1300 to 1800. 3-5 Units.**

Topics include early globalization and cross-cultural exchanges; varying and diverse cultural formations in different parts of the world; the growth and interaction of empires and states; the rise of capitalism and the economic divergence of "the west"; changes in the nature of technology, including military and information technologies; migration of ideas and people (including the slave-trade); disease, climate, and environmental change over time. Designed to accommodate beginning students, non-majors, and more advanced history students.

**HISTORY 1C. Global History: Empires, Technology, and Modernity. 3-5 Units.**

How did the power of states evolve around the globe during the modern period? And how did it shape global experiences of modernity? In this course we will examine the development of technologies of rule from the eighteenth to the twenty-first century, from the age of empires and revolutions, through the world wars, the Cold War, and the war on terror. We will look at the political, social, cultural, and intellectual roots behind their invention and their results on the ground. In doing so, we will attempt to grasp the way they have shaped the history and experience of modernity. The course offers a broad overview not of a particular region but of the wider set of processes and technologies that connected the historical experiences of far-flung human communities. Topics include the evolution of government bureaucracies and classificatory schemes; the industrial revolution; technologies of rebellion and revolution; technologies of trade, including maps, ships, guns, and railroads; liberalism's urban technologies; airpower; the history and practice of development; camps and borders; and anti-colonial critiques of these various tools of empire. Through these, we will attempt to make sense of how the technologies of imperial power have shaped the bonds and inequalities of global capitalism and the world of nation-states. We will focus on different case studies each week to trace the unfolding of large-scale processes. Students will read primary sources (produced in the period) and historians' analyses of the events from a distance. The class is appropriate for beginning students, non-majors, and more advanced history students, and may be taken for different levels of credit.

**HISTORY 201. From Confederate Monuments to Wikipedia: The Politics of Remembering the Past. 5 Units.**

Gateway course for Public History/Public Service track. Examines various ways history is used outside of the classroom, and its role in political/cultural debates in the U.S. and abroad. Showcases issues and careers in public history with guest speakers.

Same as: AFRICAAM 102, CSRE 201

**HISTORY 201C. The U.S., U.N. Peacekeeping, and Humanitarian War. 5 Units.**

The involvement of U.S. and the UN in major wars and international interventions since the 1991 Gulf War. The UN Charter's provisions on the use of force, the origins and evolution of peacekeeping, the reasons for the breakthrough to peacemaking and peace enforcement in the 90s, and the ongoing debates over the legality and wisdom of humanitarian intervention. Case studies include Croatia and Bosnia, Somalia, Rwanda, Kosovo, East Timor, and Afghanistan. \* Course satisfies the WIM requirement for International Relations majors.

Same as: INTNLREL 140C

**HISTORY 201J. Objects of History: From "Material Culture" to "Making". 4-5 Units.**

This class considers objects as historical sources. It surveys diverse approaches to the study and display of physical evidence, from "material culture" to "making." These explorations of object-oriented research will inform the course's hands-on components, working with objects and replicating historical experiences. With its focus on the question of what historical knowledge can be gained through interactivity, the course is suited to students whose interests include museums and public history, reenactment and performance, the maker movement, or interdisciplinary methodology.

Same as: HISTORY 301J

**HISTORY 201K. A History of the Global Left: Revolutionary Movements against Empire. 4-5 Units.**

This class will trace the formation of trans-regional movements against imperialism in the modern period that helped create a "global Left." We will read contemporary works by thinkers such as Lord Byron, Karl Marx, Mohandas K. Gandhi, Annie Besant, and Faiz Ahmad Faiz, as well as historical studies of these figures and the movements in which they figured. Key topics include the American Revolution, the Indian "Mutiny" of 1857, the Ghadar movement, Pan-Islamism, Irish nationalism, and global communism.

Same as: HISTORY 301K

**HISTORY 202D. The History of Genocide. 4-5 Units.**

This course will explore the history, politics, and character of genocide from the beginning of world history to the present. It will also consider the ways that the international system has developed to prevent and punish genocide.

Same as: HISTORY 302D

**HISTORY 202G. Peoples, Armies and Governments of the Second World War. 4-5 Units.**

Clausewitz conceptualized war as always consisting of a trinity of passion, chance, and reason, mirrored, respectively, in the people, army and government. Following Clausewitz, this course examines the peoples, armies, and governments that shaped World War II. Analyzes the ideological, political, diplomatic and economic motivations and constraints of the belligerents and their resulting strategies, military planning and fighting. Explores the new realities of everyday life on the home fronts and the experiences of non-combatants during the war, the final destruction of National Socialist Germany and Imperial Japan, and the emerging conflict between the victors. How the peoples, armies and governments involved perceived their possibilities and choices as a means to understand the origins, events, dynamics and implications of the greatest war in history.

Same as: HISTORY 302G

**HISTORY 202J. Climate Change Controversies: Past, Present, Future. 3-4 Units.**

Provides a unique perspective on contemporary debates about climate change through a study of their long history. After some background about climate science and a look at how people thought about climate in the 18th, 19th, and early 20th centuries, we explore the co-evolution of climate science and climate politics from World War II to the present. The approach is to examine a series of political issues and debates that established human effects on the global atmosphere as serious problems. We then focus on the UN Framework Convention on Climate Change, the 2015 Paris Agreement, and the future of international climate policy. Assignments include in-class presentations and a policy brief.

Same as: IPS 271

**HISTORY 202K. The Holocaust and Its Aftermath. 4-5 Units.**

This seminar gives an overview over different aspects of the history of the Holocaust and its aftermath and will examine key issues in recent Holocaust historiography and questions of memory and representation. Special emphasis is put on the nature of the historian's task, as viewed through the lens of historians of the Holocaust, as well as to the significance of the Holocaust in history and how it has changed over time. The course will confront students with historiographical texts and historical documents, with photography and film, works of scholarship and art.

Same as: HISTORY 302K, JEWISHST 282K, JEWISHST 382K

**HISTORY 203. Premodern Economic Cultures. 4-5 Units.**

Modern economists have made a science of studying the aggregate effects of individual choices. This science is based on the realities of personal freedom and individual choice. Prior to the modern era, however, different realities comprised very different economic cultures: moral economies in which greed was evil and generosity benefitted the patron's soul; familial collectives operating within historical conditioned diasporas; economies of obligation that threatened to collapse under their own weight as economic structures shifted. In this course we will be reading cross-culturally to develop an understanding of the shared and distinct elements of premodern economic cultures.

Same as: HISTORY 303

**HISTORY 203C. History of Ignorance. 5 Units.**

Scholars pay a lot of attention to knowledge—how it arises and impacts society—but much less attention has been given to ignorance, even though its impacts are equally profound. Here we explore the political history of ignorance, through case studies including: corporate denials of harms from particular products (tobacco, asbestos), climate change denialism, and creationist rejections of Darwinian evolution. Students will be expected to produce a research paper tracing the origins and impact of a particular form of ignorance.

**HISTORY 203K. Trauma and History. 2 Units.**

This course will examine trauma as a historical process, following the intergenerational impacts of history's darker dramas, analyzing collective strategies for coping and healing after trauma, and asking whether we can speak of "traumatized societies." Short readings and weekly discussions.

Same as: CSRE 203H

**HISTORY 204. What is History?. 5 Units.**

An introduction to the discipline of history, designed for current or prospective History majors. Focusing on methods and theories of historical inquiry, students will learn how historians frame problems, collect and analyze evidence, and contribute to on-going debates.

Through a series of case studies or exemplary works of historical study, the course will also explore different genres of historical writing (such as narrative, biography, social history) and different methodological approaches to history (such as Annales school, microhistory, and cultural history).

**HISTORY 204A. Reimagining History: New Approaches to the Past. 4-5 Units.**

This class explores, through analysis and practice, the ways in which history can be told and experienced through means other than traditional scholarly narratives. Approaches include literary fiction and non-fiction, digital media, graphic arts, maps, exhibitions, and film. A final project will require students to produce their own innovative work of history.

Same as: HISTORY 304A

**HISTORY 204D. Advanced Topics in Agnotology. 4-5 Units.**

Advanced research into the history of ignorance. Our goal will be to explore how ignorance is created, maintained and destroyed, using case studies from topics such as tobacco denialism, global climate denialism, and other forms of resistance to knowledge making. Course culminates in a research paper on the theory and practice of agnotology, the science of ignorance.

Same as: HISTORY 304D

**HISTORY 205D. Freedom in Chains: Black Slavery in the Atlantic, 1400s-1800s. 5 Units.**

This course will focus on the history of slavery in the British, French, Spanish, Portuguese and Dutch Atlantic world(s), from the late 1400s to the 1800s. Its main focus will be on the experiences of enslaved Africans and their descendants. Between the sixteenth and nineteenth centuries, the Europeans forcibly embarked over 10 million Africans to the Americas. Drawing on methodologies used by historians, archaeologists and anthropologists, the course will reconstruct the daily lives and the socio-economic, cultural and political histories of these captives. We will seek to hear their voices by investigating a variety of historical testimonies and recent scholarship. The course will examine slavery in the context of broader trends in Atlantic World studies, a field that has grown considerably in recent years, providing new ways of understanding historical developments across national boundaries. We will seek to identify commonalities and differences across time periods and regions and the reasons for those differences. Covered topics will include slave ship voyages, labor, agency, the creation of new identities (creolization), religion, race, gender, resistance, legacies, and memory. Same as: AFRICAAM 113V, AFRICAST 113V, CSRE 113V

**HISTORY 205F. Digital History: Concepts, Methods, Problems. 5 Units.**

This course confronts the current and potential influence of digital media on the theory and practice of history. We will focus on resources enabling new forms of scholarship, looking at tools for visualization and text analysis for generating historical interpretations, and explore alternative forms of publishing, design, and research. The course covers a range of readings along with a critical engagement with tools and resources. Students will also contribute to a digital spatial exhibit on the history of Silicon Valley.

**HISTORY 205G. Creative Political Thinking: From Machiavelli to Madison. 4-5 Units.**

How can we account for creativity and innovation in political thinking? Are these qualities simply a product of political expediency and rhetorical urgency, or do they also depend on qualities of mind and historical contingencies that have to be studied individually? This class will explore these questions with three noteworthy cases: Niccolo Machiavelli, John Locke, and James Madison. Extensive reading in both primary writings and secondary sources. Same as: HISTORY 305G, POLISCI 235J, POLISCI 335J

**HISTORY 205K. The Age of Revolution: America, France, and Haiti. 4-5 Units.**

This course examines the "Age of Revolution," spanning the 18th and 19th centuries. Primarily, this course will focus on the American, French, and Haitian Revolutions (which overthrew both French and white planter rule). Taken together, these events reshaped definitions of citizenship, property, and government. But could republican principles—color-blind in rhetoric—be so in fact? Could nations be both republican and pro-slavery? Studying a wide range of primary materials, this course will explore the problem of revolution in an age of empires, globalization, and slavery. Same as: AFRICAAM 205K, HISTORY 305K

**HISTORY 206A. City, Society, Literature- 19th Century Histories. 4 Units.**

This course examines the rise of modern cities through an analysis of urban society and the imaginative literature of the 1800s. Same as: HISTORY 306A, URBANST 106

**HISTORY 206B. Intoxicated: Commodities & Globalization in the Early Modern World. 4-5 Units.**

Early modern Europe experienced an influx of foreign goods, including coffee, sugar, chocolate, tea, and drugs, that ushered in a new era of global commerce. Yet, these developments also had consequences: the large-scale enslavement and relocation of human beings and the violent subjugation of local populations in the name of empire. A wider range of goods from far-flung places entered the grasp of a larger swath of society, but from where, by what means, and at what cost?. Same as: HISTORY 306B

**HISTORY 206E. CAPITALS: How Cities Shape Cultures, States, and People. 3-5 Units.**

This course takes students on a trip to eight capital cities, at different moments in time: Renaissance Florence, Golden Age Madrid, Colonial Mexico City, Enlightenment and Romantic Paris, Existential and Revolutionary St. Petersburg, Roaring Berlin, Modernist Vienna, and bustling Buenos Aires. While exploring each place in a particular historical moment, we will also consider the relations between culture, power, and social life. How does the cultural life of a country intersect with the political activity of a capital? How do large cities shape our everyday experience, our aesthetic preferences, and our sense of history? Why do some cities become cultural capitals? Primary materials for this course will consist of literary, visual, sociological, and historical documents (in translation); authors we will read include Boccaccio, Lope de Vega, Sor Juana, Montesquieu, Baudelaire, Dostoyevsky, Irmgard Keun, Freud, and Borges. Note: To be eligible for WAYS credit, you must take the course for a minimum of 3 Units and a Letter Grade. Same as: COMPLIT 100, DLCL 100, FRENCH 175, GERMAN 175, ILAC 175, ITALIAN 175, URBANST 153

**HISTORY 206J. Resist, Rebel, Revolt: A Global History. 4-5 Units.**

This course will explore the inspirations and contexts of political, social, intellectual, and cultural forms of resistance in modern global history. Historical subjects will include anti-capitalism, anti-colonialism, resistance to Fascism and Nazism, anti-Communism, civil rights movements, human rights campaigns, and contemporary forms of dissidence. Same as: HISTORY 306J

**HISTORY 207. Biography and History. 4-5 Units.**

The relationship between biographical and historical writing, primarily in Europe and America. Problems of methodology, evidence, dispassion, and empathy. Texts: biographies, critical literature on biographical work, and novels (A. S. Byatt's *Possession*, Bernard Malamud's *Dubin's Lives*) that illuminate the intellectual underpinnings of biographical labor. Same as: HISTORY 308

**HISTORY 207B. Environment, Technology and Revolution in World History. 4-5 Units.**

Exploration of historiographical and interdisciplinary methodologies and approaches to intersections among environmental, technological, and revolutionary social change in diverse geographical and temporal contexts. Readings include broad theoretical and synthetic works as well as case studies of American, French, Mexican, Russian, Chinese, and Hungarian revolutions.

**HISTORY 207C. The Global Early Modern. 4-5 Units.**

In what sense can we speak of "globalization" before modernity? What are the characteristics and origins of the economic system we know as "capitalism"? When and why did European economies begin to diverge from those of other Eurasian societies? With these big questions in mind, the primary focus will be on the history of Europe and European empires, but substantial readings deal with other parts of the world, particularly China and the Indian Ocean. HISTORY 307C is a prerequisite for HISTORY 402 (Spring quarter). Same as: HISTORY 307C

**HISTORY 207S. Digital Humanities: Concepts, Tools, Problems. 4-5 Units.**

How can digital tools benefit research in history and neighboring disciplines? The aim of this seminar is to equip students with basic skills in some of the most important digital tools currently used by scholars in the humanities and social sciences. Individual classes will focus on Geographic Information Systems (GIS), web mapping, digital network analysis, data visualization, and digital publishing formats. As part of the exercise to use digital methods, students will develop collaborative digital projects. No prior technical skills are needed for this course. Same as: HISTORY 407K



**HISTORY 208. Private Lives, Public Stories: Autobiography in Women's History. 5 Units.**

Changing contexts of women's lives and how women's actions have shaped and responded to those contexts.

**HISTORY 208A. Science and Law in History. 4-5 Units.**

How the intertwined modern fields of science and law, since the early modern period, together developed central notions of fact, evidence, experiment, demonstration, objectivity, and proof.

Same as: HISTORY 308A

**HISTORY 208B. Women Activists' Response to War. 4-5 Units.**

Theoretical issues, historical origins, changing forms of women's activism in response to war throughout the 20th century, and contemporary cases, such as the Russian Committee of Soldiers Mothers, Bosnian Mothers of Srebrenica, Serbian Women in Black, and the American Cindy Sheehan. Focus is on the U.S. and Eastern Europe, with attention to Israel, England, and Argentina.

Same as: FEMGEN 208B, HISTORY 308B

**HISTORY 208K. Global Capitalism and the Global South. 5 Units.**

Is modern capitalism a European innovation or a global phenomenon? Can there be different manifestations of capitalism in different local, regional, national, and imperial contexts? What role has the Global South played in the history of capitalism? This course examines the ways that capitalism has innovated, destroyed, and matured from the 17th to 20th centuries. It explores the themes of business, trade, labor, agriculture, gender, and race with a focus on the Middle East, Africa, and East and South Asia.

**HISTORY 208S. Facing the Past: The Politics of Retrospective Justice. 5 Units.**

Forms of injustice in history including slavery, genocide, ethnic cleansing, mass rape, forced religious conversion, and torture of prisoners. Mechanisms developed over the last century to define, deter, and alleviate the effects of such offenses, including war crimes tribunals, truth commissions, national apologies, and monetary reparations. Case studies chart the international field of retrospective justice, exploring the legal, political, and moral implications of confronting traumatic pasts.

**HISTORY 209B. The Idea of Politics. 4-5 Units.**

Can we live without politics? Is politics indispensable for humanity and vice-versa? The idea of politics is that it must transform, through human action, conditions of collective life. But the 20th century produced colliding beliefs about what that life might be and what the human being itself might look like. Explore whether, after the century, we might still think of politics as an ethical idea and the "human" as foundational political category. Keywords: Civility, Cruelty, Friendship, Empire, Democracy, Humanism, Animals.

Same as: HISTORY 309B

**HISTORY 209C. Liberalism and Violence. 4-5 Units.**

Does Liberalism have a theory of violence? What does modern political thought, in privileging humanity and rights, share with "terrorists" and "rogue states?" How is liberalism transformed by the use of religion and death for political ends? We read key thinkers of modern life- Adorno, Arendt, Agamben, Benjamin, Derrida, Fanon, Foucault, Gandhi, Heidegger, and Schmitt- to interrogate the relationship between religion, sacrifice, and democracy. At the center are connections between war and modern life, and between violence and non-violence.

Same as: HISTORY 309C

**HISTORY 209D. Postcolonialism and Universalism. 4-5 Units.**

Key texts and motifs from postcolonial theory: empire, class, exile, suffering, textuality, archive in juxtaposition to 20th-century philosophical questions about universal history and the relevance of humanist inquiry.

Same as: HISTORY 309A

**HISTORY 209S. Research Seminar for Majors. 5 Units.**

Required of History majors. How to conduct original, historical research and analysis, including methods such as using the libraries and archives at Stanford and elsewhere, and working collaboratively to frame topics, identify sources, and develop analyses. Autumn quarter focuses on gender, race, sexuality and History of Science; Winter quarter on early modern travel and Europe before 1500; Spring quarter on American political history and open topic.

**HISTORY 20A. The Russian Empire, 1450-1800. 3 Units.**

(Same as HISTORY 120A. History majors and others taking 5 units, register for 120A.) Explores rise of Russian state and expanse of empire; patterns of governance of a Eurasian empire; strategies and institutions of governance; survey of various ethnic and religious groups in empire and their varied cultures and political economies; gender and family; serfdom; Russian Orthodox religion and culture; reforms and Europeanization of 18th century.

**HISTORY 20N. Russia in the Early Modern European Imagination. 4 Units.**

Preference to freshmen. The contrast between the early modern image of Europe as free, civilized, democratic, rational, and clean against the notion of New World Indians, Turks, and Chinese as savage. The more difficult, contemporary problem regarding E. Europe and Russia which seemed both European and exotic. Readings concerning E. Europe and Russia from the Renaissance to the Enlightenment; how they construct a positive image of Europe and conversely a negative stereotype of E. Europe. Prerequisite: PWR 1.

**HISTORY 216. Women and the Book: Scribes, Artists, and Readers from Late Antiquity through the Fourteenth Century. 4-5 Units.**

This course examines the cultural worlds of medieval women through particular attention to the books that they owned, commissioned, and created. Beginning with the earliest Christian centuries, the course proceeds chronologically, charting women's book ownership, scribal and artistic activity, and patronage from Late Antiquity through the fourteenth century. In addition to examining specific manuscripts (in facsimile, or digitally), we will consider ancillary questions to do with women's authorship, education and literacy, reading patterns, devotional practices, and visual traditions and representation.

Same as: ARTHIST 206H, FEMGEN 216, HISTORY 316

**HISTORY 217S. Minorities In Medieval Europe. 5 Units.**

This course examines attitudes towards outsider groups within medieval society and the treatment of these groups by medieval Christians. Heretics, Jews, Muslims, homosexuals, prostitutes and usurers occupied ambivalent and at times dangerous positions within a society that increasingly defined itself as Christian. Differences in the treatment of these various 'outcast' groups, their depiction in art, their legal segregation, and their presumed association with demonic activity are addressed through discussion, and readings from primary and secondary source material.

Same as: RELIGST 217X

**HISTORY 218. The Holy Dead: Saints and Spiritual Power in Medieval Europe. 4-5 Units.**

Examines the cult of saints in medieval religious thought and life. Topics include martyrs, shrines, pilgrimage, healing, relics, and saints' legends.

Same as: HISTORY 318, RELIGST 218X, RELIGST 318X

**HISTORY 219C. Science, Technology, and Modernity in the Soviet Union. 5 Units.**

Science and technology were integral to the Soviet claim to offer a vision of modernity superior to that of Western capitalism. Science and technology would flourish; society would develop on a scientific basis. The results were more complex than the vision. Topics to be covered: science and Marxism-Leninism; the Lysenko affair; the R&D system; the role of the secret police; the atomic project; the space race; missile development; Andrei Sakharov; technology and innovation.

Same as: HISTORY 319C

**HISTORY 220G. Demons, Witches, Old Believers, Holy Fools, and Folk Belief: Popular Religion in Russia. 4-5 Units.**

19th and early 20th centuries. Peasants, parish priests, witches, possessed persons, cults and sects, old believers, saints, and women's religious communities. Nominally Christian, and members of the Orthodox Church, Russians embraced beliefs and customs that combined teaching from Church and folk traditions.

Same as: HISTORY 320G, REES 220G, REES 320G

**HISTORY 221A. Men, Women, and Power in Early Modern Russia, 1500-1800. 5 Units.**

Social values, gender relations, and social change in an era of rapid change; challenges to established norms by new constructions of deviance (witchcraft, religious reform, and revolt) and new standards of civility; encounters with non-Russians and the construction of national consciousness. Social values as political ethos: patrimonial autocracy and the reality of female rule in the late 17th and 18th century.

**HISTORY 221B. The 'Woman Question' in Modern Russia. 5 Units.**

Russian radicals believed that the status of women provided the measure of freedom in a society and argued for the extension of rights to women as a basic principle of social progress. The social status and cultural representations of Russian women from the mid-19th century to the present. The arguments and actions of those who fought for women's emancipation in the 19th century, theories and policies of the Bolsheviks, and the reality of women's lives under them. How the status of women today reflects on the measure of freedom in post-Communist Russia.

Same as: FEMGEN 221B

**HISTORY 222. Crime and Punishment in Early Modern Europe and Russia. 4-5 Units.**

Explores criminal law in early modern Europe and Russia, ca 1500-1800, in law and in practice. Engages debates about use of exemplary public executions as tactic of governance, and about gradual decline in "violence" in Europe over this time. Explores practice of accusatory and inquisitory judicial procedures, judicial torture, forms of punishment, concepts of justice.

Same as: HISTORY 322A

**HISTORY 223. Art and Ideas in Imperial Russia. 4-5 Units.**

Poetry, novels, symphonic music, theater, opera, painting, design, and architecture: what they reveal about the politics and culture of tsarist Russia.

Same as: HISTORY 323

**HISTORY 223E. Cities of Empire: An Urban Journey through Eastern Europe and the Mediterranean. 3-5 Units.**

This course explores the cities of the Habsburg, Ottoman and Russian empires in the dynamic and turbulent period of their greatest transformation from the 19th century through the Two World Wars. Through the reading of urban biographies of Venice and Trieste, Vienna, Budapest, Cracow, Lviv, Sarajevo, Belgrade, Salonica, and Odessa, we consider broad historical trends of political, economic, and social modernization, urbanization, identity formation, imperialism, cosmopolitanism, and orientalism. As vibrant centers of coexistence and economic exchange, social and cultural borderlands, and sites of transgression, these cities provide an ideal lens through which to examine these themes in the context of transition from imperial to post-imperial space.

Same as: HISTORY 323E, REES 204, REES 304

**HISTORY 224A. The Soviet Civilization. 4-5 Units.**

Socialist visions and practices of the organization of society and messianic politics; the Soviet understanding of mass violence, political and ethnic; and living space. Primary and secondary sources. Research paper or historiographical essay.

Same as: HISTORY 424A, REES 224A

**HISTORY 224C. Genocide and Humanitarian Intervention. 3 Units.**

Open to medical students, graduate students, and undergraduate students. Traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo and Sudan.

Same as: HISTORY 324C, JEWISHST 284C, JEWISHST 384C, PEDS 224

**HISTORY 226E. Famine in the Modern World. 3 Units.**

Open to medical students, graduate students, and undergraduate students. Examines the major famines of modern history, the controversies surrounding them, and the reasons that famine persists in our increasingly globalized world. Focus is on the relative importance of natural, economic, and political factors as causes of famine in the modern world. Case studies include the Great Irish Famine of the 1840s; the Bengal famine of 1943-44; the Soviet famines of 1921-22 and 1932-33; China's Great Famine of 1959-61; the Ethiopian famines of the 1970s and 80s, and the Somalia famines of the 1990s and of 2011.

Same as: HISTORY 326E, PEDS 226

**HISTORY 227D. All Quiet on the Eastern Front? East Europe and Russia in the First World War. 3-5 Units.**

Until recently history has been comparatively quiet about the experience of World War I in the east. Far from being a peripheral theater of war, however, the experiences of war on the Eastern Front were central to shaping the 20th century. Not only was the first shot of the war fired in the east, it was also the site of the most dramatic political revolution. Using scholarly texts, literature and film, this course combines political, military, cultural and social approaches to introduce the causes, conduct and consequences of World War I with a focus on the experiences of soldiers and civilians on the Eastern Front. Topics include: the war of movement, occupation, extreme violence against civilians, the Armenian genocide, population exchanges, the Russian Revolution and civil war, and the disintegration of empires and rise of nation-states.

Same as: HISTORY 327D, REES 227, REES 327

**HISTORY 228. Circles of Hell: Poland in World War II. 5 Units.**

Looks at the experience and representation of Poland's wartime history from the Nazi-Soviet Pact (1939) to the aftermath of Yalta (1945). Examines Nazi and Soviet ideology and practice in Poland, as well as the ways Poles responded, resisted, and survived. Considers wartime relations among Polish citizens, particularly Poles and Jews. In this regard, interrogates the traditional self-characterization of Poles as innocent victims, looking at their relationship to the Holocaust, thus engaging in a passionate debate still raging in Polish society.

Same as: HISTORY 328, JEWISHST 282, JEWISHST 382

**HISTORY 229A. Nationhood and Belonging: Poles and Jews. 3 Units.**

Examines changing conceptions of nationhood in Poland, late-19th century to present, with focus on place of Jews in Polish society. What conditions fostered the early political sense of the nation? Why was it replaced with integral nationalism, and for some, fascism? How did Jews relate to their homeland? Emphasis on post-1918 history: impact of independence, Great Depression, West European fascism, World War II, imposition of communist rule, and collapse of the Soviet Bloc. Considers current Polish-Jewish relations.

Same as: HISTORY 329A, JEWISHST 289A, JEWISHST 389A

**HISTORY 22S. From 'superfluous women' to the 'Yolocaust': The Experience of War in 20th Century Europe. 5 Units.**

Through a variety of primary sources, including diaries, photographs, letters, and artifacts this course explores the multiplicity of ways in which Europeans experienced the great conflicts that swept the continent in the 20th century. The unprecedented impact of these wars will be traced in stories of those whose voices have been marginalized in conventional historiography. This course encourages and guides students in their first forays into archival work in a hands-on approach to developing ways of thinking historically.

Same as: JEWISHST 22S

**HISTORY 230A. The Witness in Modern History: Memoir, Reportage, Image. 5 Units.**

The rise of the witness as icon and debates about its reliability as a historical source. The power of eyewitness accounts to convict accused criminals, inspire indignation about war and genocide, and attract attention to humanitarian crises. Their notorious unreliability due to exaggeration and misapprehension. Sources include reportage, photography, and documentary film. Case studies include criminal cases, war, poverty, and natural disasters.

**HISTORY 230C. Paris: Capital of the Modern World. 4-5 Units.**

This course explores how Paris, between the eighteenth and twentieth centuries, became the political, cultural, and artistic capital of the modern world. It considers how the city has both shaped and been shaped by the tumultuous events of modern history- class conflict, industrialization, imperialism, war, and occupation. It will also explore why Paris became the major world destination for intellectuals, artists and writers. Sources will include films, paintings, architecture, novels, travel journals, and memoirs.

Same as: FRENCH 140, FRENCH 340, URBANST 184

**HISTORY 230D. Europe in the World, 1789-Present. 4-5 Units.**

The European conquest of parts of Africa, Asia, and the South Pacific by European merchants, missionaries, armies, and administrators had significant, and often cataclysmic, effects on indigenous political alliances, cultural practices, and belief systems. But were the effects of expansion entirely one-sided? What impact did the experiences of colonialism have on European politics, culture, and Europe's relations with the rest of the world? Explores how interaction between Europe and the rest of the world redefined the political, racial, sexual, and religious boundaries of both Europe and its colonies and gave rise to the more "globalized" society we live in today.

Same as: HISTORY 330D

**HISTORY 231E. Paper, Printing, and Digital Revolutions: Transformations of the Book. 4-5 Units.**

What is a book? This seminar explores the conceptual implications of approximately two millennia of transformations in the physical and material properties of books. How have the meaning and authority we assign the written word changed as technologies of book production and dissemination have evolved, and how have they remained continuous? Topics covered include the rise of the medieval manuscript codex, the emergence of print culture in early modern Europe, and current debates over the nature of text in the digital age.

Same as: HISTORY 331E

**HISTORY 232B. Heretics, Prostitutes and Merchants: The Venetian Empire. 5 Units.**

Between 1200-1600, Venice created a powerful empire at the boundary between East and West that controlled much of the Mediterranean, with a merchant society that allowed social groups, religions, and ethnicities to coexist. Topics include the features of Venetian society, the relationship between center and periphery, order and disorder, orthodoxy and heresy, the role of politics, art, and culture in the Venetian Renaissance, and the empire's decline as a political power and reinvention as a tourist site and living museum.

Same as: ITALIAN 232B

**HISTORY 232C. European Security Since World War Two. 4-5 Units.**

This course looks at European security during the Cold War and up to the present. There are many historical controversies to be examined, e.g. the enlargement of NATO, as well as theoretical and doctrinal debates, e.g. about extended deterrence and detente.

Same as: HISTORY 332C, IPS 235, POLISCI 116A

**HISTORY 232E. Crooks, Quacks, and Courtesans: Jacobean City Comedy. 5 Units.**

We will read a series of plays set in or around early modern London, written by playwrights such as Ben Jonson, Thomas Middleton, and John Marston. The course will explore the plays' hilarious representations of the London underworld, with its confidence tricksters and naive victims, as well as more serious topics such as social mobility and social relations, economic expansion, disease transmission, and the built environment. Plays studied will include: *The Alchemist*, *Epicene*, *The Roaring Girl*, *A Chaste Maid In Cheapside*, *The Dutch Courtesan*.

Same as: ENGLISH 240A, ENGLISH 340A, HISTORY 332E

**HISTORY 232G. Early Modern Cities. 4-5 Units.**

Colloquium on the history of early modern European cities, covering urbanization, street life, neighborhoods, fortifications, guilds and confraternities, charity, vagrancy, and begging, public health, city-countryside relationship, urban constitutions, and confederations. Assignments include annotated bibliography, book review, and a final paper. Second-quarter continuation of research seminar available (HIST299S or HIST402).

Same as: HISTORY 332G

**HISTORY 233C. Two British Revolutions. 4-5 Units.**

Current scholarship on Britain, 1640-1700, focusing on political and religious history. Topics include: causes and consequences of the English civil war and revolution; rise and fall of revolutionary Puritanism; the Restoration; popular politics in the late 17th century; changing contours of religious life; the crisis leading to the Glorious Revolution; and the new order that emerged after the deposing of James II.

Same as: HISTORY 333C

**HISTORY 233K. The Invention of the Modern Republic. 4-5 Units.**

Examines the history of republican thinking in the Atlantic World from the Renaissance to the French Revolution.

Same as: HISTORY 333K

**HISTORY 235. The Renaissance of War: Politics, Technology, and War in Late Medieval and Renaissance Italy. 5 Units.**

The dynamic societies of the Italian Peninsula of the 14th to 16th centuries "prosperous, astonishingly creative, politically fractious, and endemically violent" produced sweeping, deeply consequential changes. Among these were new developments in the theory and practice of war, politics, and diplomacy that laid the foundations for the modern state system and European military power. The class covers: new diplomatic practice; the Military Revolution; state-building; war finance; court culture; and the intersection of these with the shimmering brilliance of Renaissance culture.

**HISTORY 235C. Readings in the Supernatural. 4-5 Units.**

Class will read and discuss a selection of monographs, scholarly essays, and primary sources on the rich supernatural world of early modern Europe. We will discuss how fairies, werewolves, nightmares, and trolls all became witches, how the binary of angels and demons figured in European thought, and how the marginalized imaginary was reconstituted in theatre and fiction.

Same as: HISTORY 335C

**HISTORY 235F. Camus. 4-5 Units.**

"The Don Draper of Existentialism" for Adam Gopnik, "the ideal husband of contemporary letters" for Susan Sontag, and "the admirable conjunction of a man, of an action, and of a work" for Sartre, Camus embodies the very French figure of the "intellectuel engagé," or public intellectual. From his birth in 1913 into a poor family in Algeria to the Nobel Prize in Literature in 1957, from Saint Germain-des-Prés to his predilection for the mediterranean culture, Camus captured the quest for universalism, for the politics of justice, and engaged in the great ethical battles of his time, from the fight against nazism and communism, from questioning colonial rules to the haunting Algerian War, and his complex "silence" over the war. Camus the Algerian, Camus the moralist, Camus the Resistant: through readings and films, we will explore his multiple, long-lasting legacies. Readings from Albert Camus, Kamel Daoud, Mouloud Feraoun, Alice Kaplan, Orhan Pamuk, A.B. Yehoshua, Assia Djebar, Jean-Paul Sartre, Yasmina Khadra. Movies include "The Stranger," and "Far from Men." This course is a gateway for French Studies, with special emphasis on oral proficiency. Taught in French.  
Same as: CSRE 129, FRENCH 129

**HISTORY 236. The Ethics of Imperialism. 5 Units.**

Can a commitment to liberty, progress, and universal rights be reconciled with imperialism? The ethical underpinnings of empire; how modern Europeans provided ethical and political justifications for colonial expansion. How European ideals were used to defend and justify inequality, violence, and genocide. The ethics of American-driven globalization and humanitarianism. Texts include primary sources, philosophical treatises, and historical studies.

**HISTORY 236F. The End of the World As They Knew It: Culture, Cafés, and Crisis in Europe, 1880-1918. 4-5 Units.**

The years stretching from roughly 1880 to end of the First World War were marked by profound social upheaval and an intense burst of creativity. This seminar will focus on the major cultural movements and big ideas of the period. Topics covered include the rise of mass culture and cinema, the origins of psychoanalysis, anti-Semitism and Zionism, new anxieties about sexuality and the "New Woman," anarchism, decadence, degeneration, and Dada, with cameos from Bernhardt, Freud, Klimt, Nietzsche, Toulouse-Lautrec, Wilde, Zola, and other luminaries of the age.

Same as: HISTORY 336F

**HISTORY 237D. The French Revolution and the Birth of Modern Politics. 4-5 Units.**

(Students who have taken HISTORY 134 should not enroll in this course.) This course will focus on the birth of modern politics in the French Revolution. The goal will be to understand the structural contradictions of the French monarchy in the pre-revolutionary period, the reasons for the monarchy's failure to resolve those contradictions, and the political dynamic unleashed as they were solved by the revolutionary action of 1789. Sovereignty, democracy, rights, representation, and terror will be principal themes. Lectures will be combined with close reading and discussions of political and philosophical writings of the period.

Same as: HISTORY 337D

**HISTORY 237F. 20th Century British History through the Hoover Archives. 4-5 Units.**

From the rich resources of the Hoover Institution, the students in this course will select a particular archive (war posters, politician, spy, literary figure, diplomat, etc. etc.) to investigate, to write about, discuss in class, and, it is hoped, present in an exhibition at the Hoover, learning museum skills along the way as well as the history of Britain in the 20th century.  
Same as: HISTORY 337F

**HISTORY 237G. Outer Space Exploration in Germany in the Twentieth Century. 1-5 Unit.**

Since the nineteenth century, Germans, like their counterparts around the world, have considered the meaning and the role of humanity in outer space. As space travel developed from a dream to a reality, and as Germany changed borders and political systems among empires, dictatorships, socialist states, and capitalist states, German interest in spaceflight remained, although the meaning found in the stars changed dramatically. This course considers Germans' dreams of and predictions for outer space travel alongside German technological developments in spaceflight. It includes the different German states throughout the century, including Weimar Germany, National Socialism, East Germany, and West Germany. The course looks at science fiction films and novels, newspaper reports, scientific developments, and German space engineering projects, which together demonstrate how and why space travel often found high levels of support in Germany. Students will engage in historical and cultural analysis through course readings, discussions, and assignments.  
NOTE: To be eligible for WAYS credit, you must take this course for a minimum of 3 units and a letter grade.  
Same as: GERMAN 275

**HISTORY 238D. Germany and the World Wars, 1870-1990. 4-5 Units.**

(Students who have taken History 38A/138A should not enroll in this course.) This course examines Germany's tumultuous history from the Second Empire through the end of the Cold War. During this time, Germany ushered in five regimes and two world wars, seesawing between material ruin and economic prosperity on the frontline of Europe's military and ideological rifts. Beginning with Bismarck's wars of unification, the class spans World War One, the Weimar Republic, the rise of Nazism, World War Two, the Holocaust, the division of communist East and capitalist West Germany, and the fall of the Iron Curtain.  
Same as: HISTORY 338D, JEWISHST 288D, JEWISHST 388D

**HISTORY 238G. Ethnography of the Late Middle Ages: Social history and popular culture in the age of the plague. 4-5 Units.**

During the late Middle Ages, as Europe was recovering from the devastation of the Black Death, political reorganization contributed to a burst of archival documentation that allows historians richly detailed glimpses of societies in transition. We will be reading selected scholarly articles and monographs covering such topics as persecution, prechristian cultural remnants, folk theologies, festival cultures, peasant revolts, heresy, and the advent of the diabolic witch.  
Same as: HISTORY 338G

**HISTORY 238J. The European Scramble for Africa: Origins and Debates. 5 Units.**

Why and how did Europeans claim control of 70% of African in the late nineteenth century? Students will engage with historiographical debates ranging from the national (e.g. British) to the topical (e.g. international law). Students will interrogate some of the primary sources on which debaters have rested their arguments. Key discussions include: the British occupation of Egypt; the autonomy of French colonial policy; the mystery of Germany's colonial entry; and, not least, the notorious Berlin Conference of 1884-1885.

**HISTORY 238K. Vox Populi: Populism and its Origins. 1-5 Unit.**

This seminar traces the proliferation of populism in contemporary Europe and the United States, with reference to the historical background of anti-institutional and anti-representational ideas of popular sovereignty. Subjects include: the notion of 'vox populi' from the early middle ages to the early modern period; ideas of radical democracy in the enlightenment era; 19th century notions of identifying 'the people' (nation, 'Volk', class, race, mass); the populist, reform and volkish movements around 1900; the rise of fascist and totalitarian ideas of popular sovereignty; the struggle over the meaning of democracy in the Cold War era; semantic transformations of 'the popular' through the audio-visual media; and the rise of today's populism since 1989. The material to be analyzed will consist of 1. Primary sources (programs, manifests, pamphlets, speeches and propaganda material including visual sources); 2. Contemporary theoretical texts (political philosophy, history, sociology, psychology, and popular science); and 3. Today's theories and practices of populism. nNote: The course will be taught by Visiting Professor Christian Geulen, University of Koblenz, Germany.

Same as: GERMAN 248, GERMAN 348, HISTORY 338K

**HISTORY 239C. Humanities Core: Great Books, Big Ideas -- Europe, Modern. 3-4 Units.**

This three-quarter sequence asks big questions of major texts in the European and American tradition. What is a good life? How should society be organized? Who belongs? How should honor, love, sin, and similar abstractions govern our actions? What duty do we owe to the past and future? This third and final quarter focuses on the modern period, from the rise of revolutionary ideas to the experiences of totalitarianism and decolonization in the twentieth century. Authors include Locke, Mary Shelley, Marx, Nietzsche, Freud, Weber, Primo Levi, and Frantz Fanon. Same as: DLCL 13, FRENCH 13, HUMCORE 13, PHIL 13

**HISTORY 239F. Empire and Information. 4-5 Units.**

How do states see? How do they know what they know about their subjects, citizens, economies, and geographies? How does that knowledge shape society, politics, identity, freedom, and modernity? Focus is on the British imperial state activities in S. Asia and Britain: surveillance technologies and information-gathering systems, including mapping, statistics, cultural schemata, and intelligence systems, to render geographies and social bodies legible, visible, and governable. Same as: HISTORY 339F

**HISTORY 239G. The Algerian Wars. 3-5 Units.**

From Algiers the White to Algiers the Red, Algiers, the Mecca of the Revolutionaries in the words of Amilcar Cabral, this course offers to study the Algerian Wars since the French conquest of Algeria (1830-) to the Algerian civil war of the 1990s. We will revisit the ways in which the war has been narrated in literature and cinema, popular culture, and political discourse. A special focus will be given to the Algerian War of Independence (1954-1962). The course considers the racial representations of the war in the media, the continuing legacies surrounding the conflict in France, Africa, and the United States, from Che Guevara to the Black Panthers. A key focus will be the transmission of collective memory through transnational lenses, and analyses of commemorative events and movies. nReadings from James Baldwin, Assia Djebar, Albert Camus, Frantz Fanon, Mouloud Feraoun. Movies include "The Battle of Algiers," "Days of Glory," and "Viva Laldjérie." nTaught in English.

Same as: CSRE 249, FRENCH 249, JEWISHST 249

**HISTORY 239H. Colonialism and Empire in Modern Europe. 5 Units.**

To better understand the history of modern Europe within a global context, explores the following questions: What impact did more than a century of colonialism have on the social lives, cultural attitudes, political loyalties, and intellectual world views of European women and men during the nineteenth century? What accounts for the resiliency of empire during a period of rapid global change that witnessed the rise of modern democracy, economic liberalism, ethnic nationalism, and international socialism?

**HISTORY 23N. The Soviet Union and the World: View from the Hoover Archives. 3 Units.**

This course seeks to explore the Soviet Union's influence on the world from 1917 to its end in 1991 from a variety of perspectives. Hoover Institution archival holdings will be the basic sources for the course.

**HISTORY 240. The History of Evolution. 4-5 Units.**

This course examines the history of evolutionary biology from its emergence around the middle of the eighteenth century. We will consider the continual engagement of evolutionary theories of life with a larger, transforming context: philosophical, political, social, economic, institutional, aesthetic, artistic, literary. Our goal will be to achieve a historical rich and nuanced understanding of how evolutionary thinking about life has developed to its current form.

Same as: BIO 340, HISTORY 340

**HISTORY 240G. Science and Empire, 1500-1900. 4-5 Units.**

During the scientific revolution of the seventeenth and eighteenth centuries, European states carved out vast colonial empires in Asia, Africa, and the Americas. How did empires make science and how did science make empires? In this course, we will explore the history of the global exchange of people, objects, and knowledge. We will consider how early modern science, medicine, and technology helped create global empires, while emerging across the division of the world into "the West and the rest."

Same as: HISTORY 340G

**HISTORY 241D. Einstein and the Structure of Reality. 4-5 Units.**

Albert Einstein once remarked "One cannot help but be in awe when one contemplates the mysteries of the marvelous structure of reality. It is enough if one tries to contemplate only a little of this mystery each day." In this course we will contemplate the history, science, and philosophy involved in three pathbreaking and contentious episodes in Einstein's lifelong quest to unveil the structure of reality: the special theory of relativity, the general theory of relativity, and the quantum theory.

Same as: HISTORY 341D

**HISTORY 242D. Knowledge and Information Infrastructures. 3-4 Units.**

This course introduces historical, theoretical, and comparative perspectives on knowledge and information systems from the medieval world to the present. Cases include libraries, meteorology, climate science, the Internet, the World Wide Web, and social science data systems. It theorizes how infrastructures form, how they change, and how they shape (and are shaped by) social systems. The course ends with challenges to modern knowledge infrastructures, such as crowdsourcing, citizen science, and alternative and bogus knowledge.

Same as: STS 166

**HISTORY 242F. Medicine in an Age of Empires. 4-5 Units.**

This course connects changing ways of understanding the body and disease in the seventeenth and eighteenth centuries to the business of empire. How did new ideas and methods of selling medicine relate to the rise of state-sponsored violence, resource extraction, global trade, and enslaved labor? Following black ritual practitioners in the Caribbean, apothecaries in England, and scientists abroad reveals the diversity of medical traditions and knowledge production in the early modern period that formed the basis of modern medicine today.

Same as: HISTORY 342F

**HISTORY 243G. Tobacco and Health in World History. 4-5 Units.**

Cigarettes are the world's leading cause of death—but how did we come into this world, where 6 trillion cigarettes are smoked every year? Here we explore the political, cultural, and technological origins of the cigarette and cigarette epidemic, using the tobacco industry's 80 million pages of secret documents. Topics include the history of cigarette advertising and cigarette design, the role of the tobacco industry in fomenting climate change denial, and questions raised by the testimony of experts in court.

Same as: HISTORY 343G

**HISTORY 243S. Human Origins: History, Evidence, and Controversy. 4-5 Units.**

Research seminar. Debates and controversies include: theories of human origins; interpretations of fossils, early art, and the oldest tools; the origin and fate of the Neanderthals; evolutionary themes in literature and film; visual rhetoric and cliché in anthropological dioramas and phyletic diagrams; the significance of hunting, gathering, and grandmothering; climatological theories and neocatastrophic geologies; molecular anthropology; the impact of racial theories on human origins discourse. Background in human evolution not required.

Same as: HISTORY 443A

**HISTORY 244C. The History of the Body in Science, Medicine, and Culture. 4-5 Units.**

The human body as a natural and cultural object, historicized. The crosscultural history of the body from the 18th century to the present. Topics include: sciences of sex and race; medical discovery of particular body parts; human experimentation, foot binding, veiling, and other bodily coverings; thinness and obesity; notions of the body politic.

Same as: HISTORY 444C

**HISTORY 244F. Beyond Pink and Blue: Gender in Tech. 1 Unit.**

This d-school seminar prototypes concepts and methods for "inclusive" design. From the moment we arrive on the planet, gender shapes our perception of the world. Examples of products (including objects, services, and systems) gone awry will serve as prompts for design activities, challenges, and discussions on gender issues to illustrate the different needs of women, men, and gender-fluid people. Class sessions mix use case explorations with design methodology, design thinking abilities, and guest speakers from technology, design, and academia. Students will be asked to work in interdisciplinary teams on several design challenges, culminating in the development of a toolkit for inclusive design. Methods will interact in crucial ways to create "intersectional thinking" (i.e., to consider how gender, ethnicity, sexuality, socio-economic status, etc. work together to require new solutions in design). Topics include: algorithms, media, seat belts for pregnant women, robotics, assistive technologies, tech for developing worlds, video games, urban/rural design, software development, and many more. Admission by application only. Visit [d.school.stanford.edu/classes](http://d.school.stanford.edu/classes) for more information.

Same as: FEMGEN 344F, HISTORY 344F

**HISTORY 245G. Law and Colonialism in Africa. 4-5 Units.**

Law in colonial Africa provides an opportunity to examine the meanings of social, cultural, and economic change in the anthropological, legal, and historical approaches. Court cases as a new frontier for the social history of Africa. Topics: meanings of conflicts over marriage, divorce, inheritance, property, and authority.

Same as: HISTORY 348D

**HISTORY 246. The Dynamics of Change in Africa. 4-5 Units.**

Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.

Same as: AFRICAST 301A, HISTORY 346, POLISCI 246P, POLISCI 346P

**HISTORY 247C. Revolutionary Mothers, National Fathers: Household, Politics and Nation in 20th Century Africa. 5 Units.**

A luta continua! This cry, Latin for "the struggle continues," evokes sub-Saharan African liberation struggles. Yet histories of these struggles sometimes cast them narrowly: as quests to transform European colonies into African-governed sovereign nation-states; struggles led by men; or public struggles, conducted in government buildings or on the streets. This course examines how freedom fighting intersected with other processes: changing gender norms, ethnic or religious identification, and labor or housing conditions, paying attention to ways political struggles came into homes.

**HISTORY 248D. Histories of Race in Science and Medicine at Home and Abroad. 4 Units.**

This course has as its primary objective, the historical study of the intersection of race, science and medicine in the US and abroad with an emphasis on Africa and its Diasporas in the US. By drawing on literature from history, science and technology studies, sociology and other related disciplines, the course will consider the sociological and cultural concept of race and its usefulness as an analytical category. The course will explore how the study of race became its own science in the late-Enlightenment era, the history of eugenics—a science of race aimed at the ostensible betterment of the overall population through the systematic killing or "letting die" of humanity's "undesirable" parts, discuss how the ideology of pseudo-scientific racism underpinned the health policies of the French and British Empires in Africa, explore the fraught relationship between race and medicine in the US, discuss how biological notions of race have quietly slipped back into scientific projects in the 21st century and explore how various social justice advocates and scholars have resisted the scientific racisms of the present and future and/or proposed new paths towards a more equitable and accessible science.

Same as: AFRICAAM 122F, AFRICAST 122F, CSRE 122F

**HISTORY 25. St. Petersburg: A Cultural Biography. 1 Unit.**

This course explores the rich cultural heritage of St. Petersburg: art, architecture, urban planning, literature, dance, music, theater. Lectures will be extensively slide-illustrated, particularly on architecture and art. The course will meet Thursday evenings 7:00-9:00 pm as part of the Continuing Studies Program (CSP) for adult students; undergraduate students are welcome to participate by enrolling in this 1-unit History course. Readings will be posted in Coursework for CSP participants and will be available but optional for undergraduate students. Satisfactory credit for undergraduates will be earned by attending 80% of the lectures and by submitting a 5-page paper on a topic of the student's choice utilizing the CSP assigned readings and sources suggested by the instructor.

**HISTORY 250A. History of California Indians. 5 Units.**

Demographic, political, and economic history of California Indians, 1700s-1950s. Processes and events leading to the destruction of California tribes, and their effects on the groups who survived. Geographic and cultural diversity. Spanish, Mexican, and Anglo-American periods. The mission system.

Same as: CSRE 117S, NATIVEAM 117S

**HISTORY 250E. Taxing America: From the Puritans to Prop. 13. 5 Units.**

Taxes have shaped American society and politics since before the Revolution. And they've been extremely controversial just as long. In this course we'll try to understand American society and government by looking at the politics of taxation from the colonial period to the twentieth century. Topics include the legitimacy of taxation, the constitution, economic development, inequality, gender, and race.

**HISTORY 251J. The End of American Slavery, 1776-1865. 4-5 Units.**

How did the institution of American slavery come to an end? The story is more complex than most people know. This course examines the rival forces that fostered slavery's simultaneous contraction in the North and expansion in the South between 1776 and 1861. It also illuminates, in detail, the final tortuous path to abolition during the Civil War. Throughout, the course introduces a diverse collection of historical figures, including seemingly paradoxical ones, such as slaveholding southerners who professed opposition to slavery and non-slaveholding northerners who acted in ways that preserved it. Historical attitudes toward race are a central integrative theme.

Same as: AFRICAAM 251J, AMSTUD 251J, HISTORY 351J

**HISTORY 252B. Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country. 5 Units.**

The tragic death of Ambassador Chris Stevens has recently highlighted the dangers of diplomacy in the modern era. This class will look at how Americans in embassies have historically confronted questions such as authoritarian rule, human rights abuses, violent changes of government, and covert action. Case studies will include the Berlin embassy in the 1930s, Tehran in 1979, and George Kennan's experiences in Moscow, among others. Recommended for students contemplating careers in diplomatic service. \* Course satisfies the WiM requirement for International Relations majors.

Same as: INTNLREL 174

**HISTORY 252C. The Old South: Culture, Society, and Slavery. 5 Units.**

This course explores the political, social, and cultural history of the antebellum American South, with an emphasis on the history of African-American slavery. Topics include race and race making, slave community and resistance, gender and reproduction, class and immigration, commodity capitalism, technology, disease and climate, indigenous Southerners, white southern honor culture, the Civil War, and the region's place in national mythmaking and memory.

Same as: AFRICAAM 252C, CSRE 252C

**HISTORY 254. Popular Culture and American Nature. 5 Units.**

Despite John Muir, Aldo Leopold, and Rachel Carson, it is arguable that the Disney studios have more to do with molding popular attitudes toward the natural world than politicians, ecologists, and activists. Disney as the central figure in the 20th-century American creation of nature. How Disney, the products of his studio, and other primary and secondary texts see environmentalism, science, popular culture, and their interrelationships.

**HISTORY 254G. The Causes and Consequences of the American Revolution. 5 Units.**

Why did Britain's North American colonies declare independence from an empire they had long revered? What did the American Revolution mean for the people who experienced it? In this course we will explore the explosive origins of the American republic. Topics: revolutionary ideology, empire, the federal constitution, slavery, social conflict, and the international consequences of the American Revolution.

**HISTORY 255. Martin Luther King, Jr.: The Social Gospel and the Struggle for Justice. 5 Units.**

The religious and political thought of Martin Luther King, Jr., using the documentary resources of the King Institute at Stanford. His social gospel Christianity and prophetic message of radical social transformation. Readings include the forthcoming *The Papers of Martin Luther King, Jr., Volume VI: Advocate of the Social Gospel*.

**HISTORY 255D. Racial Identity in the American Imagination. 4-5 Units.**

From Sally Hemings to Barack Obama, this course explores the ways that racial identity has been experienced, represented, and contested throughout American history. Engaging historical, legal, and literary texts and films, this course examines major historical transformations that have shaped our understanding of racial identity. This course also draws on other imaginative modes including autobiography, memoir, photography, and music to consider the ways that racial identity has been represented in American society. Most broadly, this course interrogates the problem of American identity and examines the interplay between racial identity and American identity.

Same as: AFRICAAM 255, AMSTUD 255D, CSRE 255D, HISTORY 355D

**HISTORY 255E. Education, Race, and Inequality in African American History, 1880-1990. 3-5 Units.**

Seminar. The relationship among race, power, inequality, and education from the 1880s to the 1990s. How schools have constructed race, the politics of school desegregation, and ties between education and the late 20th-century urban crisis.

Same as: AFRICAAM 116, AMSTUD 216, CSRE 216X, EDUC 216

**HISTORY 256. 350 Years of America-China Relations. 4-5 Units.**

The history of turbulent relations, military conflict, and cultural clashes between the U.S. and China, and the implications for the domestic lives of these increasingly interconnected countries. Diplomatic, political, social, cultural, and military themes from early contact to the recent past.

Same as: EASTASN 256, HISTORY 356

**HISTORY 256E. The American Civil War. 5 Units.**

What was it like to live in the United States during the Civil War? This course uses the lenses of racial/ethnic identity, gender, class, and geography (among others) to explore the breadth of human experience during this singular moment in American history. It illuminates the varied ways in which Americans, in the Union states and the Confederate states, struggled to move forward and to find meaning in the face of unprecedented division and destruction.

Same as: AFRICAAM 256E, AMSTUD 256E

**HISTORY 256G. Constructing Race and Religion in America. 4-5 Units.**

This seminar focuses on the interrelationships between social constructions of race, and social interpretations of religion in America. How have assumptions about race shaped religious worldviews? How have religious beliefs shaped racial attitudes? How have ideas about religion and race contributed to notions of what it means to be "American"? We will look at primary and secondary sources, and at the historical development of ideas and practices over time.

Same as: AFRICAAM 236, AMSTUD 246, CSRE 246, HISTORY 356G, RELIGST 246, RELIGST 346

**HISTORY 257. Was the American Revolution a Social Revolution?. 4-5 Units.**

What kind of a revolution was the American Revolution? The revolution gave colonial Americans political independence from Britain to found the United States. But did the revolution also transform American society in its wake? This course explores how historians and historical participants alike have answered this question paying attention to historical changes (or lack thereof) that took place in American society between c. 1750-1820 as well as grappling with what conceptually constitutes a "social" revolution in the first place.

Same as: HISTORY 357

**HISTORY 257C. LGBT/Queer Life in the United States. 4-5 Units.**

An introductory course that explores LGBT/Queer social, cultural, and political history in the United States. By analyzing primary documents that range from personal accounts (private letters, autobiography, early LGBT magazines, and oral history interviews) to popular culture (postcards, art, political posters, lesbian pulp fiction, and film) to medical, military, and legal papers, students will understand how the categories of gender and sexuality have changed over the past 150 years. This class investigates the relationship among queer, straight and transgender identities. Seminar discussions will question how the intersections of race, class, gender, and sexuality influenced the construction of these categories.

Same as: FEMGEN 140D, FEMGEN 240D

**HISTORY 258B. History of Education in the United States. 3-5 Units.**

How education came to its current forms and functions, from the colonial experience to the present. Focus is on the 19th-century invention of the common school system, 20th-century emergence of progressive education reform, and the developments since WW II. The role of gender and race, the development of the high school and university, and school organization, curriculum, and teaching.

Same as: AMSTUD 201, EDUC 201

**HISTORY 258E. History of School Reform: Origins, Policies, Outcomes, and Explanations. 3-5 Units.**

Strongly recommended for students in the POLS M.A. program; others welcome. Focus is on 20th-century U.S. Intended and unintended patterns in school change; the paradox of reform that schools are often reforming but never seem to change much; rhetorics of reform and factors that inhibit change. Case studies emphasize the American high school. This course is strongly recommended for POLS students pursuing K-12 leadership.

Same as: EDUC 220D

**HISTORY 259A. Poverty and Homelessness in America. 4-5 Units.**

Service learning. Students participate in a two quarter internship at a local shelter for homeless individuals or families. Readings include historical, social science, and social commentary literature. Service Learning Course (certified by Haas Center).

**HISTORY 259E. American Interventions, 1898-Present. 5 Units.**

This class seeks to examine the modern American experience with limited wars, beginning with distant and yet pertinent cases, and culminating in the war in Iraq. Although this class will examine war as a consequence of foreign policy, it will not focus primarily on presidential decision making. Rather, it will place wartime policy in a broader frame, considering it alongside popular and media perceptions of the war, the efforts of antiwar movements, civil-military relations, civil reconstruction efforts, and conditions on the battlefield. We will also examine, when possible, the postwar experience.

Same as: HISTORY 359E, INTNLREL 168A

**HISTORY 25N. Stalin's Europe, 1944-1948. 3 Units.**

This freshman seminar explores the history of wartime and postwar Europe through the lenses of the communist parties of Europe, the anti-Soviet forces on the continent, the devastation of the civilian population, and the intentions and actions of the Soviet Union on the one hand, and the United States on the other. We will analyze issues of resistance and collaboration under the Nazis, Allied occupation, and the division of Europe. We will also consider the forcible displacement of peoples and the fate of Jewish survivors. The idea is to understand the harsh and complex realities of European life and politics in this crucial time frame spanning war and peace. One can discover the beginnings of the Cold War in this period, the first signs of the "Iron Curtain," and the origins of the European Union. Our sources for the reconstruction of European life at this crucial time include documents, memoirs, literature, film, and various collections at the Hoover Archives. In addition to analyzing written and visual materials in discussion, presentations, and short essays, you will engage in a quarter long project on one thematic or country study during this period.

**HISTORY 260. California's Minority-Majority Cities. 4-5 Units.**

Historical development and the social, cultural, and political issues that characterize large cities and suburbs where communities of color make up majority populations. Case studies include cities in Los Angeles, Santa Clara, and Monterey counties. Comparisons to minority-majority cities elsewhere in the U.S. Service Learning Course (certified by Haas Center).

Same as: CSRE 260, URBANST 169

**HISTORY 260K. Exploring American Religious History. 4 Units.**

This course will trace how contemporary beliefs and practices connect to historical trends in the American religious landscape.

Same as: AMSTUD 91, CSRE 91, RELIGST 91

**HISTORY 261. Race, Gender, and Class in Jim Crow America. 5 Units.**

How African American life and labor were redefined from 1890-1954. Topics include family life, work, leisure patterns, transnational relations, cultural expressions emphasizing literature and music, resistance and social activism. Primary sources including visual materials, literature, and film; historical interpretations of the period.

**HISTORY 261G. Presidents and Foreign Policy in Modern History. 5 Units.**

Nothing better illustrates the evolution of the modern presidency than the arena of foreign policy. This class will examine the changing role and choices of successive presidential administrations over the past century, examining such factors as geopolitics, domestic politics, the bureaucracy, ideology, psychology, and culture. Students will be encouraged to think historically about the institution of the presidency, while examining specific case studies, from the First World War to the conflicts of the 21st century.

Same as: INTNLREL 173

**HISTORY 263D. Junipero Serra. 3-5 Units.**

Why is Junipero Serra considered a representative figure of California? How have assessments of Serra evolved over the last 200 years? Why does his name appear so often on our campus? In this course we will consider these and other questions in terms of Spanish empire, Native American history, California politics of memory and commemoration, among other approaches. Requirements include weekly reading, class discussion, a field trip to Carmel Mission, short writing assignments, and a formal debate on the ethics naming university or public buildings after historical figures with contested pasts. Taught in English.

**HISTORY 265. Writing Asian American History. 5 Units.**

Recent scholarship in Asian American history, with attention to methodologies and sources. Topics: racial ideologies, gender, transnationalism, culture, and Asian American art history. Primary research paper.

Same as: AMSTUD 265, ASNAMST 265, HISTORY 365

**HISTORY 265G. African-American Independent Film- On Both Sides of the Camera. 4-5 Units.**

From D. W. Griffith's controversial "Birth of A Nation" (1915) to Nate Parker's also controversial "Birth of a Nation" (2016), Black Americans have played roles in Hollywood movies while also seeking to define how they are depicted in these movies. This course will introduce students to this history by featuring works of pioneering black filmmakers who challenged Hollywood racial stereotypes and created alternative images of the African-American experience.

Same as: AFRICAAM 265G, HISTORY 365G

**HISTORY 267E. Martin Luther King, Jr. - His Life, Ideas, and Legacy. 4-5 Units.**

Using the unique documentary resources and publications of Stanford's King Research and Education Institute, this course will provide a general introduction to King's life, visionary ideas, and historical significance. In addition to lectures and discussions, the course will include presentations of documentaries such as *Eyes on the Prize*.

Students will be expected to read the required texts, participate in class discussions, and submit a research paper or an audio-visual project developed in consultation with the professor.

Same as: AFRICAAM 267E, AMSTUD 267E

**HISTORY 268C. Poverty in America. 4-5 Units.**

During the twentieth century, Americans launched numerous bold efforts to reduce poverty in the United States. Federal welfare policy, community-based programs, academic research, philanthropic charity, and grassroots activism committed time and resources to the cause, but poverty-- and inequality-- have persisted. Why? This seminar considers the origins, implementation, and consequences of these remedies, noting in particular how race, gender, citizenship, family composition, and geography have shaped the lives of those in poverty and the public and private responses to it.

Same as: AMSTUD 268C, CSRE 268C, HISTORY 368C



**HISTORY 271. Mexicans in the United States. 5 Units.**

This course explores the lives and experiences of Mexicans living in the United States, from 1848 to the present. Themes and topics include: the legacies of colonialism, the Mexican-American War, transnational migration, the effects of economic stratification, race and racialization, and the impact of sexual and gender ideologies on the lives of Mexicans residing north of the border.

Same as: AMSTUD 271, CHILATST 171, CSRE 171H

**HISTORY 272D. Teaching Mexican American History in High School. 5 Units.**

The purpose of the course is two fold: 1) to expose students to salient historical themes and topics in Mexican American history, and 2) to establish a mentoring project with students currently enrolled in Mexican American history courses at Luis Valdez Leadership Academy (LVLA) high school in San Jose. Students will gain a broad understanding of Mexican American history, especially since the early twentieth century, with a particular focus on the Chicano Movement of the 1960s and 1970s. Students must also commit to enrollment in Hist 272F in spring quarter.

Same as: CHILATST 272A, CSRE 272A

**HISTORY 272F. Teaching Mexican American History in High School, Part II. 5 Units.**

Prerequisite: HISTORY 272D. This course is the second part of a continuing course about teaching Mexican American history in high school. In addition to continuing the mentoring work with students at Luis Valdez Leadership Academy, the spring quarter course will focus on the conceptualization, design, and development of a website that will provide resources for U.S. history teachers who seek information about Mexican American history. Students will identify primary sources, bibliographies, lesson plans, and other materials for use by high school teachers.

Same as: CHILATST 272B, CSRE 272B

**HISTORY 273C. Caribbean Migration to the United States. 4-5 Units.**

The course will explore the history of Caribbean migration to the United States.

Same as: AFRICAAM 273C, CSRE 273, HISTORY 373C

**HISTORY 273E. The Emergence of Nations in Latin America: Independence Through 1880. 4-5 Units.**

This course provides an introduction to the main themes of nineteenth-century Latin American history, including independence from Spain, the emergence of various nation-states, and the development of a new social, political, and economic order in the region.

Same as: HISTORY 373E

**HISTORY 274E. Urban Poverty and Inequality in Latin America. 5 Units.**

We examine historical issues of social inequality, poverty, crime, industrialization, globalization, and environment in major Latin American cities.

**HISTORY 274G. Public Space, the Private Sphere, and Dictatorship in Latin America. 5 Units.**

Recently, questions about the use of force, the state's monopoly on violence, and freedom of expression have taken on a new importance in the US. In Latin America, these issues were a focus of activism in the 1960s and 1970s. This course will consider everyday life and artistic interventions in urban space as acts of resistance, focusing on the idea that public space is central to the expression of freedom, paying special attention to the role of women.

**HISTORY 275B. History of Modern Mexico. 4-5 Units.**

Surveys the history of governance, resistance, and identity formation in Mexico from the nineteenth century to the present. Explores Mexico's historical struggles to achieve political stability, economic prosperity, and social justice and examines how regional, class, ethnic, and gender differences have figured prominently in the shaping of Mexican affairs. Topics include Mexico's wars and their legacies, the power of the state, violence and protest, debates over the meaning of "Mexicanness," youth culture, and the politics of indigenismo.

Same as: AMSTUD 275B, CHILATST 275B, CSRE 275B, HISTORY 375C

**HISTORY 276K. The Nature State: Latin American Conservation in Global Perspective. 4-5 Units.**

This colloquium studies the history of conservation as a way to understand (territorial) state formation. It examines Latin America from a global perspective by comparing case studies from around the world. It examines how various political arrangements allowed for nature protection, the creation and functioning of institutions and bureaucracies in charge of protected areas, what these developments tell us about citizenship, the role of science in state formation, and the implications of different environments in the building of national territories.

Same as: HISTORY 376K

**HISTORY 278D. Race, Ethnicity, and the Environment in Latin America. 4-5 Units.**

In a long sweep from the late eighteenth century to today, this seminar explores how race, ethnicity and the environment intersect in Latin American history, with emphasis on Colombia. It will inspect the meaning of the concepts of race and ethnicity and examine how the histories of black and indigenous peoples are better understood by taking the environment—both materially and symbolically—into account. We will read a variety of scholarly works, as well as primary sources.

Same as: HISTORY 378D

**HISTORY 278S. The Ethical Challenges of Climate Change. 4-5 Units.**

This course explores the ethical challenges of climate change from historical, social, economic, political, cultural and scientific perspectives. These include the discovery of global warming over two centuries, the rise of secular and religious denialism and skepticism toward the scientific consensus on it, the dispute between developed and developing countries over how to forge a binding global agreement to mitigate it, and the "role morality" of various actors (scientists, politicians, fossil fuel companies, the media and ordinary individuals) in the US in assessing ethical responsibility for the problem and its solutions.

Same as: HISTORY 478

**HISTORY 279. Latin American Development: Economy and Society, 1800-2014. 4-5 Units.**

The newly independent nations of Latin America began the 19th century with economies roughly equal to the U.S. and Canada. What explains the economic gap that developed since 1800? Why are some Latin American nations rich and others poor and how have societies changed over time? Marxist, dependency, neoclassical, and institutionalist interpretive frameworks are explored. The effects of globalization on Latin American economic growth, autonomy, and potential for social justice are examined and debated.

Same as: HISTORY 379

**HISTORY 281A. Twentieth-Century Iraq: A Political and Social History. 5 Units.**

The colonial experience, creation of the modern Iraqi state, and transition to military dictatorship. Political movements, religious and tribal elements, and their relation to the state. Geopolitical context.

**HISTORY 281B. Modern Egypt. 4-5 Units.**

From the mid-nineteenth century to the present. Topics: European imperialism, the political economy of cotton, rise of nationalism, gender and the nation, minorities, the coup of 1952, positive neutralism and the Cold War, and the neo-liberal reconstruction of Egypt.

Same as: HISTORY 381B

**HISTORY 282. The United States and the Middle East since 1945. 4-5 Units.**

Since the end of WW II, U.S. interests in the Middle East have traditionally been defined as access to oil at a reasonable price, trade and markets, containing the influence of the Soviet Union, and the security of Israel.

Is this the full range of U.S. interests? How has the pursuit of these interests changed over time? What forces have shaped U.S. policy? What is the impact of U.S. policy on the region itself?

Same as: HISTORY 382

**HISTORY 283. Middle East Oil and Global Economy. 4-5 Units.**

The class studies Middle East oil in the global economy using the method of political economy. Topics addressed include: origins of the Middle East oil industry; the Seven Sisters international oil cartel; Aramco and the U.S.-Saudi alliance; the post-World War II petroleum order; petroleum, the crisis of 1971-82, and the rise of a new regime of capital accumulation regulated neo-liberal economic orthodoxy and "Washington Consensus" policies- commonly referred to as "globalization" since the 1990s.

Same as: HISTORY 383

**HISTORY 283G. Place, Nature, and Life: Production of Space in European and Muslim History. 4-5 Units.**

How did people experience, produce and imagine their physical and spiritual environment, their past and future, their immediate places and far geographies, life and afterlife in Europe and the Muslim Eurasia throughout history? How did political, legal and economic organizations configure and claim spaces in different time and geographies in Europe and the Muslim world? In addition to various case studies, primary texts and visual depictions, the theoretical framework of discussions will be based on texts by Lefebvre, Foucault, Soja, de Certeau, Yi-Fu Tuan, J.B. Jackson, Casey, Harvey.

Same as: HISTORY 383G

**HISTORY 284F. Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800. 4-5 Units.**

Focuses on political regimes, economic interactions and sociocultural formations in the early modern Balkans and Middle East to Central and South Asia. Topics include complex political systems of the Ottoman, Safavid and Mughal empires; experiences of various Muslim, Christian, Jewish and Hindu, as well as urban, rural and nomadic communities; consolidation of transregional commerce and cultural exchange; incorporation of the Islamic world in the global economy; transimperial networks of the Muslim and Non-Muslim merchants, scholars and sufis.

Same as: HISTORY 384F

**HISTORY 286. Jews Among Muslims in Modern Times. 4-5 Units.**

The history of Jewish communities in the lands of Islam and their relations with the surrounding Muslim populations from the time of Muhammad to the 20th century. Topics: the place of Jews in Muslim societies, Jewish communal life, variation in the experience of communities in different Muslim lands, the impact of the West in the Modern period, the rise of nationalisms, and the end of Jewish life in Muslim countries.

Same as: HISTORY 386, JEWISHST 286, JEWISHST 386

**HISTORY 287C. Zionism and its Critics. 5 Units.**

Zionism from its genesis in the 1880s up until the establishment of the state of Israel in May, 1948, exploring the historical, ideological and political dimensions of Zionism. Topics include: the emergence of Zionist ideology in connection to and as a response to challenges of modernity; emancipation; Haskalah (Jewish enlightenment); other national and ideological movements of the period; the ideological crystallization of the movement; and the immigration waves to Palestine.

**HISTORY 288D. American Jewish History: Learning to be Jewish in America. 2-4 Units.**

This course will be a seminar in American Jewish History through the lens of education. It will address both the relationship between Jews and American educational systems, as well as the history of Jewish education in America. Plotting the course along these two axes will provide a productive matrix for a focused examination of the American Jewish experience. History students must take course for at least 3 units.

Same as: AMSTUD 279X, EDUC 279, JEWISHST 297X, RELIGST 279X

**HISTORY 290. North Korea in Historical Perspective. 4-5 Units.**

This colloquium will approach North Korea from a longer historical perspective and also discuss the country's current crisis and its future. Themes will include the northern region in colonial Korea, Kim Il Sung and Manchurian guerrillas, the USSR and North Korean Revolution, the reconstruction after the Korean War, Juche ideology and the political system, the everyday life of North Korea people, the Cold War and North Korean diplomacy, culture and mass performance, the great famine and economy in transition, the military and nuclear development, and refugees and the succession of leadership.

Same as: HISTORY 390

**HISTORY 290E. Movies and Empire in East Asia. 4-5 Units.**

Cinema was invented in the 1890s and simultaneously introduced to East Asia. This colloquium explores how this new medium changed the cultural and social landscape of East Asia and how the visual power of films also affected the culture politics of empires in the region. The themes include cinema and urban spaces, cultural imperialism, film images and gender discourse, colonial modernity, Americanism and Asianism, the visual and the textual, wartime propaganda, and Hollywood movies and cold war empires.

Same as: HISTORY 390E

**HISTORY 291J. East Asian Environmental History. 4-5 Units.**

Traversing 2,500 years of history, this colloquium begins with conceptions of nature, agricultural time, and agriculture in ancient East Asia, proceeds to look closely at the environmental history of China, Japan, Korea, and Vietnam, and then concludes with environmental issues in East Asia from a contemporary perspective.

Same as: HISTORY 391J

**HISTORY 291K. Korean History and Culture before 1900. 3-5 Units.**

This course serves as an introduction to Korean culture, society, and history before the modern period. It begins with a discussion of early Korea and controversies over Korean origins; the bulk of the course will be devoted to the Chos'n period (1392-1910), that from the end of medieval Korea to the modern period. Topics to be covered include: Korean national and ethnic origins, the role of religious and intellectual traditions such as Buddhism and Confucianism, popular and indigenous religious practices, the traditional Korean family and social order, state and society during the Chos'n dynasty, vernacular prose literature, Korean's relations with its neighbors in East Asia, and changing conceptions of Korean identity. The course will be conducted through the reading and discussion of primary texts in English translation alongside scholarly research. As such, it will emphasize the interpretation of historical sources, which include personal letters, memoirs, and diaries, traditional histories, diplomatic and political documents, along with religious texts and works of art. Scholarly work will help contextualize these materials, while the class discussions will introduce students to existing scholarly debates about the Korean past. Students will be asked also to examine the premodern past with an eye to contemporary reception. The final project for the class is a film study, where a modern Korean film portraying premodern Korea will be analyzed as a case study of how the past works in public historical memory in contemporary Korea, both North and South. An open-ended research paper is also possible, pending instructor approval.

Same as: HISTORY 391K, KOREA 158, KOREA 258

**HISTORY 292D. Japan in Asia, Asia in Japan. 4-5 Units.**

How Japan and Asia mutually shaped each other in the late 19th and 20th centuries. Focus is on Japanese imperialism in Asia and its postwar legacies. Topics include: pan-Asianism and orientalism; colonial modernization in Korea and Taiwan; collaboration and resistance; popular imperialism in Manchuria; total war and empire; comfort women and the politics of apology; the issue of resident Koreans; and economic and cultural integration of postwar Asia.

Same as: HISTORY 392D

**HISTORY 292F. Culture and Religions in Korean History. 4-5 Units.**

This colloquium explores the major themes of Korean history before 1800 and the role of culture and religions in shaping the everyday life of Chosôn-dynasty Koreans. Themes include the aristocracy and military in the Koryô dynasty, Buddhism and Confucianism in the making of Chosôn Korea, kingship and court culture, slavery and women, family and rituals, death and punishment, and the Korean alphabet (Hangûl) and print culture.

Same as: HISTORY 392F

**HISTORY 292J. Sino-Korean Relations, Past and Present. 3-5 Units.**

Korea and China have long been intertwined in their political, economic, and cultural histories. The depth of this historical relationship has enormous ramifications for East Asia today. This course will investigate the history of Korea-China relations from its deep roots in the ancient past, through its formative periods in the early modern period and the age of imperialism, to the contemporary era. Topics to be covered include formation of Chinese and Korean national identity, Sino-Korean cultural exchange, premodern Chinese empire in East Asia, China and Korea in the wake of Western and Japanese imperialism, communist revolutions in East Asia, the Korean War, and China's relations with a divided Korea in the twentieth and twenty-first centuries. Particular attention will be paid to how the modern and contemporary ramifications of past historical relations and how contemporary Chinese and Koreans interpret their own and each others' pasts. This course will ask students to engage with diverse interpretations of the past and to consider how a common history is interpreted by different audiences and for different purposes. What are the implications of divergent memories of a single historical event for Chinese and Korean political, cultural, and ethnic identities? How are political, cultural, and ethnic identities constructed through engagement with difference? And what is at stake in different constructions of identity? In addressing these issues, students will also engage in social inquiry. They will be asked to understand how political ideology, economic organization, and social forces have shaped the character of Sino-Korean relations. What are the economic and political institutions that influence these relations in each time period? How do ideologies like Confucianism, Communism, or free-market liberalism interface with Chinese and Korean societies and impact their relations? Same as: CHINA 156, CHINA 256, KOREA 156, KOREA 256

**HISTORY 293A. Research Seminar on Political Thought. 4-5 Units.**

A series of texts and documents that form the heart of what Marx and Engels called "the colonial question". Discussions center on specific themes relating to each student's research topic and/or interests. The seminar will be organized around a set of core common readings and weekly discussions, supplemented by a designed list of secondary texts and primary materials. Themes include: secularism, religion, state, capital, empire, anticolonialism, gender, democracy, textual and print cultures, cinema, political and legal theory, and history of economic thought. 400-level options allows students to do a two-quarter sequence, with the Spring devoted to writing up the research paper.

Same as: HISTORY 493

**HISTORY 293E. Female Divinities in China. 4-5 Units.**

This course examines the fundamental role of powerful goddesses in Chinese religion. It covers the entire range of imperial history and down to the present. It will look at, among other questions, what roles goddesses played in the spirit world, how this is related to the roles of human women, and why a civilization that excluded women from the public sphere granted them a dominant place, in the religious sphere. It is based entirely on readings in English.

Same as: FEMGEN 293E, HISTORY 393E, RELIGST 257X, RELIGST 357X

**HISTORY 294C. First Encounters: China and the West, 1500-1860. 4-5 Units.**

For four hundred years, the peoples of China and the West have engaged with each other. What happened when worlds and world-views came into contact? In this course, we will explore the experience of encounter and its cultural impact on two largely distinct, but never isolated societies. We will study the history of cross-cultural exchange between China and the West to see how each emerged through dialogue with the other and to understand the roots of our own interconnected world.

Same as: HISTORY 394C

**HISTORY 294D. Manchuria: Cradle of Conflict, Cockpit of Asia. 4-5 Units.**

How did Manchuria become Chinese? This course utilizes the dual waves of early twentieth-century writings and a wide array of recent scholarship dealing with Manchuria to explore the formation of nation-states out of the Qing and Japanese empires in Northeast Asia through the lenses of opium, migration, cities, warlords, and memoir. This course will be of interest to students concerned with developing transcultural understandings of Northeast Asian history.

Same as: HISTORY 394D

**HISTORY 295F. Race and Ethnicity in East Asia. 4-5 Units.**

Intensive exploration of major issues in the history of race and ethnicity in China, Japan, and Korea from the early modern period to the present day.

Same as: ASNAMST 295F, CSRE 295F, HISTORY 395F

**HISTORY 296. Communism and Revolution in China. 5 Units.**

From the formation of the Chinese Communist Party (CCP) in 1921 through the 1949 founding of the People's Republic of China (PRC). Topics include: early theories of socialism in China; the relationship between Chinese communism and the Communist International and Soviet Union; agrarian reformulation of communism by Mao; the communist-nationalist civil war; the Communist Revolution of 1949; and the consolidation of communist power in the PRC.

**HISTORY 296C. The Making of Modern India. 4-5 Units.**

What does the history of the modern world look like as seen through India's history? Through an examination of ancient India and the development of Hindu and Buddhist communities, to the influx of Muslims and the rise of the Mughal Empire, to European colonialism, Gandhi and anti-colonial movements, to Partition, Independence, Bollywood, and the rise of Hindu nationalist political parties, this course will provide a fresh lens to not only view India's history, but India's role in shaping the modern world.

Same as: HISTORY 396C

**HISTORY 296F. Short Stories from India and Pakistan. 3-5 Units.**

The course introduces the main periods and trends of 20th- and 21st-century Urdu short story: Progressive Writers' Movement, Partition literature, Modernism, contemporary fiction. Classes include close reading and discussion of selected short stories, with special focus on prominent themes such as social problems; personal loss, exile, displacement, alienation, and questions of identity; gender and sexuality; history, memory, and nostalgia; myth and imagination. Readings include: Premchand, Manto, Ismat Chughtai, Qurratulain Hyder, Intizar Husain, Naiyer Masud. All readings are in English.

Same as: ICA 296F

**HISTORY 297. The Cold War and East Asia. 5 Units.**

Explores how East Asia negotiated superpower rivalry and global ideological competition during the Cold War. Considers the ways in which China, Japan, and Korea were more than battlegrounds for US-Soviet contestation and played active roles in defining the nature and dynamics of the conflict. Re-examines conventional narratives and periodizations against alternative conceptual models and interpretive frameworks highlighting the constructed nature of the struggle as well as the role of historical and cultural factors in shaping the East Asian experience. Same as: HISTORY 397

**HISTORY 297F. Religion and Power in the Making of Modern South Asia. 3-5 Units.**

This course examines the diverse ways that religious traditions have been involved in the brokering of power in South Asia from the late seventeenth century to the present day. We will examine the intersection of religion and power in different arenas, including historical memory, religious festivals, language politics, and violent actions. At the core of our inquiry is how religion is invoked in political contexts (and vice-versa), public displays of religiosity, and the complex dynamics of religion and the state. Among other issues, we will particularly engage with questions of religious identity, knowledge, and violence. Undergraduates must enroll in RELIGST 255 for 5 units. Graduate students must enroll RELIGST 355 for 3-5 units. HISTORY297F must be taken for 4-5 units. Same as: RELIGST 255, RELIGST 355

**HISTORY 298G. Death and Death Culture in Modern China. 4-5 Units.**

From the late Qing period to the Cultural Revolution, Chinese society experienced a radical transformation of the beliefs, practices, and organizations that addressed the issue of death. The culture of death was at the heart of society. This colloquium will explore the diverse aspects of Chinese social, religious, and material practices involved in parting with the dead, in rural and urban society, in China as well as overseas. Sources: we shall use a wide body of texts, photographs, images, and films. Hardly anything changed more in modern Chinese history than the ways in which Chinese society. Same as: HISTORY 398G

**HISTORY 299A. Senior Research I. 1-5 Unit.**

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**HISTORY 299B. Senior Research II. 1-5 Unit.**

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**HISTORY 299C. Senior Research III. 1-5 Unit.**

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**HISTORY 299D. Tooling Up for Digital Humanities. 1 Unit.**

What are the digital humanities? The twenty-first century presents new opportunities in the humanities, such as unprecedented access to millions upon millions of digitized sources along with powerful technological tools to study those sources. Yet it also raises new challenges, such as the responsible and effective use of technology, and defining the nature of digital scholarship and communication. This workshop offers an introduction to fundamental concepts, methods, and issues within the growing field of digital humanities, including managing your online identity, digitizing sources, managing databases, text mining, spatial analysis, visualization, and pedagogy.

**HISTORY 299F. Curricular Practical Training. 1 Unit.**

Following internship work, students complete a research report outlining work activity, problems investigated, key results and follow-up projects. Meets the requirements for curricular practical training for students on F-1 visas. Student is responsible for arranging own internship and faculty sponsorship.

**HISTORY 299H. Junior Honors Colloquium. 1 Unit.**

Required of junior History majors planning to write a History honors thesis during senior year. Meets four times during the quarter.

**HISTORY 299M. Undergraduate Directed Research: Martin Luther King, Jr., Research and Education Institute. 1-4 Unit.**

May be repeated for credit.

**HISTORY 299P. Undergraduate Directed Research: Pioneering Women. 1 Unit.**

May be repeated for credit.

**HISTORY 299S. Undergraduate Directed Research and Writing. 1-5 Unit.**

May be repeated for credit.

**HISTORY 299X. Preparing for International Field Work: Public Service or Research. 1 Unit.**

Open to students in all classes, those planning internships abroad and those planning research, from juniors with honors theses and sophomores with Chappell Lougee grants to freshmen thinking ahead. Introduces resources on campus for planning international research and service. Raises issues that need to be considered in advance of going abroad: ethical concerns, Human Subjects Protocol, networking, personal safety and gender issues, confronting cultural differences. Exposes students to research methods: case studies, interviewing, working in foreign libraries and archives.

Same as: HISTORY 399A

**HISTORY 301E. Life Under Nazism. 4-5 Units.**

This course explores everyday life in the Third Reich. Moving inside political events, students will examine daily experiences in the Nazi state-- from Hitler's tumultuous rise to power through the end of World War Two. We will see how people navigated new ideologies, practices, anti-Semitism, war, and mass murder. Through analysis of memoirs, diaries, essays, novels, propaganda, scholarship, and film, students will investigate how social and political developments can reveal the very boundaries between self and society.

**HISTORY 301J. Objects of History: From "Material Culture" to "Making". 4-5 Units.**

This class considers objects as historical sources. It surveys diverse approaches to the study and display of physical evidence, from "material culture" to "making." These explorations of object-oriented research will inform the course's hands-on components, working with objects and replicating historical experiences. With its focus on the question of what historical knowledge can be gained through interactivity, the course is suited to students whose interests include museums and public history, reenactment and performance, the maker movement, or interdisciplinary methodology.

Same as: HISTORY 201J

**HISTORY 301K. A History of the Global Left: Revolutionary Movements against Empire. 4-5 Units.**

This class will trace the formation of trans-regional movements against imperialism in the modern period that helped create a "global Left." We will read contemporary works by thinkers such as Lord Byron, Karl Marx, Mohandas K. Gandhi, Annie Besant, and Faiz Ahmad Faiz, as well as historical studies of these figures and the movements in which they figured. Key topics include the American Revolution, the Indian "Mutiny" of 1857, the Ghadar movement, Pan-Islamism, Irish nationalism, and global communism.

Same as: HISTORY 201K

**HISTORY 302D. The History of Genocide. 4-5 Units.**

This course will explore the history, politics, and character of genocide from the beginning of world history to the present. It will also consider the ways that the international system has developed to prevent and punish genocide.

Same as: HISTORY 202D

**HISTORY 302G. Peoples, Armies and Governments of the Second World War. 4-5 Units.**

Clausewitz conceptualized war as always consisting of a trinity of passion, chance, and reason, mirrored, respectively, in the people, army and government. Following Clausewitz, this course examines the peoples, armies, and governments that shaped World War II. Analyzes the ideological, political, diplomatic and economic motivations and constraints of the belligerents and their resulting strategies, military planning and fighting. Explores the new realities of everyday life on the home fronts and the experiences of non-combatants during the war, the final destruction of National Socialist Germany and Imperial Japan, and the emerging conflict between the victors. How the peoples, armies and governments involved perceived their possibilities and choices as a means to understand the origins, events, dynamics and implications of the greatest war in history.

Same as: HISTORY 202G

**HISTORY 302K. The Holocaust and Its Aftermath. 4-5 Units.**

This seminar gives an overview over different aspects of the history of the Holocaust and its aftermath and will examine key issues in recent Holocaust historiography and questions of memory and representation. Special emphasis is put on the nature of the historian's task, as viewed through the lens of historians of the Holocaust, as well as to the significance of the Holocaust in history and how it has changed over time. The course will confront students with historiographical texts and historical documents, with photography and film, works of scholarship and art.

Same as: HISTORY 202K, JEWISHST 282K, JEWISHST 382K

**HISTORY 303. Premodern Economic Cultures. 4-5 Units.**

Modern economists have made a science of studying the aggregate effects of individual choices. This science is based on the realities of personal freedom and individual choice. Prior to the modern era, however, different realities comprised very different economic cultures: moral economies in which greed was evil and generosity benefitted the patron's soul; familial collectives operating within historical conditioned diasporas; economies of obligation that threatened to collapse under their own weight as economic structures shifted. In this course we will be reading cross-culturally to develop an understanding of the shared and distinct elements of premodern economic cultures.

Same as: HISTORY 203

**HISTORY 303C. History of Ignorance. 4-5 Units.**

Scholars pay a lot of attention to knowledge—how it arises and impacts society—but much less attention has been given to ignorance, even though its impacts are equally profound. Here we explore the political history of ignorance, through case studies including: corporate denials of harms from particular products (tobacco, asbestos), climate change denialism, and creationist rejections of Darwinian evolution. Students will be expected to produce a research paper tracing the origins and impact of a particular form of ignorance.

**HISTORY 303F. Words and Things in the History of Classical Scholarship. 4-5 Units.**

How have scholars used ancient texts and objects since the revival of the classical tradition? How did antiquarians study and depict objects and relate them to texts and reconstructions of the past? What changed and what stayed the same as humanist scholarship gave way to professional archaeologists, historians, and philologists? Focus is on key works in the history of classics, such as Erasmus and Winckelmann, in their scholarly, cultural, and political contexts, and recent critical trends in intellectual history and the history of disciplines.

Same as: CLASSICS 331

**HISTORY 303K. Trauma and History: Intergenerational suffering and collective healing. 4-5 Units.**

This course will examine trauma as a historical process, following the intergenerational impacts of history's darker dramas, analyzing collective strategies for coping and healing after trauma, and asking whether we can speak of "traumatized societies." Readings for graduate students will include Ben Shephard's *A War of Nerves*, Didier Fassin and Richard Rechtman's *The Empire of Trauma*, and selections from Yael Danieli, ed., *Intergenerational Handbook of Multigenerational Legacies of Trauma*. Colloquium will be discussion-oriented, but will also include guest discussants from around the world. The course will culminate in a conference to be held at Stanford, June 4-6: "Soul Wounds: Trauma and Healing Across Generations." Undergraduate requirements for 1 credit: Attend weekly "Mind, Body, and Culture" workshop and first hour of Wednesday morning discussion, attend some part of conference on June 4-6. Graduate requirements for 4-5 credits: Attend workshop, read weekly, discussion on Wednesday mornings, write a paper and if desired present at conference.

**HISTORY 304. Approaches to History. 4-5 Units.**

Required of first-year History Ph.D. students. This course explores ideas and debates that have animated historical discourse and shaped historiographical practice over the past half-century or so. The works we will be discussing raise fundamental questions about how historians imagine the past as they try to write about it, how they constitute it as a domain of study, how they can claim to know it, and how (and why) they argue about it.

**HISTORY 304A. Reimagining History: New Approaches to the Past. 4-5 Units.**

This class explores, through analysis and practice, the ways in which history can be told and experienced through means other than traditional scholarly narratives. Approaches include literary fiction and non-fiction, digital media, graphic arts, maps, exhibitions, and film. A final project will require students to produce their own innovative work of history.

Same as: HISTORY 204A

**HISTORY 304D. Advanced Topics in Agnotology. 4-5 Units.**

Advanced research into the history of ignorance. Our goal will be to explore how ignorance is created, maintained and destroyed, using case studies from topics such as tobacco denialism, global climate denialism, and other forms of resistance to knowledge making. Course culminates in a research paper on the theory and practice of agnotology, the science of ignorance.

Same as: HISTORY 204D

**HISTORY 305. Graduate Pedagogy Workshop. 1 Unit.**

Required of first-year History Ph.D. students. Perspectives on pedagogy for historians: course design, lecturing, leading discussion, evaluation of student learning, use of technology in teaching lectures and seminars. Addressing today's classroom: sexual harassment issues, integrating diversity, designing syllabi to include students with disabilities.

**HISTORY 305C. Graduate Workshop Series. 1 Unit.**

This is a 1-credit course for which only regular attendance is required, and graduate students may audit any or all of the sessions as they find useful. The majority of the course addresses questions of research, grant writing, and professionalization, while the last few sessions offer general guidance on preparing for the job market.

**HISTORY 305G. Creative Political Thinking: From Machiavelli to Madison. 4-5 Units.**

How can we account for creativity and innovation in political thinking? Are these qualities simply a product of political expediency and rhetorical urgency, or do they also depend on qualities of mind and historical contingencies that have to be studied individually? This class will explore these questions with three noteworthy cases: Niccolò Machiavelli, John Locke, and James Madison. Extensive reading in both primary writings and secondary sources.

Same as: HISTORY 205G, POLISCI 235J, POLISCI 335J

**HISTORY 305K. The Age of Revolution: America, France, and Haiti. 4-5 Units.**

This course examines the "Age of Revolution," spanning the 18th and 19th centuries. Primarily, this course will focus on the American, French, and Haitian Revolutions (which overthrew both French and white planter rule). Taken together, these events reshaped definitions of citizenship, property, and government. But could republican principles—color-blind in rhetoric—be so in fact? Could nations be both republican and pro-slavery? Studying a wide range of primary materials, this course will explore the problem of revolution in an age of empires, globalization, and slavery. Same as: AFRICAAM 205K, HISTORY 205K

**HISTORY 306. Beyond Borders: Approaches to Transnational History. 4-5 Units.**

This core colloquium for the Transnational, International, and Global (TIG) field will introduce students to the major historiographical trends, methodological challenges, and theoretical approaches to studying and writing transnational histories.

**HISTORY 306A. City, Society, Literature- 19th Century Histories. 4 Units.**

This course examines the rise of modern cities through an analysis of urban society and the imaginative literature of the 1800s.

Same as: HISTORY 206A, URBANST 106

**HISTORY 306B. Intoxicated: Commodities & Globalization in the Early Modern World. 4-5 Units.**

Early modern Europe experienced an influx of foreign goods, including coffee, sugar, chocolate, tea, and drugs, that ushered in a new era of global commerce. Yet, these developments also had consequences: the large-scale enslavement and relocation of human beings and the violent subjugation of local populations in the name of empire. A wider range of goods from far-flung places entered the grasp of a larger swath of society, but from where, by what means, and at what cost?.

Same as: HISTORY 206B

**HISTORY 306D. World History: Graduate Colloquium. 4 Units.**

How do historians engage the global scale in the classroom as well as in research? The world history canon including Toynbee, McNeill, Braudel, Wolf, and Wallerstein; contrasting approaches, recent research, and resources for teaching. Recommended: concurrent enrollment in HISTORY 306K.

**HISTORY 306J. Resist, Rebel, Revolt: A Global History. 4-5 Units.**

This course will explore the inspirations and contexts of political, social, intellectual, and cultural forms of resistance in modern global history. Historical subjects will include anti-capitalism, anti-colonialism, resistance to Fascism and Nazism, anti-Communism, civil rights movements, human rights campaigns, and contemporary forms of dissidence.

Same as: HISTORY 206J

**HISTORY 306K. World History Pedagogy Workshop. 1 Unit.**

Students draft a syllabus and create a curriculum module for use in a world history lecture course. Corequisite: HISTORY 306D, recommended.

**HISTORY 307A. Legal History Workshop. 4-5 Units.**

(Same as LAW 372.) The Legal History Workshop is designed as a forum in which faculty and students from both the Law School and the History Department can discuss some of the best work now being done in the field of legal history. Every other week, an invited speaker will present his or her current research for discussion. This year the theme of the Workshop will be Conservative Legal Movements from 1950 to the Present. Speakers will include Reva Siegel, the Nicholas deB. Katzenbach Professor of Law at Yale Law School, and Thomas Sugrue, the David Boies Professor of History and Sociology at the University of Pennsylvania, as well several other scholars of law, the social sciences and humanities writing about this topic. In the week prior to a given speaker's presentation, the class will meet as a group to discuss secondary literature relevant to understanding and critiquing the speaker's research. Students will then read the speaker's paper in advance of the following week's workshop presentation. Special Instructions: Students are required to write a brief response to each speaker's paper. There will be a total of four speakers, and thus four papers. Guidance will be provided concerning how to frame these response papers, which will be due every two weeks - i.e., on the day before speaker presents and students will receive "W" writing credit. Students taking the course to receive "R" research credit are required to write a research paper on a legal history topic that they choose (in consultation with the professor). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the paper length. Elements used in grading: Class participation, attendance, assignments and final paper. This course is open to first-year Law School students. Writing (W) credit is for students entering prior to Autumn 2012.

**HISTORY 307C. The Global Early Modern. 4-5 Units.**

In what sense can we speak of "globalization" before modernity? What are the characteristics and origins of the economic system we know as "capitalism"? When and why did European economies begin to diverge from those of other Eurasian societies? With these big questions in mind, the primary focus will be on the history of Europe and European empires, but substantial readings deal with other parts of the world, particularly China and the Indian Ocean. HISTORY 307C is a prerequisite for HISTORY 402 (Spring quarter).

Same as: HISTORY 207C

**HISTORY 308. Biography and History. 4-5 Units.**

The relationship between biographical and historical writing, primarily in Europe and America. Problems of methodology, evidence, dispassion, and empathy. Texts: biographies, critical literature on biographical work, and novels (A. S. Byatt's *Possession*, Bernard Malamud's *Dubin's Lives*) that illuminate the intellectual underpinnings of biographical labor.

Same as: HISTORY 207

**HISTORY 308A. Science and Law in History. 4-5 Units.**

How the intertwined modern fields of science and law, since the early modern period, together developed central notions of fact, evidence, experiment, demonstration, objectivity, and proof.

Same as: HISTORY 208A

**HISTORY 308B. Women Activists' Response to War. 4-5 Units.**

Theoretical issues, historical origins, changing forms of women's activism in response to war throughout the 20th century, and contemporary cases, such as the Russian Committee of Soldiers Mothers, Bosnian Mothers of Srebrenica, Serbian Women in Black, and the American Cindy Sheehan. Focus is on the U.S. and Eastern Europe, with attention to Israel, England, and Argentina.

Same as: FEMGEN 208B, HISTORY 208B

**HISTORY 308F. Law and Humanities Workshop: History, Literature, and Philosophy. 4-5 Units.**

(Formerly LAW 516, now LAW 3515.) The Law and Humanities Workshop: History, Literature, and Philosophy is designed as a forum in which faculty and students from the Law School and from various humanities departments can discuss some of the best work now being done in law and humanities. Every other week, an invited speaker will present his or her current research for discussion. In the week prior to a given speaker's presentation, the class will meet as a group to discuss secondary literature relevant to understanding and critiquing the speaker's research. Students will then read the speaker's paper in advance of the following week's workshop presentation. Enrollment will be limited to 30 students—20 from SLS who will be selected by lottery and 10 from H&S. Elements used in grading: Class participation, attendance, and writing assignments.

**HISTORY 309A. Postcolonialism and Universalism. 4-5 Units.**

Key texts and motifs from postcolonial theory: empire, class, exile, suffering, textuality, archive in juxtaposition to 20th-century philosophical questions about universal history and the relevance of humanist inquiry. Same as: HISTORY 209D

**HISTORY 309B. The Idea of Politics. 4-5 Units.**

Can we live without politics? Is politics indispensable for humanity and vice-versa? The idea of politics is that it must transform, through human action, conditions of collective life. But the 20th century produced colliding beliefs about what that life might be and what the human being itself might look like. Explore whether, after the century, we might still think of politics as an ethical idea and the "human" as foundational political category. Keywords: Civility, Cruelty, Friendship, Empire, Democracy, Humanism, Animals. Same as: HISTORY 209B

**HISTORY 309C. Liberalism and Violence. 4-5 Units.**

Does Liberalism have a theory of violence? What does modern political thought, in privileging humanity and rights, share with "terrorists" and "rogue states?" How is liberalism transformed by the use of religion and death for political ends? We read key thinkers of modern life—Adorno, Arendt, Agamben, Benjamin, Derrida, Fanon, Foucault, Gandhi, Heidegger, and Schmitt—to interrogate the relationship between religion, sacrifice, and democracy. At the center are connections between war and modern life, and between violence and non-violence. Same as: HISTORY 209C

**HISTORY 309E. History Meets Geography. 4-5 Units.**

Focus is on developing competence in GIS computer applications and applying it to historical problems. Previous experience with GIS not required. Recommended: complete the GIS tutorial in Branner Library before the course starts.

**HISTORY 309F. Maps in the Early Modern World. 4-5 Units.**

The significance of cartographic enterprise across the early modern world. Political, economic, and epistemological imperatives that drove the proliferation of nautical charts, domain surveys, city plans, atlases, and globes; the types of work such artifacts performed for their patrons, viewers, and subjects. Contributions of indigenous knowledge to imperial maps; the career of the map in commerce, surveillance, diplomacy, conquest, and indoctrination. Sources include recent research from Asia, Europe, and the Americas. Same as: HISTORY 209F

**HISTORY 309G. Paleography of Medieval and Early Modern Manuscripts. 3-5 Units.**

Introductory course in the history of writing and of the book, from the late antique period until the advent of printing. Opportunity to learn to read and interpret medieval manuscripts through hands-on examination of original materials in Special Collections of Stanford Libraries as well as through digital images. Offers critical training in the reading of manuscripts for students from departments as diverse as Classics, History, Philosophy, Religious Studies, English, and the Division of Languages Cultures and Literatures.

Same as: CLASSICS 215, DLCL 209, RELIGST 204

**HISTORY 311A. Family, Gender, and Production in Ancient Rome. 4-5 Units.**

Seminar. The household as the basic unit of production in Rome in the context of family relations and ideologies of gender. Methodological challenges of doing social and economic history from literary, epigraphic, and literary texts. Demography of family and kinship in ancient Rome. Ideologies of gender and family roles and their influence on economic production. Economic theories of the family and human capital.

**HISTORY 311G. Big Ancient History. 4-5 Units.**

How the shift away from thinking about European history in terms of a western civilization model toward embedding it in stories of how global history affects research and teaching on ancient Greece and Rome. Conventional, evolutionary, and global history narratives of the past 5,000 to 15,000 years and some new ideas about how Greco-Roman history might fit into different storylines.

**HISTORY 313. Core Colloquium: Graduate Readings in Medieval History. 4-5 Units.**

This course serves as a graduate-level introduction to major themes, problems, methods, and historiographical traditions in medieval European history.

**HISTORY 315. Advanced Paleography. 5 Units.**

This course will train students in the transcription and editing of original Medieval and Early Modern textual materials from c. 1000 to 1600, written principally in Latin and English (but other European languages are possible, too). Students will hone their archival skills, learning how to describe, read and present a range of manuscripts and single-leaf documents, before turning their hand to critical interpretation and editing. Students, who must already have experience of working with early archival materials, will focus on the full publication of one individual fragment or document as formal assessment. Same as: CLASSICS 216, RELIGST 329X

**HISTORY 316. Women and the Book: Scribes, Artists, and Readers from Late Antiquity through the Fourteenth Century. 4-5 Units.**

This course examines the cultural worlds of medieval women through particular attention to the books that they owned, commissioned, and created. Beginning with the earliest Christian centuries, the course proceeds chronologically, charting women's book ownership, scribal and artistic activity, and patronage from Late Antiquity through the fourteenth century. In addition to examining specific manuscripts (in facsimile, or digitally), we will consider ancillary questions to do with women's authorship, education and literacy, reading patterns, devotional practices, and visual traditions and representation.

Same as: ARTHIST 206H, FEMGEN 216, HISTORY 216

**HISTORY 318. The Holy Dead: Saints and Spiritual Power in Medieval Europe. 4-5 Units.**

Examines the cult of saints in medieval religious thought and life. Topics include martyrs, shrines, pilgrimage, healing, relics, and saints' legends. Same as: HISTORY 218, RELIGST 218X, RELIGST 318X

**HISTORY 319C. Science, Technology, and Modernity in the Soviet Union. 5 Units.**

Science and technology were integral to the Soviet claim to offer a vision of modernity superior to that of Western capitalism. Science and technology would flourish; society would develop on a scientific basis. The results were more complex than the vision. Topics to be covered: science and Marxism-Leninism; the Lysenko affair; the R&D system; the role of the secret police; the atomic project; the space race; missile development; Andrei Sakharov; technology and innovation.  
Same as: HISTORY 219C

**HISTORY 320G. Demons, Witches, Old Believers, Holy Fools, and Folk Belief: Popular Religion in Russia. 4-5 Units.**

19th and early 20th centuries. Peasants, parish priests, witches, possessed persons, cults and sects, old believers, saints, and women's religious communities. Nominally Christian, and members of the Orthodox Church, Russians embraced beliefs and customs that combined teaching from Church and folk traditions.  
Same as: HISTORY 220G, REES 220G, REES 320G

**HISTORY 321A. State, Society and Nation in Modern Russian Historiography. 4-5 Units.**

Main trends of Russian intellectual history as seen through major historians' treatment of Muscovy: Romanticism, Slavophilism, Hegelianism, Populism, Social Democracy, New Idealism, and Marxism-Leninism.

**HISTORY 321B. Imperial Russian Historiography. 4-5 Units.****HISTORY 322A. Crime and Punishment in Early Modern Europe and Russia. 4-5 Units.**

Explores criminal law in early modern Europe and Russia, ca 1500-1800, in law and in practice. Engages debates about use of exemplary public executions as tactic of governance, and about gradual decline in "violence" in Europe over this time. Explores practice of accusatory and inquisitory judicial procedures, judicial torture, forms of punishment, concepts of justice.  
Same as: HISTORY 222

**HISTORY 323. Art and Ideas in Imperial Russia. 4-5 Units.**

Poetry, novels, symphonic music, theater, opera, painting, design, and architecture: what they reveal about the politics and culture of tsarist Russia.  
Same as: HISTORY 223

**HISTORY 323B. Research Methodologies in Early Modern Russian History. 4-5 Units.****HISTORY 323E. Cities of Empire: An Urban Journey through Eastern Europe and the Mediterranean. 3-5 Units.**

This course explores the cities of the Habsburg, Ottoman and Russian empires in the dynamic and turbulent period of their greatest transformation from the 19th century through the Two World Wars. Through the reading of urban biographies of Venice and Trieste, Vienna, Budapest, Cracow, Lviv, Sarajevo, Belgrade, Salonica, and Odessa, we consider broad historical trends of political, economic, and social modernization, urbanization, identity formation, imperialism, cosmopolitanism, and orientalism. As vibrant centers of coexistence and economic exchange, social and cultural borderlands, and sites of transgression, these cities provide an ideal lens through which to examine these themes in the context of transition from imperial to post-imperial space.  
Same as: HISTORY 223E, REES 204, REES 304

**HISTORY 324C. Genocide and Humanitarian Intervention. 3 Units.**

Open to medical students, graduate students, and undergraduate students. Traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo and Sudan.  
Same as: HISTORY 224C, JEWISHST 284C, JEWISHST 384C, PEDS 224

**HISTORY 324F. The Caucasus and the Muslim World. 4-5 Units.**

The linkages connecting the societies of the Caucasus to Muslim communities in Iran, Russia, the Ottoman Empire and Turkey, S. Asia, and the Middle East.

**HISTORY 326A. Modern Europe: Society and Politics. 5 Units.**

The goal of this course is to introduce graduate students to major works of history and literature in the field of nineteenth and early-twentieth century history. A colloquia will be given in tandem with a research seminar.

**HISTORY 326C. Graduate Colloquium on Balkan History. 4-5 Units.**

Designed for History Ph.D. students to develop competence in the history and historiography of the modern Balkans, from the French Revolution to the present. Areas of study include the influence of empires on the region, the rise of nationalism and nation states, the dilemmas of independence, the emergence and decline of communism in the region, and the recurrence of war and ethnic conflict.

**HISTORY 326E. Famine in the Modern World. 3 Units.**

Open to medical students, graduate students, and undergraduate students. Examines the major famines of modern history, the controversies surrounding them, and the reasons that famine persists in our increasingly globalized world. Focus is on the relative importance of natural, economic, and political factors as causes of famine in the modern world. Case studies include the Great Irish Famine of the 1840s; the Bengal famine of 1943-44; the Soviet famines of 1921-22 and 1932-33; China's Great Famine of 1959-61; the Ethiopian famines of the 1970s and 80s, and the Somalia famines of the 1990s and of 2011.  
Same as: HISTORY 226E, PEDS 226

**HISTORY 327D. All Quiet on the Eastern Front? East Europe and Russia in the First World War. 3-5 Units.**

Until recently history has been comparatively quiet about the experience of World War I in the east. Far from being a peripheral theater of war, however, the experiences of war on the Eastern Front were central to shaping the 20th century. Not only was the first shot of the war fired in the east, it was also the site of the most dramatic political revolution. Using scholarly texts, literature and film, this course combines political, military, cultural and social approaches to introduce the causes, conduct and consequences of World War I with a focus on the experiences of soldiers and civilians on the Eastern Front. Topics include: the war of movement, occupation, extreme violence against civilians, the Armenian genocide, population exchanges, the Russian Revolution and civil war, and the disintegration of empires and rise of nation-states.  
Same as: HISTORY 227D, REES 227, REES 327

**HISTORY 328. Circles of Hell: Poland in World War II. 5 Units.**

Looks at the experience and representation of Poland's wartime history from the Nazi-Soviet Pact (1939) to the aftermath of Yalta (1945). Examines Nazi and Soviet ideology and practice in Poland, as well as the ways Poles responded, resisted, and survived. Considers wartime relations among Polish citizens, particularly Poles and Jews. In this regard, interrogates the traditional self-characterization of Poles as innocent victims, looking at their relationship to the Holocaust, thus engaging in a passionate debate still raging in Polish society.  
Same as: HISTORY 228, JEWISHST 282, JEWISHST 382



**HISTORY 329A. Nationhood and Belonging: Poles and Jews. 3 Units.**

Examines changing conceptions of nationhood in Poland, late-19th century to present, with focus on place of Jews in Polish society. What conditions fostered the early political sense of the nation? Why was it replaced with integral nationalism, and for some, fascism? How did Jews relate to their homeland? Emphasis on post-1918 history: impact of independence, Great Depression, West European fascism, World War II, imposition of communist rule, and collapse of the Soviet Bloc. Considers current Polish-Jewish relations.

Same as: HISTORY 229A, JEWISHST 289A, JEWISHST 389A

**HISTORY 330. Core Colloquium on Early Modern Europe: Ancien Regime. 4-5 Units.**

Topics in the social, political, and religious history of Western Europe, 1550-1789, with an emphasis on France. May be repeated for credit.

**HISTORY 330A. Early Modern Colloquium. 4-5 Units.**

Historiographical survey from the Renaissance to the Enlightenment. Topics include Renaissance, Reformation, European expansion, state and nation building, printing, military, and scientific revolutions, origins of Enlightenment. Designed to prepare students doing either a primary or secondary graduate field in early modern European history.

**HISTORY 330D. Europe in the World, 1789-Present. 4-5 Units.**

The European conquest of parts of Africa, Asia, and the South Pacific by European merchants, missionaries, armies, and administrators had significant, and often cataclysmic, effects on indigenous political alliances, cultural practices, and belief systems. But were the effects of expansion entirely one-sided? What impact did the experiences of colonialism have on European politics, culture, and Europe's relations with the rest of the world? Explores how interaction between Europe and the rest of the world redefined the political, racial, sexual, and religious boundaries of both Europe and its colonies and gave rise to the more "globalized" society we live in today.

Same as: HISTORY 230D

**HISTORY 331B. Core Colloquium on Modern Europe: The 19th Century. 4-5 Units.**

The major historical events and historiographical debates of the long 19th century from the French Revolution to WW I.

**HISTORY 331D. Core Colloquium on Modern Europe: Intellectual History. 4-5 Units.****HISTORY 331E. Paper, Printing, and Digital Revolutions: Transformations of the Book. 4-5 Units.**

What is a book? This seminar explores the conceptual implications of approximately two millennia of transformations in the physical and material properties of books. How have the meaning and authority we assign the written word changed as technologies of book production and dissemination have evolved, and how have they remained continuous? Topics covered include the rise of the medieval manuscript codex, the emergence of print culture in early modern Europe, and current debates over the nature of text in the digital age.

Same as: HISTORY 231E

**HISTORY 332C. European Security Since World War Two. 4-5 Units.**

This course looks at European security during the Cold War and up to the present. There are many historical controversies to be examined, e.g. the enlargement of NATO, as well as theoretical and doctrinal debates, e.g. about extended deterrence and detente.

Same as: HISTORY 232C, IPS 235, POLISCI 116A

**HISTORY 332E. Crooks, Quacks, and Courtesans: Jacobean City Comedy. 5 Units.**

We will read a series of plays set in or around early modern London, written by playwrights such as Ben Jonson, Thomas Middleton, and John Marston. The course will explore the plays' hilarious representations of the London underworld, with its confidence tricksters and naive victims, as well as more serious topics such as social mobility and social relations, economic expansion, disease transmission, and the built environment. Plays studied will include: *The Alchemist*, *Epicene*, *The Roaring Girl*, *A Chaste Maid In Cheapside*, *The Dutch Courtesan*.

Same as: ENGLISH 240A, ENGLISH 340A, HISTORY 232E

**HISTORY 332G. Early Modern Cities. 4-5 Units.**

Colloquium on the history of early modern European cities, covering urbanization, street life, neighborhoods, fortifications, guilds and confraternities, charity, vagrancy, and begging, public health, city-countryside relationship, urban constitutions, and confederations. Assignments include annotated bibliography, book review, and a final paper. Second-quarter continuation of research seminar available (HIST299S or HIST402).

Same as: HISTORY 232G

**HISTORY 333C. Two British Revolutions. 4-5 Units.**

Current scholarship on Britain, 1640-1700, focusing on political and religious history. Topics include: causes and consequences of the English civil war and revolution; rise and fall of revolutionary Puritanism; the Restoration; popular politics in the late 17th century; changing contours of religious life; the crisis leading to the Glorious Revolution; and the new order that emerged after the deposing of James II.

Same as: HISTORY 233C

**HISTORY 333K. The Invention of the Modern Republic. 4-5 Units.**

Examines the history of republican thinking in the Atlantic World from the Renaissance to the French Revolution.

Same as: HISTORY 233K

**HISTORY 334F. Science, Technology, and Empire. 4-5 Units.**

How modern Europe came to be connected to the wider world through repeated cycles of expansion, circulation, and exchange from the mid-nineteenth century to the present. Using weekly themes and in-depth discussions of watershed moments, the roles played by colonialism, migration, commerce, warfare, telecommunications, and popular culture in redefining the place of Europe in a changing global landscape will be explored.

**HISTORY 335. The Renaissance of War: Politics, Technology, and War in Late Medieval and Renaissance Italy. 4-5 Units.**

The dynamic societies of the Italian Peninsula of the 14th to 16th centuries "prosperous, astonishingly creative, politically fractious, and endemically violent" produced sweeping, deeply consequential changes. Among these were new developments in the theory and practice of war, politics, and diplomacy that laid the foundations for the modern state system and European military power. The class covers: new diplomatic practice; the Military Revolution; state-building; war finance; court culture; and the intersection of these with the shimmering brilliance of Renaissance culture.

**HISTORY 335C. Readings in the Supernatural. 4-5 Units.**

Class will read and discuss a selection of monographs, scholarly essays, and primary sources on the rich supernatural world of early modern Europe. We will discuss how fairies, werewolves, nightmares, and trolls all became witches, how the binary of angels and demons figured in European thought, and how the marginalized imaginary was reconstituted in theatre and fiction.

Same as: HISTORY 235C

**HISTORY 336. Modern France. 4-5 Units.**

(Daughton).

**HISTORY 336E. Humanities+Design: Visualizing the Grand Tour. 4-5 Units.**

Study of the eighteenth-century Grand Tour of Italy through visualization tools of the digital age. Critical readings in both visual epistemology and current Grand Tour studies; interrogating the relationship between quantitative and qualitative approaches in digital humanities; what new insights in eighteenth-century British travel to Italy does data visualization offer us? Students will transform traditional texts and documents into digital datasets, developing individual data analysis projects using text mining, data capture and visualization techniques. Same as: CLASSICS 396, DLCL 396

**HISTORY 336F. The End of the World As They Knew It: Culture, Cafés, and Crisis in Europe, 1880-1918. 4-5 Units.**

The years stretching from roughly 1880 to end of the First World War were marked by profound social upheaval and an intense burst of creativity. This seminar will focus on the major cultural movements and big ideas of the period. Topics covered include the rise of mass culture and cinema, the origins of psychoanalysis, anti-Semitism and Zionism, new anxieties about sexuality and the *‘New Woman,’* anarchism, decadence, degeneration, and Dada *‘with cameos from Bernhardt, Freud, Klimt, Nietzsche, Toulouse-Lautrec, Wilde, Zola, and other luminaries of the age.’*

Same as: HISTORY 236F

**HISTORY 337. The Holocaust. 4-5 Units.**

The emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.

Same as: HISTORY 137, JEWISHST 183, JEWISHST 383

**HISTORY 337C. Street History: Learning the Past in School and Out. 3-5 Units.**

Interdisciplinary. Since Herodotus, history and memory have competed to shape minds: history cultivates doubt and demands interpretation; memory seeks certainty and detests that which thwarts its aims. History and memory collide in modern society, often violently. How do young people become historical amidst these forces; how do school, family, nation, and mass media contribute to the process?

Same as: EDUC 356

**HISTORY 337D. The French Revolution and the Birth of Modern Politics. 4-5 Units.**

(Students who have taken HISTORY 134 should not enroll in this course.) This course will focus on the birth of modern politics in the French Revolution. The goal will be to understand the structural contradictions of the French monarchy in the pre-revolutionary period, the reasons for the monarchy's failure to resolve those contradictions, and the political dynamic unleashed as they were solved by the revolutionary action of 1789. Sovereignty, democracy, rights, representation, and terror will be principal themes. Lectures will be combined with close reading and discussions of political and philosophical writings of the period.

Same as: HISTORY 237D

**HISTORY 337F. 20th Century British History through the Hoover Archives. 4-5 Units.**

From the rich resources of the Hoover Institution, the students in this course will select a particular archive (war posters, politician, spy, literary figure, diplomat, etc. etc.) to investigate, to write about, discuss in class, and, it is hoped, present in an exhibition at the Hoover, learning museum skills along the way as well as the history of Britain in the 20th century.

Same as: HISTORY 237F

**HISTORY 338A. Graduate Colloquium in Modern British History, Part I. 4-5 Units.**

Influential approaches to problems in British, European, and imperial history. The 19th-century British experience and its relationship to Europe and empire. National identity, the industrial revolution, class formation, gender, liberalism, and state building. Goal is to prepare specialists and non-specialists for oral exams.

**HISTORY 338B. MODERN BRITISH HISTORY PART II. 4-5 Units.**

Themes include empire and racism, the crisis of liberalism, the rise of the welfare state, national identity, the experience of total war, the politics of decline, and modernity and British culture.

**HISTORY 338D. Germany and the World Wars, 1870-1990. 4-5 Units.**

(Students who have taken History 38A/138A should not enroll in this course.) This course examines Germany's tumultuous history from the Second Empire through the end of the Cold War. During this time, Germany ushered in five regimes and two world wars, seesawing between material ruin and economic prosperity on the frontline of Europe's military and ideological rifts. Beginning with Bismarck's wars of unification, the class spans World War One, the Weimar Republic, the rise of Nazism, World War Two, the Holocaust, the division of communist East and capitalist West Germany, and the fall of the Iron Curtain.

Same as: HISTORY 238D, JEWISHST 288D, JEWISHST 388D

**HISTORY 338G. Ethnography of the Late Middle Ages: Social history and popular culture in the age of the plague. 4-5 Units.**

During the late Middle Ages, as Europe was recovering from the devastation of the Black Death, political reorganization contributed to a burst of archival documentation that allows historians richly detailed glimpses of societies in transition. We will be reading selected scholarly articles and monographs covering such topics as persecution, prechristian cultural remnants, folk theologies, festival cultures, peasant revolts, heresy, and the advent of the diabolic witch.

Same as: HISTORY 238G

**HISTORY 338K. Vox Populi: Populism and its Origins. 1-5 Unit.**

This seminar traces the proliferation of populism in contemporary Europe and the United States, with reference to the historical background of anti-institutional and anti-representational ideas of popular sovereignty. Subjects include: the notion of 'vox populi' from the early middle ages to the early modern period; ideas of radical democracy in the enlightenment era; 19th century notions of identifying 'the people' (nation, 'Volk', class, race, mass); the populist, reform and volkish movements around 1900; the rise of fascist and totalitarian ideas of popular sovereignty; the struggle over the meaning of democracy in the Cold War era; semantic transformations of 'the popular' through the audio-visual media; and the rise of today's populism since 1989. The material to be analyzed will consist of 1. Primary sources (programs, manifests, pamphlets, speeches and propaganda material including visual sources); 2. Contemporary theoretical texts (political philosophy, history, sociology, psychology, and popular science); and 3. Today's theories and practices of populism. nNote: The course will be taught by Visiting Professor Christian Geulen, University of Koblenz, Germany.

Same as: GERMAN 248, GERMAN 348, HISTORY 238K

**HISTORY 339F. Empire and Information. 4-5 Units.**

How do states see? How do they know what they know about their subjects, citizens, economies, and geographies? How does that knowledge shape society, politics, identity, freedom, and modernity? Focus is on the British imperial state activities in S. Asia and Britain: surveillance technologies and information-gathering systems, including mapping, statistics, cultural schemata, and intelligence systems, to render geographies and social bodies legible, visible, and governable.

Same as: HISTORY 239F

**HISTORY 339H. Modern European History in a Global Age. 4-5 Units.**

How scholars can write the history of modern Europe in a way that integrates global and transnational perspectives. Discussed the methodological challenges and merits of various approaches and reviews relevant theoretical and interdisciplinary models for how this can best be done. Topics include globalization, migration, internationalism, colonialism, post-colonialism, modern warfare, and the media.

**HISTORY 340. The History of Evolution. 4-5 Units.**

This course examines the history of evolutionary biology from its emergence around the middle of the eighteenth century. We will consider the continual engagement of evolutionary theories of life with a larger, transforming context: philosophical, political, social, economic, institutional, aesthetic, artistic, literary. Our goal will be to achieve a historical rich and nuanced understanding of how evolutionary thinking about life has developed to its current form.

Same as: BIO 340, HISTORY 240

**HISTORY 340G. Science and Empire, 1500-1900. 4-5 Units.**

During the scientific revolution of the seventeenth and eighteenth centuries, European states carved out vast colonial empires in Asia, Africa, and the Americas. How did empires make science and how did science make empires? In this course, we will explore the history of the global exchange of people, objects, and knowledge. We will consider how early modern science, medicine, and technology helped create global empires, while emerging across the division of the world into "the West and the rest."

Same as: HISTORY 240G

**HISTORY 341D. Einstein and the Structure of Reality. 4-5 Units.**

Albert Einstein once remarked "One cannot help but be in awe when one contemplates the mysteries of the marvelous structure of reality. It is enough if one tries to contemplate only a little of this mystery each day." In this course we will contemplate the history, science, and philosophy involved in three pathbreaking and contentious episodes in Einstein's lifelong quest to unveil the structure of reality: the special theory of relativity, the general theory of relativity, and the quantum theory.

Same as: HISTORY 241D

**HISTORY 342. Darwin in the History of Life. 4-5 Units.**

Origins and impact of evolutionary theory from the nineteenth century to the present. Early theories of fossils, the discovery of deep time and uniformitarian geology, debates over evolution vs. extinction, the origin of life, and human origins; the rise of anthropology and racial theory; the changing challenge of creationism, the abuse of evolution in eugenics and Nazi racial hygiene; and new discoveries in the realm of extreme life, evo-devo, neocatastrophism, and the new technological frontier of biomimicry. Attendance at the lectures of HISTORY 142 is required.

**HISTORY 342F. Medicine in an Age of Empires. 4-5 Units.**

This course connects changing ways of understanding the body and disease in the seventeenth and eighteenth centuries to the business of empire. How did new ideas and methods of selling medicine relate to the rise of state-sponsored violence, resource extraction, global trade, and enslaved labor? Following black ritual practitioners in the Caribbean, apothecaries in England, and scientists abroad reveals the diversity of medical traditions and knowledge production in the early modern period that formed the basis of modern medicine today.

Same as: HISTORY 242F

**HISTORY 343G. Tobacco and Health in World History. 4-5 Units.**

Cigarettes are the world's leading cause of death—but how did we come into this world, where 6 trillion cigarettes are smoked every year? Here we explore the political, cultural, and technological origins of the cigarette and cigarette epidemic, using the tobacco industry's 80 million pages of secret documents. Topics include the history of cigarette advertising and cigarette design, the role of the tobacco industry in fomenting climate change denial, and questions raised by the testimony of experts in court.

Same as: HISTORY 243G

**HISTORY 344. Narrative Knowing. 1-2 Unit.**

Philosophers and historians have been debating the status of narrative explanation for well over 50 years. Until quite recently, a supposed dichotomy between natural science and history has shaped the discussion. Beginning from the origins, history, and limitations of the dichotomy, this seminar will explore how claims for narrative understanding and explanation have come to occupy an increasingly important role in the natural sciences as well as the social sciences. Some classic contributors are Hempel, Danto, Mink, Kuhn, White, Ricouer, Geertz, and Ginzburg. Current authors include Roth, Rheinberger, Kitcher, Beatty, Morgan, and (yes) Wise.

Same as: PHIL 344

**HISTORY 344F. Beyond Pink and Blue: Gender in Tech. 1 Unit.**

This d-school seminar prototypes concepts and methods for "inclusive" design. From the moment we arrive on the planet, gender shapes our perception of the world. Examples of products (including objects, services, and systems) gone awry will serve as prompts for design activities, challenges, and discussions on gender issues to illustrate the different needs of women, men, and gender-fluid people. Class sessions mix use case explorations with design methodology, design thinking abilities, and guest speakers from technology, design, and academia. Students will be asked to work in interdisciplinary teams on several design challenges, culminating in the development of a toolkit for inclusive design. Methods will interact in crucial ways to create "intersectional thinking" (i.e., to consider how gender, ethnicity, sexuality, socio-economic status, etc. work together to require new solutions in design). Topics include: algorithms, media, seat belts for pregnant women, robotics, assistive technologies, tech for developing worlds, video games, urban/rural design, software development, and many more. Admission by application only. Visit [d.school.stanford.edu/classes](http://d.school.stanford.edu/classes) for more information.

Same as: FEMGEN 344F, HISTORY 244F

**HISTORY 345A. Africa in the Era of the Slave Trade. 4-5 Units.**

The slave trade, including the trans-Saharan, Indian Ocean, and trans-Atlantic trades, constituted nearly a millennium of interaction with the wider world and set in motion transformations in African societies, politics, and cultures. Topics include the debates about slavery in Africa, the impact of the slave trade on African societies, state formation, economic change, religious change, and household change in the period before the scramble for Africa in the late 19th century.

**HISTORY 346. The Dynamics of Change in Africa. 4-5 Units.**

Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.

Same as: AFRICAST 301A, HISTORY 246, POLISCI 246P, POLISCI 346P

**HISTORY 348D. Law and Colonialism in Africa. 4-5 Units.**

Law in colonial Africa provides an opportunity to examine the meanings of social, cultural, and economic change in the anthropological, legal, and historical approaches. Court cases as a new frontier for the social history of Africa. Topics: meanings of conflicts over marriage, divorce, inheritance, property, and authority.

Same as: HISTORY 245G

**HISTORY 349. Bodies, Technologies, and Natures in Africa. 4-5 Units.**

This interdisciplinary course explores how modern African histories, bodies, and natures have been entangled with technological activities. Viewing Africans as experts and innovators, we consider how technologies have mediated, represented, or performed power in African societies. Topics include infrastructure, extraction, medicine, weapons, communications, sanitation, and more. Themes woven through the course include citizenship, mobility, labor, bricolage, in/formal economies, and technopolitical geographies, among others. Readings draw from history, anthropology, geography, and social/cultural theory. Same as: AFRICAST 249, ANTHRO 348B

**HISTORY 351A. Core in American History, Part I. 4-5 Units.**

May be repeated for credit.

**HISTORY 351B. Core in American History, Part II. 4-5 Units.****HISTORY 351C. Core in American History, Part III. 4-5 Units.****HISTORY 351D. Core in American History, Part IV. 4-5 Units.**

May be repeated once for credit.

**HISTORY 351E. Core in American History, Part V. 4-5 Units.**

Required of all first-year United States History Ph.D. students. Topics in Twentieth Century United States History.

**HISTORY 351F. Core in American History, Part VI. 4-5 Units.**

Required of all first-year Ph.D. students in U.S. History.

**HISTORY 351J. The End of American Slavery, 1776-1865. 4-5 Units.**

How did the institution of American slavery come to an end? The story is more complex than most people know. This course examines the rival forces that fostered slavery's simultaneous contraction in the North and expansion in the South between 1776 and 1861. It also illuminates, in detail, the final tortuous path to abolition during the Civil War. Throughout, the course introduces a diverse collection of historical figures, including seemingly paradoxical ones, such as slaveholding southerners who professed opposition to slavery and non-slaveholding northerners who acted in ways that preserved it. Historical attitudes toward race are a central integrative theme. Same as: AFRICAAM 251J, AMSTUD 251J, HISTORY 251J

**HISTORY 352B. History of American Law. 5 Units.**

(Formerly Law 318. Now Law 3504.) This course examines the growth and development of American legal institutions with particular attention to crime and punishment, slavery and race relations, the role of law in developing the economy, and the place of lawyers in American society, from colonial times to the present. Special Instructions: Any student may write a paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Final exam or paper. Automatic grading penalty waived for writers. Cross-listed with History (HISTORY 152 Consent of instructor required) & (HISTORY 352B). Same as: HISTORY 152

**HISTORY 353D. Approaches to American Legal History. 4-5 Units.**

(Same as LAW 651.) Legal history may once have been primarily devoted to exploring legal doctrines and key judicial opinions, and thus to be of interest mainly to legal scholars and lawyers. Now, the best writing in legal history resembles historical writing more generally, and the study of legal ideas and practices is increasingly integrated with social, intellectual, cultural, and political history. Examines recent writings in American legal history, ranging broadly across time and space to ask how the field reflects developments in historical writing more generally, and how the use of legal materials affects our understanding of major aspects of American history.

**HISTORY 354D. Religion and War in America. 4 Units.**

Scholars have devoted much attention to wars in American history, but have not agreed as to whether religion was a major cause or simply a cover for political, economic, and other motives. We will compare interpretations that leave religion out, with those that take it into account. We will also look at the impact of war on the religious lives of ordinary Americans. We will examine both secondary as well as primary sources, beginning with King Philip's War in the 17th century, and ending with the "War on Terror" in the present day.

Same as: AMSTUD 105R, CSRE 105, HISTORY 254D, RELIGST 105

**HISTORY 354F. Law and Empire in U.S. History. 2-3 Units.**

(Same as LAW 3506. Instructor consent required for History 354F.) This course will examine the interrelationship between legal norms and empire in the history of the United States. Topics in this part will include the Constitution as an imperial document; law and the expansion of the United States in western North America, Puerto Rico, and Hawaii; the Insular Cases; and current debates over extraterritoriality and the War on Terror. Substantial readings will consist of scholarly articles, historical cases, and primary sources, and will be provided online. Requirements for the course include regular class participation and, at the students' election, either response papers or a historiographical essay. Students may also elect to complete a research paper, in which case they will receive 3 units and "R" credit.

**HISTORY 355D. Racial Identity in the American Imagination. 4-5 Units.**

From Sally Hemings to Barack Obama, this course explores the ways that racial identity has been experienced, represented, and contested throughout American history. Engaging historical, legal, and literary texts and films, this course examines major historical transformations that have shaped our understanding of racial identity. This course also draws on other imaginative modes including autobiography, memoir, photography, and music to consider the ways that racial identity has been represented in American society. Most broadly, this course interrogates the problem of American identity and examines the interplay between racial identity and American identity.

Same as: AFRICAAM 255, AMSTUD 255D, CSRE 255D, HISTORY 255D

**HISTORY 356. 350 Years of America-China Relations. 4-5 Units.**

The history of turbulent relations, military conflict, and cultural clashes between the U.S. and China, and the implications for the domestic lives of these increasingly interconnected countries. Diplomatic, political, social, cultural, and military themes from early contact to the recent past.

Same as: EASTASN 256, HISTORY 256

**HISTORY 356G. Constructing Race and Religion in America. 4-5 Units.**

This seminar focuses on the interrelationships between social constructions of race, and social interpretations of religion in America. How have assumptions about race shaped religious worldviews? How have religious beliefs shaped racial attitudes? How have ideas about religion and race contributed to notions of what it means to be "American"? We will look at primary and secondary sources, and at the historical development of ideas and practices over time.

Same as: AFRICAAM 236, AMSTUD 246, CSRE 246, HISTORY 256G, RELIGST 246, RELIGST 346

**HISTORY 357. Was the American Revolution a Social Revolution?. 4-5 Units.**

What kind of a revolution was the American Revolution? The revolution gave colonial Americans political independence from Britain to found the United States. But did the revolution also transform American society in its wake? This course explores how historians and historical participants alike have answered this question paying attention to historical changes (or lack thereof) that took place in American society between c. 1750-1820 as well as grappling with what conceptually constitutes a "social" revolution in the first place.

Same as: HISTORY 257

**HISTORY 359E. American Interventions, 1898-Present. 5 Units.**

This class seeks to examine the modern American experience with limited wars, beginning with distant and yet pertinent cases, and culminating in the war in Iraq. Although this class will examine war as a consequence of foreign policy, it will not focus primarily on presidential decision making. Rather, it will place wartime policy in a broader frame, considering it alongside popular and media perceptions of the war, the efforts of antiwar movements, civil-military relations, civil reconstruction efforts, and conditions on the battlefield. We will also examine, when possible, the postwar experience.

Same as: HISTORY 259E, INTNLREL 168A

**HISTORY 362G. The Pivotal Decade in U.S. History: 1960's or 1970's?. 4-5 Units.**

Which had more lasting impact, the civil war of the 1960s or the conservative revolt of the 1970s? Should the 1970s supersede the 1960s as a pivotal moment when something happened of considerable importance to historians? Considers this debate of the decades comparatively and thematically, addressing topics including civil rights, foreign policy, electoral politics, popular culture, law, economics, labor, and social movement organizing.

**HISTORY 365. Writing Asian American History. 5 Units.**

Recent scholarship in Asian American history, with attention to methodologies and sources. Topics: racial ideologies, gender, transnationalism, culture, and Asian American art history. Primary research paper.

Same as: AMSTUD 265, ASNAMST 265, HISTORY 265

**HISTORY 365G. African-American Independent Film- On Both Sides of the Camera. 4-5 Units.**

From D. W. Griffith's controversial "Birth of A Nation" (1915) to Nate Parker's also controversial "Birth of a Nation" (2016), Black Americans have played roles in Hollywood movies while also seeking to define how they are depicted in these movies. This course will introduce students to this history by featuring works of pioneering black filmmakers who challenged Hollywood racial stereotypes and created alternative images of the African-American experience.

Same as: AFRICAAM 265G, HISTORY 265G

**HISTORY 366B. Immigration Debates in America, Past and Present. 3-5 Units.**

Examines the ways in which the immigration of people from around the world and migration within the United States shaped American nation-building and ideas about national identity in the twentieth century. Focuses on how conflicting ideas about race, gender, ethnicity, and citizenship with respect to particular groups led to policies both of exclusion and integration. Part One begins with the ways in which the American views of race and citizenship in the colonial period through the post-Reconstruction Era led to the passage of the Chinese Exclusion Act in 1882 and subsequently to broader exclusions of immigrants from other parts of Asia, Southern and Eastern Europe, and Mexico. Explores how World War II and the Cold War challenged racial ideologies and led to policies of increasing liberalization culminating in the passage of the 1965 Immigration Act, which eliminated quotas based on national origins and opened the door for new waves of immigrants, especially from Asia and Latin America. Part Two considers new immigration patterns after 1965, including those of refugees, and investigates the contemporary debate over immigration and immigration policy in the post 9/11 era as well as inequalities within the system and the impact of foreign policy on exclusions and inclusions.

Same as: CSRE 166B, HISTORY 166B

**HISTORY 368C. Poverty in America. 4-5 Units.**

During the twentieth century, Americans launched numerous bold efforts to reduce poverty in the United States. Federal welfare policy, community-based programs, academic research, philanthropic charity, and grassroots activism committed time and resources to the cause, but poverty-- and inequality-- have persisted. Why? This seminar considers the origins, implementation, and consequences of these remedies, noting in particular how race, gender, citizenship, family composition, and geography have shaped the lives of those in poverty and the public and private responses to it.

Same as: AMSTUD 268C, CSRE 268C, HISTORY 268C

**HISTORY 36N. Gay Autobiography. 4 Units.**

Preference to freshmen. Gender, identity, and solidarity as represented in nine autobiographies: Isherwood, Ackerley, Duberman, Monette, Louganis, Barbin, Cammermeyer, Gingrich, and Lorde. To what degree do these writers view sexual orientation as a defining feature of their selves? Is there a difference between the way men and women view identity? What politics follow from these writers' experiences?.

Same as: FEMGEN 36N

**HISTORY 371. Graduate Colloquium: Explorations in Latin American History and Historiography. 4-5 Units.**

Introduction to modern Latin American history and historiography, including how to read and use primary sources for independent research.

Same as: ILAC 371

**HISTORY 372A. Mexico: From Colony to Nation or the History of an Impossible Republic?. 5 Units.**

Was a republican form of government even possible in 19th-century Mexico after 300 years of colonial rule under the Spanish monarchy? Was the Spanish colonial heritage a positive or a negative legacy according to 19th-century Mexican politicians? How were they to forge a new national identity with so many ethnically and culturally diverse peoples throughout the territory? Just how "traditional" was, in fact, the colonial period? These are some of the questions we will explore in this course. Journeying from the late colonial period (c.1700) to the 35-year dictatorship known as El Porfiriato (1876-1911) we will examine how Mexico's diverse indigenous peoples adapted to both colonial and postcolonial rule, how they actively participated in politics and political discourse to preserve their cultures, customs and colonial privileges, and how after independence in 1821, a new republican political culture was forged. Mexico was not an impossible republic, but rather another kind of republic.

**HISTORY 373C. Caribbean Migration to the United States. 4-5 Units.**

The course will explore the history of Caribbean migration to the United States.

Same as: AFRICAAM 273C, CSRE 273, HISTORY 273C

**HISTORY 373E. The Emergence of Nations in Latin America: Independence Through 1880. 4-5 Units.**

This course provides an introduction to the main themes of nineteenth-century Latin American history, including independence from Spain, the emergence of various nation-states, and the development of a new social, political, and economic order in the region.

Same as: HISTORY 273E

**HISTORY 375B. Borders and Borderlands in Modern Mexico. 4-5 Units.**

Surveys the history of Mexico's borders and borderlands from the nineteenth century to the present. Examines theoretical conceptualizations of the borderlands as well as the historical development of identities and geographic borders within and around Mexico. Topics include the legacies of war, map making, the construction of lo Mexicano, the politics of culture, and migrations to, from, and through Mexico. Analyzes the prevailing trends in Mexicanist historiography.

**HISTORY 375C. History of Modern Mexico. 4-5 Units.**

Surveys the history of governance, resistance, and identity formation in Mexico from the nineteenth century to the present. Explores Mexico's historical struggles to achieve political stability, economic prosperity, and social justice and examines how regional, class, ethnic, and gender differences have figured prominently in the shaping of Mexican affairs. Topics include Mexico's wars and their legacies, the power of the state, violence and protest, debates over the meaning of "Mexicanness," youth culture, and the politics of indigenismo.

Same as: AMSTUD 275B, CHILATST 275B, CSRE 275B, HISTORY 275B

**HISTORY 376K. The Nature State: Latin American Conservation in Global Perspective. 4-5 Units.**

This colloquium studies the history of conservation as a way to understand (territorial) state formation. It examines Latin America from a global perspective by comparing case studies from around the world. It examines how various political arrangements allowed for nature protection, the creation and functioning of institutions and bureaucracies in charge of protected areas, what these developments tell us about citizenship, the role of science in state formation, and the implications of different environments in the building of national territories.

Same as: HISTORY 276K

**HISTORY 378A. The Logic of Authoritarian Government, Ancient and Modern. 5 Units.**

If authoritarianism is less economically efficient than democracy, and if authoritarianism is a less stable form of political organization than democracy, then why are there more authoritarian governments than democracies? To address this paradox, focus is on theoretical and empirical literature on authoritarian governments, and related literatures on the microeconomic analysis of property rights and credible commitments.

**HISTORY 378D. Race, Ethnicity, and the Environment in Latin America. 4-5 Units.**

In a long sweep from the late eighteenth century to today, this seminar explores how race, ethnicity and the environment intersect in Latin American history, with emphasis on Colombia. It will inspect the meaning of the concepts of race and ethnicity and examine how the histories of black and indigenous peoples are better understood by taking the environment—both materially and symbolically—into account. We will read a variety of scholarly works, as well as primary sources.

Same as: HISTORY 278D

**HISTORY 379. Latin American Development: Economy and Society, 1800-2014. 4-5 Units.**

The newly independent nations of Latin America began the 19th century with economies roughly equal to the U.S. and Canada. What explains the economic gap that developed since 1800? Why are some Latin American nations rich and others poor and how have societies changed over time? Marxist, dependency, neoclassical, and institutionalist interpretive frameworks are explored. The effects of globalization on Latin American economic growth, autonomy, and potential for social justice are examined and debated.

Same as: HISTORY 279

**HISTORY 37S. Love and Lust in the French Empire, 1830-1962. 5 Units.**

Can we write the history of private life? Throughout this course, we will try out different historical approaches to the history of intimate matters in the French Empire. Beyond a more complete understanding of what colonialism was like, studying the intimate draws attention to the societal norms and anxieties of the nineteenth and twentieth centuries. Patriarchy, racism, and classism the power structures inherent in colonialism produce fruitful sites for prying into intimate matters. To that end, we will probe a wide variety of primary sources, including novels, films, paintings, letters, diaries, travel accounts produced by male and female Europeans, Africans, Arabs, and East Asians. Topics covered through these sources include, colonial masculinity and femininity; divorce; homosexuality; prostitution; and sexual violence. We will transcend racial and class divides, and cover a diverse geography including, France, North and West Africa, and Vietnam.

Same as: FEMGEN 37S, FRENCH 157

**HISTORY 381. Economic and Social History of the Modern Middle East. 4-5 Units.**

The integration of the Middle East into the world capitalist market on a subordinate basis and the impact on economic development, class formation, and politics. Alternative theoretical perspectives on the rise and expansion of the international capitalist market are combined with possible case studies of Egypt, Iraq, and Palestine.

**HISTORY 381B. Modern Egypt. 4-5 Units.**

From the mid-nineteenth century to the present. Topics: European imperialism, the political economy of cotton, rise of nationalism, gender and the nation, minorities, the coup of 1952, positive neutralism and the Cold War, and the neo-liberal reconstruction of Egypt.

Same as: HISTORY 281B

**HISTORY 382. The United States and the Middle East since 1945. 4-5 Units.**

Since the end of WW II, U.S. interests in the Middle East have traditionally been defined as access to oil at a reasonable price, trade and markets, containing the influence of the Soviet Union, and the security of Israel. Is this the full range of U.S. interests? How has the pursuit of these interests changed over time? What forces have shaped U.S. policy? What is the impact of U.S. policy on the region itself?

Same as: HISTORY 282

**HISTORY 382F. History of Modern Turkey. 4-5 Units.**

Social, political and cultural history of Modern Turkey from the last decades of the Ottoman Empire in the late 19th century until Today. Themes include transformation from a multi-national empire to a national republic; Islam, secularism and radical modernism; military, bureaucracy and democratic experience; economic development, underdevelopment and class; Istanbul, Ankara and provincial Turkey; socialism, conservatism(s), and Kurdish challenge; Turkey in Europe, the Middle East and Central Asia; gender, sexuality and family; popular culture, soccer, and film industry; Post-Modernism, Neo-Ottomanism, and the New-Turkey; The class also include reading works of Turkish literature and watching movies by Turkish directors.

**HISTORY 383. Middle East Oil and Global Economy. 4-5 Units.**

The class studies Middle East oil in the global economy using the method of political economy. Topics addressed include: origins of the Middle East oil industry; the Seven Sisters international oil cartel; Aramco and the U.S.-Saudi alliance; the post-World War II petroleum order; petroleum, the crisis of 1971-82, and the rise of a new regime of capital accumulation regulated neo-liberal economic orthodoxy and "Washington Consensus" policies- commonly referred to as "globalization" since the 1990s.

Same as: HISTORY 283

**HISTORY 383G. Place, Nature, and Life: Production of Space in European and Muslim History. 4-5 Units.**

How did people experience, produce and imagine their physical and spiritual environment, their past and future, their immediate places and far geographies, life and afterlife in Europe and the Muslim Eurasia throughout history? How did political, legal and economic organizations configure and claim spaces in different time and geographies in Europe and the Muslim world? In addition to various case studies, primary texts and visual depictions, the theoretical framework of discussions will be based on texts by Lefebvre, Foucault, Soja, de Certeau, Yi-Fu Tuan, J.B. Jackson, Casey, Harvey.  
Same as: HISTORY 283G

**HISTORY 384F. Empires, Markets and Networks: Early Modern Islamic World and Beyond, 1500-1800. 4-5 Units.**

Focuses on political regimes, economic interactions and sociocultural formations in the early modern Balkans and Middle East to Central and South Asia. Topics include complex political systems of the Ottoman, Safavid and Mughal empires; experiences of various Muslim, Christian, Jewish and Hindu, as well as urban, rural and nomadic communities; consolidation of transregional commerce and cultural exchange; incorporation of the Islamic world in the global economy; transimperial networks of the Muslim and Non-Muslim merchants, scholars and sufis.  
Same as: HISTORY 284F

**HISTORY 385A. Core Colloquium in Jewish History, 17th-19th Centuries. 4-5 Units.**

Same as: JEWISHST 385A

**HISTORY 385B. Graduate Colloquium in Modern Jewish History. 4-5 Units.**

Instructor consent required.  
Same as: JEWISHST 385B

**HISTORY 385C. Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility. 4-5 Units.**

(Same as HISTORY 85B.) This course explores the full expanse of Jewish life today and in the recent past. The inner workings of religious faith, the content of Jewish identity shorn of belief, the interplay between Jewish powerlessness and influence, the myth and reality of Jewish genius, the continued pertinence of antisemitism, the rhythms of Jewish economic life – all these will be examined in weekly lectures, classroom discussion, and with the use of a widely diverse range of readings, films, and other material. Explored in depth will be the ideas and practices of Zionism, the content of contemporary secularism and religious Orthodoxy, the impact Holocaust, the continued crisis facing Israel and the Palestinians. Who is to be considered Jewish, in any event, especially since so many of the best known (Spinoza, Freud, Marx) have had little if anything to do with Jewish life with their relationships to it indifferent, even hostile?.

Same as: CSRE 185B, HISTORY 185B, JEWISHST 185B, REES 185B

**HISTORY 385K. History of Modern Antisemitism: Nineteenth and Twentieth Centuries. 4-5 Units.**

The articulations of anti-Jewish hatred from the advent of Jewish emancipation in Europe. The legacy of premodern Christian demonization and its modern protean transformations as they penetrated and annexed new currents of ideology, notions of identity (social, national, racial), taste, and aesthetics. A history of ideas, representations, and stereotypes, and their relation to historical experience, action, and mobilization. Europe is the focus; case studies also include the Middle East and elsewhere.

**HISTORY 386. Jews Among Muslims in Modern Times. 4-5 Units.**

The history of Jewish communities in the lands of Islam and their relations with the surrounding Muslim populations from the time of Muhammad to the 20th century. Topics: the place of Jews in Muslim societies, Jewish communal life, variation in the experience of communities in different Muslim lands, the impact of the West in the Modern period, the rise of nationalisms, and the end of Jewish life in Muslim countries.

Same as: HISTORY 286, JEWISHST 286, JEWISHST 386

**HISTORY 387C. Zionism and Its Critics. 4-5 Units.**

Zionism from its genesis in the 1880s up until the establishment of the state of Israel in May, 1948, exploring the historical, ideological and political dimensions of Zionism. Topics include: the emergence of Zionist ideology in connection to and as a response to challenges of modernity; emancipation; Haskalah (Jewish enlightenment); other national and ideological movements of the period; the ideological crystallization of the movement; and the immigration waves to Palestine.

**HISTORY 387K. Gentlemen and Jews: History of the Jews of England. 4-5 Units.**

Focuses on key chapters in the cultural and political histories of Britain and its Jews, between 1650 and 1950 and examines the advantages, as well as possible difficulties, that emerge when connecting Anglo-Jewish history to mainstream British history. What is unique about Jewish emancipation in England, and what are its connections to the formation of British national identity? Is there unique path in which Jewish Enlightenment developed in England? What was the contribution of Jews to British Imperialism? Is there a cultural affinity between English philosemitism and liberalism?.

**HISTORY 39. Modern Britain and the British Empire. 3 Units.**

(Same as HISTORY 139. History majors and others taking 5 units, register in 139.) From American Independence to the latest war in Iraq. Topics include: the rise of the modern British state and economy; imperial expansion and contraction; the formation of class, gender, and national identities; mass culture and politics; the world wars; and contemporary racial politics. Focus is on questions of decline, the fortunes and contradictions of British liberalism in an era of imperialism, and the weight of the past in contemporary Britain.

**HISTORY 390. North Korea in Historical Perspective. 4-5 Units.**

This colloquium will approach North Korea from a longer historical perspective and also discuss the country's current crisis and its future. Themes will include the northern region in colonial Korea, Kim Il Sung and Manchurian guerrillas, the USSR and North Korean Revolution, the reconstruction after the Korean War, Juche ideology and the political system, the everyday life of North Korea people, the Cold War and North Korean diplomacy, culture and mass performance, the great famine and economy in transition, the military and nuclear development, and refugees and the succession of leadership.

Same as: HISTORY 290

**HISTORY 390A. Major Topics in Modern Chinese History: Qing/Republican Transition. 4-5 Units.**

Continuities and discontinuities in society, economy, politics, culture, and thought during the transition from the Qing dynasty to the republic. May be repeated for credit.

**HISTORY 390E. Movies and Empire in East Asia. 4-5 Units.**

Cinema was invented in the 1890s and simultaneously introduced to East Asia. This colloquium explores how this new medium changed the cultural and social landscape of East Asia and how the visual power of films also affected the culture politics of empires in the region. The themes include cinema and urban spaces, cultural imperialism, film images and gender discourse, colonial modernity, Americanism and Asianism, the visual and the textual, wartime propaganda, and Hollywood movies and cold war empires.

Same as: HISTORY 290E

**HISTORY 391. East Asia in the Early Buddhist Age. 4-5 Units.**

Evolution of cities in imperial China through early imperial, medieval, and early modern periods. Topics include physical structure, social order, cultural forms, economic roles, relations to rural hinterlands, and the contrast between imperial capitals and other cities. Comparative examination of cases from European history.

**HISTORY 391B. The City in Imperial China. 4-5 Units.**

The evolution of cities in the early imperial, medieval, and early modern periods. Topics include physical structure, social order, cultural forms, economic roles, relations to rural hinterlands, and the contrast between imperial capitals and other cities. Comparative cases from European history. Readings include primary and secondary sources, and visual materials.

**HISTORY 391C. Early Imperial China. 4-5 Units.**

The first millennium of imperial China, what endured over the centuries, and the major changes that took place in the political, social, and intellectual realms. Topics include the evolving geographic and environmental background, cities, the countryside, kinship, relations with the outer world, religion, philosophy, and literature. Also examines the nature of empire as a distinctive political form.

**HISTORY 391J. East Asian Environmental History. 4-5 Units.**

Traversing 2,500 years of history, this colloquium begins with conceptions of nature, agricultural time, and agriculture in ancient East Asia, proceeds to look closely at the environmental history of China, Japan, Korea, and Vietnam, and then concludes with environmental issues in East Asia from a contemporary perspective.

Same as: HISTORY 291J

**HISTORY 391K. Korean History and Culture before 1900. 3-5 Units.**

This course serves as an introduction to Korean culture, society, and history before the modern period. It begins with a discussion of early Korea and controversies over Korean origins; the bulk of the course will be devoted to the Chosŏn period (1392-1910), that from the end of medieval Korea to the modern period. Topics to be covered include: Korean national and ethnic origins, the role of religious and intellectual traditions such as Buddhism and Confucianism, popular and indigenous religious practices, the traditional Korean family and social order, state and society during the Chosŏn dynasty, vernacular prose literature, Korean's relations with its neighbors in East Asia, and changing conceptions of Korean identity. The course will be conducted through the reading and discussion of primary texts in English translation alongside scholarly research. As such, it will emphasize the interpretation of historical sources, which include personal letters, memoirs, and diaries, traditional histories, diplomatic and political documents, along with religious texts and works of art. Scholarly work will help contextualize these materials, while the class discussions will introduce students to existing scholarly debates about the Korean past. Students will be asked also to examine the premodern past with an eye to contemporary reception. The final project for the class is a film study, where a modern Korean film portraying premodern Korea will be analyzed as a case study of how the past works in public historical memory in contemporary Korea, both North and South. An open-ended research paper is also possible, pending instructor approval.

Same as: HISTORY 291K, KOREA 158, KOREA 258

**HISTORY 392D. Japan in Asia, Asia in Japan. 4-5 Units.**

How Japan and Asia mutually shaped each other in the late 19th and 20th centuries. Focus is on Japanese imperialism in Asia and its postwar legacies. Topics include: pan-Asianism and orientalism; colonial modernization in Korea and Taiwan; collaboration and resistance; popular imperialism in Manchuria; total war and empire; comfort women and the politics of apology; the issue of resident Koreans; and economic and cultural integration of postwar Asia.

Same as: HISTORY 292D

**HISTORY 392E. The Historical Roots of Modern East Asia. 4-5 Units.**

Focus is on China and Japan before and during their transition to modernity. The populous, urbanized, economically advanced, and culturally sophisticated Ming empire and Muromachi shogunate in the 16th century when Europeans first arrived. How the status quo had turned on its head by the early 20th century when European and American steamships dominated the Pacific, China was in social and political upheaval, and Japan had begun its march to empire.

Same as: HISTORY 92A

**HISTORY 392F. Culture and Religions in Korean History. 4-5 Units.**

This colloquium explores the major themes of Korean history before 1800 and the role of culture and religions in shaping the everyday life of Chosŏn-dynasty Koreans. Themes include the aristocracy and military in the Koryŏ dynasty, Buddhism and Confucianism in the making of Chosŏn Korea, kingship and court culture, slavery and women, family and rituals, death and punishment, and the Korean alphabet (Hangŭl) and print culture.

Same as: HISTORY 292F

**HISTORY 392G. Modern Korea. 4-5 Units.**

Examines seminal works and major historical debates in the study of modern Korea. Topics include the state and society in the Chosŏn dynasty, reform and rebellion in the nineteenth century, colonization, gender and colonial modernity, national identity and assimilation, wartime colonial Korea, decolonization and the North Korean revolution, the Korean War and its aftermath, the Pak Chung Hee regime and labor relations, and democratization.

**HISTORY 393A. State, Society, and Economy in Qing Dynasty China. 4-5 Units.**

Historical scholarship on China during the Qing period, including the gentry, civil examinations, and the debate about social mobility; merchants, cities, and the debate about civil society/public sphere; taxation, local security, and famine relief; heterodoxy, collective violence, and rebellion; and rival approaches (neo-Malthusian, neo-conservative, and neo-Marxist) to understanding the high Qing economy.

**HISTORY 393C. The Chinese Empire from the Mongol Invasion to the Boxer Uprising. 4-5 Units.**

A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

Same as: CHINA 383C

**HISTORY 393E. Female Divinities in China. 4-5 Units.**

This course examines the fundamental role of powerful goddesses in Chinese religion. It covers the entire range of imperial history and down to the present. It will look at, among other questions, what roles goddesses played in the spirit world, how this is related to the roles of human women, and why a civilization that excluded women from the public sphere granted them a dominant place, in the religious sphere. It is based entirely on readings in English.

Same as: FEMGEN 293E, HISTORY 293E, RELIGST 257X, RELIGST 357X

**HISTORY 394C. First Encounters: China and the West, 1500-1860. 4-5 Units.**

For four hundred years, the peoples of China and the West have engaged with each other. What happened when worlds and world-views came into contact? In this course, we will explore the experience of encounter and its cultural impact on two largely distinct, but never isolated societies. We will study the history of cross-cultural exchange between China and the West to see how each emerged through dialogue with the other and to understand the roots of our own interconnected world.

Same as: HISTORY 294C



**HISTORY 394D. Manchuria: Cradle of Conflict, Cockpit of Asia. 4-5 Units.**

How did Manchuria become Chinese? This course utilizes the dual waves of early twentieth-century writings and a wide array of recent scholarship dealing with Manchuria to explore the formation of nation-states out of the Qing and Japanese empires in Northeast Asia through the lenses of opium, migration, cities, warlords, and memoir. This course will be of interest to students concerned with developing transcultural understandings of Northeast Asian history.

Same as: HISTORY 294D

**HISTORY 395. Modern Korean History. 4-5 Units.**

(Same as HISTORY 95. History majors and others taking 5 units, register for 195.) This lecture course provides a general introduction to the history of modern Korea. Themes include the characteristics of the Chosôn dynasty, reforms and rebellions in the nineteenth century, Korean nationalism; Japan's colonial rule and Korean identities; decolonization and the Korean War; and the different state-building processes in North and South, South Korea's democratization in 1980s, and the current North Korean crisis.

Same as: HISTORY 195

**HISTORY 395F. Race and Ethnicity in East Asia. 4-5 Units.**

Intensive exploration of major issues in the history of race and ethnicity in China, Japan, and Korea from the early modern period to the present day.

Same as: ASNAMST 295F, CSRE 295F, HISTORY 295F

**HISTORY 395J. Gender and Sexuality in Chinese History. 4-5 Units.**

Same as: CHINGEN 395, FEMGEN 395J

**HISTORY 396C. The Making of Modern India. 4-5 Units.**

What does the history of the modern world look like as seen through India's history? Through an examination of ancient India and the development of Hindu and Buddhist communities, to the influx of Muslims and the rise of the Mughal Empire, to European colonialism, Gandhi and anti-colonial movements, to Partition, Independence, Bollywood, and the rise of Hindu nationalist political parties, this course will provide a fresh lens to not only view India's history, but India's role in shaping the modern world.

Same as: HISTORY 296C

**HISTORY 397. The Cold War and East Asia. 5 Units.**

Explores how East Asia negotiated superpower rivalry and global ideological competition during the Cold War. Considers the ways in which China, Japan, and Korea were more than battlegrounds for US-Soviet contestation and played active roles in defining the nature and dynamics of the conflict. Re-examines conventional narratives and periodizations against alternative conceptual models and interpretive frameworks highlighting the constructed nature of the struggle as well as the role of historical and cultural factors in shaping the East Asian experience.

Same as: HISTORY 297

**HISTORY 398G. Death and Death Culture in Modern China. 4-5 Units.**

From the late Qing period to the Cultural Revolution, Chinese society experienced a radical transformation of the beliefs, practices, and organizations that addressed the issue of death. The culture of death was at the heart of society. This colloquium will explore the diverse aspects of Chinese social, religious, and material practices involved in parting with the dead, in rural and urban society, in China as well as overseas. Sources: we shall use a wide body of texts, photographs, images, and films. Hardly anything changed more in modern Chinese history than the ways in which Chinese society.

Same as: HISTORY 298G

**HISTORY 399A. Preparing for International Field Work: Public Service or Research. 1 Unit.**

Open to students in all classes, those planning internships abroad and those planning research, from juniors with honors theses and sophomores with Chappell Lougee grants to freshmen thinking ahead. Introduces resources on campus for planning international research and service. Raises issues that need to be considered in advance of going abroad: ethical concerns, Human Subjects Protocol, networking, personal safety and gender issues, confronting cultural differences. Exposes students to research methods: case studies, interviewing, working in foreign libraries and archives.

Same as: HISTORY 299X

**HISTORY 399E. Preparing for International Field Research: Public Svc or Research, Electronic Version. 1 Unit.**

Restricted to students studying at a Stanford Overseas Studies campus; same course content as HISTORY 299X. Problems involved in research abroad: ethical issues; safety; security and conduct; human subjects protocol. Methodologies of research: interviewing, networking, case studies, participant observation, large surveys. Prerequisite: consent of instructor.

**HISTORY 399P. Archives-Based Teaching Practicum. 1 Unit.**

Through hands-on exercises and key readings, students will learn about basic archival handling techniques, usage guidelines, security issues, principles of archival organization, and bibliographic literacy around archival and Special Collections materials, along with an insiders tour of Stanford University Special Collections. During the second, students will partake in a hands-on session using Special Collections materials, with a class session enactment that demonstrates the program's concepts. Note: Enrollment only open to PhD students (ANY department) with instructor permission required.

**HISTORY 399W. Graduate Directed Reading. 1-10 Unit.****HISTORY 3B. Transhistory: Gender Diversity from Medieval to Modern. 1-3 Unit.**

This series of six lectures explores the history of gender crossings and transgressions, broadly defined. Several Stanford faculty members and one visitor will present historical interpretations of how and why individuals crossed gender boundaries in the past, as well as how different societies have reacted to gender crossing. The topics range from medieval to modern times and across geographic regions, including Europe, China, South Asia and the Americas.

Same as: FEMGEN 3B

**HISTORY 3D. Dangerous Ideas. 1 Unit.**

Ideas matter. Concepts such as race, progress, and evil have inspired social movements, shaped political systems, and dramatically influenced the lives of individuals. Others, like religious tolerance, voting rights, and wilderness preservation play an important role in contemporary debates in the United States. All of these ideas are contested, and they have a real power to change lives, for better and for worse. In this one-unit class we will examine these dangerous ideas. Each week, a faculty member from a different department in the humanities and arts will explore a concept that has shaped human experience across time and space. Some weeks will have short reading assignments, but you are not required to purchase any materials.

Same as: ARTHIST 36, COMPLIT 36A, EALC 36, ENGLISH 71, FRENCH 36, MUSIC 36H, PHIL 36, POLISCI 70, RELIGST 21X, SLAVIC 36

**HISTORY 3E. Michelle Obama in American Culture. 1 Unit.**

Never before has the United States had a First Lady like Michelle Obama. During her eight years in the White House, Michelle Obama transformed traditional meanings of womanhood, marriage, motherhood, and style and created new possibilities for what it means to be strong and what it means to be beautiful. No First Lady has ever been so scrutinized but also so beloved: from her J. Crew dresses to her Let's Move campaign, from her vegetable gardens to her chiseled arms, and from her powerful speeches to her casual and always authentic personality. This class examines the impact on American culture of the most popular First Lady in American history.

Same as: AFRICAAM 3E, AMSTUD 3E, CSRE 3E, FEMGEN 3E

**HISTORY 3F. The Changing Face of War: Introduction to Military History. 3-5 Units.**

Introduces students to the rich history of military affairs and, at the same time, examines the ways in which we think of change and continuity in military history. How did war evolve from ancient times, both in styles of warfare and perceptions of war? What is the nature of the relationship between war and society? Is there such a thing as a Western way of war? What role does technology play in transforming military affairs? What is a military revolution and can it be manufactured or induced? Chronologically following the evolution of warfare from Ancient Greece to present day so-called new wars, we will continuously investigate how the interdependencies between technological advances, social change, philosophical debates and economic pressures both shaped and were influenced by war.

Same as: HISTORY 103F

**HISTORY 3G. Hamilton: An American Musical. 1 Unit.**

"Hamilton" is one of the most popular and most celebrated musicals in American history. It has received 11 Tony Awards, including best musical, and 16 Tony nominations, the most nominations in Broadway history. It won the Pulitzer Prize and a Grammy Award. The musical draws on the language and rhythms of hip-hop and R & B, genres that are underrepresented in the musical theater tradition. "Hamilton" has redefined the American musical, particularly in terms of sound, casting, and storytelling. What explains the deep cultural impact and acclaim for this play? This interdisciplinary course examines Alexander Hamilton and his world as well as *Hamilton: An American Musical* through a series of lectures from faculty in History, Theater and Performance Studies, English, Music, and Writing and Rhetoric.

Same as: AFRICAAM 5I, AMSTUD 5I, CSRE 5I

**HISTORY 4. Introduction to Geospatial Humanities. 3-5 Units.**

This course introduces undergraduate students to the theory and methods of the geospatial humanities, understood broadly as the application of GIS techniques and other quantitative methods in the humanistic study of social and cultural patterns in past and present settings.

Same as: HISTORY 104

**HISTORY 40. World History of Science. 3 Units.**

(Same as HISTORY 140. History majors and others taking 5 units, register for 140.) The earliest developments in science, the prehistoric roots of technology, the scientific revolution, and global voyaging. Theories of human origins and the oldest known tools and symbols. Achievements of the Mayans, Aztecs, and native N. Americans. Science and medicine in ancient Greece, Egypt, China, Africa, and India. Science in medieval and Renaissance Europe and the Islamic world including changing cosmologies and natural histories. Theories of scientific growth and decay; how science engages other factors such as material culture and religions.

**HISTORY 401B. Spatial History, Part II. 4-5 Units.**

Prerequisite: 401A.

**HISTORY 407K. Digital Humanities: Concepts, Tools, Problems. 4-5 Units.**

How can digital tools benefit research in history and neighboring disciplines? The aim of this seminar is to equip students with basic skills in some of the most important digital tools currently used by scholars in the humanities and social sciences. Individual classes will focus on Geographic Information Systems (GIS), web mapping, digital network analysis, data visualization, and digital publishing formats. As part of the exercise to use digital methods, students will develop collaborative digital projects. No prior technical skills are needed for this course.

Same as: HISTORY 207S

**HISTORY 40A. The Scientific Revolution. 3 Units.**

(Same as History 140A. History majors and others taking 5 units, register for History 140A.) What do people know and how do they know it? What counts as scientific knowledge? In the 16th and 17th centuries, understanding the nature of knowledge engaged the attention of individuals and institutions including Copernicus, Galileo, Descartes, Newton, the early Royal Society, and less well-known contemporaries. New meanings of observing, collecting, experimenting, and philosophizing, and political, religious, and cultural ramifications in early modern Europe.

**HISTORY 421A. Early Modern Russia. 4-5 Units.****HISTORY 422A. Research Seminar on the History of the Russian Empire. 4-5 Units.****HISTORY 424A. The Soviet Civilization. 4-5 Units.**

Socialist visions and practices of the organization of society and messianic politics; the Soviet understanding of mass violence, political and ethnic; and living space. Primary and secondary sources. Research paper or historiographical essay.

Same as: HISTORY 224A, REES 224A

**HISTORY 42S. The Circle of Life: Visions of Nature in Modern Science, Religion, Politics and Culture. 5 Units.**

A new understanding of nature emerged in the 1700s that fundamentally altered our perception of the living world and humanity's relationship with it. By tracing the evolution of this understanding forward, we gain insight into the interactions among science, religion, politics and culture. Topics include: nature in Romantic science, poetry and art; Darwin's theory of evolution and its afterlife in science, literature and popular culture; the science and politics of the 20th-century environmental movement; and the philosophical presuppositions underlying modern debates about biodiversity. In addition to close readings of canonical texts and contemporary commentaries, students will be introduced to digital history methods. Students will design their own final projects in consultation with the instructor.

**HISTORY 430. Graduate Research Seminar: Early Modern Europe. 4-5 Units.**

Prerequisite: HISTORY 332G. Students may research any aspect of late medieval, Renaissance, and early modern history, ca. 1300-1800. Students wishing to take this seminar must enroll in HISTORY 332G: Early Modern Cities in Autumn 2017.

**HISTORY 430A. Graduate Research Seminar: Early Modern Europe. 3-5 Units.**

Students will begin a research project on any aspect of early modern European history, 1400-1800, by taking HISTORY 430A in winter quarter as the first quarter of this two-quarter sequence. Enrollment by permission of instructor.

**HISTORY 431. Early Modern Things. 4-5 Units.**

How do objects reveal their histories? What can be learned about the past by studying things? The material culture of early modern Europe, ca 1450-1750. Recent work on the circulation, use, and consumption of things, starting with the Columbian exchange which expanded the material horizons of the early modern world in the late 15th century, exploring challenges to the meaning of things in the age of the Reformation and Scientific Revolution, and ending with the birth of consumer society in the 18th century How did the meaning of things and people's relationships to them change over these centuries? What objects, ordinary and extraordinary, secular and sacred, natural and man-made, came to define the emerging features of the early modern world?.

**HISTORY 433A. Research Seminar in Modern Europe. 4-5 Units.**

Students will complete an article-length research paper based on primary sources.

**HISTORY 433B. Research Seminar in Modern Europe. 4-5 Units.**

Prerequisite: HISTORY 433A.

**HISTORY 438. European History Workshop. 1 Unit.**

All European history graduate students in residence register for this weekly workshop, at which dissertation chapters and prospectuses, papers, and grant proposals by students and faculty are read and discussed.

**HISTORY 439A. Graduate Research Seminar: Modern Britain and the British Empire. 4-5 Units.****HISTORY 439B. Graduate Research Seminar: Modern Britain and the British Empire II. 4-5 Units.****HISTORY 44. Women and Gender in Science, Medicine and Engineering. 3 Units.**

(Same as HISTORY 144. Majors and others taking 5 units, enroll in HISTORY 144.) Men's and women's roles in science, medicine, and engineering over the past 200 years with a focus on the present. What efforts are underway globally to transform research institutions so that both men's and women's careers can flourish? How have science and medicine studied and defined males and females? How can we harness the creative power of gender analysis to enhance knowledge and spark innovation?.

**HISTORY 443A. Human Origins: History, Evidence, and Controversy. 4-5 Units.**

Research seminar. Debates and controversies include: theories of human origins; interpretations of fossils, early art, and the oldest tools; the origin and fate of the Neanderthals; evolutionary themes in literature and film; visual rhetoric and cliché in anthropological dioramas and phyletic diagrams; the significance of hunting, gathering, and grandmothering; climatological theories and neocatastrophic geologies; molecular anthropology; the impact of racial theories on human origins discourse. Background in human evolution not required.

Same as: HISTORY 243S

**HISTORY 444. Graduate Research Seminar: Gender in Science, Medicine, and Engineering. 5 Units.**

Theory and practice of gender in STEM. 1. "Fix the Numbers of Women" focuses on increasing women's participation; 2. "Fix the Institutions" promotes gender equality in careers through structural change in research organizations; 3. "Fix the Knowledge" or "gendered innovations" stimulates excellence in science and technology by integrating gender analysis into research. Seminar explores harnessing the creative power of gender analysis to enhance knowledge and spark innovation.

Same as: FEMGEN 444

**HISTORY 444C. The History of the Body in Science, Medicine, and Culture. 4-5 Units.**

The human body as a natural and cultural object, historicized. The crosscultural history of the body from the 18th century to the present. Topics include: sciences of sex and race; medical discovery of particular body parts; human experimentation, foot binding, veiling, and other bodily coverings; thinness and obesity; notions of the body politic.

Same as: HISTORY 244C

**HISTORY 445A. Research Seminar in African History. 4-5 Units.**

Primary sources such as government records and missionary archives. Students present work in progress. Prerequisite: consent of instructor.

**HISTORY 445B. Research Seminar in African History. 4-5 Units.**

Primary sources such as government records and missionary archives. Students present work in progress. Prerequisite: consent of instructor.

**HISTORY 459A. Grad Research Seminar in U.S. History. 4-5 Units.****HISTORY 45B. Africa in the Twentieth Century. 3 Units.**

(Same as HISTORY 145B. History majors and others taking 5 units, register for 145B.) The challenges facing Africans from when the continent fell under colonial rule until independence. Case studies of colonialism and its impact on African men and women drawn from West, Central, and Southern Africa. Novels, plays, polemics, and autobiographies written by Africans.

**HISTORY 45S. The Cold War and the Shaping of Modern Africa. 5 Units.**

This course considers the options and obstacles facing Africa during the Cold War, covering the period from the 1940s to the 2000s. Topics include the Cold War histories of Ghana, Algeria, Democratic Republic of the Congo (Zaire), Tanzania, and South Africa, among others. The legacies of the Cold War for contemporary Africa will also be discussed. This course will also focus on how to manage large source bases and ways to engage with diverse primary sources including film and literature.

Same as: AFRICAAM 45S

**HISTORY 460. Research Seminar in America in the World. 4-5 Units.**

Ways to place American history in an international context. Comparative, transnational, diplomatic, and world systems are approaches to complete a research paper based on research into primary materials. Historical methodologies, research strategies, and essay projects. May be repeated for credit.

**HISTORY 461A. Graduate Research Seminar on the History of Women, Gender, the Family, and Sexuality. 4-5 Units.**

Instructor consent required for non-History graduate students. Seminar introduces graduate students to current issues and methods in the history of women, gender, the family, and sexuality in the United States. After an initial period of working on secondary and primary source bibliographies, and some discussion of secondary readings, each student will choose a topic for an original research paper (20-30 pages) based on primary sources. Each student will complete a first draft of the paper by late May and a revised paper by the end of Spring Quarter.

Same as: FEMGEN 461A

**HISTORY 461B. Graduate Research Seminar on the History of Women, Gender, the Family, and Sexuality Part II. 4-5 Units.**

Prerequisite: 461A. Instructor consent required for non-History graduate students.

Same as: FEMGEN 461B

**HISTORY 47. History of South Africa. 3 Units.**

(Same as HISTORY 147. History majors and others taking 5 units, register for 147.) Introduction, focusing particularly on the modern era. Topics include: precolonial African societies; European colonization; the impact of the mineral revolution; the evolution of African and Afrikaner nationalism; the rise and fall of the apartheid state; the politics of post-apartheid transformation; and the AIDS crisis.

Same as: AFRICAAM 47, CSRE 74

**HISTORY 471A. Environmental History of Latin America. 5 Units.**

What role did the natural environment play in the emergence of Latin America as a distinct geographical and socio-cultural world region? How do we analyze the historical relationship between the regions rich and seemingly abundant natural resources and its status as underdeveloped? What historical consequences did this relationship have and what alternative, more sustainable developmental paths can we envision for the future in light of the past that we will study? In this course, students will become familiar with the historiography on Brazil, Mexico, Peru, Cuba and Honduras that has explored these questions through a variety of approaches, methodologies and points of view.

**HISTORY 471B. Environmental History of Latin America. 5 Units.**

What role did the natural environment play in the emergence of Latin America as a distinct geographical and socio-cultural world region? How do we analyze the historical relationship between the region's rich and seemingly abundant natural resources and its status as 'underdeveloped'? What historical consequences did this relationship have and what alternative, more sustainable developmental paths can we envision for the future in light of the past that we will study? In this course, students will become familiar with the historiography on Brazil, Mexico, Peru, Cuba and Honduras that has explored these questions through a variety of approaches, methodologies and points of view.

**HISTORY 472. The Caribbean. 4-5 Units.**

This course will examine the social history of the Caribbean.

**HISTORY 478. The Ethical Challenges of Climate Change. 4-5 Units.**

This course explores the ethical challenges of climate change from historical, social, economic, political, cultural and scientific perspectives. These include the discovery of global warming over two centuries, the rise of secular and religious denialism and skepticism toward the scientific consensus on it, the dispute between developed and developing countries over how to forge a binding global agreement to mitigate it, and the "role morality" of various actors (scientists, politicians, fossil fuel companies, the media and ordinary individuals) in the US in assessing ethical responsibility for the problem and its solutions.  
Same as: HISTORY 278S

**HISTORY 48. The Egyptians. 3-5 Units.**

Overview of ancient Egyptian pasts, from predynastic times to Greco-Roman rule, roughly 3000 BCE to 30 BCE. Attention to archaeological sites and artifacts; workings of society; and cultural productions, both artistic and literary. Participation in class is required.  
Same as: AFRICAAM 30, CLASSICS 82, HISTORY 148

**HISTORY 481. Research Seminar in Middle East History. 4-5 Units.**

Student-selected research topics. May be repeated for credit.  
Same as: JEWISHST 287S, JEWISHST 481

**HISTORY 486A. Graduate Research Seminar in Jewish History. 4-5 Units.**

Same as: JEWISHST 486A

**HISTORY 486B. Graduate Research Seminar in Jewish History. 4-5 Units.**

Prerequisite: HISTORY 486A.  
Same as: JEWISHST 486B

**HISTORY 48Q. South Africa: Contested Transitions. 4 Units.**

Preference to sophomores. The inauguration of Nelson Mandela as president in May 1994 marked the end of an era and a way of life for South Africa. The changes have been dramatic, yet the legacies of racism and inequality persist. Focus: overlapping and sharply contested transitions. Who advocates and opposes change? Why? What are their historical and social roots and strategies? How do people reconstruct their society? Historical and current sources, including films, novels, and the Internet.  
Same as: AFRICAAM 48Q

**HISTORY 491A. Modern Korea Research Seminar. 4-5 Units.**

This graduate seminar prepares students to undertake research using Korean-language sources on a variety of themes in modern Korea. Students will identify characteristics of major online and offline archives in Korean studies, learn essential skills in investigating primary sources, and analyze selected sample documents in class.

**HISTORY 491B. Modern Korea Research Seminar. 4-5 Units.**

This graduate seminar prepares students to undertake research using Korean-language sources on a variety of themes in modern Korea. Students will identify characteristics of major online and offline archives in Korean studies, learn essential skills in investigating primary sources, and analyze selected sample documents in class.

**HISTORY 492B. Origins of Technical Medicine in the Han Dynasty. 4-5 Units.**

How medicine as a technical, text-based art monopolized by specialists was established under the Han Dynasty in competition with practices aimed at nourishing life and securing longevity.

**HISTORY 493. Research Seminar on Political Thought. 4-5 Units.**

A series of texts and documents that form the heart of what Marx and Engels called "the colonial question". Discussions center on specific themes relating to each student's research topic and/or interests. The seminar will be organized around a set of core common readings and weekly discussions, supplemented by a designed list of secondary texts and primary materials. Themes include: secularism, religion, state, capital, empire, anticolonialism, gender, democracy, textual and print cultures, cinema, political and legal theory, and history of economic thought. 400-level options allows students to do a two-quarter sequence, with the Spring devoted to writing up the research paper.  
Same as: HISTORY 293A

**HISTORY 496A. Research Seminar in Chinese History. 4-5 Units.**

First part of a two part sequence. Primary sources and research methods to be used in the study of modern Chinese history.

**HISTORY 496B. Research Seminar in Chinese History. 4-5 Units.**

Second part of a two part sequence. Primary sources and research methods to be used in the study of modern Chinese history. Prerequisite: HISTORY 496A.

**HISTORY 498D. Japanese Imperial Archives, Part 2. 4-5 Units.**

Second part of a two-quarter research graduate seminar on Japanese imperialism in Asia. Students complete research papers based on research conducted for History 498C; the class meets occasionally to report on progress and discuss working drafts. Prerequisite: History 498C.

**HISTORY 499X. Graduate Research. 1-10 Unit.**

Units by arrangement. May be repeated for credit.

**HISTORY 4N. A World History of Genocide. 3-5 Units.**

Reviews the history of genocide from ancient times until the present. Defines genocide, both in legal and historical terms, and investigates its causes, consequences, and global dimensions. Issues of prevention, punishment, and interdiction. Main periods of concern are the ancient world, Spanish colonial conquest; early modern Asia; settler genocides in America, Australia, and Africa; the Armenian genocide and the Holocaust; genocide in communist societies; and late 20th century genocide.  
Same as: JEWISHST 4N

**HISTORY 50A. Colonial and Revolutionary America. 3 Units.**

(Same as HISTORY 150A. History majors and others taking 5 units, register for 150A.) Survey of the origins of American society and polity in the 17th and 18th centuries. Topics: the migration of Europeans and Africans and the impact on native populations; the emergence of racial slavery and of regional, provincial, Protestant cultures; and the political origins and constitutional consequences of the American Revolution.

**HISTORY 50B. Nineteenth Century America. 3 Units.**

(Same as HISTORY 150B. History majors and others taking 5 units, register in 150B.) Territorial expansion, social change, and economic transformation. The causes and consequences of the Civil War. Topics include: urbanization and the market revolution; slavery and the Old South; sectional conflict; successes and failures of Reconstruction; and late 19th-century society and culture.

Same as: AFRICAAM 50B, CSRE 50S

**HISTORY 50C. The United States in the Twentieth Century. 3 Units.**

(Same as HISTORY 150C. History majors and others taking 5 units, register for 150C.) Covering the past century, this course will survey U.S. politics, culture, and social movements, tracing three recurrent themes: the growth of the federal government and ensuing political debates about its role; the development of the United States into a world power; and the contested expansion of American democracy. Lectures meet Mon, Tues, Wed. This is a Massive Multiplayer Humanities course: students will participate in two archival workshops held on Thursdays. Research workshops for 5 credit students will also be held on Thursdays. Suitable for non-majors and majors alike. Three and five credit options, with the choice of a research paper or proposal for 5 credit students.

**HISTORY 50K. John F. Kennedy: Fifty Years Later. 1 Unit.**

November 22, 2013 marks the 50th anniversary of President John F. Kennedy's assassination. Half a century on, our visually saturated culture remains besotted with images of the youthful president and his strikingly photogenic family. But the passage of time has also yielded new perspectives on Kennedy's presidency and on his era. November 22, 1963 may well come to be remembered not only as the day when the life of a promising young leader was violently cut short, but also as the pivot between two distinct eras in American history. Ironically, though Kennedy was the first World War II veteran to reach the White House, his death heralded the end of the long postwar season of national pride, optimism, confidence, and widely shared prosperity, and may have opened the road to the great catastrophe that was the Vietnam War. His passing also helped to pry open the portals to historic changes in the lives of millions of African Americans, as witnessed by Lyndon Johnson's artful invocation of the fallen president to bring about passage of the epic civil rights legislation of the late 1960s. This course will examine the postwar domestic and international settings in which Kennedy rose to and exercised power. It will probe our continuing fascination with his character and with his family; his role as a Cold Warrior, especially in the tense confrontation known as the Cuban Missile Crisis; and his relation to the African American struggle to bury Jim Crow. We will conclude with an assessment of the longer-term historical consequence of his brief moment in the arenas of celebrity and power. Guest speakers will include noted Kennedy biographer Robert Dallek; Johnson biographer Bruce Schulman; Taylor Branch, acclaimed biographer of Martin Luther King, Jr.; and Stanford's own Jennifer Burns, historian of modern America.

**HISTORY 51K. Election 2016. 1 Unit.**

The 2016 Presidential Election season has been anything but ordinary. So much in the Democratic and Republican primaries consistently defied conventional wisdom and upended the predictions of experts. This course will attempt, with the help of distinguished guests, to make sense of an election that defies all historical precedent and to take stock of the health of American democracy. Class is jointly offered for Continuing Studies students and Stanford students. As a 1 unit, online course for Stanford students, enrollment is unlimited. Registration for the course offers online access to a livestream of each class session, participation in online discussions, access to course website and materials, and admission to a lottery for attending each class in person.

Same as: CSRE 51K, POLISCI 51K

**HISTORY 51S. American Travel, Tourism and Empire in the Pacific, 1880s-1970s. 5 Units.**

What does it mean to be a traveler or a tourist? Is travel a form of empire or exploitation? Can it ever be an innocent form of economic and cultural exchange? This class will examine how cultures of travel and tourism helped everyday Americans understand and shape the country's political, social, and economic challenges from the 1880s to 1970s, as the U.S. evolved from a continental empire, into an overseas empire, and finally into an informal empire.

Same as: AMSTUD 51S, CSRE 51S

**HISTORY 52Q. Democracy in Crisis: Learning from the Past. 3 Units.**

This Sophomore Seminar will focus on U.S. democracy and will use a series of case studies of major events in our national history to explore what happened and why to American democracy at key pressure points. This historical exploration should shed light on how the current challenges facing American democracy might best be handled. (Cardinal Course certified by the Haas Center).

Same as: EDUC 122Q, POLISCI 20Q

**HISTORY 54N. African American Women's Lives. 3 Units.**

This course encourages students to think critically about historical sources and to use creative and rigorous historical methods to recover African American women's experiences, which often have been placed on the periphery of American history and American life.

Same as: AFRICAAM 54N, AMSTUD 54N, CSRE 54N, FEMGEN 54N

**HISTORY 54S. The American Civil War. 5 Units.**

Few events in American history match the significance of the Civil War, a conflict that freed 4 million people held in bondage and left 750,000 men dead. This course will explore the war from a range of perspectives, including those of Union and Confederate soldiers, African Americans, women, and Native Americans. Based on the documents these different groups left behind, as well as the histories they inspired, we will seek to understand how the Civil War was experienced and commemorated. Priority given to history majors and minors.

**HISTORY 55D. The Asian American Movement: A History of Activism. 3-5 Units.**

The "Asian American Movement" was born in the late 1960s inspired by other movements for social change and justice in the era. Activism among Asians in America has a longer history and a continuity to today. We will examine past, present, and future and consider issues of racial/ethnic identity, of inequality, and of injustice. And we will explore avenues that sought remedy and progress. Political, social, cultural, gender and sexuality, and international dimensions will be considered.

Same as: AMSTUD 155D, ASNAMST 55D, ASNAMST 155D, HISTORY 155D

**HISTORY 55Q. The Origins of the Modern American City, 1865-1920. 3 Units.**

Are we living in a new Gilded Age? To answer this question, we go back to the original Gilded Age, as well as its successor, the Progressive Era. How did urban Americans around the turn of the twentieth century deal with stark inequalities of class, race, ethnicity, gender, and sexuality? And what can we learn from their struggles for our own time? Students use primary and secondary sources in digital and print formats. Possible field trip to San Francisco.

Same as: AMSTUD 25Q, URBANST 25Q

**HISTORY 57E. State of the Union 2014. 1 Unit.**

This course will examine major themes that contribute to the health, or disease, of the US body politic. Challenges and opportunities abound: we live in an age of rising inequality, dazzling technological innovation, economic volatility, geopolitical uncertainty, and the accumulating impact of climate change. These conditions confront our political leaders and us as citizens of a democracy plagued by dysfunction. What are the implications for the body politic? Led by Rob Reich (Political Science, Stanford), David Kennedy (History, Stanford), and James Steyer (CEO, Common Sense Media), the course will bring together distinguished analysts of American politics. Together, we will examine the following topics: inequality; energy and the environment; media and technology; the economy; and the 2014 midterm elections. The course is designed for the entire Stanford community: jointly offered for undergraduate and graduate students at Stanford (through listings in Political Science and History) and for community members through the Continuing Studies Program. For students, the course is available for 1 credit. This course may not be taken for a Letter Grade.

Same as: POLISCI 57E

**HISTORY 58Q. American Landscapes of Segregation. 3-4 Units.**

This course examines various landscapes of segregation in U.S. history from 19th century reconstruction and settler expansion through the contemporary U.S. security state. Each week we consider different histories of segregation including native reservation and boarding school stories, Jim Crow and post-World War II urban/suburban segregation, school integration and bussing, and the rise of the carceral state. We will ask: How have Americans moved through space with different degrees of freedom and constraint over time, and how has that shaped what it has meant to be an American in different ways for different groups? How has access to land, property, consumer, recreational and educational spaces and resources been regulated by categories of race, gender, sexuality, colonial subjectivity, immigrant status and class? To gain a better sense of our local history, we will also consider how structures of segregation have historically mapped the Bay Area. Sources include primary and secondary historic texts, feature and documentary films, photography, and poetry.

Same as: AFRICAAM 58Q, AMSTUD 58Q

**HISTORY 60N. Revolutionaries and Founders. 3 Units.**

Americans remain fascinated by the revolutionary generation which secured independence and established a national constitutional republic. Books about the founders come steadily from the presses, some describing the lives of individual revolutionaries, others trying to analyze and explain what made these events possible. This seminar will approach the Revolution through both a biographical and analytical framework, relying both on scholarly writings and the massive array of primary sources that are readily available through letterpress editions and on-line. The course will rely on the instructor's own recent book, *Revolutionaries: A New History of the Invention of America*, which carries the story from the crisis around the Boston Tea Party of 1773 through the end of President Washington's first administration. The course will be divided evenly between modern scholarship and the careful reading of original materials, and students will write short essays that will involve the analysis of explanatory problems, the close interpretation of documents, and the crafting of historical narratives. Topics to be discussed will include the outbreak of the revolution, constitution-making at both the state and national levels of government, the conduct of the war, and the legacies that Americans particularly associate with Thomas Jefferson, James Madison, and Alexander Hamilton.

**HISTORY 61. The Politics of Sex: Work, Family, and Citizenship in Modern American Women's History. 3-5 Units.**

This course explores the transition from Victorian to modern American womanhood by asking how Native, European, African, Mexican, and Asian American women navigated the changing sexual, economic, and political landscapes of the twentieth century. Through secondary readings, primary sources, films, music, and literature we explore the opportunities and boundaries on groups of women in the context of historical events that included immigration, urbanization, wartime, depression, the Cold War, as well as recurrent feminist and conservative political movements. Same as: AMSTUD 161, CSRE 162, FEMGEN 161, HISTORY 161

**HISTORY 61N. The Worlds of Thomas Jefferson. 3 Units.**

Thomas Jefferson assumed many roles during his life-- Founding Father, revolutionary, and author of the Declaration of Independence; natural scientist, inventor, and political theorist; slaveholder, founder of a major political party, and President of the United States. This introductory seminar explores these many worlds of Jefferson, both to understand the multifaceted character of the man and the broader historical contexts that he inhabited and did so much to shape.

**HISTORY 63N. The Feminist Critique: The History and Politics of Gender Equality. 3-4 Units.**

This course explores the long history of ideas about gender and equality. Each week we read, dissect, compare, and critique a set of primary historical documents (political and literary) from around the world, moving from the 15th century to the present. We tease out changing arguments about education, the body, sexuality, violence, labor, politics, and the very meaning of gender, and we place feminist critics within national and global political contexts.

Same as: AMSTUD 63N, CSRE 63N, FEMGEN 63N

**HISTORY 64. Racial and Ethnic Diversity in Modern America. 4-5 Units.**

How ethnicity influenced the American experience and how prevailing attitudes about racial and ethnic groups over time have affected the historical and contemporary reality of the nation's major minority populations. Focus is on the past two centuries.

Same as: CSRE 64

**HISTORY 68D. Martin Luther King, Jr.: The Inner Life and Global Vision. 3-5 Units.**

Martin Luther King, Jr., was the 20th-century's best-known African-American leader, but the religious roots of his charismatic leadership are far less widely known. The documents assembled and published by Stanford's King Research and Education Institute provide the source materials for this exploration of King's swift rise to international prominence as an articulate advocate of global peace and justice.

Same as: AFRICAAM 68D, AMSTUD 168D, CSRE 68, HISTORY 168D

**HISTORY 68S. New Orleans: An American City?. 5 Units.**

Some scholars argue that New Orleans is not quite an American city, but is instead a cultural hybrid of Europe, Africa, and the Caribbean. This course will investigate that claim by studying New Orleans from its colonial period to the present. Topics include colonial empires, the role of New Orleans as the largest slave market in North America, the Great Mississippi Flood of 1927, Civil Rights, Carnival, tourism, religion, and state and federal responses to Hurricane Katrina, among others.

Same as: AFRICAAM 68S, AMSTUD 68S, URBANST 68S

**HISTORY 69Q. American Road Trips. 4 Units.**

"Nothing behind me, everything ahead of me, as is ever so on the road."  
 –Jack Kerouac, *On the Road*, 1957. From Jack Kerouac's *On the Road* to Cheryl Strayed's *Wild*, this course explores epic road trips of the twentieth century. Travel is a fundamental social and cultural practice through which Americans have constructed ideas about the self, the nation, the past, and the future. The open road, as it is often called, offered excitement, great adventure, and the space for family bonding and memory making. But the footloose and fancy-free nature of travel that Jack Kerouac celebrated was available to some travelers but not to all. Engaging historical and literary texts, film, autobiography, memoir, photography, and music, we will consider the ways that travel and road trips have been represented in American culture. This course examines the following questions: How did men and women experience travel differently? How did the motivations for travel change over time? What role did race, ethnicity, class, relationships, and sexuality play in these trips? Students will work together to plan a road trip of their own which the class will take during the quarter.

Same as: AMSTUD 109Q

**HISTORY 70C. Modern Latin America. 3-5 Units.**

This course examines Latin American history from independence to the present day. Key issues include nationalism, urbanization, culture, and revolution. Sources include writings in the social sciences as well as primary documents, fiction, and film.

Same as: HISTORY 170C

**HISTORY 71S. American Political Thought from the Civil War to the Cold War. 5 Units.**

This course explores America's most important political tradition: liberalism. What does liberalism mean? Does it mean something different today than it did in the past? Using multiple textual and visual sources, students will grapple with how Americans remade liberalism in the 19th and 20th centuries and how political thinkers have understood its meaning over time. We will see how American liberalism was shaped by factors of race, gender, and class and by competing ideologies like conservatism and socialism.

**HISTORY 73S. History of the Police in the United States: Slave Patrols to Ferguson. 5 Units.**

How did police come to have the power to use violence? Themes: growth of professional policing, creation of private police forces and vigilantism, and public portrayals of police—by Hollywood and the press. The historical relationship between race and the administration of policing is a central question. Students will hone the methodology necessary to examine primary sources such as police memoirs, court records, police files, detective novels, music videos and photographs. The course fulfills the departmental Sources and Methods requirement. Priority given to history majors and minors.

**HISTORY 74S. Sounds of the Century: Popular Music and the United States in the 20th Century. 5 Units.**

What can popular music teach us about the past? What can we learn about music if we study it historically? This course grapples with these two questions by examining various examples of American music in the 20th century, as well as more conventional historical sources, scholarly books, and essays. Will pay special attention to how issues of race, gender, sexuality, class, and nation were reflected in and produced by people's interactions with music, inside and outside American borders.

**HISTORY 78Q. Film and History of Latin American Revolutions and Counterrevolutions. 3 Units.**

In this course we will watch and critique films made about Latin America's 20th century revolutions focusing on the Mexican, Cuban, Chilean and Nicaraguan revolutions. We will analyze the films as both social and political commentaries and as aesthetic and cultural works, alongside archivally-based histories of these revolutions.

**HISTORY 7D. Rise and Fall of Atlantic Slavery, 1500 to 1900. 3-5 Units.**

Between 1500 and 1900, about 12 million people were forcibly removed from Africa and transported to the Americas to work as slaves. This course explores the history of racial slavery in the Atlantic world and its lasting significance. Topics include the Middle Passage, the development of racism, the trans-Atlantic slave trade, the slave experience, resistance, African-American cultures, abolitionism, the process of emancipation, reparations, and the perpetuation of slavery and other forms of unfree labor.

Same as: AFRICAAM 107D, HISTORY 107D

**HISTORY 7E. Islamic Routes: Archaeology and Heritage of Muslim Societies. 3-5 Units.**

How has archaeology changed our knowledge of the spread of Islam and past Muslim societies? How does archaeology shape heritage debates, conflicts and ideas about Islam today? Topics include the city and urban change, secular and religious life, gender, economy, and globalization. These topics are explored using archaeological and critical heritage approaches. Focus is on examples drawn from Syria-Palestine, Egypt, Iraq, Arabian Peninsula, India, and Africa. Sources include archaeological data and material culture, historical texts in translation, and photography.

Same as: ANTHRO 13A, ARCHLGY 13, HISTORY 107E

**HISTORY 7G. Making Anglo-American Capitalism. 3-5 Units.**

This course addresses capitalism in global perspective to identify the roots of our current economic system. We will consider theories about capitalism, the politics and policies of implementation, and the human and environmental consequences through topics such as the imperial political economy, consumerism, plantation economies, the East India Company, and the rise of credit. Embedding markets in a range of social relations, cultural practices, and institutional arrangements, reveals how capital became an -ism in specific and knowable historical circumstances.

Same as: HISTORY 107G

**HISTORY 7S. Stanford Collects: A History of Collecting. 5 Units.**

Leland Stanford, Jr. was a curator extraordinaire. His collecting shaped Stanford into a university, an archive, a library, and a museum. Students will explore Stanford's campus collections to discover how objects and artifacts tell the history not only of the university, but also Palo Alto, California, and the American West writ large. The course is hosted in Green Library and features visits to the Cantor Arts Center, Stanford University Archaeology Collections, and more. All majors welcome. Priority given to history majors and minors.

Same as: ARTHIST 278S

**HISTORY 80. The Ottoman Empire: Conquest, Coexistence, and Coffee. 3-5 Units.**

The Ottoman Empire ruled the Middle East, North Africa and Eastern Europe from the 15th to the early 20th centuries. How did the Ottoman enterprise appear in the frontier region between Christendom and the Islamic world? How were diverse peoples, religions, and regions integrated under the Ottoman order? Was there an Ottoman Mediterranean and Indian Ocean? How did reform movements in Islamic, Christian and Jewish thinking transform Ottoman societies? Topics include the Ottoman Empire between Europe and Eastern Islamic World; merchants and their markets; elite, urban, rural and nomadic lives; women, family, childhood and sexuality; life, afterlife and dreams. Special emphasis will be given to coffee and coffee houses which shaped public life in the Ottoman World since the 16th century. The survey ends with the rise of nationalisms, inter-communal violence and the disintegration of the Ottoman world.

Same as: HISTORY 180

**HISTORY 802. TGR Dissertation. 0 Units.**

Units by arrangement.

**HISTORY 82C. Making of the Islamic World, 600-1500. 3 Units.**

(Same as HISTORY 182C. Majors and other taking 5 units, register for 182C.) The History of Islam and Muslim peoples from 600-1500. Topics include Muhammad and his community; the early Arab conquests and empires; sectarian movements; formation of Islamic belief, thought, legal culture and religious institutions; transregional Sufi and learned networks; family and sexuality; urban, rural and nomadic life; non-Muslim communities; the development of Mediterranean and Indian Ocean trade; relations with Byzantium, the Latin West, China; the Crusades and the Mongols.

**HISTORY 82G. Making Palestine Visible. 3-5 Units.**

Israel-Palestine is one of the most difficult subjects to talk about, in large part because we in the United States do not have much exposure to Palestinian history, culture, and politics in their own terms. This course aims to humanize Palestinians and asks why Palestinian claims to rights are illegible for much of the American public. We begin to answer this question by examining a broad sampling of history, structures of power and law, culture, and contemporary political issues.

Same as: COMPLIT 82, COMPLIT 182, CSRE 82G, HISTORY 182G

**HISTORY 83S. Refugees of Palestine and Syria: History, Identity, and Politics of Exile in the Middle East. 5 Units.**

Mass displacements of Palestinians (1948, 1967) and Syrians (2011-) remain crucial to our understanding of history and politics of the modern Middle East. The course topics include the media's role in alleviating or worsening refugee crises, the Palestinian "right of return," and the place of religion in the Syrian civil war. By looking at autobiographies, graffiti, revolutionary posters, and music, we will study the construction of refugee identities, through the prism of race, ethnicity, statelessness, gender, and sexual orientation. Priority given to history majors and minors.

**HISTORY 84N. The American Empire in the Middle East. 4 Units.**

What have been the traditional objectives of U.S. policy in the Middle East since the end of World War II? What forces shape U.S. policy towards the Middle East? Did those interests and the means employed to pursue them change substantially after the demise of the Soviet Union? What has been the impact of U.S. policy on the region itself? The three principal cases to be examined are Afghanistan, Iraq and Israel/Palestine.

**HISTORY 85B. Jews in the Contemporary World: Faith and Ethnicity, Visibility and Vulnerability. 3 Units.**

(Same as HISTORY 185B. History majors and others taking 5 units, register for 185B.) This course explores the full expanse of Jewish life today and in the recent past. The inner workings of religious faith, the content of Jewish identity shorn of belief, the interplay between Jewish powerlessness and influence, the myth and reality of Jewish genius, the continued pertinence of antisemitism, the rhythms of Jewish economic life – all these will be examined in weekly lectures, classroom discussion, and with the use of a widely diverse range of readings, films, and other material. Explored in depth will the ideas and practices of Zionism, the content of contemporary secularism and religious Orthodoxy, the impact Holocaust, the continued crisis facing Israel and the Palestinians. Who is to be considered Jewish, in any event, especially since so many of the best known (Spinoza, Freud, Marx) have had little if anything to do with Jewish life with their relationships to it indifferent, even hostile?.

Same as: CSRE 85B, JEWISHST 85B, REES 85B

**HISTORY 85S. A History of Strangers: Jews in the Mediterranean. 5 Units.**

A community needs outsiders. Sometimes it needs them to provide material things, but always it needs them to define itself. Focusing on Jews in the early-modern Mediterranean (1450-1750), this course asks questions about the nature of community, the causes and effects of exclusion, and processes of creating the "other." We will look at primary sources produced by "strangers" and so-called "host" societies. Sources include travelogues, maps, novels, poetry, paintings, contracts, Ottoman edicts, Italian charters, and rulings from religious courts.

Same as: JEWISHST 85S

**HISTORY 86Q. Blood and Money: The Origins of Antisemitism. 4-5 Units.**

For over two millennia, Jews and Judaism have been the object of sustained anxieties, fears, and fantasies, which have in turn underpinned repeated outbreaks of violence and persecution. This course will explore the development and impact of antisemitism from Late Antiquity to the Enlightenment, including the emergence of the Blood libel, the association between Jews and moneylending, and the place of Judaism in Christian and Islamic theology. No prior background in history or Jewish studies is necessary. Prerequisite: PWR 1.

Same as: JEWISHST 86Q

**HISTORY 8C. Sugar and Slavery, Race and Revolution: The Caribbean 1450-1888. 3-5 Units.**

This course examines race and slavery across British, French, and Spanish islands, plus Brazil. The intensity of Caribbean slavery produced societies where more people were enslaved than free. The idea of "black" was invented and contested as Caribbean inhabitants leaned on African roots to shape new cultures. Sugar production sparked global wars and planted the seed of modern financial systems. Black people fought back, in ways large and small, marking the beginning of emancipation with the Haitian Revolution.

Same as: AFRICAAM 18C, CSRE 108C, HISTORY 108C

**HISTORY 90. Early Chinese Thought. 3-5 Units.**

This lecture course examines the emergence of critical thought in early China. After a brief study of the social and political changes that made this emergence possible, it looks at the nature and roles of the thinkers, and finally their ideas about the social order, the state, war and the army, the family, the cosmos, and the self (both physical and mental). Some brief comparisons with early Greek thought.

Same as: HISTORY 190

**HISTORY 90S. The Forgotten War: The Korean War in Historical Perspective. 5 Units.**

This course examines the history of the Korean War (1950-53), a pivotal moment in modern world history. Using sources across seven countries including photographs, film, maps, diaries, literature, music, declassified military communications and psychological warfare materials, we will examine the war as a complex, multidimensional human phenomenon. Along the way we will find that the Korean War sheds light on a range of contemporary issues including US-China relations, the War on Terror, and America's larger place in the world. Priority given to history majors and minors.

Same as: AMSTUD 90S, KOREA 155X

**HISTORY 91D. China: The Northern and Southern Dynasties. 3 Units.**

(Same as HISTORY 191D. History majors and others taking 5 units, register for 191D.) Examines one of the most dynamic periods of Chinese history with the emergence of the institutional religions (Buddhism and Daoism), the development of the garden as an art form, the rise of landscape as a theme of verse and art, the invention of lyric poetry, and the real beginnings of the southward spread of Chinese civilization.

**HISTORY 92A. The Historical Roots of Modern East Asia. 4-5 Units.**

Focus is on China and Japan before and during their transition to modernity. The populous, urbanized, economically advanced, and culturally sophisticated Ming empire and Muromachi shogunate in the 16th century when Europeans first arrived. How the status quo had turned on its head by the early 20th century when European and American steamships dominated the Pacific, China was in social and political upheaval, and Japan had begun its march to empire.

Same as: HISTORY 392E



**HISTORY 93. The Chinese Empire from the Mongol Invasion to the Boxer Uprising. 3 Units.**

(Same as HISTORY 193. History majors and others taking 5 units, register for 193.) A survey of Chinese history from the 11th century to the collapse of the imperial state in 1911. Topics include absolutism, gentry society, popular culture, gender and sexuality, steppe nomads, the Jesuits in China, peasant rebellion, ethnic conflict, opium, and the impact of Western imperialism.

Same as: CHINA 93, FEMGEN 93

**HISTORY 94B. Japan in the Age of the Samurai. 3 Units.**

(Same as HISTORY 194B. History majors and others taking 5 units, register for 194B.) From the Warring States Period to the Meiji Restoration. Topics include the three great unifiers, Tokugawa hegemony, the samurai class, Neoconfucian ideologies, suppression of Christianity, structures of social and economic control, frontiers, the other and otherness, castle-town culture, peasant rebellion, black marketing, print culture, the floating world, National Studies, food culture, samurai activism, black ships, unequal treaties, anti-foreign terrorism, restorationism, millenarianism, modernization as westernization, Japan as imagined community.

**HISTORY 95. Modern Korean History. 3 Units.**

(Same as HISTORY 195. History majors and others taking 5 units, register for 195.) This lecture course provides a general introduction to the history of modern Korea. Themes include the characteristics of the Chosôn dynasty, reforms and rebellions in the nineteenth century, Korean nationalism; Japan's colonial rule and Korean identities; decolonization and the Korean War; and the different state-building processes in North and South, South Korea's democratization in 1980s, and the current North Korean crisis.

**HISTORY 95C. Modern Japanese History: From Samurai to Pokemon. 3 Units.**

(Same as History 195C. History majors and others taking 5 units, register for 195C.) Japan's modern transformation from the late 19th century to the present. Topics include: the Meiji revolution; industrialization and social dislocation; the rise of democracy and empire; total war and US occupation; economic miracle and malaise; Japan as soft power; and politics of memory. Readings and films focus on the lived experience of ordinary men and women across social classes and regions.

**HISTORY 95N. Maps in the Modern World. 4-5 Units.**

Preference to freshmen. Focus is on cutting-edge research. Topics: the challenge of grasping the globe as a whole; geography's roots in empire; maps as propaganda and as commodities; the cultural production of scale; and the cartography of imaginary worlds. Sources include resources in the Green Library Special Collections and in the Stanford Spatial History Lab.

**HISTORY 95S. Protest in Modern China. 5 Units.**

How has protest impacted the history of China? In this course, we study the history of state-citizen confrontation from the fall of the Qing Dynasty in 1911 to the Occupy Central movement in 2014. We seek to understand the politics of civic engagement in China today as part of politicized, global conversation about human rights, democracy, and revolution. We will examine a wide range of primary sources, explore archival offerings on campus, and hone critical reading and analytical writing skills.

Same as: PUBLPOL 95S

**HISTORY 98. The History of Modern China. 3 Units.**

(Same as HISTORY 198. History majors and others taking 5 units, register for 198.) Do you want to understand Modern China? If so, this course is for you. And even if you've studied China before, or grew up there, this course will deepen and challenge your perspectives. Through vivid and propulsive lectures - drawing on fiction, film, political essays, and more - Professor Tom Mullaney will chart out China's historical transformations from 1800 to today, equipping you to speak and write intelligently about Chinese politics, society, economy, culture, gender, ethnicity, and international affairs.

**HISTORY 98N. Beijing, Shanghai, and the Structure of Modern China. 3 Units.**

This course examines the transformation of China from the late empire to the present by studying the nature of its two greatest cities. Topics examined will include the evolving physical structure of the cities, their changing relations to the Chinese state and the outside world, shifting understandings of the urban population/crowd, the changing nature of time, new modes of self-definition through patterns of consumption, the cities as topics of literature and movies, and the nature of urban modernity.

**HISTORY 9N. How to Start Your Own Country: Sovereignty and State-Formation in Modern History. 3 Units.**

What does it mean to start a country, or to acquire and possess sovereignty over a territory? This course will examine the historical evolution of fundamental concepts in our international system: state formation, statehood, and sovereignty. Each week will spotlight a case-study in which sovereignty and statehood have appeared greatly confused and hotly contested. These include: the UK-China lease for control of Hong Kong; the US Naval Station in Guantanamo Bay; the corporate state of the legendary British East India Company; and Disney World.

**HISTORY 9S. Censorship & Propaganda: From Renaissance to Revolution. 5 Units.**

Information is power. From the fifteenth through eighteenth centuries, a shadowy world of illicit communication challenged church and state. We'll explore the resulting communication wars as waged through print, art, architecture, and theatre. We'll read banned, scandalous and satirical works by Niccolò Machiavelli, Martin Luther and Benjamin Franklin among many others. From the archives to the digital humanities, students will gain new tools to explore the politics and historical development of information control.

Same as: DLCL 106

## Human Biology (HUMBIO)

**HUMBIO 11. Meet HumBio: a lecture series introducing HumBio themes. 1 Unit.**

A lecture and discussion series designed for freshmen who want to learn more about Human Biology - either the major itself or the topics within its realm - by hearing from some of HumBio's most engaging faculty. Each week the class will feature a faculty member addressing three central questions: What do I do? Why is it important? and What professional opportunities are possible for a person concentrating in my field? The course is not meant to cover a specific body of content, therefore the assignments for the class aim to build fundamental study skills. These include taking useful notes, articulating questions or ideas prompted by the presentations, visiting office hours, connecting lecture topics with current events or journal articles, paying full courteous attention to speakers and peers, and creating a study guide. There will be no required readings or exams.

**HUMBIO 112. Conservation Biology: A Latin American Perspective. 3 Units.**

Principles and application of the science of preserving biological diversity. Conceptually, this course is designed to explore 4 major components relevant to the conservation of biodiversity, as exemplified by the Latin American region. The conceptual frameworks and principles, however, should be generally applicable, and provide insights for all regions of the world, including those of lesser biodiversity. Satisfies Central Menu Area 4 for Bio majors. Prerequisite: BIO 101, or BIO 43 or HUMBIO 2A with consent of instructor. Graduate level students will be expected to conduct a literature research exercise leading to a written paper, addressing a topic of their choosing, derived from any of the themes discussed in class.

Same as: BIO 144, BIO 234

**HUMBIO 113. The Human-Plant Connection. 3 Units.**

The intertwined biologies of humans and plants, particularly the ways in which people and plants have imposed selection pressures and ecological change on one another. Topics include evolution and basic plant structure; plant domestication; effects of agriculture on human health and physiology; plants in traditional and contemporary diets; and human influences on plant biology through genetic manipulation and environmental change. Class meetings center on journal articles. Final project includes written and multimedia presentations. Prerequisites: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 113S. Healthy/Sustainable Food Systems: Maximum Sustainability across Health, Economics, and Environment. 4 Units.**

Focus on problems with and systems-based solutions to food system issues. Four particular settings are addressed: University, worksite, hospital, and school food. Traditional vs. disruptive food system models compared and contrasted. The goal is to determine how best to maximize sustainability across several dimensions, including health, economics, and the environment. Underlying class themes include social justice and the potential for changing social norms around food production and consumption. Discussion-based seminar. Prerequisite: Human Biology Core or equivalent or consent of instructor.

Same as: CHPR 113

**HUMBIO 114. Environmental Change and Emerging Infectious Diseases. 4-5 Units.**

The changing epidemiological environment. How human-induced environmental changes, such as global warming, deforestation and land-use conversion, urbanization, international commerce, and human migration, are altering the ecology of infectious disease transmission, and promoting their re-emergence as a global public health threat. Case studies of malaria, cholera, hantavirus, plague, and HIV.

Same as: ANTHRO 177, ANTHRO 277, EARTHSYS 114, EARTHSYS 214

**HUMBIO 118. Theory of Ecological and Environmental Anthropology. 5 Units.**

Dynamics of culturally inherited human behavior and its relationship to social and physical environments. Topics include a history of ecological approaches in anthropology, subsistence ecology, sharing, risk management, territoriality, warfare, and resource conservation and management. Case studies from Australia, Melanesia, Africa, and S. America.

Same as: ANTHRO 90C

**HUMBIO 120. Health Care in America: An Introduction to U.S. Health Policy. 4 Units.**

Health policy and health care delivery from a historical and a current policy perspective. Introduces cost, quality, and access as measures of health system performance. Considers institutional aspects of health care reform. Upper division course with preference given to upperclassmen.

**HUMBIO 120A. American Health Policy. 3 Units.**

Issues in health care reform and the policy making process, the evolution of current systems, and theories underlying efforts for change. The national search for solutions to the problems of the uninsured, and the feasibility, options, and ramifications of alternative proposals for health care reform. Student presentations. Prerequisite: Human Biology 4B or equivalent, Human Biology 120, or consent of instructor.

**HUMBIO 121. Critical Issues in Child Health. 4 Units.**

Integrated picture of the physical and psychosocial health factors that result in a healthy child building on principles taught in the Human Biology core. Students apply basic human physiology to the physiology of the child to develop perspective on global pediatric health challenges and how the cultural context influences and defines the child living within it. Prerequisite: Human Biology Core or equivalent or consent of instructor. Enrollment will be limited and preference given to Seniors.

**HUMBIO 121E. Ethnicity and Medicine. 1-3 Unit.**

Weekly lecture series. Examines the linguistic, social class, and cultural factors that impact patient care. Presentations promote culturally sensitive health care services and review contemporary research issues involving minority and underserved populations. Topics include health care inequities and medical practices of African Americans, Asians, Latinos, Native Americans, immigrants, and refugees in both urban and rural settings. 1 unit requires weekly lecture attendance, completion of required readings, completion of response questions; 2 units requires weekly lecture attendance and discussion session, completion of required readings and weekly response questions; additional requirement for 3 units (HUMBIO only) is completion of a significant term paper. Only students taking the course for 3 units may request a letter grade. Enrollment limited to students with sophomore academic standing or above. This course must be taken for a minimum of 3 units to be eligible for Ways credit.

Same as: FAMMED 244

**HUMBIO 122. Beyond Health Care: the effects of social policies on health. 3 Units.**

Available evidence at the national and cross-country level linking social welfare interventions and health outcomes. If and how non-health programs and policies could have an impact on positive health outcomes. Evaluation of social programs and policies that buffer the negative health impact of economic instability and unemployment among adult workers and their children. Examination of safety nets, including public health insurance, income maintenance programs, and disability insurance. Prerequisites: HumBio 4B or equivalent, and some background in research methods and statistics, or Instructor permission.

Same as: PEDS 222

**HUMBIO 122M. Challenges of Human Migration: Health and Health Care of Migrants and Autochthonous Populations. 3 Units.**

(Undergraduate students must enroll in HUMBIO 122M. MD and Graduate students enroll in PEDS 212) An emerging area of inquiry. Topics include: global migration trends, health issues/aspects of migration, healthcare and the needs of immigrants in the US, and migrants as healthcare providers: a new area of inquiry in the US. Class is structured to include: lectures lead by the instructor and possible guest speakers; seminar, discussion and case study sessions led by students. Upper division course with preference given to upperclassmen.

Same as: PEDS 212

**HUMBIO 122S. Social Class, Race, Ethnicity, and Health. 4 Units.**

Examines health disparities in the U.S., looking at the patterns of those disparities and their root causes. Explores the intersection of lower social class and ethnic minority status in affecting health status and access to health care. Compares social and biological conceptualizations of race and ethnicity. Upper division course with preference given to upperclassmen.

Same as: AFRICAAM 132

**HUMBIO 123. Obesity in America: Clinical and Public Health Implications. 3-4 Units.**

Interdisciplinary clinical, research, and policy approaches. The prevalence, predictors, and consequences of obesity and diabetes; biological and physiological mechanisms; clinical treatments including medications and surgery; and the relevance of behavioral, environmental, economic, and policy approaches to obesity prevention and control. Undergraduate prerequisite: Human Biology core or equivalent, or consent of instructor. HumBio students must enroll in HumBio 123. CHPR Master's students who are not medical students enroll in CHPR 223 for a letter grade. Priority for enrollment given to CHPR master's students.

Same as: CHPR 223

**HUMBIO 124C. Global Child Health. 3 Units.**

This course introduces students to key challenges to the health and well being of children worldwide. We focus on child health problems in low- and middle-income countries (LMIC) to reflect the global burden of disease among children. We will review the scope and magnitude of the leading causes of morbidity and mortality among children, as well as examine regional variations. We will then identify both medical and non-medical causes, effects of, as well as interventions to address, some of the biggest child health problems. The course will also present an overview of the role of culture, gender, and non-state actors (NGOs, foundations, etc.) on health and health policy. Upper division course with preference given to upperclassmen.

**HUMBIO 124E. Economics of Infectious Disease and Global Health. 3 Units.**

Introduction to global health topics such as childhood health, hygiene, drug resistance, and pharmaceutical industries from an economic development perspective. Introduces economic concepts including decision-making over time, externalities, and incentives as they relate to health. Prerequisite: Human Biology Core or equivalent or consent of the instructor.

Same as: MED 236

**HUMBIO 125. Current Topics and Controversies in Women's Health. 2-3 Units.**

Interdisciplinary. Focus is primarily on the U.S., with selected global women's health topics. Topics include: leading causes of morbidity and mortality across the life course; reproductive (e.g. gynecologic & obstetric) health issues; sexual function; importance of lifestyle (e.g. diet, exercise, weight control), including eating disorders; mental health; sexual and relationship abuse; issues for special populations. In-class Student Debates on key controversies in women's health. Guest lecturers. For Ways credit eligibility, students must enroll in HUMBIO 125 for a minimum of 3 units and a letter grade. PhD minor in FGSS, enroll in FEMGEN 256 for 2 - 3 units and for a letter grade. Med students enroll in OBGYN 256 for 2 units. Undergraduate prerequisite: Human Biology Core or equivalent or consent of instructor.

Same as: FEMGEN 256, OBGYN 256

**HUMBIO 126. Promoting Health Over the Life Course: Multidisciplinary Perspectives. 3 Units.**

(HUMBIO students must enroll in HumBio 126. CHPR students must enroll in CHPR 226 for a letter grade.) Disease prevention and health promotion topics pertinent to different stages of the life span emphasizing healthy lifestyle and reducing risk factors in both individuals and communities. Focus is on scientific investigation, the application of behavioral science to risk reduction strategies, and the importance of health promotion as a social and economic imperative. Topics include: epidemiology of chronic diseases; social determinants of health, behavior change; obesity, nutrition, and stress; children, young adult, mid-life and aging health issues; health care delivery and public health system; workplace wellness programs; and other additional issues. Undergraduate prerequisite: Human Biology Core or equivalent or consent of instructor. Students enrolled in CHPR 226 must complete additional assignments appropriate for its Masters level listing.

Same as: CHPR 226

**HUMBIO 126A. Advanced Seminar in Health and Security. 3 Units.**

In this course, we explore the growing interconnections between health and security. Global health can no longer be addressed without some important consideration of international security as war, civil conflict and political instability have increasingly defined the health challenges in major parts of the world. This course will address the interaction of three types of security: human, national, and international. Health is obviously a component of human security. However, it has also been raised as a concern of national and international security, particularly in areas where HIV/AIDS and Ebola have been prevalent and where the risk of pandemic outbreaks is high. This course will bring together a cross-disciplinary examination of these issues and address the opportunities and potential risks of tightly linking the provision of essential health services to security considerations. We will use case studies to explore both the conceptual and technical issues inherent in health and security. The challenges of Ebola, HIV, complex humanitarian emergencies, and pandemics will be explored in detail. As part of each discussion, the intense interaction of biology, service delivery, political legitimacy, human rights, and international relations will be examined. Upper division course with preference given to upperclassmen.

**HUMBIO 127A. Community Health: Assessment and Planning I. 4 Units.**

Major determinants of health in a community. Working with community partners to identify health issues and plan programs and policies to prevent disease and promote health. Service learning component involving students in community health assessment techniques. Final grade given upon completion of HUMBIO 127B. Service Learning Course (certified by Haas Center). Prerequisite: HUMBIO 4B or equivalent, or consent of instructor.

**HUMBIO 127B. Community Health: Assessment and Planning II. 4 Units.**

Continuation of 127A. Service learning course with emphasis on conducting community health assessment and planning projects in collaboration with community-based organizations. Service Learning Course (certified by Haas Center). Prerequisite: HUMBIO 4B or equivalent HUMBIO 127A, or consent of instructor.

**HUMBIO 128. Community Health Psychology. 4 Units.**

Social ecological perspective on health emphasizing how individual health behavior is shaped by social forces. Topics include: biobehavioral factors in health; health behavior change; community health promotion; and psychological aspects of illness, patient care, and chronic disease management. Prerequisites: HUMBIO 3B or PSYCH 1, or equivalent.

Same as: PSYCH 101

**HUMBIO 129. Critical Issues in International Women's Health. 4 Units.**

Facilitated discussion about women's lives, from childhood through adolescence, reproductive years, and aging. Economic, social, and human rights factors, and the importance of women's capacities to have good health and manage their lives in the face of societal pressures and obstacles. Emphasis is on life or death issues of women's health that depend on women's capacity to exercise their human rights including maternal mortality, violence, HIV/AIDS, reproductive health, and sex trafficking. Organizations addressing these issues. A requirement of this class is participation in public blogs. Prerequisites: Human Biology core or equivalent or consent of instructor.

Same as: FEMGEN 129

**HUMBIO 129S. Global Public Health. 4 Units.**

The class is an introduction to the fields of international public health and global medicine. It focuses on resource poor areas of the world and explores major global health problems and their relation to policy, economic development and human rights. The course is intended for students interested in global health, development studies, or international relations, and provides opportunities for in-depth discussion and interaction with experts in the field. Upper division course with preference given to upperclassmen.

**HUMBIO 129W. Health Care Systems Around the World. 4 Units.**

This course will explore the role of health care systems in societies around the world, identifying the common challenges facing health care systems and how different institutional structures in different countries perform in response to these challenges. We will structure the course around general conceptual frameworks related to key health system institutions (including financing, insurance, provider payment, patient cost-sharing, and the regulation of medical technology). From this foundation, we will draw on the experience of individual countries (high and low income, with heavy chronic disease and infectious disease burdens) to illustrate the function of these institutions under real-world circumstances observed around the globe. Prerequisite: Human Biology Core or equivalent or consent of instructor.

Same as: MED 129

**HUMBIO 130. Human Nutrition. 4 Units.**

The study of food, and the nutrients and substances therein. Their action, interaction, and balance in relation to health and disease. Emphasis is on the biological, chemical, and physiological processes by which humans ingest, digest, absorb, transport, utilize, and excrete food. Dietary composition and individual choices are discussed in relationship to the food supply, and to population and cultural, race, ethnic, religious, and social economic diversity. The relationships between nutrition and disease; ethnic diets; vegetarianism; nutritional deficiencies; nutritional supplementation; phytochemicals. HUMBIO students must enroll in HUMBIO 130. CHPR master's students must enroll for a letter grade. Undergraduate prerequisite: Human Biology Core or equivalent or consent of instructor.

Same as: CHPR 130

**HUMBIO 131. Kinesiology. 4 Units.**

This course covers the basic principles governing human movement with an emphasis on sports applications. The course spends roughly equal amounts of time on the applied anatomy and biology, meaning both the large and small-scale body structure and function. The applied anatomy portion includes body structure (the muscles and their connections) and mechanics (e.g. forces, torque, momentum and power), which together describe macroscopic movement. The applied biology portion includes the molecular and cellular basis of movement, mainly muscle contraction, nerve signaling, and the mechanisms of exercise damage, cramping, muscle memory, delayed-onset muscle soreness, and fatigue. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 133. Human Physiology. 4 Units.**

Human physiology will be examined by organ systems: cardiovascular, respiratory, renal, gastrointestinal and endocrine. Molecular and cell biology and signaling principles that underlie organ development, pathophysiology and opportunities for regenerative medicine are discussed, as well as integrative control mechanisms and fetal development. Prerequisite: Human Biology core, Biology core, or equivalent, or consent of instructor.

Same as: BIO 112

**HUMBIO 135. Exercise Physiology. 4 Units.**

Explore the amazing capacity of your body to move and adapt within your everyday world. You will learn: how your body systems respond to the stress of acute exercise and adapt to chronic exercise training, how your cardiovascular system adapts to optimize oxygen delivery and utilization, how your muscles generate force and hypertrophy in response to training, and how your metabolic/biochemical pathways are regulated to support the increased energy demand of exercise. We will discuss theories on the causes of fatigue and muscle soreness, and on what limits human performance. Applied topics such as the effects of aging, gender, and environmental conditions (high altitude, heat, cold, microgravity) on your body will be emphasized in the second half of the course. Portions of the class will be taught through videos that use online lectures and engaging stories to illustrate physiology concepts. Prerequisite: Human Biology core, Biology core, or equivalent, or consent of instructor.

**HUMBIO 135S. Body Hacking: Applied Topics in Exercise Physiology. 3 Units.**

Our increasing understanding of exercise physiology and biochemistry provide new insights into how we can "hack" the human body to increase the response to exercise training and improve human performance and health. We will explore research and training interventions that try to capitalize on this new knowledge. Science communication will also be emphasized in the class, so students will learn the fundamentals of science storytelling and mixed media presentation of ideas.

Requirements of this class include participating in blogs & in-class discussions, evaluating physiology research, writing a research paper, and creating a science-based story by video or podcast to share with the class. If class is full, contact instructor for an application. Enrollment limited to 10. Prerequisites: B+ or higher in HUMBIO 135 and/or consent of instructor.

**HUMBIO 136. Human Physiology Laboratory. 4 Units.**

This laboratory course is active and inquiry based. Aspects of exercise and temperature are explored; however, the specific questions the class tackles differ each quarter. Samples of past questions: Does lactic acid accumulation correlate with exercise fatigue at different exercise and body temperatures? Does palm cooling during exercise mitigate the effect of body temperature on fatigue with or without evaporative cooling? Students participate both as experimenters and as subjects of the experiments in two-person teams. Participants must be in good physical condition, though not necessarily athletes, and must be willing to participate in strenuous exercise routines under adverse environmental conditions. Varsity athletes concurrently participating in a spring sport must consult the instructor before applying. Discussion sessions include student presentations of journal articles, data analyses, and feedback on individual WIM research proposals. By application only, see [sites.stanford.edu/bio107humbio136](https://sites.stanford.edu/bio107humbio136) for the application form.

Prerequisite: Bio 42 or HumBio 4A. Satisfies WIM for Biology.

Same as: BIO 107

**HUMBIO 139S. Sport and Exercise Medicine. 3 Units.**

Formerly HUMBIO 139E. This is an upper division course with a common theme of injury as well as injury prevention in sport and physical activity. The topics include the treatment and evaluation of common sports injuries and illnesses for both musculoskeletal and non-musculoskeletal/medical conditions. Students will also develop critical reading and thinking skills. Classes will incorporate didactic lectures, critical analysis of sports medicine literature, as well as hand-on labs incorporating current sports medicine injury evaluation tools. Prerequisite: Human Biology Core or Biology Foundations or equivalent or consent of instructor.

**HUMBIO 140. Sex and Gender in Human Physiology and Disease. 2-3 Units.**

(HumBio students must enroll in HumBio 140.) Chromosomal, hormonal and environmental influences that lead to male and female reproductive systems and neuroendocrine regulation and intersex variants. Masculinizing and feminizing effects of endogenous and exogenous sex hormones and other factors, in particular gender, on the musculoskeletal, neurological, cardiovascular, immunological and other systems and tissues, e.g. adipose, skin, etc. over the lifecourse, from conception to puberty, through reproductive phases (including changes during the menstrual cycle up to and beyond menopause in women, and with aging in both sexes). Transgender health issues. Guest lecturers. Prerequisite: Human Biology core or equivalent, or consent of instructor. HUMBIO students must enroll for 3 units.

Same as: FEMGEN 241, MED 240

**HUMBIO 142. Adolescent Development. 4 Units.**

Underlying changes and their consequences in everyday functioning. Physical, cognitive, social, and sexual development; how these changes influence the emerging sense of identity, autonomy, and intimacy. Contexts in which adolescents move such as family, friends and peers, school, and workplace. Focus is on normal development of boys and girls; attention to problem outcomes including eating disorders, depression, and teen pregnancy. Prerequisite: HUMBIO 3B or PSYCH 1, or consent of instructor.

**HUMBIO 142M. Special Topics in Adolescent Mental Health. 4 Units.**

Includes the study of aspects of common disorders seen in adolescent populations, such as prevalence, developmental course, gender differences, theoretical explanations, and therapeutic interventions. Topics will include mood/anxiety disorders, eating disorders, learning disabilities and ADHD, sexual risk behaviors, developmental disorders, substance abuse, and self-harm. Goals of this course include getting students to think critically about the unique mental health needs of adolescents, collaborating on devising ways to improve the way our society meets those needs, and strengthening writing and communication skills applicable to this area of inquiry. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 143. Adolescent Sexuality. 4 Units.**

Developmental perspective. Issues related to scientific, historical, and cultural perceptions; social influences on sexual development; sexual risk; and the limitations and future directions of research. Sexual identity and behavior, sexually transmitted diseases including HIV, pregnancy, abortion, gay and lesbian youth, sex education and condom availability in schools, mass media, exploitative sexual activity, and difficulties and limitations in studying adolescent sexuality. Legal and policy issues, gender differences, and international and historical trends. Prerequisite: Human Biology core or equivalent, or consent of instructor.

**HUMBIO 144. Boys' Psychosocial Development. 4 Units.**

Focuses on early childhood through adolescence. Examines boys' lives and experiences as embedded within interpersonal relationships as well as social and cultural contexts. Includes perspectives from psychology, sociology, gender studies, and education. Prerequisite: Human Biology core, Developmental Psychology, or consent of instructor.

**HUMBIO 145L. The Biology and Evolution of Language. 4-5 Units.**

Lecture course surveying the biology, linguistic functions, and evolution of the organs of speech and speech centers in the brain, language in animals and humans, the evolution of language itself, and the roles of innateness vs. culture in language. Suitable both for general education and as preparation for further studies in anthropology, biology, linguistics, medicine, psychology, and speech & language therapy. Anthropology concentration: CS, EE. No prerequisites.

Same as: ANTHRO 171, ANTHRO 271

**HUMBIO 146. Culture and Madness: Anthropological and Psychiatric Approaches to Mental Illness. 3-5 Units.**

Unusual mental phenomena have existed throughout history and across cultures. Taught by an anthropologist and psychiatrist, this course explores how different societies construct the notions of "madness": What are the boundaries between "normal" and "abnormal", reason and unreason, mind and body, diversity and disease? Optional: The course will be taught in conjunction with an optional two-unit discussion section or engaged learning component.

Same as: ANTHRO 186, ANTHRO 286, PSYC 286

**HUMBIO 146D. Developmental Disabilities: From Biology to Policy. 3 Units.**

Fifteen percent of US children have disabilities. While advances in medicine and technology have increased life expectancy for these children, health care delivery, education, and public attitudes have not kept pace. Students in this course will learn the possibilities and limitations of new biomedical treatments of Down syndrome, cerebral palsy, and autism. Students will also evaluate the impact of public policy initiatives, such as the Individuals with Disabilities Education Act and Americans with Disabilities Act on inclusion and participation in society. Prerequisite: HUMBIO 25SI or Human Biology Core or equivalent.

Same as: PEDS 246

**HUMBIO 147. Biology, Culture and Family in Early Development. 3-4 Units.**

Early childhood is a time of both enormous promise and vulnerability. Parents differ widely in their practices and beliefs about their role in enabling children to avoid risk and to achieve their potential for a healthy and productive life in the particular physical, social and cultural contexts of the communities and societies in which they live. In this seminar we will evaluate evidence from the biological and social sciences showing how experiences in infancy have profound and enduring effects on early brain architecture, with consequences for later language, cognitive, and socio-emotional development in childhood and adulthood. We will also consider the challenges of designing more effective social policies and programs to provide support for families in diverse socioeconomic and cultural contexts, who all want to help their children thrive. A community-service learning option, working with children as a reading tutor, is included for students taking this class for 4-units. Enrollment is limited and consent of instructor is required. Please send a brief statement of your interests, goals, and academic preparation relevant to the themes of this class to Prof. Fernald (afernald@stanford.edu). Pre-requisites: Psych 01 and Psych 60, or Human Biology 3B.

Same as: PSYCH 176

**HUMBIO 149. Psychological and Educational Resilience Among Children and Youth. 4 Units.**

Theoretical, methodological, and empirical issues pertaining to the psychological and educational resilience of children and adolescents. Overview of the resilience framework, including current terminology and conceptual and measurement issues. Adaptive systems that enable some children to achieve successful adaptation despite high levels of adversity exposure. How resilience can be studied across multiple levels of analysis, ranging from cell to society. Individual, family, school, and community risk and protective factors that influence children's development and adaptation. Intervention programs designed to foster resilient adaptation in disadvantaged children's populations.

Same as: EDUC 256

**HUMBIO 149L. Longevity. 4 Units.**

Interdisciplinary. Challenges to and solutions for the young from increased human life expectancy: health care, financial markets, families, work, and politics. Guest lectures from engineers, economists, geneticists, and physiologists.

Same as: NENS 202, PSYCH 102

**HUMBIO 151R. Biology, Health and Big Data. 3 Units.**

We are living in the midst of a revolution in the accessibility and availability of biological and medical data. How can all this data be used to improve human health? In this course, students will look at case studies from diabetes and cancer research to learn how to access publicly available data ranging from gene or protein level datasets to information about clinical trials. Students will apply what they learn from the case studies to develop a research proposal and presentation on a biology-related topic of their choice. The class will have a small group workshop-type format. Students will gain skills in research methods including accessing, analyzing and presenting data. There will be exercises using the R programming language. Prior programming experience is not required. Prerequisites: HumBio 2A, 3A or equivalent.

**HUMBIO 152. Viral Lifestyles. 3 Units.**

Viral lifestyles is a seminar devoted to exploring contemporary topics in microbiology with a focus on the examination of the major transitions in evolution. The course includes lectures and will provide an opportunity for students to interact with each other, the instructor and guest lecturers to explore novel research areas in microbiology that are still being formed. The course will begin with lectures on topics such as the major transitions framework, postulated by John Maynard Smith and Eors Szathmary, proposes that major leaps in evolution follow the same roadmap, where individual entities come together to form complex individuals, in the process giving up their ability to reproduce independently. and will transition to presentation and discussion led by student groups. A significant percentage of class will be devoted to presentation and discussion focused on group projects. Prerequisite: Human Biology core or Biology core or equivalent, or consent of instructor.

**HUMBIO 153. Parasites and Pestilence: Infectious Public Health Challenges. 4 Units.**

We will learn about parasitic and other pestilence of public health importance and how they affect billions of people worldwide. We examine the pathogenesis, clinical syndromes, complex life cycles, and the interplay among environment, vectors, hosts, and reservoirs; we explore historical contexts as it informs current interventions and programming against disease. Public health policy initiatives aimed at halting disease transmission are viewed critically through the lens of researchers, public health level initiatives, popular media (TV and movies) and individual patients with these diseases. There will be guest visitors who have experienced these diseases and we will hear from several researchers and experts working on the challenges of controlling, eliminating or even eradicating these diseases. We will become familiar with the targeted diseases of the World Health Organization tropical disease research list, including river blindness, sleeping sickness, leishmaniasis, schistosomiasis, mycobacterial disease (tuberculosis and leprosy), malaria, toxoplasmosis, dracunculiasis, and intestinal helminthes. There will be a lab section for "hands on" learning and viewing of parasites. Interactive sessions will involve teaching each other about these biological forces of nature that invade humans. Prerequisite: Human Biology core or equivalent, or consent of instructor.

**HUMBIO 154A. Engineering Better Health Systems: modeling for public health. 4 Units.**

This course teaches engineering, operations research and modeling techniques to improve public health programs and systems. Students will engage in in-depth study of disease detection and control strategies from a "systems science" perspective, which involves the use of common engineering, operations research, and mathematical modeling techniques such as optimization, queuing theory, Markov and Kermack-McKendrick models, and microsimulation. Lectures and problem sets will focus on applying these techniques to classical public health dilemmas such as how to optimize screening programs, reduce waiting times for healthcare services, solve resource allocation problems, and compare macro-scale disease control strategies that cannot be easily evaluated through randomized trials. Readings will complement the lectures and problem sets by offering critical perspectives from the public health history, sociology, and epidemiology. In-depth case studies from non-governmental organizations, departments of public health, and international agencies will drive the course. Prerequisites: A course in introductory statistics, and a course in multivariable calculus including ordinarily differential equations. Open to upper-division undergraduate students and graduate students. Human Biology majors enroll in HUMBIO 154A.

Same as: HRP 234, MED 254

**HUMBIO 154B. Principles of Epidemiology, with an emphasis on women's health. 3 Units.**

Epidemiology is the study of the distribution and determinants of health and disease in human populations. Utilizing the lens of women's health, this course will introduce students to the basic principles of epidemiological study design, analysis, and interpretation. The course will draw on critical topics in women's health for lectures, discussions, readings and assignments. Research articles from epidemiology as well as other social science disciplines will be utilized to offer students multiple perspectives on contemporary women's health issues. Human Biology 154 courses can be taken separately or as a series. Prerequisite: Human Biology core or equivalent or consent of instructor.

**HUMBIO 154C. Cancer Epidemiology. 4 Units.**

Clinical epidemiological methods relevant to human research in cancer will be the focus. The concepts of risk; case control, cohort, and cross-sectional studies; clinical trials; bias; confounding; interaction; screening; and causal inference will be introduced and applied. Social, political, economic, and ethical controversies surrounding cancer screening, prevention, and research will be considered. Human Biology 154 courses can be taken separately or as a series. Prerequisite: Human Biology core or equivalent, or instructor consent.

**HUMBIO 155C. Human and Viruses Part III. 3 Units.**

Comprehensive survey of human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis on host pathogen interactions and policy issues. Prerequisite: prior enrollment MI 155A/HUMBIO 155H and MI 155B/HUMBIO 155V and concurrent enrollment with MI 155D. Same as: MI 155C

**HUMBIO 155D. Human and Viruses Part IV. 3 Units.**

Comprehensive survey of human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis on host pathogen interactions and policy issues. Prerequisite: prior enrollment in MI 155A/HUMBIO 155H and MI 155B/HUMBIO 155V and concurrent enrollment with MI 155C. Same as: MI 155D

**HUMBIO 155H. Humans and Viruses I. 3 Units.**

Introduction to human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis is on host pathogen interactions and policy issues. Topics: polio and vaccination, smallpox and eradication, yellow fever and history, influenza and genomic diversity, rubella and childhood infections, adenovirus and viral morphology, ebola and emerging infection, lassa fever and immune response. Prerequisite: Concurrent enrollment in MI 155B or HUMBIO 155V. Same as: MI 155A

**HUMBIO 155V. Humans and Viruses II. 3 Units.**

Introduction to human virology integrating epidemiology, molecular biology, clinical sciences, social sciences, history, and the arts. Emphasis on host pathogen interactions and policy issues. Topics: measles and viral epidemiology, rotavirus and world health, rabies and infections of the brain, HPV and cancer-causing viruses, herpes simplex and viral latency, CMV and viral teratogenesis, retrovirology and endogenous viral sequences, HIV and viral treatment, viral hepatitis and chronic infections, prions and diseases of life style. Prerequisite: Concurrent enrollment with MI 155A or HUMBIO 155H. Same as: MI 155B

**HUMBIO 157. The Biology of Stem Cells. 3 Units.**

The role of stem cells in human development and potential for treating disease. Guest lectures by biologists, ethicists, and legal scholars. Prerequisites: HumBio 2A and HUMBIO 3A, or the equivalent in the BioCore in Biological Sciences.

**HUMBIO 158. The Human Genome and Disease. 3 Units.**

The variability of the human genome and the role of genomic information in research, drug discovery, and human health. Concepts and interpretations of genomic markers in medical research and real life applications. Human genomes in diverse populations. Original contributions from thought leaders in academia and industry and interaction between students and guest lecturers. Students with a major, minor or cotermin in Biology: 109A/209A or 109B/209B may count toward degree program but not both.

Same as: BIO 109A, BIOC 109A, BIOC 209A

**HUMBIO 158S. Genetics and Society. 3 Units.**

This course will focus on social science engagement with developments in genetic research, focusing on two key issues. First, social scientists are trying to figure out how genetic data can be used to help them better understand phenomena they have been long endeavoring to understand. Second, social scientists try to improve understanding of how social environments moderate, amplify, or attenuate genetic influences on outcomes.

Same as: EDUC 373, SOC 232

**HUMBIO 159. Genes and Environment in Disease Causation: Implications for Medicine and Public Health. 2-3 Units.**

The historical, contemporary, and future research and practice among genetics, epidemiology, clinical medicine, and public health as a source of insight for medicine and public health. Genetic and environmental contributions to multifactorial diseases; multidisciplinary approach to enhancing detection and diagnosis. The impact of the Human Genome Project on analysis of cardiovascular and neurological diseases, and cancer. Ethical and social issues in the use of genetic information. Prerequisite: basic course in genetics; for undergraduates, Human Biology core or equivalent or consent of instructor. This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit.

Same as: HRP 238

**HUMBIO 160. Human Behavioral Biology. 5 Units.**

Multidisciplinary. How to approach complex normal and abnormal behaviors through biology. How to integrate disciplines including sociobiology, ethology, neuroscience, and endocrinology to examine behaviors such as aggression, sexual behavior, language use, and mental illness.

Same as: BIO 150

**HUMBIO 161. The Neurobiology of Sleep. 4 Units.**

Preference to seniors and graduate students. The neurochemistry and neurophysiology of changes in brain activity and conscious awareness associated with changes in the sleep/wake state. Behavioral and neurobiological phenomena including sleep regulation, sleep homeostasis, circadian rhythms, sleep disorders, sleep function, and the molecular biology of sleep. Enrollment limited to 16.

Same as: BIO 149, BIO 249

**HUMBIO 162L. The Literature of Psychosis. 3-5 Units.**

One of the great gifts of literature is its ability to give us insight into the internal worlds of others. This is particularly true of that state clinicians call "psychosis." But psychosis is a complex concept. It can be terrifying and devastating for patients and families, and yet shares characteristics with other, less pathological states, such as mysticism and creativity. How then can we begin to make sense of it? In this course, we will examine the first-hand experience of psychosis. We will approach it from multiple perspectives, including clinical descriptions, works of art, and texts by writers ranging from Shakespeare, to the science fiction writer Philip K. Dick, to patients attempting to describe their experience. This class is not only for students thinking of careers in medicine, psychology or anthropology, but also readers and writers interested exploring extraordinary texts. There are no prerequisites necessary; all that is needed is a love of language and a curiosity about the secrets of other minds.

Same as: ANTHRO 82P, PSYC 82, PSYC 282

**HUMBIO 163. Neural Systems and Behavior. 4 Units.**

The field of neuroethology and its vertebrate and invertebrate model systems. Research-oriented. Readings include reviews and original papers. How animal brains compare; how neural circuits are adapted to species-typical behavior; and how the sensory worlds of different species represent the world. Lectures and required discussions. Satisfies Central Menu Area 3 for Bio majors. Prerequisites: BIO 42, HUMBIO 4A.

Same as: BIO 263

**HUMBIO 164. Autism Spectrum Disorder. 3 Units.**

Deficits in social communication and interaction and repetitive behaviors are the core symptoms of Autism Spectrum Disorder (ASD), a neurodevelopmental disorder that affects about 1% of all children and costs society an estimated \$268B annually. This interactive seminar course will provide an overview of our understanding of ASD, from genetics through epidemiology, biology and treatment, and the many implications for society, including the principles and problems of diagnosis, its impact upon family and across the lifespan, and controversies regarding its etiology, perception and care. Preference given to Seniors. Prerequisite: Human Biology core, Biology core, or equivalent, or consent of instructor.

**HUMBIO 165. Frontiers in Global Mental Health. 3 Units.**

This class will increase awareness of global mental health issues and social disparities while developing tools to address associated challenges both at home and abroad. Special attention will be placed on human rights issues including access to mental health care and the mental health of survivors of human rights abuses. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 166. Food and Society: Exploring Eating Behaviors in Social, Environmental, and Policy Context. 4 Units.**

The material in this course is an introduction to the field and the target audience is undergraduates. It may be of interest to graduate students unfamiliar with the field. The class examines the array of forces that affect the foods human beings eat, and when, where, and how we eat them, including human labor, agriculture, environmental sustainability, politics, animal rights/welfare, ethics, policy, culture, economics, business, law, trade, and ideology, and psychology. The class addresses the impact of current policies and actions that might be taken to improve human nutrition and health; macro-scale influences on food, nutrition, and eating behavior. Undergraduate Prerequisite: Human Biology Core or equivalent or consent of instructor.

Same as: CHPR 166

**HUMBIO 167. The Art of Vision. 3 Units.**

This course is about eyes and art. We explore how eyes are built, how they process visual information, and how they are affected by disease. And we explore how fine art and famous artists (from all eras, ancient to modern) have depended upon vision, both normal and abnormal. There are short diversions into animal eyes and the role of vision in music, literature, and sports. Prerequisite: HumBio 4A or BIO 42 or consent of Instructor.

**HUMBIO 168. Multidisciplinary Perspectives on Guilt. 3 Units.**

The seminar encompasses the personal and cultural components of guilt from multidisciplinary perspectives. At the individual level, it explores behaviors that induce guilt; their relational aspects; genesis in evolutionary and developmental terms: and its normal and pathological manifestations. The cultural section includes cross-cultural perspectives on guilt and its conceptions in Christianity, Judaism, Islam, Hinduism, Buddhism, and Confucianism; as well as in the philosophy of Aristotle, Kant, J. S Mill and Nietzsche, and culpability in the law. Derived from this material, the course will also focus on the nature of ethical reasoning and the ways we make ethical choices and judgments in our lives.

Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 16SC. The Stanford Safari: Field Observations in Our Own Backyard. 2 Units.**

Although Stanford is renowned as a place of learning and research, the goal of this class is to approach Stanford University as a subject worthy of study in and of itself. Students will study Stanford in terms of the built environment (e.g. architecture; how buildings and styles interact; how the landscape shapes the flow of people, plants, and animals), the human interactions (e.g. sociology of tourism, the politics of land use), and the ecology (flora, fauna, geology, climatology, and pest control) of campus. The students in this course will defamiliarize themselves with their campus environment and approach Stanford with new eyes—the eyes of the anthropologist, the photographer, the historian, the artist, and the tourist. We will explore its edifices, gardens, sculptures, open spaces, and commercial areas. Moreover, we will use Stanford as a lens to discuss a variety of disciplines: architecture, educational theory, California history, climatology, and natural history. But more than anything, we will focus on the human component, including the vision, drive, and serendipity that shaped the University. In taking the course students will hone their skills in field observation that will carry over to future field work in more distant locales, develop an interdisciplinary approach to analyzing complex institutions, and gain a deeper appreciation for the complexity and richness of Stanford that will enhance all aspects of their remaining time as undergraduates. On a daily basis, the class will consist of three components: class presentations and discussions, formal and informal talks by many of the local experts at Stanford, and topical field trips. Students will select a theme that is of personal interest and develop field observation techniques useful for their particular topics. Course assignments will be to give two presentations on specific aspects of Stanford. In addition, each student will keep a field note-book with daily observations and field notes, post a collection of photographic observations, and complete pertinent readings. Plan to work intensely and have a great time in the process.

**HUMBIO 170. Facts, Science & Making Policy. 5 Units.**

The World Is Flat, The Sun Revolves Around The Earth, and other Alternative Facts. The role of science in civil rights, justice, policy, criminal justice, evidence, education, and disabled rights. Prerequisite: Upper division course with preference given to upperclassmen.

**HUMBIO 170A. Sex and the Law. 5 Units.**

This course uses an interdisciplinary approach to examine the laws and regulation of sex in the United States by considering the legal, policy, social, political and scientific bases (or lack thereof) of such laws, the context and objectives of sex regulation, and the political dynamics of contemporary and controversial issues presented by this subject. Some laws reflect policies to protect persons from harm related to sexual conduct, such as rape, assault and pedophilia. Other laws impose notions of morality, such as sodomy, incest or polygamy, or homosexuality, or reflect policy or social judgments regarding abortion, contraceptives, and sexual activity of minors. Regulation often concern consensual conduct. This course will consider these topics from varying perspectives and policy objectives, and in the context of Constitutional and other liberty interests. Prerequisite: Upper division course with preference given to upperclassmen.

**HUMBIO 171. The Death Penalty: Human Biology, Law, and Policy. 3 Units.**

Combines academic study with student participation in forensic research and case investigation, including DNA evidence, psychological and physiological development, mental and physical disabilities, and witness interviews. The philosophy, structure, and application of capital punishment in the U.S. Goal is to examine and challenge the issues involved in the death penalty from the perspective of involvement in a real case. Course not taught from a preconceived belief or political or philosophical agenda except to involve students in an intellectual challenge of policy and philosophy. Prerequisite: Upper division course with preference given to upperclassmen.

**HUMBIO 172B. Children, Youth, and the Law. 5 Units.**

How the legal rights of children and adolescents in America are defined, protected, and enforced through the legal process within the context of their developmental needs and competing societal interests. Topics: origins and definitions of children's rights; adoption; custody; the juvenile justice system; education; freedom of speech; and sex. The class is interactive, using hypotheticals for discussion and analysis. A and B alternate; students may take one or both. Prerequisite: Upper division course with preference given to upperclassmen. Same as: PUBLPOL 172

**HUMBIO 173. Science, Innovation and the Law. 5 Units.**

The interaction of science, business and law: how scientific ideas are protected by law; the rights of those who invent, develop, and finance scientific discovery; the kinds of protections that apply; and how ideas are commercialized and brought to market. Guest speakers will include investors, start-up founders, scientists and inventors, and other relevant experts from IT, medical, pharma and biological sectors. The history of Silicon Valley will be examined as a paradigm for innovation, including a tour of historical landmarks in Silicon Valley. Prerequisite: Upper division course with preference given to upperclassmen.

**HUMBIO 174. Foundations of Bioethics. 3 Units.**

Classic articles, legal cases, and foundational concepts. Theoretical approaches derived from philosophy. The ethics of medicine and research on human subjects, assisted reproductive technologies, genetics, cloning, and stem cell research. Ethical issues at the end of life. Prerequisite: Human Biology core or equivalent, or consent of instructor.

**HUMBIO 175H. Literature and Human Experimentation. 3-5 Units.**

This course introduces students to the ways literature has been used to think through the ethics of human subjects research and experimental medicine. We will focus primarily on readings that imaginatively revisit experiments conducted on vulnerable populations: namely groups placed at risk by their classification according to perceived human and cultural differences. We will begin with Mary Shelley's *Frankenstein* (1818), and continue our study via later works of fiction, drama and literary journalism, including Toni Morrison's *Beloved*, David Feldshuh's *Miss Evers Boys*, Hannah Arendt's *Eichmann* and Vivien Spitz's *Doctors from Hell*, Rebecca Skloot's *Immortal Life of Henrietta Lacks*, and Kazuo Ishiguro's *Never Let Me Go*. Each literary reading will be paired with medical, philosophical and policy writings of the period; and our ultimate goal will be to understand modes of ethics deliberation that are possible via creative uses of the imagination, and literature's place in a history of ethical thinking about humane research and care. Note: This course must be taken for a letter grade to be eligible for WAYS credit. Same as: AFRICAAM 223, COMPLIT 223, CSRE 123B, MED 220

**HUMBIO 175L. Literature and Global Health. 3-5 Units.**

This course examines the ways writers in literature and medicine have used the narrative form to explore the ethics of care in what has been called the developing world. We will begin with a call made by the editor-in-chief of *The Lancet* for a literature of global health, namely fiction modeled on the social reform novels of the nineteenth century, understood to have helped readers develop a conscience for public health as the field emerged as a modern medical specialty. We will then spend the quarter understanding how colonial, postcolonial, and world literatures have answered and complicated this call. Readings will include prose fiction by Albert Camus, Joseph Conrad, Tsitsi Dangaremba, Amitav Ghosh, Susan Sontag as well as physician memoirs featuring Frantz Fanon, Albert Schweitzer, Abraham Verghese, Paul Farmer. And each literary reading will be paired with medical, philosophical, and policy writings that deeply inform the field of global health. Note: To be eligible for WAYS credit, you must take the course for a Letter Grade.

Same as: AFRICAAM 229, AFRICAST 229, COMPLIT 229, CSRE 129B, FRENCH 229, MED 234



**HUMBIO 176A. Medical Anthropology. 4 Units.**

Emphasis is on how health, illness, and healing are understood, experienced, and constructed in social, cultural, and historical contexts. Topics: biopower and body politics, gender and reproductive technologies, illness experiences, medical diversity and social suffering, and the interface between medicine and science.

Same as: ANTHRO 82, ANTHRO 282

**HUMBIO 178. Ethics and Politics of Public Service. 3-5 Units.**

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford.

Same as: CSRE 178, ETHICSOC 133, PHIL 175A, PHIL 275A, POLISCI 133, PUBLPOL 103D, URBANST 122

**HUMBIO 180. Human Skeletal Anatomy. 5 Units.**

Study of the human skeleton (a. k. a. human osteology), as it bears on other disciplines, including medicine, forensics, archaeology, and paleoanthropology (human evolution). Basic bone biology, anatomy, and development, emphasizing hands-on examination and identification of human skeletal parts, their implications for determining an individual's age, sex, geographic origin, and health status, and for the evolutionary history of our species. Three hours of lecture and at least three hours of supervised and independent study in the lab each week.

Same as: ANTHRO 175, ANTHRO 275, BIO 174, BIO 274

**HUMBIO 182. Peopling of the Globe: Changing Patterns of Land Use and Consumption Over the Last 50,000 Years. 3-5 Units.**

Fossil, genetic and archaeological evidence suggest that modern humans began to disperse out of Africa about 50,000 years ago. Subsequently, humans have colonized every major landmass on earth. This class introduces students to the data and issues regarding human dispersal, migration and colonization of continents and islands around the world. We explore problems related to the timing and cause of colonizing events, and investigate questions about changing patterns of land use, demography and consumption. Students are introduced to critical relationships between prehistoric population changes and our contemporary environmental crisis.

Same as: ANTHRO 18, ARCHLGY 12, EARTHSYS 21

**HUMBIO 18SC. Conservation and Development Dilemmas in the Amazon. 2 Units.**

This course explores the human dimensions of conservation efforts under way in the Amazon Basin of South America. It has two specific goals: (1) to introduce the human ecology of Amazonia; and (2) to assess the prospects for joint efforts at biodiversity conservation and community development. We will draw on case studies to investigate such topics as the causes and consequences of deforestation, the social impact of parks and protected areas, and the potential for "Integrated Conservation and Development Projects" (ICDPs) such as extractive reserves, natural forest management, biodiversity prospecting, and community-based ecotourism. The course views Amazonia as a microcosm of the challenges facing conservation and development efforts today in the Third World. Part of the course is an intensive 11-day expedition to the Peruvian Amazon, at no extra cost, to observe firsthand the conservation and development dilemmas discussed in class. We will visit ecolodges in the rainforest, walking miles of trails to learn about local flora, fauna, and conservation efforts. We will also visit Machu Picchu in the upper reaches of the rainforest. For the travel portion of the class, undergraduates will be joined by a group of Stanford alumni and friends. Student contributions and presentations are emphasized throughout the course. Students are expected to come well-prepared to each session, to lead discussions, and to carry out literature research. The final assignment is a 6 to 8 page paper on a case study of your own choosing or an equivalent piece of a longer collaborative paper that offers a critical assessment of one particular conservation and/or development project in or near the region we will visit. Students will present the main findings of their papers in a joint seminar of undergraduates and alumni as we travel in the Peruvian Amazon. Note: Students will arrive on campus and will be housed at Stanford until we leave for the Amazon. Travel to and from Peru organized by the Travel/Study Program of the Stanford Alumni Association is included; costs are defrayed by the Stanford Field Seminar Fund and generous donors.

Same as: ANTHRO 11SC

**HUMBIO 191. Human Biology Practicum. 1 Unit.**

Restricted to Human Biology majors. For students who have undertaken supervised community-engaged service, research (e.g. HB-REX, Bio-X) or pre-professional experiences related to their Area of Concentration topic. Includes a series of five required workshops, written reflection and presentation. Satisfies the Capstone Requirement of the major.

**HUMBIO 192A. Human Biology Synthesis. 2-3 Units.**

Co-Requisite HUMBIO 191. Restricted to Human Biology majors. Expands the work of the Human Biology Practicum; (can also focus on a different aspect of the Area of Concentration). Allows students the opportunity to craft a culminating, creative work of scholarship based on a synthesis of personal and academic interests, including service projects. Exhibited during senior year.

**HUMBIO 192S. Human Biology Synthesis. 2-3 Units.**

Co-Requisite HUMBIO 191. Restricted to Human Biology majors. Expands the work of the Human Biology Practicum; (can also focus on a different aspect of the Area of Concentration). Allows students the opportunity to craft a culminating, creative work of scholarship based on a synthesis of personal and academic interests, including service projects. Exhibited during senior year.

**HUMBIO 192W. Human Biology Synthesis. 2-3 Units.**

Co-Requisite HUMBIO 191. Restricted to Human Biology majors. Expands the work of the Human Biology Practicum; (can also focus on a different aspect of the Area of Concentration). Allows students the opportunity to craft a culminating, creative work of scholarship based on a synthesis of personal and academic interests, including service projects. Exhibited during senior year.

**HUMBIO 193. Research in Human Biology. 1-5 Unit.**

Independent research conducted under faculty supervision, in junior or senior year, normally but not necessarily in pursuit of an honors project. May be taken for a maximum 3 quarters of credit. Prerequisite: Faculty approval; application available in student services office.

**HUMBIO 194. Honors. 1-10 Unit.**

Restricted to Human Biology majors. Completion of the honors project, normally taken in the student's final quarter. First component: the honors thesis, a final paper providing evidence of rigorous research, fully referenced, and written in an accepted scientific style. Second component: participation in the honors symposium, including a 10-minute oral presentation followed by a brief question and answer session. Prerequisites: 193 or 199, and acceptance into the honors program.

**HUMBIO 197. Human Biology Internship. 1-4 Unit.**

Limited to and required of Human Biology majors. A supervised field, community, or lab experience of student's choosing, pre-approved by Human Biology faculty and student advisers, and initiated at least three quarters prior to graduation. Participation in a poster session on the internship experience is required during the first quarter that the student is in residence at Stanford after completion of the internship. May be repeated for credit and a total of 4 units accumulatively. Prerequisite: Human Biology core.

**HUMBIO 198. Senior Tutorial in Human Biology. 1-5 Unit.**

Reading for Human Biology majors in exceptional circumstances and under sponsorship of Human Biology associated faculty. Students must apply through Human Biology student services before registering. Reading list, paper, and evaluation required. May be repeated for credit.

**HUMBIO 199. Directed Reading/Special Projects. 1-4 Unit.**

Human Biology majors must obtain a sponsor from the Human Biology associated faculty or the Academic Council. Non-majors and students who have not declared must obtain a sponsor only from the Human Biology associated faculty. Students must complete application in student services office.

**HUMBIO 19SC. Parks and Peoples: Dilemmas of Protected Area Conservation in East Africa. 2 Units.**

The world-famous landscapes of East Africa, including Serengeti National Park, Ngorongoro Conservation Area, and the Rift Valley lakes of Tanzania form the backdrop for this special course on protected area conservation and its impacts on local people. The course is designed to explore the pros and cons of parks and protected areas as they affect flora, fauna, and human inhabitants, and to address the dilemma of how to achieve conservation in a manner that creates local community benefits and promotes social justice. We will use a case study approach to ask: (1) What approach to protected area (PA) conservation has been taken in each case? Who are the key proponents and what are their main social and ecological objectives? (2) How successful has the protected area been at achieving its conservation goals? (3) What are the benefits of the PA to people and who receives them? (4) What are the costs of the PA to people and who pays them? (5) Where benefits are not commensurate to costs, what, if anything, is being done to address the imbalance? How well is it working? (6) Are there alternative conservation models that would make the interests of parks and people more compatible, and reduce the tradeoffs between them? What is needed to operationalize these alternative models, and how do they incentivize conservation behavior among local residents? This course includes an intensive 12-day expedition to Tanzania to observe firsthand the dilemmas of parks and peoples we have discussed in class. We are scheduled to visit Tarangire, Lake Manyara, Mt. Meru, and Serengeti National Parks, the Ngorongoro Conservation Area, and nearby Maasai villages. Both on campus and in Tanzania, the course emphasizes student contributions and presentations. Students are required to read one or two books a month over the summer, and to come to campus in the fall well-prepared to discuss each one, including co-leading the discussion of one of the readings. Students are also expected to carry out literature research on a particular conservation dilemma in East Africa that is of interest to them for the final assignment of the seminar, a 6- to 8-page paper, and to present the main findings of that paper during evening seminars as we travel in East Africa. Note: Students will arrive on campus and will be housed at Stanford until we leave for the travel portion of the course. A group of 20-some Stanford alumni will join us for the last 2 days on campus and for the travel portion of the course.

**HUMBIO 200. Teaching of Human Biology. 1-5 Unit.**

For upper division undergraduates and graduate students. Practical experience in teaching Human Biology or serving as an assistant in a lecture course. May be repeated for credit.

**HUMBIO 25SI. Diverse Perspectives on Disabilities. 1-2 Unit.**

This class investigates definitions and the complexities of life with a disability through discussion and panel based learning. Through student and parent panels, speakers, professors, and professionals in the field of disability, this class looks at the different perspectives and ways that disability interacts with the world. In addition to learning about the scientific, social and legal backgrounds students can also participate in a community volunteering project for an additional unit through Kids with Dreams or another community or student organization.

**HUMBIO 26. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.**

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 135, AFRICAST 235, EDUC 135, EDUC 335, HRP 235, MED 235

**HUMBIO 27. Traditional Chinese Medicine. 1 Unit.**

The philosophy and history behind traditional Chinese medicine. Concepts such as Qi, Yin/Yang, meridians, Chinese organs, and the 5 elements. How these concepts are applied through techniques such as acupuncture, herbal medicine, Qi gong, and massage. How traditional Chinese medicine is understood from a scientific standpoint. Political and socioeconomic implications. Observation of an acupuncturist. Readings on the integration of Eastern and Western medicine and on traditional Chinese medicine.

**HUMBIO 28. Health Impact of Sexual Assault and Relationship Abuse across the Lifecourse. 1-3 Unit.**

Cross-listed with SOMGEN 237 and FEMGEN 237. HumBio students must enroll in HumBio 28 or AFRICAAM 28. An overview of the acute and chronic physical and psychological health impact of sexual abuse through the perspective of survivors of childhood, adolescent, young and middle adult, and elder abuse, including special populations such as pregnant women, military and veterans, prison inmates, individuals with mental or physical impairments. Also addresses: race/ethnicity, gender identity, sexual orientation, and other demographic and societal factors, including issues specific to college culture. Professionals with expertise in sexual assault present behavioral and prevention efforts such as bystander intervention training, medical screening, counseling and other interventions to manage the emotional trauma of abuse. Undergraduates must enroll for 3 units. Medical and graduate students should enroll in SOMGEN 237 for 1-3 units. To receive a letter grade in any listing, students must enroll for 3 units. This course must be taken for a letter grade and a minimum of 3 units to be eligible for Ways credit. Same as: AFRICAAM 28

**HUMBIO 29A. Well-Being in Immigrant Children & Youth: A Service Learning Course. 4 Units.**

This is an interdisciplinary course that will examine the dramatic demographic changes in American society that are challenging the institutions of our country, from health care and education to business and politics. This demographic transformation is occurring first in children and youth, and understanding how social institutions are responding to the needs of immigrant children and youth to support their well-being is the goal of this course.

Same as: CHILATST 177A, CSRE 177E, EDUC 177A

**HUMBIO 2A. Genetics, Evolution, and Ecology. 5 Units.**

Introduction to the principles of classical and modern genetics, evolutionary theory, and population biology. Topics: micro- and macro-evolution, population and molecular genetics, biodiversity, and ecology, emphasizing the genetics and ecology of the evolutionary process and applications to human populations. HUMBIO 2A and HUMBIO 2B are designed to be taken concurrently and exams for both sides may include material from joint module lectures. Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines. Please note Human Biology majors are required to take the Human Biology Core Courses for a letter grade.

**HUMBIO 2B. Culture, Evolution, and Society. 5 Units.**

Introduction to the evolutionary study of human diversity. Hominid evolution, the origins of social complexity, social theory, and the emergence of the modern world system, emphasizing the concept of culture and its influence on human differences. HUMBIO 2B, with HUMBIO 3B and HUMBIO 4B, satisfies the Writing in the Major (WIM) requirement for students in Human Biology. HUMBIO 2A and HUMBIO 2B are designed to be taken concurrently and exams for both sides may include material from joint module lectures. Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines. Please note Human Biology majors are required to take the Human Biology Core Courses for a letter grade.

**HUMBIO 3A. Cell and Developmental Biology. 5 Units.**

The principles of the biology of cells: principles of human developmental biology, biochemistry of energetics and metabolism, the nature of membranes and organelles, hormone action and signal transduction in normal and diseased states (diabetes, cancer, autoimmune diseases), drug discovery, immunology, and drug addiction. HUMBIO 3A and HUMBIO 3B are designed to be taken concurrently and exams for both sides may include material from joint module lectures. Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines. Please note Human Biology majors are required to take the Human Biology Core Courses for a letter grade. Prerequisite: college chemistry or completion of the HumBio Core on-line chemistry lecture series during the fall quarter.

**HUMBIO 3B. Behavior, Health, and Development. 5 Units.**

Research and theory on human behavior, health, and life span development. How biological factors and cultural practices influence cognition, emotion, motivation, personality, and health in childhood, adolescence, and adulthood. HUMBIO 3B, with HUMBIO2B and HUMBIO 4B, satisfies the Writing in the Major (WIM) requirement for students in Human Biology. HUMBIO 3A and HUMBIO 3B are designed to be taken concurrently and exams for both sides may include material from joint module lectures. Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines. Please note Human Biology majors are required to take the Human Biology Core Courses for a letter grade.

**HUMBIO 3Y. Practicum in Child Development. 1 Unit.**

Practicum experience at Bing Nursery School for 1-1/4 hours of observation per week, class meeting every other week for 1 hour for a total of 5 meetings. Pre- or corequisite: HUMBIO 3B.

**HUMBIO 4A. The Human Organism. 5 Units.**

Integrative Physiology: Neurobiology, endocrinology, and organ system function, control, and regulation. HUMBIO 4A and HUMBIO 4B are designed to be taken concurrently and exams for both sides may include material from joint module lectures. Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines. Please note Human Biology majors are required to take the Human Biology Core Courses for a letter grade.

**HUMBIO 4B. Environmental and Health Policy Analysis. 5 Units.**

Connections among the life sciences, social sciences, public health, and public policy. The economic, social, and institutional factors that underlie environmental degradation, the incidence of disease, and inequalities in health status and access to health care. Public policies to address these problems. Topics include pollution regulation, climate change policy, biodiversity protection, health care reform, health disparities, and women's health policy. HUMBIO 4B, with HUMBIO 2B and HUMBIO 3B, satisfies the Writing in the Major (WIM) requirement for students in Human Biology. HUMBIO 4A and HUMBIO 4B are designed to be taken concurrently and exams for both sides may include material from joint module lectures. Concurrent enrollment is strongly encouraged and is necessary for majors in order to meet declaration deadlines. Please note Human Biology majors are required to take the Human Biology Core Courses for a letter grade.

**HUMBIO 51. Big Data for Biologists - Decoding Genomic Function. 3 Units.**

Biology and medicine are becoming increasingly data-intensive fields. This course is designed to introduce students interested in human biology and related fields to methods for working with large biological datasets. There will be in-class activities analyzing real data that have revealed insights about the role of the genome and epigenome in health and disease. For example, we will explore data from large-scale gene expression and chromatin state studies. The course will provide an introduction to the relevant topics in biology and to fundamental computational skills such as editing text files, formatting and storing data, visualizing data and writing data analysis scripts. Students will become familiar with both UNIX and Python. This course is designed at the introductory level. Previous university-level courses in biology and programming experience are not required.

**HUMBIO 57. Epidemic Intelligence: How to Identify, Investigate and Interrupt Outbreaks of Disease. 4 Units.**

We will cover: the components of public health systems in the US; principles of outbreak investigation and disease surveillance; different types of study design for field investigation; visualization and interpretation of public health data, including identification and prevention of biases; and implementation of disease control by public health authorities. Students will meet with leaders of health departments of the state and the county and will be responsible for devising and conducting their own investigation of a health problem. HUMBIO students must enroll in HUMBIO 57. HRP students must enroll in HRP 247.

Same as: HRP 247

**HUMBIO 5E. Science Education in Human Biology. 1 Unit.**

In this seminar, students will become familiar with research on science education. They will use this knowledge to create and analyze teaching material such as section plans, exams, and problem sets. Material produced in this course will be related to the topics covered in the core course of the Program in Human Biology. Students will experience and practice various teaching styles. Prerequisite: Human Biology Core or equivalent or consent of instructor.

**HUMBIO 6. Human Origins. 5 Units.**

The human fossil record from the first non-human primates in the late Cretaceous or early Paleocene, 80-65 million years ago, to the anatomically modern people in the late Pleistocene, between 100,000 to 50,000 B.C.E. Emphasis is on broad evolutionary trends and the natural selective forces behind them.

Same as: ANTHRO 6, ANTHRO 206

**HUMBIO 65. Biosocial Medicine: The Social, Psychological, and Biological Determinants of Behavior and Wellbeing. 2-3 Units.**

Explores how social forces, psychological influences, and biological systems combine to affect human behavior in early childhood, in the educational experience, and throughout the life course. Examines how behaviors are linked to well-being. Uses a flipped classroom model, in which a series of lectures are available for students to view on-line before class. In-class time then focuses on case studies from published research. Undergraduates enroll for 3 units. This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit. Same as: EDUC 205, SOMGEN 215

**HUMBIO 74. Ethics in a Human Life. 4 Units.**

Ethical questions pervade a human life from before a person is conceived until after she dies, and at every point in between. This course raises a series of ethical questions, following along the path of a person's life - questions that arise before, during, and after she lives it. We will explore distinctive questions that a life presents at each of several familiar stages: prior to birth, childhood, adulthood, death, and even beyond. We will consider how some philosophers have tried to answer these questions, and we will think about how answering them might help us form a better understanding of the ethical shape of a human life as a whole.

Same as: PHIL 74A

**HUMBIO 79Q. Sexuality and Society. 3 Units.**

This course will explore how sexual identity, attitudes, and behaviors are shaped by the messages sent by the various agents of society such as schools, family, peers, media, and religious, medical, and political institutions. The interaction of biology, psychology, and socio-cultural factors, such as gender roles and sexual/relationship scripts will be discussed, as will the intersection of sexuality and notions of love, romance, and commitment. Critical developmental periods, such as adolescence and emerging adulthood will be examined in depth. Students will explore their own values and feelings about sexuality and come to an understanding of how their beliefs were formed. We will discuss how information about sexuality is disseminated in our society and what we can do to help ensure that such information is used in a way that promotes healthy self-conceptions, behavior, and relationships.

**HUMBIO 82A. Qualitative Research Methodology. 3 Units.**

Goal is to develop knowledge and skills for designing and conducting qualitative research studies including purposes, conceptual contexts, research questions, methods, validity issues, and interactions among these facets. Each student designs a qualitative research study.

**HUMBIO 82B. Advanced Data Analysis in Qualitative Research. 3 Units.**

For students writing up their own qualitative research. Students prepare a complete draft presenting their own qualitative research study including results, with reports drafted section by section, week by week. Class provides feedback, guidance, support.

**HUMBIO 85A. Essential Statistics for Human Biology. 4 Units.**

Introduction to statistical concepts and methods that are essential to the study of questions in biology, environment, health and related areas. The course will teach and use the computer language R and Python (you learn both, choose one). Topics include distributions, probabilities, likelihood, linear models; illustrations will be based on recent research.

Same as: BIO 108

**HUMBIO 86Q. Love as a Force for Social Justice. 3 Units.**

Preference to sophomores. Biological, psychological, religious, social and cultural perspectives on the concept of agape love. How love is conceptualized across cultures; agape love as the basis of many religions; different kinds of love; the biology of love; love in action for social justice; the languages of love, including art, literature, music, and poetry. Emphasis is on blog writing, participation, and oral presentation. Same as: FEMGEN 86Q

**HUMBIO 88. Introduction to Statistics for the Health Sciences. 4 Units.**

Students will learn the statistical tools used to describe and analyze data in the fields of medicine and epidemiology. This very applied course will rely on current research questions and publicly available data. Students will gain proficiency with Stata to do basic analyses of health-related data, including linear and logistic regression, and will become sophisticated consumers of health-related statistical results.

**HUMBIO 89. Statistics in the Health Sciences. 3 Units.**

This course aims to provide a firm grounding in the foundations of probability and statistics, with a focus on analyzing data from the health sciences. Students will learn how to read, interpret, and critically evaluate the statistics in medical and biological studies. The course also prepares students to be able to analyze their own data, guiding them on how to choose the correct statistical test, avoid common statistical pitfalls, and perform basic functions in R deducer. Cardinal Course certified by the Haas Center.

**HUMBIO 8P. Pre-field Course for Bolivia Impact Abroad in Child Family Health International. 1 Unit.**

Enrollment restricted to undergraduates participating in Impact Abroad's Boliva Program. Focus is on understanding service-learning principles and the historical, social and political context of Bolivia's health system.

**HUMBIO 9. Public Service Internship Preparation. 1 Unit.**

Are you prepared for your internship this summer? This workshop series will help you make the most of your internship experience by setting learning goals in advance; negotiating and communicating clear roles and expectations; preparing for a professional role in a non-profit, government, or community setting; and reflecting with successful interns and community partners on how to prepare sufficiently ahead of time. You will read, discuss, and hear from guest speakers, as well as develop a learning plan specific to your summer or academic year internship placement. This course is primarily designed for students who have already identified an internship for summer or a later quarter. You are welcome to attend any and all workshops, but must attend the entire series and do the assignments for 1 unit of credit.

Same as: ARTSINST 40, EARTHYSYS 9, EDUC 9, PUBLPOL 74, URBANST 101

**HUMBIO 91Q. Neuroethology: The Neural Control of Behavior. 3 Units.**

Preference to sophomores. Animal behavior offers insights about evolutionary adaptations and this seminar will discuss the origins of the study of animal behavior and its development to the present. How does the nervous system control behavior and how is it changed by behavior? We will analyze and discuss original research papers about the neural basis of behavior. The use and misuse of parallels between animal and human behavior. Possible field trip to observe animals in their natural habitat.

Same as: BIO 32Q

**HUMBIO 94Q. Law, Lawyers and Justice in Cinema. 4 Units.**

Examination of how the law, justice and lawyers are depicted in film, how real the depictions are, and the social issues that are the subjects of the film and the effect of film on change, attitudes and policy.

**HUMBIO 96Q. Injustice, Advocacy and Courage: The Path of Everyday Heroes. 3 Units.**

This course will study the paradigms of people of courage, action and energy who have fought against injustice by advocating for causes against great odds and at personal risk. The focus will be on everyday people who have taken action, often at great personal risk, not for ambition, but because of their convictions and steadfast commitment to their beliefs.

## Humanities & Sciences (HUMSCI)

**HUMSCI 201. Graduate Environment of Support. 1 Unit.**

Psychosocial, financial, and career issues in adapting graduate students to Stanford; how these issues relate to diversity, resources, policies, and procedures. Discussions among faculty, advanced graduate students, campus resource people, and the dean's office. (Thomas).

## International Relations (INTNLREL)

**INTNLREL 101Z. Introduction to International Relations. 4 Units.**

Approaches to the study of conflict and cooperation in world affairs. Applications to war, terrorism, trade policy, the environment, and world poverty. Debates about the ethics of war and the global distribution of wealth.

Same as: POLISCI 101Z

**INTNLREL 102. History of the International System. 5 Units.**

After defining the characteristics of the international system at the beginning of the twentieth century, this course reviews the primary developments in its functioning in the century that followed. Topics include the major wars and peace settlements; the emergence of Nazism and Communism; the development of the Cold War and nuclear weapons; the rise of China, India, and the EU; and the impact of Islamic terrorism. The role of international institutions and international society will also be a focus as will the challenge of environment, health, poverty, and climate issues to the functioning of the system.

Same as: HISTORY 102

**INTNLREL 110C. America and the World Economy. 5 Units.**

Examination of contemporary US foreign economic policy. Areas studied: the changing role of the dollar; mechanism of international monetary management; recent crises in world markets including those in Europe and Asia; role of IMF, World Bank and WTO in stabilizing world economy; trade politics and policies; the effects of the globalization of business on future US prosperity. Enroll in PoliSci 110C for WIM credit.

Same as: POLISCI 110C, POLISCI 110X

**INTNLREL 110D. War and Peace in American Foreign Policy. 5 Units.**

(Students not taking this course for WIM, register for 110Y.) The causes of war in American foreign policy. Issues: international and domestic sources of war and peace; war and the American political system; war, intervention, and peace making in the post-Cold War period.

Same as: AMSTUD 110D, POLISCI 110D, POLISCI 110Y

**INTNLREL 114D. Democracy, Development, and the Rule of Law. 5 Units.**

Links among the establishment of democracy, economic growth, and the rule of law. How democratic, economically developed states arise. How the rule of law can be established where it has been historically absent. Variations in how such systems function and the consequences of institutional forms and choices. How democratic systems have arisen in different parts of the world. Available policy instruments used in international democracy, rule of law, and development promotion efforts.

Same as: IPS 230, POLISCI 114D, POLISCI 314D

**INTNLREL 118S. Political Economy of International Trade and Investment. 5 Units.**

How domestic and international politics influence the economic relations between countries. Why do governments promote or oppose globalization? Why do countries cooperate economically in some situations but not others? Why do countries adopt bad economic policies? Focus on the politics of international trade and investment. Course approaches each topic by examining alternative theoretical approaches and evaluate these theories using historical and contemporary evidence from many geographical regions around the world. Prerequisites: ECON 1A, ECON 1B, and a statistics course.

Same as: POLISCI 218S

**INTNLREL 122. Introduction to European Studies. 5 Units.**

This course offers an introduction to major topics in the study of historical and contemporary Europe. We focus on European politics, economics and culture. First, we study what makes Europe special, and how its distinct identity has been influenced by its history. Next, we analyze Europe's politics. We study parliamentary government and proportional representation electoral systems, and how they affect policy. Subsequently, we examine the challenges the European economy faces. We further study the European Union and transatlantic relations.

Same as: POLISCI 213E

**INTNLREL 123. The Future of the European Union: Challenges and Opportunities. 5 Units.**

First, this course analyzes the EU's greatest challenge, preserving the monetary union, and discusses the political and economic reforms needed to achieve that goal. In this context the course also studies the fiscal and budgetary policies of the EU. Second, the course discusses the EU's role in global politics, its desire to play a more prominent role, and the ways to reach that objective. Third, the course analyzes the EU's institutional challenges in its efforts to enhance its democratic character.

**INTNLREL 135A. International Environmental Law and Policy. 4-5 Units.**

This course addresses the nature, content, and structure of international environmental law. We will discuss its sources (formal and informal) and general principles, along with the emerging principles (sustainable development, precautionary principle, etc.) We will evaluate the role of international and non-governmental organizations, as well as examine the negotiation, conclusion, and implementation of international environmental agreements. Problem areas to be examined include global warming, stratospheric ozone depletion, exports of hazardous substances, transboundary pollution, trade and environment, and development and environment. RECOMMENDED PREREQ: students have completed POLISCI 101 and/or INTNLREL 140A.

**INTNLREL 136R. Introduction to Global Justice. 4 Units.**

This course provides an overview of core ethical problems in international politics, with special emphasis on the question of what demands justice imposes on institutions and agents acting in a global context. The course is divided into three sections. The first investigates the content of global justice, and comprises of readings from contemporary political theorists and philosophers who write within the liberal contractualist, utilitarian, cosmopolitan, and nationalist traditions. The second part of the course looks at the obligations which global justice generates in relation to a series of real-world issues of international concern: global poverty, human rights, natural resources, climate change, migration, and the well-being of women.. The final section of the course asks whether a democratic international order is necessary for global justice to be realized.

Same as: ETHICSOC 136R, PHIL 76, POLISCI 136R, POLISCI 336

**INTNLREL 140A. International Law and International Relations. 5 Units.**

What is the character of international legal rules? Do they matter in international politics, and if so, to what degree? How effective can they really be? What should we expect from international law in shaping international relations? This seminar will provide introductory knowledge of the foundational principles and sources of public international law and a brief review of the most prominent IR-theories. Besides exploring how these theories address the role of IL in international politics, we will also consider a set of practical problems, where IL and IR intersect most dramatically, such as intervention by force, human rights, and enforcement of criminal law. Course satisfies the WiM requirement for International Relations majors.

**INTNLREL 140C. The U.S., U.N. Peacekeeping, and Humanitarian War. 5 Units.**

The involvement of U.S. and the UN in major wars and international interventions since the 1991 Gulf War. The UN Charter's provisions on the use of force, the origins and evolution of peacekeeping, the reasons for the breakthrough to peacemaking and peace enforcement in the 90s, and the ongoing debates over the legality and wisdom of humanitarian intervention. Case studies include Croatia and Bosnia, Somalia, Rwanda, Kosovo, East Timor, and Afghanistan. \* Course satisfies the WiM requirement for International Relations majors.

Same as: HISTORY 201C

**INTNLREL 141A. Camera as Witness: International Human Rights Documentaries. 5 Units.**

Rarely screened documentary films, focusing on global problems, human rights issues, and aesthetic challenges in making documentaries on international topics. Meetings with filmmakers.

**INTNLREL 142. Challenging the Status Quo: Social Entrepreneurs Advancing Democracy, Development and Justice. 3-5 Units.**

This seminar is part of a broader program on Social Entrepreneurship at CDDRRL in partnership with the Haas Center for Public Service. It will use practice to better inform theory. Working with three visiting social entrepreneurs from developing and developed country contexts students will use case studies of successful and failed social change strategies to explore relationships between social entrepreneurship, gender, democracy, development and justice. It interrogates current definitions of democracy and development and explores how they can become more inclusive of marginalized populations. This is a service learning class in which students will learn by working on projects that support the social entrepreneurs' efforts to promote social change. Students should register for either 3 OR 5 units only. Students enrolled in the full 5 units will have a service-learning component along with the course. Students enrolled for 3 units will not complete the service-learning component. Limited enrollment. Attendance at the first class is mandatory in order to participate in service learning.

Same as: AFRICAST 142, AFRICAST 242

**INTNLREL 145. Genocide and Humanitarian Intervention. 4 Units.**

The course, traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo, and Sudan. The final session of the course will be devoted to a discussion of the International Criminal Court and the separate criminal tribunals that have been tasked with investigating and punishing the perpetrators of genocide.

**INTNLREL 152. Organized Crime and Democracy in Latin America. 5 Units.**

Scholars and policy analysts have long emphasized the strength of the rule of law as a key determinant of economic development and social opportunity. They also agree that the rule of law requires an effective and accountable legal system. The growth of transnational organized crime is a major impediment, however, to the creation of effective and accountable legal systems. This seminar examines how and why transnational criminal organizations have developed in Latin America, explores why they constitute a major challenge to the consolidation of democratic societies, economic development and individual rights. It also examines the efforts of governments to combat them, with a focus on the experiences of Mexico, Colombia, and Brazil. The course examines these cases in order to draw lessons, by pointing to both successes and failures, of use to policy analysts, legal scholars, and practitioners.

Same as: IPS 247

**INTNLREL 168. America as a World Power: U.S. Foreign Relations, 1914 to Present. 5 Units.**

This course will examine the modern history of American foreign relations, from 1914 to the present. Beginning with the fateful decision to intervene in the First World War, it will examine the major crises and choices that have defined the "American Century." Our study of U.S. foreign relations will consider such key factors as geopolitics, domestic politics, bureaucracy, psychology, race, and culture. Students will be expected to undertake their own substantial examination of a critical episode in the era studied.

Same as: HISTORY 152K

**INTNLREL 168A. American Interventions, 1898-Present. 5 Units.**

This class seeks to examine the modern American experience with limited wars, beginning with distant and yet pertinent cases, and culminating in the war in Iraq. Although this class will examine war as a consequence of foreign policy, it will not focus primarily on presidential decision making. Rather, it will place wartime policy in a broader frame, considering it alongside popular and media perceptions of the war, the efforts of antiwar movements, civil-military relations, civil reconstruction efforts, and conditions on the battlefield. We will also examine, when possible, the postwar experience.

Same as: HISTORY 259E, HISTORY 359E

**INTNLREL 173. Presidents and Foreign Policy in Modern History. 5 Units.**

Nothing better illustrates the evolution of the modern presidency than the arena of foreign policy. This class will examine the changing role and choices of successive presidential administrations over the past century, examining such factors as geopolitics, domestic politics, the bureaucracy, ideology, psychology, and culture. Students will be encouraged to think historically about the institution of the presidency, while examining specific case studies, from the First World War to the conflicts of the 21st century.

Same as: HISTORY 261G

**INTNLREL 174. Diplomacy on the Ground: Case Studies in the Challenges of Representing Your Country. 5 Units.**

The tragic death of Ambassador Chris Stevens has recently highlighted the dangers of diplomacy in the modern era. This class will look at how Americans in embassies have historically confronted questions such as authoritarian rule, human rights abuses, violent changes of government, and covert action. Case studies will include the Berlin embassy in the 1930s, Tehran in 1979, and George Kennan's experiences in Moscow, among others. Recommended for students contemplating careers in diplomatic service. \* Course satisfies the WiM requirement for International Relations majors.

Same as: HISTORY 252B

**INTNLREL 179. Major Themes in U.S.-Latin America Diplomatic History. 5 Units.**

This seminar provides an overview of the most important events and initiatives that have characterized the relationship of the United States of America with its neighbors to the south, including Mexico, the Caribbean (especially Cuba, Haiti, and the Dominican Republic), Central America, and South America since the proclamation of the Monroe Doctrine in the early 19th century until the Obama Administration. In particular, the course examines the motivations for the Theodore Roosevelt Corollary to the Monroe Doctrine and the resulting period of blatant interventionism known as "Dollar Diplomacy," the Good Neighbor Policy of Franklin Delano Roosevelt, the brutal Cold War period, as well as policies pursued by the Clinton, George W. Bush, and Obama administrations, such as the Free Trade Area of the Americas (FTAA) and the Energy and Climate Partnership of the Americas (ECPA). The seminar explores not only what motivated U.S. policy makers and how their policies were implemented (and explains why they either succeeded or failed), but also discusses the impacts on individual countries and/or the region as a whole and the long-term consequences whose repercussions are still being felt today. The course also examines the major features of the inter-American system from the Pan American Union to the creation of the Organization of American States (OAS) and its continued relevancy in light of new institutional frameworks such as the Community of Latin American and Caribbean States (CELAC) and the Union of South American Nations (UNASUR) that exclude the United States of America.

**INTNLREL 180A. Transitional Justice, Human Rights, and International Criminal Tribunals. 3-5 Units.**

Historical backdrop of the Nuremberg and Tokyo Tribunals. The creation and operation of the Yugoslav and Rwanda Tribunals (ICTY and ICTR). The development of hybrid tribunals in East Timor, Sierra Leone, and Cambodia, including evaluation of their success in addressing perceived shortcomings of the ICTY and ICTR. Examination of the role of the International Criminal Court and the extent to which it will succeed in supplanting all other ad hoc international justice mechanisms and fulfill its goals. Analysis focuses on the politics of creating such courts, their interaction with the states in which the conflicts took place, the process of establishing prosecutorial priorities, the body of law they have produced, and their effectiveness in addressing the needs of victims in post-conflict societies.

Same as: ETHICSOC 280, HUMRTS 103, IPS 280

**INTNLREL 182. The Great War. 5 Units.**

The First World War provided a prototype for a new, horrific kind of war. It catalyzed the emergence of modern means of warfare and the social mechanisms necessary to sustain the industrialized war machine. Killing millions, it became the blueprint for the total war that succeeded it. It also brought about new social and political orders, transforming the societies which it mobilized at unprecedented levels. This course will examine the military, political, economic, social and cultural aspects of the conflict. We will discuss the origins and outbreak of the war, the land, sea and air campaigns, the war's economic and social consequences, the home fronts, the war's final stages in eastern and western Europe as well as non-European fronts, and finally, the war's impact on the international system and on its belligerents and participants' perceptions of the new reality it had created.

**INTNLREL 189. PRACTICAL TRAINING. 1-3 Unit.**

Students obtain internship in a relevant research or industrial activity to enhance their professional experience consistent with their degree program and area of concentration. Prior to enrolling students must get internship approved by the director. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program. Meets the requirements for Curricular Practical Training for students on F-1 visas. Student is responsible for arranging own internship. Limited to declared International Relations students only who are non-US citizens. May be repeated for credit.

**INTNLREL 197. Directed Reading in International Relations. 1-5 Unit.**

Open only to declared International Relations majors. (Staff).

**INTNLREL 198. Senior Thesis. 2-10 Units.**

Open only to declared International Relations majors with approved senior thesis proposals.

**INTNLREL 200A. International Relations Honors Field Research. 3 Units.**

For juniors planning to write an honors thesis during senior year. Initial steps to prepare for independent research. Professional tools for conceptualizing a research agenda and developing a research strategy. Preparation for field research through skills such as data management and statistics, references and library searches, and fellowship and grant writing. Creating a work schedule for the summer break and first steps in writing. Prerequisite: acceptance to IR honors program.

**INTNLREL 200B. International Relations Honors Seminar. 3 Units.**

Second of two-part sequence. For seniors working on their honors theses. Professional tools, analysis of research findings, and initial steps in writing of thesis. How to write a literature review, formulate a chapter structure, and set a timeline and work schedule for the senior year. Skills such as data analysis and presentation, and writing strategies. Prerequisites: acceptance to IR honors program, and 199 or 200A. \* Course satisfies the WiM requirement for International Relations majors who are accepted into the IR Honors program.

**INTNLREL 200C. IR Honors Thesis Writing. 1 Unit.**

Mandatory seminar for International Relations Honors Students who are writing their Honors Thesis. INTNLREL 200A and 200B are prerequisites.

**INTNLREL 60Q. United Nations Peacekeeping. 3 Units.**

Focus is on an examination of United Nations peacekeeping, from its inception in 1956 in the wake of the Suez Crisis, to its increasingly important role as an enforcer of political stability in sub-Saharan Africa. Examines the practice of "classic" peacekeeping as it developed during the Cold War, the rise and fall of "second-generation" peacekeeping, and the reemergence of a muscular form of peacekeeping in sub-Saharan Africa more recently. Topics include the basic history of the United Nations since 1945, the fundamentals of the United Nations Charter, and the historical trajectory of U.N. peacekeeping and the evolving arguments of its proponents and critics over the years.

**INTNLREL 61Q. Food and security. 3 Units.**

The course will provide a broad overview of key policy issues concerning agricultural development and food security, and will assess how global governance is addressing the problem of food security. At the same time the course will provide an overview of the field of international security, and examine how governments and international institutions are beginning to include food in discussions of security.

Same as: EARTHSYS 61Q, ESS 61Q

**INTNLREL 62Q. Mass Atrocities and Reconciliation. 3 Units.**

This seminar considers the theory and practice of transitional justice as exemplified by diverse case studies, such as Germany, South Africa, Bosnia, and Rwanda. We will ask ourselves throughout the term whether and to what extent mass atrocities and grave human rights violations can be ameliorated and healed, and what legal, institutional, and political arrangements may be most conducive to such attempts. We will study war crimes tribunals and truth commissions, and we will ask about their effectiveness, especially in regards to their potential of fostering reconciliation in a given society. In every case we will encounter and evaluate specific shortcomings and obstacles, which will provide us with a more nuanced understanding of the complex process of coming to terms with the past.

**INTNLREL 82. The Ending of World War I: Three Perspectives. 2 Units.**

This course is required for those students who will be taking the BOSP Overseas Seminar, The Ending of the First World War and the Shaping of the 20th Century. Enrollment is limited to students who will be taking the overseas seminar, or are waitlisted for the seminar. This course has three learning goals: 1.) to provide historical background on the war and the events and processes leading up to the ending of the war; 2.) to help students formulate possible research topics for the Overseas Seminar; and 3.) to acquaint the students with archival research in preparation for their time in London. The course will be taught from the perspectives of military history, political science, and literature. Each week we will meet to discuss the reading material.

## Italian (ITALIAN)

**ITALIAN 101. Italy: The Good, the Bad and the Ugly. 3 Units.**

Renowned for its rich cultural tradition, Italy is also one of the most problematic nations in Europe. This course explores the contradictions at the heart of Italy by examining how art and literature provide a unique perspective onto modern Italian history. We will focus on key phenomena that contribute both positively and negatively to the complex "spirit" of Italy, such as the presence of the past, political realism and idealism, revolution, corruption, decadence, war, immigration, and crises of all kinds. Through the study of historical and literary texts, films, and news media, the course seeks to understand Italy's current place in Europe and its future trajectory by looking to its past as a point of comparison. Taught in English.

**ITALIAN 127. Inventing Italian Literature: Dante, Boccaccio, Petrarca. 4 Units.**

This course examines the origins of Italian literature in the late Middle Ages. We will read selections from Dante's *Vita Nuova* and *Inferno*; Petrarca's *Canzoniere*; and Boccaccio's *Decameron*. Taught in Italian. Prerequisites: ITALLANG 22A or equivalent.

**ITALIAN 128. The Italian Renaissance and the Path to Modernity. 4 Units.**

The literature, art, and history of the Renaissance and beyond. Readings from the 15th through 18th centuries include Moderata Fonte, Machiavelli, Ariosto, Tasso, Galileo, and Goldoni. Taught in Italian. Prerequisites: ITALLANG 22A or equivalent (2 years of Italian).

**ITALIAN 129. Modern Italian Culture. 4 Units.**

This course examines the fate of Italian culture since 1800. We will study major examples of Italian literature, art, and cinema from the modern period in relation to their historical context. Taught in Italian. Prerequisites: ITALLANG 22A or equivalent.

**ITALIAN 143. Favorite Italian Films. 2 Units.**

In this course we will view and discuss 9 beloved & critically acclaimed Italian films, primarily from the 1980's and 90's, including "Cinema paradiso," "Il postino," "Mediterraneo," and "La vita e bella." This course is especially intended for returnees from the Florence program who want to maintain and develop their spoken Italian. A film screening time will be scheduled during the first week of class. Taught in Italian. Prerequisites: ITALLANG 21 or equivalent (4 quarters of Italian).

**ITALIAN 152. Boccaccio's Decameron: The Ethics of Storytelling. 3-5 Units.**

This course involves an in-depth study of Boccaccio's *Decameron* in the context of medieval theories of poetry and interpretation. The goal is to understand more fully the relationship between literature and lived experience implied by Boccaccio's fictions. We will address key critical issues and theoretical approaches related to the text. Taught in English translation, there will be an optional supplementary Italian discussion section during weeks 2-9.

Same as: ITALIAN 352

**ITALIAN 155. The Mafia in Society, Film, and Fiction. 4 Units.**

The mafia has become a global problem through its infiltration of international business, and its model of organized crime has spread all over the world from its origins in Sicily. At the same time, film and fiction remain fascinated by a romantic, heroic vision of the mafia. Compares both Italian and American fantasies of the Mafia to its history and impact on Italian and global culture. Taught in English.

**ITALIAN 175. CAPITALS: How Cities Shape Cultures, States, and People. 3-5 Units.**

This course takes students on a trip to eight capital cities, at different moments in time: Renaissance Florence, Golden Age Madrid, Colonial Mexico City, Enlightenment and Romantic Paris, Existential and Revolutionary St. Petersburg, Roaring Berlin, Modernist Vienna, and bustling Buenos Aires. While exploring each place in a particular historical moment, we will also consider the relations between culture, power, and social life. How does the cultural life of a country intersect with the political activity of a capital? How do large cities shape our everyday experience, our aesthetic preferences, and our sense of history? Why do some cities become cultural capitals? Primary materials for this course will consist of literary, visual, sociological, and historical documents (in translation); authors we will read include Boccaccio, Lope de Vega, Sor Juana, Montesquieu, Baudelaire, Dostoyevsky, Irmgard Keun, Freud, and Borges. Note: To be eligible for WAYS credit, you must take the course for a minimum of 3 Units and a Letter Grade. Same as: COMPLIT 100, DLCL 100, FRENCH 175, GERMAN 175, HISTORY 206E, ILAC 175, URBANST 153



**ITALIAN 181. Philosophy and Literature. 5 Units.**

Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track. Majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature, with particular focus on the question of value: what, if anything, does engagement with literary works do for our lives? Issues include aesthetic self-fashioning, the paradox of tragedy, the paradox of caring, the truth-value of fiction, metaphor, authorship, irony, make-believe, expression, edification, clarification, and training. Readings are drawn from literature and film, philosophical theories of art, and stylistically interesting works of philosophy. Authors may include Sophocles, Chaucer, Dickinson, Proust, Woolf, Borges, Beckett, Kundera, Charlie Kaufman; Barthes, Foucault, Nussbaum, Walton, Nehamas; Plato, Montaigne, Schopenhauer, Nietzsche, and Sartre. Taught in English.

Same as: CLASSICS 42, COMPLIT 181, ENGLISH 81, FRENCH 181, GERMAN 181, PHIL 81, SLAVIC 181

**ITALIAN 199. Individual Work. 1-12 Unit.****ITALIAN 216. Michelangelo Architect. 5 Units.**

The architecture of Michelangelo Buonarroti (1475-1564), "Father and Master of all the Arts," redefined the possibilities of architectural expression for generations. This course considers his civic, ecclesiastic, and palatial works. It proceeds from his beginnings in Medicean Florence to his fulfillment in Papal Rome. It examines the anxiety of influence following his death and his enduring legacy in modernism. Topics include: Michelangelo's debt to Classical and Early Renaissance prototypes; his transformation of the canon; the iterative sketch as disegno; architecture and the body; the queering of architectural language; sketch, scale, and materiality; Modernism and Michelangelo. The historiography of Michelangelo has predominantly favored studies in painting and sculpture. Our focus on architecture encourages students to test new ideas and alternative approaches to his work.

Same as: ARTHIST 416A, CEE 33A

**ITALIAN 228. Science, technology and society and the humanities in the face of the looming disaster. 3-5 Units.**

How STS and the Humanities can together help think out the looming catastrophes that put the future of humankind in jeopardy.

Same as: FRENCH 228, POLISCI 233F

**ITALIAN 232B. Heretics, Prostitutes and Merchants: The Venetian Empire. 5 Units.**

Between 1200-1600, Venice created a powerful empire at the boundary between East and West that controlled much of the Mediterranean, with a merchant society that allowed social groups, religions, and ethnicities to coexist. Topics include the features of Venetian society, the relationship between center and periphery, order and disorder, orthodoxy and heresy, the role of politics, art, and culture in the Venetian Renaissance, and the empire's decline as a political power and reinvention as a tourist site and living museum.

Same as: HISTORY 232B

**ITALIAN 235E. Dante's "Inferno". 3-5 Units.**

Intensive reading of Dante's "Inferno" (the first canticle of his three canticle poem *The Divine Comedy*). Main objective: to learn how to read the *Inferno* in detail and in depth, which entails both close textual analysis as well as a systematic reconstruction of the Christian doctrines that subtend the poem. The other main objective is to understand how Dante's civic and political identity as a Florentine, and especially his exile from Florence, determined his literary career and turned him into the author of the poem. Special emphasis on Dante's moral world view and his representation of character. Taught in English. nNOTE: Enrollment requires Professor Harrison's approval. Please contact him directly at harrison@stanford.edu.

Same as: COMPLIT 235E

**ITALIAN 236E. Dante's "Purgatorio" and "Paradiso". 4-5 Units.**

Reading the second and third canticles of Dante's *Divine Comedy*. Prerequisite: students must have read Dante's *Inferno* in a course or on their own. Taught in English. Recommended: reading knowledge of Italian.

Same as: COMPLIT 236E

**ITALIAN 261. War and Peace: Writings by and about Veterans in the 20th and 21st Centuries. 2-5 Units.**

Since the aftermath of World War One, and with increasing urgency in contemporary America, stories about and by veterans are assigned a double role: that of exposing the horror of war yet also defending the possibility of a just war, and that of healing both veterans themselves and the society they return to. Key questions for this course are: Given the current practice of using writing and the hero's journey as a model for healing veterans and making their voices heard in our culture, can we look back to post-World-War-One culture and see if writing fulfills a similar function? And given how many post-World-War-One veterans became famous writers, how do we assess the interplay between literature, poetry, memoir, journalism, personal letters, photo accounts? Is there a connection between artistic innovation and the capacity to heal?.

Same as: FRENCH 261, FRENCH 361, ITALIAN 361

**ITALIAN 266. Women's Voices in Contemporary Italian Literature. 3-5 Units.**

The traditional canon of Italian literature consists almost exclusively of male authors. Yet Italian women writers have been active since the time of Dante. This course presents an overview of women's prose fiction of the last 100 years, from Sibilla Aleramo's groundbreaking feminist novel *Una donna* (1906) to Elena Ferrante's *La figlia oscura* (2015). We will examine such concerns as the central issue of sexual violence in many female autobiographies; the experience of motherhood; the conflict between maternal love and the desire for self-determination and autonomy; paths to political awareness; reinventing the historical novel. Taught in English.

Same as: FEMGEN 266

**ITALIAN 272. Body Doubles: From the Fantastic Short Story to Science-Fiction. 2-5 Units.**

How do we imagine our bodies through language, at times almost completely refashioning a physical double, be it idealized or abject? How do such body doubles intersect with our sense of self, defining or redefining sexual identity, spiritual aspirations, illness and recovery, and the senses themselves, as our window into reality? This course focuses on short stories from the late 19th- and early 20th-century fantastic genre, and science fiction stories from the following turn of the century, 100 years later: in these revealing instances, body doubles often seem to acquire a will of their own, overwhelming normal physical identity.

Same as: FRENCH 272, FRENCH 372, ITALIAN 372

**ITALIAN 315. Italian Film, Fashion, and Design, 1950-1968. 3-5 Units.**

In a close analysis of films by Fellini, Antonioni, Rossellini, Pasolini, and Bertolucci, we will explore the various contradictions that fueled the Italian cultural imagination in the 50s and 60s: minimalism and multiplicity, male and female, industrial and archaic, comic and tragic, wealth and poverty. Special emphasis placed on fashion, design, and modernist art. Taught in English, with the option of an additional discussion section in Italian. Occasional screenings Monday evenings at 7pm.

**ITALIAN 325. Petrarch & Petrarchism: Fragments of the Self. 3-5 Units.**

In this course we will examine Francis Petrarch's book of Italian lyric poems, *Rerum vulgarium fragmenta*, and its reception in early modern France, England, and Spain. Readings from Petrarch's epistolary and ethical writings will contextualize historically and intellectually the aesthetics and ethics of the fragment in his poetry. With this foundation, we will investigate the long-lasting impact of Petrarch's work on Renaissance poetry and humanism, with attention to both the literary and the material aspects of its reception. Taught in English.

**ITALIAN 327. Giambattista Vico & Claude Lévi-Strauss. 3-5 Units.**

An intensive reading of Vico's *New Science* with special emphasis on Vico's theory of anthropogenesis, myth, and the poetic origins of human consciousness. Vico's thought will be placed in relation to Lévi-Strauss's theories of myth and so-called "primitive thought". Readings include Vico's *New Science* and Lévi-Strauss's "The Structural Study of Myth", and the first chapters of his book *The Savage Mind*. Taught in English. Same as: FRENCH 230, FRENCH 330

**ITALIAN 346. Body over Mind. 3-5 Units.**

How does modern fiction, aided by modern philosophy, give the lie to Descartes' famous "I think therefore I am"? And how does writing convey the desire for a different, perhaps stronger, integration of mind and body? Does the body speak a particular truth that we must learn to hear, that the mind is not always connected to? How do modern metaphors for the mind-body connection shape our experience? These questions will be explored via the works of major French and Italian writers and thinkers, including Pirandello, Calvino, Camus, Houellebecq, Sartre, and Agamben. Same as: FRENCH 246, FRENCH 346

**ITALIAN 352. Boccaccio's Decameron: The Ethics of Storytelling. 3-5 Units.**

This course involves an in-depth study of Boccaccio's *Decameron* in the context of medieval theories of poetry and interpretation. The goal is to understand more fully the relationship between literature and lived experience implied by Boccaccio's fictions. We will address key critical issues and theoretical approaches related to the text. Taught in English translation, there will be an optional supplementary Italian discussion section during weeks 2-9. Same as: ITALIAN 152

**ITALIAN 361. War and Peace: Writings by and about Veterans in the 20th and 21st Centuries. 2-5 Units.**

Since the aftermath of World War One, and with increasing urgency in contemporary America, stories about and by veterans are assigned a double role: that of exposing the horror of war yet also defending the possibility of a just war, and that of healing both veterans themselves and the society they return to. Key questions for this course are: Given the current practice of using writing and the hero's journey as a model for healing veterans and making their voices heard in our culture, can we look back to post-World-War-One culture and see if writing fulfills a similar function? And given how many post-World-War-One veterans became famous writers, how do we assess the interplay between literature, poetry, memoir, journalism, personal letters, photo accounts? Is there a connection between artistic innovation and the capacity to heal?. Same as: FRENCH 261, FRENCH 361, ITALIAN 261

**ITALIAN 369. Introduction to the Profession of Literary Studies. 1-2 Unit.**

A survey of how literary theory and other methods have been made institutional since the nineteenth century. The readings and conversation are designed for entering Ph.D. students in the national literature departments and comparative literature. Same as: COMPLIT 369, DLCL 369, FRENCH 369, GERMAN 369

**ITALIAN 372. Body Doubles: From the Fantastic Short Story to Science-Fiction. 2-5 Units.**

How do we imagine our bodies through language, at times almost completely refashioning a physical double, be it idealized or abject? How do such body doubles intersect with our sense of self, defining or redefining sexual identity, spiritual aspirations, illness and recovery, and the senses themselves, as our window into reality? This course focuses on short stories from the late 19th- and early 20th-century fantastic genre, and science fiction stories from the following turn of the century, 100 years later: in these revealing instances, body doubles often seem to acquire a will of their own, overwhelming normal physical identity. Same as: FRENCH 272, FRENCH 372, ITALIAN 272

**ITALIAN 395. Philosophical Reading Group. 1 Unit.**

Discussion of one contemporary or historical text from the Western philosophical tradition per quarter in a group of faculty and graduate students. For admission of new participants, a conversation with H. U. Gumbrecht is required. May be repeated for credit. Taught in English. Same as: COMPLIT 359A, FRENCH 395

**ITALIAN 398. Intensive Reading in French/Italian. 10 Units.**

Enrollment is limited to French/Italian Ph.D. students. Course is designed for French/Italian Ph.D. students to prepare for department milestone exams. Same as: FRENCH 398

**ITALIAN 399. Individual Work. 1-12 Unit.**

Repeatable for Credit.

**ITALIAN 75N. Narrative Medicine and Near-Death Experiences. 3 Units.**

Even if many of us don't fully believe in an afterlife, we remain fascinated by visions of it. This course focuses on Near-Death Experiences and the stories around them, investigating them from the many perspectives pertinent to the growing field of narrative medicine: medical, neurological, cognitive, psychological, sociological, literary, and filmic. The goal is not to understand whether the stories are veridical but what they do for us, as individuals, and as a culture, and in particular how they seek to reshape the patient-doctor relationship. Materials will span the 20th century and come into the present. Taught in English. Same as: FRENCH 75N

**ITALIAN 802. TGR Dissertation. 0 Units.**

## Jewish Studies (JEWISHST)

**JEWISHST 101A. First-Year Hebrew, First Quarter. 5 Units.**

In the first-year program, students acquire essential Hebrew through abundant opportunities to interact in the language in meaningful ways. The students learn to function appropriately in the language in a variety of social and cultural contexts. Same as: AMELANG 128A

**JEWISHST 101B. First-Year Hebrew, Second Quarter. 5 Units.**

Continuation of AMELANG 128A. Prerequisite: Placement Test, AMELANG 128A. Same as: AMELANG 128B

**JEWISHST 101C. First-Year Hebrew, Third Quarter. 5 Units.**

Continuation of AMELANG 128B. Prerequisite: Placement Test, AMELANG 128B. Fulfill the University Foreign Language Requirement. Same as: AMELANG 128C

**JEWISHST 102A. Second-Year Hebrew, First Quarter. 4 Units.**

Continuation of AMELANG 128C. Prerequisite: Placement Test, AMELANG 128C. Same as: AMELANG 129A

**JEWISHST 102B. Second-Year Hebrew, Second Quarter. 4 Units.**

Continuation of AMELANG 129A. Prerequisite: Placement Test, AMELANG 129A. Same as: AMELANG 129B

**JEWISHST 102C. Second-Year Hebrew, Third Quarter. 4 Units.**

Continuation of AMELANG 129B. Prerequisite: Placement Test, AMELANG 129B. Same as: AMELANG 129C

**JEWISHST 103A. Third-Year Hebrew, First Quarter. 3 Units.**

Continuation of AMELANG 129C. Prerequisite: Placement Test, AMELANG 129C. Same as: AMELANG 130A

**JEWISHST 104. Hebrew Forum. 2-4 Units.**

Intermediate and advanced level. Biweekly Hebrew discussion on contemporary issues with Israeli guest speakers. Vocabulary enhancement. Focus on exposure to academic Hebrew. May be repeat for credit.

Same as: AMELANG 131A

**JEWISHST 104A. First-Year Yiddish, First Quarter. 4 Units.**

Reading, writing, and speaking.

Same as: AMELANG 140A

**JEWISHST 104B. First-Year Yiddish, Second Quarter. 4 Units.**

Continuation of AMELANG 140A. Prerequisite: AMELANG.

Same as: AMELANG 140B

**JEWISHST 104C. First-Year Yiddish, Third Quarter. 4 Units.**

Continuation of AMELANG 140B. Prerequisite: AMELANG 140B. Fulfills the University Foreign Language Requirement.

Same as: AMELANG 140C

**JEWISHST 105. Hebrew Forum. 2-4 Units.**

Intermediate and advanced level. Biweekly Hebrew discussion on contemporary issues with Israeli guest speakers. Vocabulary enhancement. Focus on exposure to academic Hebrew. May repeat for credit.

Same as: AMELANG 131B

**JEWISHST 106. Reflection on the Other: The Jew and the Arab in Literature. 3-5 Units.**

How literary works outside the realm of Western culture struggle with questions such as identity, minority, and the issue of the Other. How the Arab is viewed in Hebrew literature, film and music and how the Jew is viewed in Palestinian works in Hebrew or Arabic (in translation to English). Historical, political, and sociological forces that have contributed to the shaping of these writers' views. Guest lectures about the Jew in Palestinian literature and music. Note: To be eligible for WAYS credit, you must take course for a Letter Grade.

Same as: AMELANG 126, COMPLIT 145

**JEWISHST 107A. Biblical Hebrew, First Quarter. 2 Units.**

Establish a basic familiarity with the grammar and vocabulary of Biblical Hebrew and will begin developing a facility with the language. Students that are enrolled in this course must also enroll in Beginning Hebrew. This course requires no prior knowledge of Hebrew and will begin with learning the alphabet. By the end of the year, students will be able to translate basic biblical texts, will be familiar with common lexica and reference grammars, and will have sufficient foundational knowledge to enable them to continue expanding their knowledge either in a subsequent course or on their own.

Same as: AMELANG 170A, RELIGST 170A

**JEWISHST 107B. Biblical Hebrew, Second Quarter. 2 Units.**

Continuation of 170A.

Same as: AMELANG 170B

**JEWISHST 107C. Biblical Hebrew, Third Quarter. 2 Units.**

Continuation of 170B.

Same as: AMELANG 170C

**JEWISHST 120. Sex and Gender in Judaism and Christianity. 3 Units.**

What role do Jewish and Christian traditions play in shaping understandings of gender differences? Is gender always imagined as dual, male and female? This course explores the variety of ways in which Jewish and Christian traditions - often in conversation with and against each other - have shaped gender identities and sexual politics. We will explore the central role that issues around marriage and reproduction played in this conversation. Perhaps surprisingly, early Jews and Christian also espoused deep interest in writing about 'eunuchs' and 'androgynes,' as they thought about Jewish and Christian ways of being a man or a woman. We will examine the variety of these early conversations, and the contemporary Jewish and Christian discussions of feminist, queer, trans- and intersex based on them.

Same as: FEMGEN 130, RELIGST 130

**JEWISHST 125. Modern Jewish Mystics: Devotion in a Secular Age. 4 Units.**

The twentieth-century was a time of tremendous upheaval and unspeakable tragedy for the Jewish communities of Europe. But the past hundred years were also a period of great renewal for Jewish spirituality, a renaissance that has continued into the present day. We will explore the mystic writings of figures from the Safed Renaissance, the Hasidic masters, with a particular focus on the works of Martin Buber, Hillel Zeitlin, Abraham Isaac Kook, Abraham Joshua Heschel, and Arthur Green. We will examine their teachings in light of the challenges of the two World Wars, the Holocaust, and the processes of modernity and secularism. Consideration will be made of the unique cultural contexts of modern Israel and contemporary America.

Same as: RELIGST 165

**JEWISHST 127D. Readings in Talmudic Literature. 1 Unit.**

Readings of the talmudic texts. Some knowledge of Hebrew is preferred. The ongoing seminar is designed to study the making of the talmudic sugya (unit of discourse), along with classic commentaries. Students will consider some of the recent developments in the academic study of Talmudic literature, introduced by the instructor. The goal of the ongoing seminar is to provide Stanford students and faculty with the opportunity to engage in regular Talmud study, and to be introduced to a variety of approaches to studying Talmudic texts. Class meets on Fridays, from 12:00-1:15 pm in Hillel (Koret Pavilion Taube Hillel House; Ziff Center for Jewish Life). May be repeat for credit.

Same as: JEWISHST 227D, RELIGST 170D

**JEWISHST 127E. Readings in Talmudic Literature Advanced. 1 Unit.**

Readings of the talmudic texts. Knowledge of Hebrew is required. The ongoing seminar is designed to study the making of the talmudic sugya (unit of discourse), along with classic commentaries. Students will consider some of the recent developments in the academic study of Talmudic literature, introduced by the instructor. The goal of the ongoing seminar is to provide Stanford students and faculty with the opportunity to engage in regular Talmud study, and to be introduced to a variety of approaches to studying Talmudic texts. Meeting time and location TBA. May be repeated for credit.

Same as: JEWISHST 227E, RELIGST 170E

**JEWISHST 129. Sacred Words: Jewish Thought and the Question of Language. 4 Units.**

Jews have long been referred as the people of the book, but they might better be referred to as the people of the word. Drawing upon texts from the Hebrew Bible to the works of modern Hebrew writers like of Hayyim Nahman Bialik and Amos Oz, this seminar will chart the development of Jewish thinking on language over the past two millennia. We will explore issues such as: the idea of canonization; oral versus written language; the nature and possibility of translation; the origins of language; notions of negative theology; mystical approaches to the word; the rebirth of Hebrew as a spoken and cultural language; and the limits of language after the Holocaust. This course will also bring Jewish thought into dialogue with contemporary philosophical reflections on issues of language. Modern explorations of language will prove an interesting way of deepening our understanding of the Jewish thinkers on one hand, and enriching contemporary intellectual discourse on the other.

Same as: RELIGST 169

**JEWISHST 132. Between Nation-Building and Liberalization: The Welfare State in Israel. 3 Units.**

According to one commentator, the political economy of Israel is characterized by embedded illiberalism. In the context of a national and territorial conflict, the Israeli state fostered comprehensive nation-building projects (such as immigration absorption), via employment and social protection schemes. This course surveys the distinctive development of the Israeli welfare state in comparative perspective, and analyzes its particular politics and outcomes in the form of inclusion but also exclusion of different populations from full citizenship. The course will follow a chronological path from the pre-state crystallization of national welfare institutions to the current neo-liberalization trend that seems to undermine collectivist projects and advance the re-commodification of citizenship. Throughout the course we will discuss issues such as: the role of labor and nationalism in the design of social policy, the production of national, ethnic and gender inequality, and the dynamics of change and continuity following heightened liberalization and internationalization since the 1980s. The course exposes students to key issues of the sociology of the welfare state with particular emphasis on the development and role of the state in a deeply conflicted society, using the Israeli experience. At the conclusion of the course students are expected to understand how welfare state institutions reflect but also reproduce societal schisms and conflicts, and be familiar with central aspects of Israeli politics past and present.

Same as: SOC 102

**JEWISHST 132A. Social Inequality in Israel. 3 Units.**

Like the US, Israel is a nation of immigrants. Israel additionally shares with the US vast economic, ethnic/racial and gender gaps, which are shaped and are being shaped by the demographic diversity characterizing its society. The course will provide a comparative framework for analyzing social inequality in Israel. We will start by reviewing essential concepts and theories in the study of social stratification. We will then review the main cleavages characterizing Israeli society, while comparing them to gaps in other advanced societies and particularly the US. We will focus on class, gender and ethnicity as the main distinctions and will examine their implications for differences in life chances in several domains across the life course. We will conclude with a discussion of possible scenarios for change, which are relevant to both Israel and the US. Throughout the course, we will study critical thinking techniques and will use them for analyzing issues that are central for the analysis of social inequality in Israel and elsewhere.

Same as: CSRE 132A, SOC 102A

**JEWISHST 132D. Sociology of Jewishness. 3-5 Units.**

Examines the place of the Jewish people in society throughout various locales and historical periods to understand how interactions among Jews and with other groups have shaped Jewish identities. Topics include modernism, the Holocaust, Israel/nationhood, race/ethnicity, intermarriage, and assimilation. Uses theoretical, empirical, and historical material from multiple social scientific fields of study and explores the study of Judaism from several major sociological lenses.

Same as: CSRE 132J, SOC 132J

**JEWISHST 133. Sociology of Citizenship. 3 Units.**

Not only a legal status, citizenship forms a major concern for political sociologists interested in questions of membership, exclusion, redistribution, and struggles over the boundaries of collective identity. Citizenship is in essence membership in a political community that entails rights and duties, and structures a tripartite relationship between the individual, community and state. The institutions of citizenship include formal and bureaucratic rules of eligibility but also informal institutions such as identity and belonging. Throughout the course, students are exposed to key issues of the sociology of citizenship such as the historically different paths of men, women, minority groups and immigrants into citizenship, the contested development of rights and duties, the regulation of population, as well as insurgency and collective attempts to rearticulate the terms of the "contract" with the state. Israel, the USA, France and Germany are used as empirical illustrations. At the conclusion of the course students will know how to utilize the analytic framework of citizenship in order to analyze a wide range of political phenomena in contemporary societies.

Same as: SOC 103

**JEWISHST 133A. WELFARE, WORK AND POVERTY.. 3 Units.**

Early theorists of the welfare state described it as a reaction to the emergence of needs and interests of specific social groups during processes of economic development and change. Later theorists countered that the welfare state does not merely react to social cleavages during times of economic change but rather works to actively shape them, in line with worldviews or the interests of dominant group members. Adopting the latter approach, the goal of this course is to provide the tools and knowledge necessary for a critical evaluation of the social services provided to Israeli citizens and their impact on social and economic inequalities. The course will survey various approaches to the understanding of the goals of the welfare state. A comparative and historical account of the development of the welfare state will be presented, while highlighting recent developments, such as the increase in poverty rates and the aging of the population. During the course, we will examine the diverse needs that are served by the welfare state, as well as major dilemmas associated with the provision of services. Throughout the course, we will study critical thinking techniques and will use them for analyzing issues that are central for the development of social policies in Israel and the US.

Same as: CSRE 133J, SOC 103A

**JEWISHST 139. Rereading Judaism in Light of Feminism. 4 Units.**

During the past three decades, Jewish feminists have asked new questions of traditional rabbinic texts, Jewish law, history, and religious life and thought. Analysis of the legal and narrative texts, rituals, theology, and community to better understand contemporary Jewish life as influenced by feminism.

Same as: FEMGEN 139

**JEWISHST 143. Literature and Society in Africa and the Caribbean. 4 Units.**

This course aims to equip students with an understanding of the cultural, political and literary aspects at play in the literatures of Francophone Africa and the Caribbean. Our primary readings will be Francophone novels and poetry, though we will also read some theoretical texts. The assigned readings will expose students to literature from diverse French-speaking regions of the African/Caribbean world. This course will also serve as a "literary toolbox," with the intention of facilitating an understanding of literary forms, terms and practices. Students can expect to work on their production of written and spoken French (in addition to reading comprehension) both in and outside of class. Special guest: LEILA SLIMANI (Goncourt Prize 2016). Required readings include: Leila Slimani, *Sexe et Mensonges au Maroc*, Albert Memmi, "La Statue de Sel," Kaouther Adimi, "L'Envers des autres", Maryse Condé, "La Vie sans fards". Movies include "Goodbye Morocco", "Aya de Yopougon", "Les Baies d'Alger". nTaught in French. Prerequisite: FRENLANG 124 or consent of instructor.

Same as: AFRICAAM 133, AFRICAST 132, FRENCH 133

**JEWISHST 144B. Poetic Thinking Across Media. 4 Units.**

Even before Novalis claimed that the world must be romanticized, thinkers, writers, and artists wanted to perceive the human and natural world poetically. The pre- and post-romantic poetic modes of thinking they created are the subject of this course. Readings include Ecclesiastes, Zhaozhou Congshen, Montaigne, Nietzsche, Kafka, Benjamin, Arendt, and Sontag. This course will also present poetic thinking in the visual arts—from the expressionism of Ingmar Bergman to the neo-romanticism of Gerhard Richter.

**JEWISHST 145. Masterpieces: Kafka. 3-5 Units.**

This class will address major works by Franz Kafka and consider Kafka as a modernist writer whose work reflects on modernity. We will also examine the role of Kafka's themes and poetics in the work of contemporary writers.

Same as: COMPLIT 114, COMPLIT 350, GERMAN 150, GERMAN 350

**JEWISHST 147B. The Hebrew and Jewish Short Story. 3-5 Units.**

Short stories from Israel, the US and Europe including works by Agnon, Kafka, Keret, Castel-Bloom, Kashua, Singer, Benjamin, Freud, biblical myths and more. The class will engage with questions related to the short story as a literary form and the history of the short story. Reading and discussion in English. Optional: special section with readings and discussions in Hebrew. Note: To be eligible for WAYS credit, you must take the course for a Letter Grade.

Same as: COMPLIT 127B

**JEWISHST 148. Writing Between Languages: The Case of Eastern European Jewish Literature. 1-5 Unit.**

Eastern European Jews spoke and read Hebrew, Yiddish, and their co-territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well. \*\*\*This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit\*\*\*.

Same as: JEWISHST 348, SLAVIC 198, SLAVIC 398

**JEWISHST 148N. Other People's Words: Folklore and Literature. 4 Units.**

What happens when you collect and use other people's words? This class considers folklore and literature based on it, focusing on the theme of objects that come to life and threaten their makers or owners (including Russian fairy tales and Nikolai Gogol's stories, the Golem legend and Michael Chabon's *Amazing Adventures of Kavalier and Clay*, and Ovid's and Shaw's *Pygmalion*). We read essays by Jacob Grimm, Sigmund Freud, Roman Jakobson, and others, to understand what folklore can mean and how the oral and the written can interact. Students collect living folklore from a group of their choosing. This course fulfills the second-level Writing and Rhetoric Requirement (Write-2) and emphasizes oral and multimedia presentation. Prerequisite: PWR 1.

Same as: SLAVIC 118N

**JEWISHST 155D. Jewish American Literature. 5 Units.**

From its inception, Jewish-American literature has taken as its subject as well as its context the idea of Jewishness itself. Jewish culture is a diasporic one, and for this reason the concept of Jewishness differs from country to country and across time. What stays remarkably similar, though, is Jewish self-perception and relatedly Jewish literary style. This is as true for the first-generation immigrant writers like Isaac Bashevis Singer and Anzia Yezierska who came to the United States from abroad as it is for their second-generation children born in the United States, and the children of those children. In this course, we will consider the difficulties of displacement for the emigrant generation and their efforts to sustain their cultural integrity in the multicultural American environment. We'll also examine the often comic revolt of their American-born children and grandchildren against their (grand-)parents nostalgia and failure to assimilate. Only by considering these transnational roots can one understand the particularity of the Jewish-American novel in relation to mainstream and minority American literatures. In investigating the link between American Jewish writers and their literary progenitors, we will draw largely but not exclusively from Russia and the countries of Eastern Europe.

Same as: AMSTUD 145D, ENGLISH 145D, REES 145D

**JEWISHST 183. The Holocaust. 4-5 Units.**

The emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.

Same as: HISTORY 137, HISTORY 337, JEWISHST 383

**JEWISHST 185B. Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility. 4-5 Units.**

(Same as HISTORY 85B.) This course explores the full expanse of Jewish life today and in the recent past. The inner workings of religious faith, the content of Jewish identity shorn of belief, the interplay between Jewish powerlessness and influence, the myth and reality of Jewish genius, the continued pertinence of antisemitism, the rhythms of Jewish economic life—all these will be examined in weekly lectures, classroom discussion, and with the use of a widely diverse range of readings, films, and other material. Explored in depth will be the ideas and practices of Zionism, the content of contemporary secularism and religious Orthodoxy, the impact of the Holocaust, the continued crisis facing Israel and the Palestinians. Who is to be considered Jewish, in any event, especially since so many of the best known (Spinoza, Freud, Marx) have had little if anything to do with Jewish life with their relationships to it indifferent, even hostile?.

Same as: CSRE 185B, HISTORY 185B, HISTORY 385C, REES 185B

**JEWISHST 18N. Religion and Politics: Comparing Europe to the U.S.. 3-4 Units.**

Interdisciplinary and comparative. Historical, political, sociological, and religious studies approaches. The relationship between religion and politics as understood in the U.S. and Europe. How this relationship has become tense both because of the rise of Islam as a public religion in Europe and the rising influence of religious groups in public culture. Different understandings and definitions of the separation of church and state in Western democratic cultures, and differing notions of the public sphere. Case studies to investigate the nature of public conflicts, what issues lead to conflict, and why. Why has the head covering of Muslim women become politicized in Europe? What are the arguments surrounding the Cordoba House, known as the Ground Zero Mosque, and how does this conflict compare to controversies about recent constructions of mosques in Europe? Resources include media, documentaries, and scholarly literature.

Same as: RELIGST 18N

**JEWISHST 199B. Directed Reading in Yiddish, Second Quarter. 1-5 Unit.**

For intermediate or advanced students. May be repeated for credit.

**JEWISHST 19N. Everyone Eats: Food, Religion and Culture. 3 Units.**

Food is one of the most essential aspects of the human experience. The decisions and choices we make about food define who we have been, who we are now, and who we want to become. In this seminar we will study how food habits have shaped religious traditions, and vice versa, how religious traditions have shaped food ways. Some traditions are centered around food regimens such as the dietary laws, derived from biblical law that shapes Jewish and Christian tradition very differently. Indeed, many religious and ethical thinkers, as well as anthropologists, have interpreted the meanings of the dietary laws very differently. Further, in many religious traditions the killing of animals and consumption of meat is deeply fraught. We will explore the history of food practices and their contemporary impact; the connections between food, religion, and identity; the meanings that religious thinkers and anthropologists have attributed to food habits; as well as the creative translations of religious traditions into contemporary food ethics by various social movements and groups, predominantly in the U.S. Same as: CSRE 19N, RELIGST 19N

**JEWISHST 221D. Readings in Syriac Literature. 2-5 Units.**

In recent years, there has been growing interest in the works of Syriac speaking Christians in antiquity and beyond. This course offers an introduction to the Syriac language, including its script, vocabulary and grammar, and a chance to read from a selection of foundational Syriac Christian texts. Same as: JEWISHST 321D, RELIGST 221D, RELIGST 321D

**JEWISHST 224. Emmanuel Levinas: Ethics, Philosophy and Religion. 4 Units.**

Emmanuel Levinas (1906-1995) is a major French philosopher of the second half of the twentieth century and is among the half-dozen most important Jewish thinkers of the century. Born in Lithuania, Levinas lived most of his life in France; he was primarily a philosopher but also a deeply committed Jewish educator who often lectured and wrote about Judaism and Jewish matters. Levinas was influenced by Bergson, Husserl, Heidegger, and others, like Buber and Rosenzweig. We will look at the philosophical world in which he was educated and explore his unique development as a philosopher in the years after World War Two. Levinas reacted against the main tendencies of Western philosophy and religious thought and as a result shaped novel, powerful, and challenging ways of understanding philosophy, religion, ethics, and politics. In this course, we will examine works from every stage of Levinas's career, from his early study of Husserl and Heidegger to the emergence of his new understanding of the human condition and the primacy of ethics, the face-to-face encounter with the human other, the role of language and the relationship between ethics and religion, and finally his understanding of Judaism and its relationship to Western philosophy. We will be interested in his philosophical method, the relevance of his thinking for ethics and religion, the role of language in his philosophy and the problem of the limits of expressibility, and the implications of his work for politics. We shall also consider his conception of Judaism, its primary goals and character, and its relation to Western culture and philosophy. Same as: JEWISHST 324, RELIGST 234, RELIGST 334

**JEWISHST 227D. Readings in Talmudic Literature. 1 Unit.**

Readings of the talmudic texts. Some knowledge of Hebrew is preferred. The ongoing seminar is designed to study the making of the talmudic sugya (unit of discourse), along with classic commentaries. Students will consider some of the recent developments in the academic study of Talmudic literature, introduced by the instructor. The goal of the ongoing seminar is to provide Stanford students and faculty with the opportunity to engage in regular Talmud study, and to be introduced to a variety of approaches to studying Talmudic texts. Class meets on Fridays, from 12:00-1:15 pm in Hillel (Koret Pavilion Taube Hillel House; Ziff Center for Jewish Life). May be repeat for credit. Same as: JEWISHST 127D, RELIGST 170D

**JEWISHST 227E. Readings in Talmudic Literature Advanced. 1 Unit.**

Readings of the talmudic texts. Knowledge of Hebrew is required. The ongoing seminar is designed to study the making of the talmudic sugya (unit of discourse), along with classic commentaries. Students will consider some of the recent developments in the academic study of Talmudic literature, introduced by the instructor. The goal of the ongoing seminar is to provide Stanford students and faculty with the opportunity to engage in regular Talmud study, and to be introduced to a variety of approaches to studying Talmudic texts. Meeting time and location TBA. May be repeated for credit.

Same as: JEWISHST 127E, RELIGST 170E

**JEWISHST 22S. From 'superfluous women' to the 'Yolocaust': The Experience of War in 20th Century Europe. 5 Units.**

Through a variety of primary sources, including diaries, photographs, letters, and artifacts this course explores the multiplicity of ways in which Europeans experienced the great conflicts that swept the continent in the 20th century. The unprecedented impact of these wars will be traced in stories of those whose voices have been marginalized in conventional historiography. This course encourages and guides students in their first forays into archival work in a hands-on approach to developing ways of thinking historically.

Same as: HISTORY 22S

**JEWISHST 237. Religion and Politics: A Threat to Democracy?. 4-5 Units.**

The meddling of religion in politics has become a major global issue. Can religion co-exist with politics in a democracy? In Israel this is an acute issue exhibiting an existential question: To what extent religion is a source of the weaknesses and vulnerabilities of Israeli Democracy? The course offered is a research workshop, part of a policy-oriented applied research in motion. The workshop will meet a few times during the Fall Quarter and the instructor will be available to consult with the workshop's participants on a bi-weekly basis. The workshop will include unique opportunities for hands-on, team-based research.

Same as: IPS 237

**JEWISHST 240. The Yiddish Story. 3-5 Units.**

The Yiddish language is associated with jokes, folktales, and miracle legends, as well as modern stories. This class traces the development of Yiddish literature through these short oral and written forms, following Jewish writers out of the East European market town to cities in the Soviet Union, Israel, and especially the United States. We conclude with stories written in other languages about Yiddish writers. Readings include Sholem Aleichem, I. L. Peretz, Isaac Bashevis Singer, Esther Singer-Kreitman, Cynthia Ozick, and Dina Rubina. Readings in English; optional discussion section for students who read Yiddish.

Same as: AMSTUD 240Y

**JEWISHST 249. The Algerian Wars. 3-5 Units.**

From Algiers the White to Algiers the Red, Algiers, the Mecca of the Revolutionaries in the words of Amilcar Cabral, this course offers to study the Algerian Wars since the French conquest of Algeria (1830-) to the Algerian civil war of the 1990s. We will revisit the ways in which the war has been narrated in literature and cinema, popular culture, and political discourse. A special focus will be given to the Algerian War of Independence (1954-1962). The course considers the racial representations of the war in the media, the continuing legacies surrounding the conflict in France, Africa, and the United States, from Che Guevara to the Black Panthers. A key focus will be the transmission of collective memory through transnational lenses, and analyses of commemorative events and movies. Readings from James Baldwin, Assia Djebar, Albert Camus, Frantz Fanon, Mouloud Feraoun. Movies include "The Battle of Algiers," "Days of Glory," and "Viva Laldjérie." nTaught in English.

Same as: CSRE 249, FRENCH 249, HISTORY 239G

**JEWISHST 271C. Campaigns and Elections in Israel. 5 Units.**

Employing a theoretical and comparative framework, this seminar focuses on campaigns and elections in Israel. The seminar is divided into two interrelated sections. In the first section, we will cover voting behavior. Here we will look at Israel's election laws, its political culture, socialization and cleavages, turnout, political sophistication, ideology, partisanship and issue voting. In the second half of the semester we will examine elections from the perspective of candidates and campaign strategists. The topics we will focus on include election laws, public and private campaign finance, campaign strategy, media, polling, and advertising. In examining these topics, we will cover a variety of elections campaigns since Israel's birth, with an emphasis on the most recent ones.

Same as: POLISCI 241C

**JEWISHST 275D. Special Topics: Dilemmas of Democracy and Security in Israel and the Middle East. 5 Units.**

The Middle East is known to be a volatile region, characterized by political violence, armed conflicts, and social instabilities. This volatility is of relevance for many countries including the US with its invested interests in the region and Israel that exists at the heart of the region, and along with its conflict with the Palestinians is considered to be one of the root causes of this volatility. Moreover, the volatility brings into encounter two kinds of collective goods: democracy and security. Their encounter in a conflictual and unstable environment raises a host of questions and dilemmas, both moral and practical: should we balance democracy and security and if so how? Can the two be accommodated at all? Does democracy is better or worse in addressing security problems? Does democracy and security constitute each other conceptually? Do democratic states tend to cooperate with each other when confronting security issues? And what about democratization: how good a ca use is it as a foreign policy? How good a cause is it in justifying war and/or not ending one? From its establishment the State of Israel found itself torn by these and others related questions and the recent decades saw the US drawn by these dilemmas as well (think of the Bybee Memo and the Patriot acts). In the course we will introduce these dilemmas, analyze them and examine different normative and policy answers that were discussed in academia and in the policy world.

Same as: POLISCI 215D

**JEWISHST 282. Circles of Hell: Poland in World War II. 5 Units.**

Looks at the experience and representation of Poland's wartime history from the Nazi-Soviet Pact (1939) to the aftermath of Yalta (1945). Examines Nazi and Soviet ideology and practice in Poland, as well as the ways Poles responded, resisted, and survived. Considers wartime relations among Polish citizens, particularly Poles and Jews. In this regard, interrogates the traditional self-characterization of Poles as innocent victims, looking at their relationship to the Holocaust, thus engaging in a passionate debate still raging in Polish society.

Same as: HISTORY 228, HISTORY 328, JEWISHST 382

**JEWISHST 282K. The Holocaust and Its Aftermath. 4-5 Units.**

This seminar gives an overview over different aspects of the history of the Holocaust and its aftermath and will examine key issues in recent Holocaust historiography and questions of memory and representation. Special emphasis is put on the nature of the historian's task, as viewed through the lens of historians of the Holocaust, as well as to the significance of the Holocaust in history and how it has changed over time. The course will confront students with historiographical texts and historical documents, with photography and film, works of scholarship and art.

Same as: HISTORY 202K, HISTORY 302K, JEWISHST 382K

**JEWISHST 284C. Genocide and Humanitarian Intervention. 3 Units.**

Open to medical students, graduate students, and undergraduate students. Traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo and Sudan.

Same as: HISTORY 224C, HISTORY 324C, JEWISHST 384C, PEDS 224

**JEWISHST 286. Jews Among Muslims in Modern Times. 4-5 Units.**

The history of Jewish communities in the lands of Islam and their relations with the surrounding Muslim populations from the time of Muhammad to the 20th century. Topics: the place of Jews in Muslim societies, Jewish communal life, variation in the experience of communities in different Muslim lands, the impact of the West in the Modern period, the rise of nationalisms, and the end of Jewish life in Muslim countries.

Same as: HISTORY 286, HISTORY 386, JEWISHST 386

**JEWISHST 287S. Research Seminar in Middle East History. 4-5 Units.**

Student-selected research topics. May be repeated for credit.

Same as: HISTORY 481, JEWISHST 481

**JEWISHST 288D. Germany and the World Wars, 1870-1990. 4-5 Units.**

(Students who have taken History 38A/138A should not enroll in this course.) This course examines Germany's tumultuous history from the Second Empire through the end of the Cold War. During this time, Germany ushered in five regimes and two world wars, seeing between material ruin and economic prosperity on the frontline of Europe's military and ideological rifts. Beginning with Bismarck's wars of unification, the class spans World War One, the Weimar Republic, the rise of Nazism, World War Two, the Holocaust, the division of communist East and capitalist West Germany, and the fall of the Iron Curtain.

Same as: HISTORY 238D, HISTORY 338D, JEWISHST 388D

**JEWISHST 289A. Nationhood and Belonging: Poles and Jews. 3 Units.**

Examines changing conceptions of nationhood in Poland, late-19th century to present, with focus on place of Jews in Polish society. What conditions fostered the early political sense of the nation? Why was it replaced with integral nationalism, and for some, fascism? How did Jews relate to their homeland? Emphasis on post-1918 history: impact of independence, Great Depression, West European fascism, World War II, imposition of communist rule, and collapse of the Soviet Bloc. Considers current Polish-Jewish relations.

Same as: HISTORY 229A, HISTORY 329A, JEWISHST 389A

**JEWISHST 291X. Learning Religion: How People Acquire Religious Commitments. 4 Units.**

This course will examine how people learn religion outside of school, and in conversation with popular cultural texts and practices. Taking a broad social-constructivist approach to the variety of ways people learn, this course will explore how people assemble ideas about faith, identity, community, and practice, and how those ideas inform individual, communal and global notions of religion. Much of this work takes place in formal educational environments including missionary and parochial schools, Muslim madrasas or Jewish yeshivot. However, even more takes place outside of school, as people develop skills and strategies in conversation with broader social trends. This course takes an interdisciplinary approach to questions that lie at the intersection of religion, popular culture, and education. May be repeat for credit.

Same as: AMSTUD 231X, EDUC 231, RELIGST 231X

**JEWISHST 297X. American Jewish History: Learning to be Jewish in America. 2-4 Units.**

This course will be a seminar in American Jewish History through the lens of education. It will address both the relationship between Jews and American educational systems, as well as the history of Jewish education in America. Plotting the course along these two axes will provide a productive matrix for a focused examination of the American Jewish experience. History students must take course for at least 3 units. Same as: AMSTUD 279X, EDUC 279, HISTORY 288D, RELIGST 279X

**JEWISHST 299A. Directed Reading in Yiddish, First Quarter. 1-5 Unit.**  
Directed Reading in Yiddish, First Quarter.**JEWISHST 321D. Readings in Syriac Literature. 2-5 Units.**

In recent years, there has been growing interest in the works of Syriac speaking Christians in antiquity and beyond. This course offers an introduction to the Syriac language, including its script, vocabulary and grammar, and a chance to read from a selection of foundational Syriac Christian texts.

Same as: JEWISHST 221D, RELIGST 221D, RELIGST 321D

**JEWISHST 324. Emmanuel Levinas: Ethics, Philosophy and Religion. 4 Units.**

Emmanuel Levinas (1906-1995) is a major French philosopher of the second half of the twentieth century and is among the half-dozen most important Jewish thinkers of the century. Born in Lithuania, Levinas lived most of his life in France; he was primarily a philosopher but also a deeply committed Jewish educator who often lectured and wrote about Judaism and Jewish matters. Levinas was influenced by Bergson, Husserl, Heidegger, and others, like Buber and Rosenzweig. We will look at the philosophical world in which he was educated and explore his unique development as a philosopher in the years after World War Two. Levinas reacted against the main tendencies of Western philosophy and religious thought and as a result shaped novel, powerful, and challenging ways of understanding philosophy, religion, ethics, and politics. In this course, we will examine works from every stage of Levinas's career, from his early study of Husserl and Heidegger to the emergence of his new understanding of the human condition and the primacy of ethics, the face-to-face encounter with the human other, the role of language and the relationship between ethics and religion, and finally his understanding of Judaism and its relationship to Western philosophy. We will be interested in his philosophical method, the relevance of his thinking for ethics and religion, the role of language in his philosophy and the problem of the limits of expressibility, and the implications of his work for politics. We shall also consider his conception of Judaism, its primary goals and character, and its relation to Western culture and philosophy.

Same as: JEWISHST 224, RELIGST 234, RELIGST 334

**JEWISHST 348. Writing Between Languages: The Case of Eastern European Jewish Literature. 1-5 Unit.**

Eastern European Jews spoke and read Hebrew, Yiddish, and their co-territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well. \*\*\*This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit\*\*\*.

Same as: JEWISHST 148, SLAVIC 198, SLAVIC 398

**JEWISHST 37Q. Zionism and the Novel. 3 Units.**

At the end of the nineteenth century, Zionism emerged as a political movement to establish a national homeland for the Jews, eventually leading to the establishment of the State of Israel in 1948. This seminar uses novels to explore the changes in Zionism, the roots of the conflict in the Middle East, and the potentials for the future. We will take a close look at novels by Israelis, both Jewish and Arab, in order to understand multiple perspectives, and we will also consider works by authors from the North America and from Europe. Note: This course must be taken for a letter grade to be eligible for WAYS credit.

Same as: COMPLIT 37Q

**JEWISHST 382. Circles of Hell: Poland in World War II. 5 Units.**

Looks at the experience and representation of Poland's wartime history from the Nazi-Soviet Pact (1939) to the aftermath of Yalta (1945). Examines Nazi and Soviet ideology and practice in Poland, as well as the ways Poles responded, resisted, and survived. Considers wartime relations among Polish citizens, particularly Poles and Jews. In this regard, interrogates the traditional self-characterization of Poles as innocent victims, looking at their relationship to the Holocaust, thus engaging in a passionate debate still raging in Polish society. Same as: HISTORY 228, HISTORY 328, JEWISHST 282

**JEWISHST 382K. The Holocaust and Its Aftermath. 4-5 Units.**

This seminar gives an overview over different aspects of the history of the Holocaust and its aftermath and will examine key issues in recent Holocaust historiography and questions of memory and representation. Special emphasis is put on the nature of the historian's task, as viewed through the lens of historians of the Holocaust, as well as to the significance of the Holocaust in history and how it has changed over time. The course will confront students with historiographical texts and historical documents, with photography and film, works of scholarship and art.

Same as: HISTORY 202K, HISTORY 302K, JEWISHST 282K

**JEWISHST 383. The Holocaust. 4-5 Units.**

The emergence of modern racism and radical anti-Semitism. The Nazi rise to power and the Jews. Anti-Semitic legislation in the 30s. WW II and the beginning of mass killings in the East. Deportations and ghettos. The mass extermination of European Jewry.

Same as: HISTORY 137, HISTORY 337, JEWISHST 183

**JEWISHST 384C. Genocide and Humanitarian Intervention. 3 Units.**

Open to medical students, graduate students, and undergraduate students. Traces the history of genocide in the 20th century and the question of humanitarian intervention to stop it, a topic that has been especially controversial since the end of the Cold War. The pre-1990s discussion begins with the Armenian genocide during the First World War and includes the Holocaust and Cambodia under the Khmer Rouge in the 1970s. Coverage of genocide and humanitarian intervention since the 1990s includes the wars in Bosnia, Rwanda, Kosovo, the Congo and Sudan.

Same as: HISTORY 224C, HISTORY 324C, JEWISHST 284C, PEDS 224

**JEWISHST 385A. Core Colloquium in Jewish History, 17th-19th Centuries. 4-5 Units.**

Same as: HISTORY 385A

**JEWISHST 385B. Graduate Colloquium in Modern Jewish History. 4-5 Units.**

Instructor consent required.

Same as: HISTORY 385B

**JEWISHST 386. Jews Among Muslims in Modern Times. 4-5 Units.**

The history of Jewish communities in the lands of Islam and their relations with the surrounding Muslim populations from the time of Muhammad to the 20th century. Topics: the place of Jews in Muslim societies, Jewish communal life, variation in the experience of communities in different Muslim lands, the impact of the West in the Modern period, the rise of nationalisms, and the end of Jewish life in Muslim countries.

Same as: HISTORY 286, HISTORY 386, JEWISHST 286



**JEWISHST 388D. Germany and the World Wars, 1870-1990. 4-5 Units.** (Students who have taken History 38A/138A should not enroll in this course.) This course examines Germany's tumultuous history from the Second Empire through the end of the Cold War. During this time, Germany ushered in five regimes and two world wars, seesawing between material ruin and economic prosperity on the frontline of Europe's military and ideological rifts. Beginning with Bismarck's wars of unification, the class spans World War One, the Weimar Republic, the rise of Nazism, World War Two, the Holocaust, the division of communist East and capitalist West Germany, and the fall of the Iron Curtain.  
Same as: HISTORY 238D, HISTORY 338D, JEWISHST 288D

**JEWISHST 389A. Nationhood and Belonging: Poles and Jews. 3 Units.** Examines changing conceptions of nationhood in Poland, late-19th century to present, with focus on place of Jews in Polish society. What conditions fostered the early political sense of the nation? Why was it replaced with integral nationalism, and for some, fascism? How did Jews relate to their homeland? Emphasis on post-1918 history: impact of independence, Great Depression, West European fascism, World War II, imposition of communist rule, and collapse of the Soviet Bloc. Considers current Polish-Jewish relations.  
Same as: HISTORY 229A, HISTORY 329A, JEWISHST 289A

**JEWISHST 393X. The Education of American Jews. 4 Units.** This course will take an interdisciplinary approach to the question of how American Jews negotiate the desire to retain a unique ethnic sensibility without excluding themselves from American culture more broadly. Students will examine the various ways in which people debate, deliberate, and determine what it means to be an "American Jew". This includes an investigation of how American Jewish relationships to formal and informal educational encounters through school, popular culture, religious ritual, and politics.  
Same as: EDUC 313, RELIGST 313X

**JEWISHST 39S. The Other Side: Ethnography and Travel Writing through Jewish, Christian and Muslim Eyes. 3 Units.** In an age of reality television and social media, we are bombarded with snapshots of the exotic, monstrous, and bizarre. Yet despite their quantity, these images pale in comparison to the qualities of terror, wonder and curiosity that ancient travelers evoked in their encounters with foreign lands and peoples. Early ethnographers, too, painstakingly explored the beliefs and practices of unfamiliar peoples sometimes very close to home. This course surveys their most vivid writings, from ancient Greece to the colonization of the New World, focusing on the relation between fascination with the other and the author's own religious imagination. In particular, it introduces the contributions of Jewish travelers and ethnographers to this history, which has often been written from the standpoint of imperial, ecclesiastical or colonial power. It stresses literary continuities across three general periods (ancient, medieval, and colonial), showing how remarkably consistent patterns of identification spring from diverse encounters.

**JEWISHST 481. Research Seminar in Middle East History. 4-5 Units.** Student-selected research topics. May be repeated for credit.  
Same as: HISTORY 481, JEWISHST 287S

**JEWISHST 486A. Graduate Research Seminar in Jewish History. 4-5 Units.**  
Same as: HISTORY 486A

**JEWISHST 486B. Graduate Research Seminar in Jewish History. 4-5 Units.**  
Prerequisite: HISTORY 486A.  
Same as: HISTORY 486B

**JEWISHST 4N. A World History of Genocide. 3-5 Units.** Reviews the history of genocide from ancient times until the present. Defines genocide, both in legal and historical terms, and investigates its causes, consequences, and global dimensions. Issues of prevention, punishment, and interdiction. Main periods of concern are the ancient world, Spanish colonial conquest; early modern Asia; settler genocides in America, Australia, and Africa; the Armenian genocide and the Holocaust; genocide in communist societies; and late 20th century genocide.  
Same as: HISTORY 4N

**JEWISHST 5. Biblical Greek. 3-5 Units.** (Formerly CLASSGRK 5.) This is a one term intensive class in Biblical Greek. After quickly learning the basics of the language, we will then dive right into readings from the New Testament and the Septuagint, which is the ancient Greek translation of the Hebrew Bible. No previous knowledge of Greek required. If demand is high for a second term, an additional quarter will be offered in the Spring.  
Same as: CLASSICS 6G, RELIGST 171A

**JEWISHST 53. Exploring Jewish Spirituality. 4 Units.** It was once accepted as fact that Judaism is a purely rational religion devoid of any authentic mystical tradition. But the past century of scholarship has reversed this claim, demonstrating that the spiritual life has been integral to Judaism's vital heart since ancient times. This yearning for a direct immediate experience of God's Presence, a longing to grasp the mysteries of the human soul and know the inner dynamics of the Divine realm, has taken on many different forms across the centuries. This course will introduce students to the major texts and core ideas of Jewish mysticism and spirituality, tracking their development from the Hebrew Bible to the present day. Close attention will be paid to the sources, historical context, and we will also engage with broader methodological questions regarding the academic study of religion and the comparative approach to mysticism.  
Same as: RELIGST 53

**JEWISHST 5B. Biblical Greek. 3-5 Units.** (Formerly CLASSGRK 6) This is a continuation of the Winter Quarter Biblical Greek Course. Pre-requisite: CLASSICS 6G (Formerly CLASSGRK 5) or a similar introductory course in Ancient Greek.  
Same as: CLASSICS 7G

**JEWISHST 5G. Intensive Biblical Greek. 8 Units.** Equivalent to two quarters of Biblical Greek (CLASSICS 6G, 7G). Students will learn the core of New Testament Greek with the goal of learning to accurately translate and read the New Testament. Students will read one-third of the Gospel of John during the course and will be well-prepared to read the Greek New Testament independently after the course. Focus on knowledge of key vocabulary and grammar needed to read the Greek Bible with ease. No previous knowledge of Greek required. Course does not fulfill the Stanford language requirement.  
Same as: RELIGST 171X

**JEWISHST 71. Jews and Christians: Conflict and Coexistence. 3 Units.** The relationship between Judaism and Christianity has had a long a controversial history. Christianity originated as a dissident Jewish sect but eventually evolved into an independent religion, with only tenuous ties to its Jewish past and present. Since the Holocaust, Jews and Christians have begun the serious work of forging more meaningful relationships with each other. This course explores the most significant moments that have shaped the relationship between Judaism and Christianity and examines some of the theological complexities imbedded in these traditions, while searching constructive ways of situating oneself amidst such complexities.  
Same as: RELIGST 71

**JEWISHST 80T. Jewish Music in the Lands of Islam. 4 Units.**

An Interdisciplinary study of Music, Society, and Culture in communities of the Jewish Diaspora in Islamic countries. The course examines the diverse and rich musical traditions of the Jews in North Africa and the Middle East. Based on the "Maqamat" system, the Arabic musical modes, Jewish music flourished under Islamic rule, encompassing the fields of sacred music, popular songs, and art music. Using musicological, historical, and anthropological tools, the course compares and contrasts these traditions from their original roots through their adaptation, appropriation, and re-synthesis in contemporary art music and popular songs.

Same as: MUSIC 80T

**JEWISHST 85B. Jews in the Contemporary World: Faith and Ethnicity, Visibility and Vulnerability. 3 Units.**

(Same as HISTORY 185B. History majors and others taking 5 units, register for 185B.) This course explores the full expanse of Jewish life today and in the recent past. The inner workings of religious faith, the content of Jewish identity shorn of belief, the interplay between Jewish powerlessness and influence, the myth and reality of Jewish genius, the continued pertinence of antisemitism, the rhythms of Jewish economic life – all these will be examined in weekly lectures, classroom discussion, and with the use of a widely diverse range of readings, films, and other material. Explored in depth will be the ideas and practices of Zionism, the content of contemporary secularism and religious Orthodoxy, the impact Holocaust, the continued crisis facing Israel and the Palestinians. Who is to be considered Jewish, in any event, especially since so many of the best known (Spinoza, Freud, Marx) have had little if anything to do with Jewish life with their relationships to it indifferent, even hostile?.

Same as: CSRE 85B, HISTORY 85B, REES 85B

**JEWISHST 85S. A History of Strangers: Jews in the Mediterranean. 5 Units.**

A community needs outsiders. Sometimes it needs them to provide material things, but always it needs them to define itself. Focusing on Jews in the early-modern Mediterranean (1450-1750), this course asks questions about the nature of community, the causes and effects of exclusion, and processes of creating the "other." We will look at primary sources produced by "strangers" and so-called "host" societies. Sources include travelogues, maps, novels, poetry, paintings, contracts, Ottoman edicts, Italian charters, and rulings from religious courts.

Same as: HISTORY 85S

**JEWISHST 86. Exploring the New Testament. 4 Units.**

To explore the historical context of the earliest Christians, students will read most of the New Testament as well as many documents that didn't make the final cut. Non-Christian texts, Roman art, and surviving archeological remains will better situate Christianity within the ancient world. Students will read from the Dead Sea Scrolls, explore Gnostic gospels, hear of a five-year-old Jesus throwing divine temper tantrums while killing (and later resurrecting) his classmates, peruse an ancient marriage guide, and engage with recent scholarship in archeology, literary criticism, and history.

Same as: CLASSICS 43, RELIGST 86

**JEWISHST 86Q. Blood and Money: The Origins of Antisemitism. 4-5 Units.**

For over two millennia, Jews and Judaism have been the object of sustained anxieties, fears, and fantasies, which have in turn underpinned repeated outbreaks of violence and persecution. This course will explore the development and impact of antisemitism from Late Antiquity to the Enlightenment, including the emergence of the Blood libel, the association between Jews and moneylending, and the place of Judaism in Christian and Islamic theology. No prior background in history or Jewish studies is necessary. Prerequisite: PWR 1.

Same as: HISTORY 86Q

## Law (LAW)

**LAW 1001. Antitrust. 4 Units.**

(Formerly Law 233) Antitrust law sets the ground rules for competition. This course will explore the basic concepts in antitrust law. We will examine cartels and competitor collaborations, monopolization, vertical restraints and horizontal mergers. There are no prerequisites for this course. No economic background is required. The course is open to GSB students and graduate students in the Economics Department. To apply for this course, non-Law students must complete a Non-Law Student Add Request Form available on the SLS Registrar's Office website (see Non-Law Students). Elements used in grading: Class participation, attendance and final exam.

**LAW 1002. Advanced Antitrust: Monopolization and Abuse of Dominance in the US and the EU. 3 Units.**

This course will take an in-depth look at the principles in US and EU competition law regarding conduct by firms that excludes or weakens rivals. This is perhaps the most controversial and unsettled part of competition law and the part about which there is the least multinational agreement. We will study, among other materials, some of the major recent cases in which the same or very similar matters were addressed by both US and EU competition authorities, including matters involving Microsoft, Google, Intel and Rambus. The objectives are to gain a deeper understanding of the principles regarding exclusionary conduct and the ways in which those principles in US and EU law differ and, from that understanding, to draw inferences about the reasons for the differences between US and the EU law and the impact of different enforcement procedures on substantive legal principles. Elements used in grading: Class participation and written assignments or final paper. This course is open to anyone who has taken Antitrust Law 233 and to others with the permission of the instructor.

**LAW 1003. Bankruptcy. 3 Units.**

(Formerly Law 240) This course concerns the law and finance of corporate bankruptcy with an emphasis on reorganization. The course reviews the fundamentals of debt contracting, including the role of events of default, debt priority, and security interests. The course examines various aspects of the bankruptcy process: including the automatic stay, the avoidance of prebankruptcy transactions (e.g. fraudulent conveyances and preferences), the treatment of executory contracts, the debtor's governance structure during bankruptcy, the financing of operations and investments in bankruptcy, sales of assets during bankruptcy, and the process of negotiating, voting, and ultimately confirming a plan of reorganization. Elements use in grading: Class participation and exam.

**LAW 1004. Comparative Corporate Capitalism. 2 Units.**

From the United States to China, and from Brazil to the EU, corporate capitalism has triumphed globally as the dominant form of economic organization. Yet despite the common attributes of the corporation familiar to every U.S. law student, corporations around the world have diverse ownership structures, interact in their domestic political economies in different ways, and exhibit a host of traits that vary with the institutional context in which they operate. This seminar explores the many forms corporate capitalism takes around the world, and the important legal and policy issues raised by global corporate activity. We will explore the rise of "agency capitalism" in the U.S. and the proliferation of new corporate ownership structures around the world, the emergence of Chinese state capitalism and its legal and policy consequences, efforts to reform Japanese stakeholder capitalism, and hybrid forms of organization such as the "benefit corporation" and public-private partnerships (PPP). Policy issues to be considered include corporate social responsibility, the national security implications of investment by state-owned enterprises, and the consequences of global activist investing. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Presentation.

**LAW 1005. Comparative Venture Capital - China. 2 Units.**

(Formerly Law 736) This course is taught in conjunction with Law 1006. Students may enroll for this course alone or for both this course and Law 1006. Law 1005 is intended to introduce students to the legal and financial principles underlying venture capital investment in start-up enterprises and innovative technologies. A special emphasis of this course will be a comparative analysis of the ways in which the various legal and financial structures employed by venture capitalists are replicated in other legal environments, with a focus on the largest venture capital and IPO market in the world - China. The first eight weeks of the course will coincide with the first eight weeks of Winter Quarter, and will be conducted at Stanford Law School. Class sessions will be comprised of lectures regarding the basic concepts and structures, as well as seminar discussions with venture capital industry participants. Elements used in grading: Final exam, attendance and class participation. Special Instructions: Enrollment in the Beijing option is limited to 12 students (See Law 1006 for application instructions and deadline).

**LAW 1006. Comparative Venture Capital - China: Field Study. 1 Unit.**

(Formerly Law 736A) This is the Stanford Center at Peking University in Beijing component of Comparative Venture Capital - China (Law 1005). For details, see course description for Law 1006. During spring break 2017, the course will be held at the Stanford Center at Peking University in Beijing, and will consist of meetings and seminars with lawyers, entrepreneurs, and venture capitalists active in the Chinese venture capital market. Students will also tour start-up enterprises made possible with venture investments. Enrollment is limited to 12 students. PLEASE NOTE: Students will need a passport and a visa to travel to Beijing. Elements used in grading: class participation and short writing assignments. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 1007. Contracts: American Law. 4 Units.**

(Formerly Law 722) This course will provide advanced-degree students with coverage of Contracts law comparable to the fall course offered for first-year JD students. The course will identify the scope and purpose of the legal protection accorded to interests created by voluntary undertakings. We will focus on problems of contract formation, enforceability, interpretation, performance and excuses for non-performance, and remedies for breach. The course will cover both the U.S. common law of contracts and the basics of UCC Article 2 (sales of goods). Not open to JD students. Open only to students in the SLS Advanced Degree Programs. Elements used in grading: Class Participation, Attendance, Final Exam.

**LAW 1008. Contract Design: Principles and Practice. 2 Units.**

(Formerly Law 434) Although transaction lawyers spend much time drafting contracts and related documents, they can contribute very significant value by designing transactions. Transactions should be tailored to the goals and circumstances of each set of parties, but there are some general principles that can guide the design process. This seminar examines some of these principles: such as the use of embedded options in contracts, of third parties, and of tailored procedures for dispute resolution and enforcement. Some of the readings and discussion will be at a fairly high level of abstraction, drawing on economic theories of contracting. A good part of our analysis will be closer to ground level, looking at particular types of transactions: for example, franchising, construction, corporate acquisition, loans, data use and insurance contracts. We will also look at the process of innovation and negotiation in contract design, including the role of lawyers and digital document production. Students will be required to write paper for the seminar, and encouraged to focus on a specific type of transaction. Elements used in grading: Class participation (10%) and an independent research paper for "R" (Research credit).

**LAW 1009. Corporate Finance I. 3 Units.**

(Formerly Law 262) There are many contexts in which lawyers need an understanding of finance. For example, many of the disputes that give rise to litigation center on the financial valuation of firms and the securities they issue. In addition, an understanding of firms' capital structures and the design of corporate securities is necessary in analyzing many legal issues, especially those arising in corporate transactions, executive compensation, and bankruptcy proceedings. This course is designed to provide students with a rigorous conceptual understanding of finance and to give students the analytical tools needed to make financial decisions and value financial securities. The course stresses problem solving and includes problem sets, cases, and a midterm and final examination. The course is designed to be accessible to students with a fairly limited mathematical background. In general we will not assume any knowledge of mathematics beyond high-school algebra. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Exam.

**LAW 1010. Corporate Income Taxation. 4 Units.**

(Formerly Law 351) Overview of the fundamental tax rules and principles regarding the taxation of domestic corporate entities. Course will address choice of entity (C corporation, S corporation and non-corporate pass-through entities), capital structure and formation issues, corporate operations, including cash and property distributions and shareholder exit transactions. Approximately half of the course will be devoted to taxable and non-taxable acquisitions, dispositions and reorganizations, including planning and structuring strategies; a portion will address current tax policy considerations. The student's final grade will be based on a final exam, although class participation may improve a student's grade. Prerequisite: Taxation 1 or Partnership Tax. Elements used in grading: Class Participation, Final Exam.

**LAW 1011. Advanced Corporate Finance. 3 Units.**

(Formerly Law 264) Lawyers often need an advanced understanding of corporate financial decisions, instruments, and transactions, including equity financing and initial public offerings, the determination of a firm's cost of capital, valuation, payout policy, recapitalizations and bankruptcy, mergers and acquisitions, and the market for corporate control. Advanced Corporate Finance introduces these topics by lecture and then explores them through detailed analysis of actual cases. This structure maximizes the synergy between theory and practice, providing students with portable, durable, and marketable tools for their careers. Legal considerations that arise in the execution of these corporate financial decisions include mandatory disclosure requirements, the issuance of dual class shares, charges of anticompetitive practices, taxes, appraisal cases and fairness opinions, takeover defenses and fiduciary duty challenges, contractual provisions in merger agreements, insider trading, and Chapter 11 bankruptcy proceedings. This class rigorously advances both conceptual and practical/analytical understanding. The knowledge gained will facilitate professional dealings with boards of directors, chief financial officers and corporate treasurers, investment bankers, consultants, portfolio and investment managers, venture capitalists, and private equity investors. Prerequisite: Corporate Finance I (Law 1009, formerly Law 262) or equivalent background. Elements used in grading: class participation and final exam.

**LAW 1012. Corporate Reorganization. 3 Units.**

(Formerly Law 248) This course examines the reorganization of a financially distressed company under chapter 11 of the Bankruptcy Code. The course follows a fictitious company through several stages of a business turnaround and financial restructuring, including an out-of-court workout, a chapter 11 filing, selected chapter 11 operating issues, and the formulation, negotiation and confirmation of a plan of reorganization. In addition, the course follows current developments in bankruptcy, primarily through reports in the media. For example, in recent years the course has followed issues as they have arisen in actual chapter 11 cases (e.g., General Motors, Chrysler Corporation, Lehman Brothers, SunEdison, Westinghouse Electric, several retailers) and the effects of bankruptcy on various industries (e.g., real estate, energy, retail, technology, airlines, automotive). The course also touches on various issues that often arise in a reorganization setting, such as valuation, leveraged buyouts, debt and derivative instruments, and distressed debt trading. Elements used in grading: Class participation and final exam.

**LAW 1013. Corporations. 4 Units.**

(Formerly Law 242) This is a basic course in corporation law and provides a foundation for advanced business courses. The course examines the role of law in structuring economic relationships among shareholders, management, creditors, and other participants in modern business corporations. Some background in accounting and corporate finance is helpful, but not required. The course briefly considers basic theories of the firm, the reasons for incorporation of a business enterprise, and agency theory. The course then turns to management and control of the corporation, the actions of directors and officers, and the distribution of powers within the corporate structure more generally. The role of shareholders is examined next, and we devote substantial attention to the fiduciary duties of directors and controlling shareholders. Finally, we closely examine transactions in corporate control and consider the permissible scope of anti-takeover devices. Elements used in grading: Attendance, Class Participation, Exam.

**LAW 1014. Current Issues in Tax Practice. 2 Units.**

(Formerly Law 785) This course will introduce students to major issues in tax practice. Each class will be co-taught by one or more leading practitioners in the tax bar, with other members of the bar attending. Subjects include international tax, intellectual property and tax, tax litigation, state and local taxation, working for the government in tax, tax lobbying and working in a corporate tax department. Class will meet at my home (with take-out dinner provided). The class offers students a good opportunity to connect their SLS tax courses to real-world tax issues and practitioners. Elements used in grading: Class Participation, Attendance, Written Assignments.

**LAW 1015. Corporate Social Responsibility. 2 Units.**

Although corporate social responsibility ("CSR") initiatives have been pursued by a range of companies as voluntary measures for decades, recent developments have rendered the exercise by companies of designing and implementing environmental, social and governance mechanisms inherently legal in nature. This course will explore the legal issues that companies have been forced to confront, increasingly with the support of specialized legal counsel, in pursuing CSR or sustainability objectives, including those arising in the context of supply chain human rights due diligence (e.g., minerals sourcing and human trafficking), impact investment and the adoption of alternative corporate forms, voluntary standards and mandatory requirements regarding non-financial disclosure and reporting (e.g., SASB, sustainability listing standards, possible amendments to Regulation S-K, and the EU non-financial reporting rules), director fiduciary duties and the changing expectations of investors, shareholder proposals and stakeholder engagement, and the rise of corporate social activism by companies and their officers, among others. Elements used in grading: Class Participation, Written Assignments, Final Paper.

**LAW 1016. Deals I. 4 Units.**

(Formerly Law 273) This course applies economic concepts to the practice of structuring contracts. The course extends over two quarters. In the Fall quarter it will meet four hours per week. In the Winter quarter, it will meet ONLY FOR FIVE WEEKS for four hours per week—for 2 units of course credit. During those five weeks, it will meet on Monday and Friday. Exactly which five weeks the course will meet will be announced during the Fall quarter. Students enrolled in the course must take both quarters. All of the first quarter will be spent in a traditional classroom setting but with untraditional materials. Most of the materials consist of case studies of business transactions (and no case law). We will use those case studies to analyze the economics underlying a wide range of business transactions and the contractual terms and structures use to respond to underlying economic challenges. During the second quarter, we will explore deals in greater detail by studying five complex transactions in full. For this part of the course, students will be divided into groups and will be assigned one of the five deals. Each group will give a presentation of its deal to the class, and in the following class, a lawyer or other participant in the deal will come to class to present the deal based on his or her experience. We study five new deals each year. Deals that we have studied over the years have included movie financings, biotech alliances, venture capital financings, cross-border joint ventures, private equity investments, corporate reorganizations, and more. Special Instructions: Students enrolled in the course must take both quarters. Students who have not taken the course in the fall cannot register for it in the winter, and those who took it in the fall must register for it in the winter. No exam in Autumn Term. An In-School exam will be given at the conclusion of the course in the Winter Term. Grades will be given at the end of the second quarter and will be applied to both quarters. I use the consent form to ensure diversity of experience and non-experience and diversity across classes. There is no background required for the course. Elements used in grading: Attendance, class participation, class presentation, written assignments, group paper, and exam. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 1017. Deals II. 2 Units.**

(Formerly Law 275) This course applies economic concepts to the practice of structuring contracts. The course extends over two quarters. In the Fall quarter it will meet four hours per week. In the Winter quarter, it will meet ONLY FOR FIVE WEEKS for four hours per week—for 2 units of course credit. During those five weeks, it will meet on Monday and Friday. Exactly which five weeks the course will meet will be announced during the Fall quarter. Students enrolled in the course must take both quarters. All of the first quarter will be spent in a traditional classroom setting but with untraditional materials. Most of the materials consist of case studies of business transactions (and no case law). We will use those case studies to analyze the economics underlying a wide range of business transactions and the contractual terms and structures use to respond to underlying economic challenges. During the second quarter, we will explore deals in greater detail by studying five complex transactions in full. For this part of the course, students will be divided into groups and will be assigned one of the five deals. Each group will give a presentation of its deal to the class, and in the following class, a lawyer or other participant in the deal will come to class to present the deal based on his or her experience. We study five new deals each year. Deals that we have studied over the years have included movie financings, biotech alliances, venture capital financings, cross-border joint ventures, private equity investments, corporate reorganizations, and more. Special Instructions: Students enrolled in the course must take both quarters. Students who have not taken the course in the fall cannot register for it in the winter, and those who took it in the fall must register for it in the winter. No exam in Autumn Term. An In-School exam will be given at the conclusion of the course in the Winter Term. Grades will be given at the end of the second quarter and will be applied to both quarters. NOTE: This year, I have blocked out 4 class periods per week in the second quarter on Mondays and Fridays. As explained above, however, WE WILL ONLY USE HALF OF THOSE CLASSES – that is, FIVE MONDAYS and FIVE FRIDAYS over the Winter quarter. CONSENT APPLICATION: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration) to the instructors. See Consent Application Form for submission deadline. I use the consent form to ensure diversity of experience and non-experience and diversity across classes. There is no background required for the course. Elements used in grading: Attendance, class participation, class presentation, written assignments, group paper, and exam.

**LAW 1018. Derivatives. 2 Units.**

(Formerly Law 299) The course will examine the legal, regulatory, trading and risk management aspects of the \$600 trillion notional over-the-counter and cleared derivatives markets. Derivatives have historically not been well-understood by regulators or the public and have been blamed for causing or contributing to the economic crisis. This course will offer students the opportunity to understand how various derivative products are designed, traded and risk-managed and what role regulators play in the derivatives industry. In addition, students will focus on understanding key legal contracts that underpin the global derivatives industry, in particular focusing on the ISDA® Master Agreement and Credit Support Annex, as well as documentation supporting credit derivatives and other common derivative types. Students will also consider the shifting regulatory landscape for financial institutions and hedge funds as it relates to the way in which these products are traded, with rates and credit products migrating to clearinghouses. The course will conclude with an examination of the economic crisis that erupted with Lehman Brothers' bankruptcy in September 2008 and the consequent policy reactions to that event from a derivatives and bankruptcy perspective. Elements used in grading: attendance, written homework assignments and a final exam.

**LAW 1019. Current Topics in Sports Law. 1 Unit.**

Current Topics in Sports Law is a one-unit seminar for up to 15 students with San Francisco 49ers General Counsel and SLS alumna Hannah Gordon. The class is made up of six 90-minute sessions and brief reflection papers. Attendance is mandatory at all six sessions to pass the course. The class will meet the first six weeks of Autumn Quarter. The seminar will explore current topics in the practice of law that are impacting the sports industry, both through litigation and legislation. Elements used in grading: Attendance, Class Participation, Written Assignments. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 1020. Entertainment Law. 3 Units.**

(Formerly Law 297) Entertainment law is not, in and of itself, a separate legal discipline. Instead, the practice of entertainment law lies at the intersection of various traditional legal disciplines, such as contract, tort, copyright, trademark, antitrust, secured transactions, etc., and applies those disciplines to a unique business setting. This course is intended to approach the study of entertainment law from a practical perspective, applying the principles of traditional legal disciplines to avoid problems and find solutions in various facets of the entertainment industry. To accomplish the necessary background, we will study the entertainment industry from both a macro level (i.e., the organization of the motion picture, television and music business, including the function of studios, producers, networks, record companies, agencies, managers, lawyers and labor unions) and a micro level (i.e., examining actual agreements in order to understand the principal components of motion picture talent, production and distribution contracts, television series contracts, music and book publishing contracts). We will also examine key litigation issues that affect the industry, such as the interaction of the First Amendment and the right of publicity, the right of privacy and libel, the anti-SLAPP laws, the "final cut" and profit participation cases. The impact of the digital media (including the internet) will, of course, be analyzed, along with the future of the entertainment industry, including convergence, holograms, syntho-thesians and the like. We plan to include guest speakers from the entertainment industry so that this class will embody both business and legal considerations. The overall goals of this course are (1) to expose students to the unique and increasingly complex structure of the entertainment business; (2) to foster an understanding of the role the law and entertainment lawyers play in that unique business structure; (3) to strengthen students' ability to draft key documents and craft persuasive legal arguments to accomplish the goals they may seek to achieve as lawyers in the entertainment industry; and (4) to develop the analytical and problem-solving skills necessary to make them into effective entertainment lawyers. Elements used in grading: Class participation, brief writing exercises, team contract negotiation and drafting projects.

**LAW 1021. Estate Planning. 3 Units.**

(Formerly Law 292) This class will cover the basics of the gift and estate tax system and estate planning principles. With these fundamentals, the course will then examine basic and advanced estate planning and wealth transfer techniques, including wills, various types of trusts, titling property, gifts during lifetime, charitable vehicles, handling closely held businesses and valuation matters—with an emphasis on how to use these tools in planning an estate to meet the objectives of a couple or individual. Probate of an estate, durable power of attorneys, conservatorships, and planning for other life situations will be explored. Elements used in grading: Class participation (is a small factor and only in the positive direction) and final open book exam. This course is open to GSB and graduate students with consent of the instructor.

**LAW 1022. International Tax. 2 Units.**

(Formerly Law 352) This course examines the United States federal income taxation of international operations and transactions, including international joint ventures and M&A transactions. Income source, foreign tax credits and Subpart F are important. International transfer pricing rules also will be addressed. Congress is currently debating fundamental reform of US international tax rules; developments in this area will also be covered. Elements used in grading: Final Exam.

**LAW 1023. International Securities Offerings. 2 Units.**

This course will focus on the application of United States securities laws and regulations to non-US issuers. We will examine how that regulatory framework differs for Foreign Private Issuers, as compared to other issuers in the United States. Initial public offerings, private placements under Rule 144A and Regulation S and ADR programs will all be covered. We will take a close look at the Alibaba IPO and Alibaba's subsequent regulation as a public company listed in the United States. The course will be taught from a practical perspective with in-class review of SEC filings, offering documents and SEC correspondence. The Morrison Case and its progeny defining the reach of U.S. Securities law to conduct with limited U.S. contacts will also be examined. Elements used in grading: Class Participation, Final Exam.

**LAW 1024. Private Equity Investing. 3 Units.**

(Formerly Law 522) This course will focus on the central issues involved in private equity investing. Topics will include: pricing, structuring and valuation of private equity and venture capital investments; buyouts and other transactions involving multitiered capital structures; the structure and governance of PE and VC funds; conceptual issues relevant in this realm such as option theory, asymmetric information and bounded rationality; and private equity as a distinct asset class. There are no required prerequisites. Students will develop skills and tools used in the private equity arena, including financial analysis (e.g., "deal arithmetic" fundamentals, spreadsheet modeling and forecast preparation); the drafting and negotiation of transaction documents; and the ability to conduct comprehensive due diligence examinations of prospective acquisitions and investments. We will have a number of guest speakers during the term, and will draw on various materials illustrative of what one would encounter in private equity deals and funds. Elements Used in Grading: Periodic problem sets, a final case study and class participation. (The case study will be completed in a small group, and it will give students the opportunity to analyze a real-world transaction from a number of perspectives.) A Final Note: While a 3-credit course, Private Equity Investing will not meet for the entirety of the Winter quarter. The final class session will be on March 2nd (rather than March 12th). This class is limited to 24 students. 16 SLS students will be selected by lottery. The other eight spots will be allocated by consent of instructor, and will be selected from law students who were waitlisted and non-law students. All interested students must attend the first two class sessions (January 10 & 12) in order to keep a spot on the class list or waitlist.

**LAW 1026. Securities Litigation. 3 Units.**

(Formerly Law 300) Executives of American public companies control one of the largest accumulations of wealth in history, amounting to trillions of dollars in market capitalization. Tens of billions of dollars of securities in these companies are traded daily. This course addresses the most interesting and complex litigation that arises in connection with these securities, including fraud claims against executives and corporations, criminal actions for insider trading, internal investigations of executive misconduct, SEC enforcement actions, and derivative actions against corporate directors and officers. This course does not concern stock market technicalities. Instead, you will learn the basic legal framework governing this area, the theories underpinning it, and how to present legal arguments in this area. You will learn in a group setting by working out solutions to some of the most challenging issues that we have faced. In the process you will come to recognize the patterns we see and understand the forces behind them, so that you are prepared to practice in this area. Elements used in grading: Attendance, Class Participation, Exam.

**LAW 1027. Securities Regulation: Capital Formation from Start-Up to IPO and Beyond. 4 Units.**

(Formerly 591) This course uses Silicon Valley's venture capital process as a template to examine the legal regime governing capital formation in the United States. The course tracks financing from the earliest angel investing rounds, through billion dollar private placements, initial public offerings (IPO's), and subsequent governance as a publicly traded firm. The course also explores emerging crowd-funding markets, secondary market mechanisms for trading privately held shares, and the operation of Rule 144A, which allows large foreign firms to raise significant amounts from US institutional investors without ever registering with the SEC. The course relies extensively on recent transactions including the Alibaba, Facebook, and Square IPOs, and Uber private placements. Students interested in a more complete appreciation of the securities regulation process are advised also to take the Spring Securities Litigation course. Elements used in grading: Final exam.

**LAW 1028. Tax Policy. 2 Units.**

(Formerly Law 359) This course will explore various tax policy issues. In past years, the issues we've explored have included the carbon tax, health care, social security, consumption tax, tax compliance, tax shelters and school financing. Special Instructions: Grades will be based on either (A) class participation and memos responding to the discussion questions for any three of the sessions or (B) class participation and a research paper on a topic of your choosing (subject to instructor approval). Option B is Research (R) credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class Participation, attendance and written assignments.

**LAW 1029. Taxation I. 4 Units.**

(Formerly Law 355) This course provides an overview of the federal income tax. Elements use in grading: Class participation and final exam.

**LAW 1030. Partnership Tax. 2 Units.**

(Formerly Law 377) This course will cover the basic rules that govern the tax treatment of partnerships and partners, with a focus on agreements and issues that are relevant to venture capital and private equity investment partnerships. The course will be primarily problem-set based. Prerequisites: Taxation I required; Corporate Income Taxation suggested but not required. Elements used in grading: Final Exam, Class Participation.

**LAW 1031. Current Issues in Business Law. 2 Units.**

This course will focus on issues in law and business that are both important to practitioners and the subject of academic or policy debates. We will cover a range of legal and economic issues, including the following topics: nonbank lending, gatekeeper liability, capital repatriation and tax policy, corporate restructuring, blockchain and smart contracts, and cyber risk management. Each of these issues will be introduced by readings and presentations, but the classes will rely on student discussion and critical evaluation of the papers and positions we examine. Students will have the opportunity to write reaction papers that critically analyze the required readings and to learn and analyze other business law issues of their choice by working in groups. Elements used in grading: Reaction papers, class participation, and performance in the group project and presentation.

**LAW 1032. Banking Law. 3 Units.**

(Formerly 378) This course will examine the legal and regulatory system governing financial institutions, with an emphasis on banks. It will do so by exploring the underlying economics of banking, and the ongoing effort to reform financial regulation. Questions addressed will include: Why do we regulate financial institutions? What dangers do we want to avoid? How well does the current regulatory system achieve what we want to achieve? What alternative approaches can be taken? What are the costs and benefits of the current system, and those of the alternatives? Elements used in grading: Class participation, attendance, final exam.

**LAW 1033. Trusts and Estates. 2 Units.**

(Formerly Law 430) This course will cover the following topics: intestacy; will execution and revocation; will provisions and interpretations; restrictions on the right to devise; probate; creation, amendment and termination of trusts; revocable and irrevocable trusts; trust provisions; charitable trusts; trust administration; and substitutes and conservatorships. Elements used in grading: Final exam (In-School: open book, essay).

**LAW 1034. Real Estate Transactions and Commercial Development. 3 Units.**

(Formerly Law 336) Real Estate Transactions and Commercial Development examines the structuring, negotiation and documentation of commercial real estate transactions. Working both individually and in groups, students will learn the requisite skills for drafting and negotiation leases, letters of intent, sale contracts and related financing documents. As time permits, development-related matters will be explored, including the legal aspects of site acquisition, design and construction. Classes will be a mixture of lectures, interactive discussions, and several mock negotiations. Elements used in grading: Class attendance, individual and group project participation, and written assignments.

**LAW 1035. Mergers, Acquisitions and other Complex Transactions. 3 Units.**

This course is a comprehensive introduction to the law and practice of mergers, acquisitions and other complex transactions. It will cover key and emerging issues in transactional legal practice, including in mergers, tender offers, carve-outs and asset sales, negotiated and unsolicited acquisitions, buyouts, conflict transactions, spin-offs/split-offs and deal activism. In addition to the relevant laws, regulations and fiduciary standards, the course will cover key aspects of the deal-making process, including mechanisms for protecting a preferred transaction and increasing deal certainty, takeover preparedness and responding to hostile offers, as well as structuring alternatives. The course will include practical exercises on M&A topics and guest speakers who have encountered some of the issues discussed. Prerequisite: Corporations, except on petition to the instructors based on prior coursework or special experience. The course is intended both for students anticipating a career in transactional legal practice as well as for students seeking to develop a general understanding of issues in M&A transactions. Elements used in grading: Attendance, Class Participation, Exam. Casebook: We will be using a casebook: *Mergers and Acquisitions Law, Theory, and Practice* by Claire Hill, Brian JM Quinn and Steven Davidoff Solomon (West Academic Publishing 2016).

**LAW 1036. Introduction to Finance. 2 Units.**

(Formerly Law 794) This course is a basic introduction to the principles of finance and is intended as a primer on principles of valuation that are useful in everything from settlement negotiations to family law. No prior knowledge of finance will be assumed. If you want an introduction to corporate finance and won't take the full 3 credit course, this is for you. The first part of the course (approximately 6 weeks) will consist of on-line modules and problem sets that you will complete on your own and in small groups. We will cover topics such as: earnings, cash flows, income statements, interest rates, time value of money, estimating firm value, risk and return and the cost of capital. We will provide a framework for answering questions such as: how much is this project (or firm) worth? How should the firm raise money for a new investment? There will be weekly problem sets and you will get experience with building a simple model (excel spreadsheet) that will help you estimate the value of a potential new project. The second part of the course will consist of in-class discussions of case studies that apply these valuation principles to particular legal settings: e.g. valuing settlement offers, merger proposals, appraisal proceedings, and the efficient capital markets hypothesis. We hope that this flexible format will allow more students to take finance. If you wish, you can take this course and then later take Corporate Finance 1. The class will meet (TBA). Additional small group meetings will be scheduled with the instructor. On-line component. Elements used in grading: Written Assignments, Final Project.

**LAW 1037. The Evolution of Finance. 2 Units.**

(Formerly Law 487) This course provides a framework to understand how uncertainty and technology affect the evolution of finance (and businesses generally), and its illustration with heavy emphasis on recent developments and future trends. In recent years Myron Scholes has given about half the lectures with the other half given by prominent guests. The guest list changes year to year but 2016's list included David Booth, Howard Marks, Martin Chavez, James Manyika, Kevin Warsh, Tom Kempner, and Larry Summers. Special instructions: LAW 1037 is limited to 15 law students. If more than 15 law students enroll, a lottery will be run to determine the final class list. Elements used in grading: No Exam. Participation 50% Projects/Papers 50%. Mandatory attendance. Absences impact grade. Cross-listed with Graduate School of Business (MGTECON 343).

**LAW 1038. The Future of Finance. 2 Units.**

If you are interested in a career in finance or that touches finance (computational science, economics, public policy, legal, regulatory, corporate, other), this course will give you a useful perspective. We will take on hot topics in the current landscape of global financial markets such as how the world has evolved post-financial crisis, how it is being disrupted by FinTech, RegTech, artificial intelligence, crowd financing, blockchain, machine learning & robotics (to name a few), how it is being challenged by IoT, cyber, financial warfare & crypto currency risks (to name a few) and how it is seizing new opportunities in fast-growing areas such as ETFs, new instruments/payment platforms, robo advising, big data & algorithmic trading (to name a few). The course will include guest-lecturer perspectives on how sweeping changes are transforming business models and where the greatest opportunities exist for students entering or touching the world of finance today including existing, new and disruptive players. While derivatives and other quantitative concepts will be handled in a non-technical way, some knowledge of finance and the capital markets is presumed. Elements used in grading: Class Participation, Attendance, Final Paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration) to the instructor(s). Elements used in grading: Class Participation, Attendance, Final Paper. Consent Application: To apply for this course, students must complete and e-mail the Consent Application Form available on the SLS Registrar's Office website (see Registration) to the instructor(s). See Consent Application Form for submission deadline. Cross-listed with Economics (ECON 152/252), Public Policy (PUBLPOL 364), Statistics (STATS 238).

**LAW 1039. Deal Litigation Seminar. 2-3 Units.**

(Formerly Law 483) This seminar is designed as an introduction to mergers and acquisitions litigation. The course provides both a practical and doctrinal perspective on M&A-related litigation and will rely heavily on readings and issues derived from practice in the Delaware courts where much contemporary deal litigation occurs. Students will be asked to apply cases and legal principles in various practical situations that may arise in a transactional litigation practice. Familiarity with basic corporate law principles is assumed. Classes and readings. The first segment of the course will introduce basic doctrinal principles of M&A law and provide an introduction to the litigator's role in the transactional setting. The remaining sessions will revolve around two detailed M&A case studies, with seminar members divided into group roles. The first week of each case study will involve the negotiation and structuring of an M&A transaction. The second week will involve litigation relating to the transaction. Reading for these sessions will include case scenarios, supporting materials, and additional relevant case law and articles. The attendance and active participation of seminar members is essential. Readings for all classes will be provided in spiral-bound volumes distributed in class. Written assignments and grading. Students will be expected to (i) write a final paper; (ii) prepare two additional short written assignments associated with the case study assignments (such as marking up draft documents or preparing court papers); and (iii) participate actively in class. Special Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the R requirement, with consent of the instructor. Students taking the seminar for R credit can take the seminar for either 2 or 3 units, depending on the paper length. Corporations (Law 242) is a prerequisite. Elements used in grading: Attendance, class participation, written assignments and paper. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 1040. Venture Capital. 3 Units.**

(Formerly Law 465) This course examines the venture capital (VC) industry from both a theoretical and a practical perspective. The course traces the start-up process from initial formation of a new venture through angel investments, institutional venture capital financing rounds, with a view to potential exits via acquisition or initial public offering. The class will analyze each step in the process from the perspective of the business entity, the founders and employees, the investors, and the lawyers for each party. It also will consider the incentives and control structures used at each step of the transaction, with a focus on both the underlying economic and financial theory, as well as on pragmatic considerations in structuring the transactions. Students will learn the VC business model to understand what makes it unique from other investment forms and how that impacts the startup ecosystem. Students are required to complete a term sheet or other negotiation exercise, participate in class discussions, and sit for an examination. There will be required readings for each session that include a range of materials from VC practitioners' blog posts to case law. Some sessions will include guest speakers with experience in VC or entrepreneurship. This course is co-taught by Gordon Davidson and Michael Esquivel. Both are partners at Fenwick & West LLP who advise technology companies, startups, and venture capitalists. Elements used in grading: Class participation/ assignments, negotiation exercises and written summary, and the final exam.

**LAW 1041. Venture Capital II: Starting and Running a Venture-Backed Company. 3 Units.**

(Formerly Law 401) This class will focus on the legal and non-legal tactical details of entrepreneurial endeavors. The legal specifics of corporate formation, tax, and contracts are well covered by a variety of other courses at the Law School and will only be reviewed briefly in this course. Instead, the course will examine the life stages (formation, financing, execution, and exit) of a venture-backed company from the entrepreneur's perspective. Students who are interested in either starting companies or working with startup founders as their legal counsel will solidify their foundations in this course. There will be no textbook – course materials will include PowerPoint slides, readings from various entrepreneur and venture capital blogs, sample business plans, and other sources. This course is limited to 14 students. Those students who have taken VC I receive priority in enrollment. Prerequisites: A modest background in financial analysis or the use of Excel, such as might be obtained from any of the introductory finance courses in most undergraduate curriculums or the handful of similar graduate classes at Stanford (such as QM Finance) is strongly recommended for this course. Venture Capital I will also be helpful but is not a prerequisite. Elements used in grading: Class participation (20%), and a 60 minute oral business plan presentation with accompanying slide deck and written materials (80%). CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 1042. New Venture Finance. 2 Units.**

This is a practice-oriented business law seminar designed to provide students with an understanding of the legal, business, financial and practical issues that arise in advising venture capital-backed and emerging growth companies through the typical stages of their development and common transactions. The seminar will cover selected corporate, securities and tax issues in areas such as business entity formation, corporate organization and governance, venture capital financings, employee benefits, acquisitions and initial public offerings, with an emphasis on practical solutions and business realities. The goal of the seminar is to provide students with a window into the daily life of a typical Silicon Valley-style corporate attorney. Students are required to complete a number of assignments, participate in a negotiation exercise, participate in class discussions and sit for an exam. There will be required readings for each session that include a range of materials. Some sessions will include guest speakers. This course is taught by Mark Reinstra (JD '92), a partner at Wilson Sonsini Goodrich & Rosati. Mark represents emerging growth companies in substantially all facets of their corporate lives, from incorporation, financings, strategic transactions and, ultimately, liquidity events. Elements used in grading: Students will be evaluated on class participation/assignments, negotiation exercises and a final exam (In-School Essay - closed book).

**LAW 1046. Deals in Hong Kong: Field Study. 1 Unit.**

This is a travel course that is integrated into Deals I and Deals II. Students who take this course will have taken Deals I and Deals II in the same year. The course will have two elements. First, there will be two deals assigned to two groups of students, as is true of Deals II. Rather than meeting with the lawyers involved in those deals here at Stanford, as we do in Deals II, we will meet in Hong Kong. Students will complete their papers on these deals shortly following their week in Hong Kong. Second, we have a variety of meetings in Hong Kong in which we learn about transactions that are handled by lawyers and bankers there and more generally about business in that part of the world.



**LAW 2001. Criminal Procedure: Adjudication. 4 Units.**

(Formerly Law 315) The Law School offers two survey courses dealing with constitutional criminal procedure. "Criminal Investigation" will consider questions that arise under the fourth, fifth, and sixth amendments regarding investigations, interrogations, and charging decisions. This course, "Criminal Adjudication," will look at the way the judicial system handles criminal cases. Topics will include the right to counsel (and the concomitant right to "effective assistance" of counsel), prosecutorial discretion and plea bargaining, joinder and severance, discovery, the right to jury trial, double jeopardy, sentencing, and appellate review. Students may take both Criminal Investigation and Criminal Adjudication. (There is, of course, no requirement to do so.) Elements used in grading: Attendance, participation and final exam. Small grade adjustments will be made for exceptional class participation.

**LAW 2002. Criminal Procedure: Investigation. 4 Units.**

(Formerly Law 312) The law school offers two survey courses dealing with constitutional criminal procedure. "Criminal Adjudication" covers the formal pretrial and trial processes, including the right of counsel, prosecutorial charging criteria, grand juries, bail, speedy trial, discovery, plea bargaining, trial by jury, and double jeopardy. This course, "Criminal Investigation," covers police investigation in the form of searches and seizures, interrogations, lineups, and undercover operations, and hence examines the Fourth and Fifth (and, to a limited extent, the Sixth) Amendment rules regulating the police in these endeavors. It also incorporates some of the federal laws governing electronic communications and privacy. Students may take both Criminal Investigation and Criminal Adjudication. (There is, of course, no requirement to do so.) Elements used in grading: Final exam (in-class, open book), plus small adjustments for exceptional class participation.

**LAW 2006. Race, Class, and Punishment. 3 Units.**

Since the early 1970s, the criminal justice system in the United States has expanded dramatically. America has adopted an array of increasingly tough approaches to crime, including aggressive street-level policing, longer sentences, and a range of collateral consequences for criminal convictions. As a result, there are currently 2.2 million persons in prisons and jails and seven million under some form of correctional supervision. The impact on communities of color has been especially profound: In many of our nation's cities, nearly one-half of young black men are in the criminal justice system. This seminar will begin with readings discussing the tough-on-crime era's historical roots. We will then turn to examine the impact of these policies. Finally, we will turn to current efforts to resist and reform the system that has been created. This portion of the seminar will focus on violent crime, and whether and how to respond to violent crime differently than we currently do. The assigned reading will be substantial, and will come from a wide variety of sources, including history, sociology, political science, criminology, and law. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper.

**LAW 2008. Three Strikes Project: Criminal Justice Reform & Individual Representation. 3 Units.**

(Formerly Law 419) This seminar offers an opportunity to study mass incarceration and criminal justice reform in real time. California has been at the forefront of political movements leading to the era of mass incarceration and is now leading the trend in the opposite direction. In this seminar students read and analyze a variety of cases and articles, examining the evolution of incarceration and sentencing reform and assist with related ongoing research, public policy analysis advocacy, and live litigation on behalf of inmates sentenced to life in prison for nonviolent crimes. The class focuses largely on California's 'Three Strikes' recidivist sentencing law as a case study in the history, politics, constitutional doctrine, practical considerations and legal regulation of sentencing policy throughout the country. Students will also test their skills in the field by assisting with the representation of individual inmates sentenced to long prison terms for nonviolent crimes in state and federal courts. The Project has been intimately involved in the movement to reduce incarceration in California, leading ballot measures that implemented legislative reforms to shorten prison sentences and representing individual prisoners sentenced to life for nonviolent crimes. Based on this experience, the Project recently partnered with the Obama administration to support prisoners who receive sentence commutations from the President. Students enrolled in the seminar are involved in all aspects of the Project's work, including assistance with different stages of ongoing litigation. Students will visit a Project client in prison, conduct factual investigations, and draft petitions on our clients' behalf. The Project is an active, fast-paced organization that depends on the hard work and contributions of law students enrolled in this seminar. This seminar offers the opportunity to both study the theory behind the law and to hone practical litigation and advocacy skills in and out of the courtroom. The seminar will meet for 3 hours per week. Students will also meet for 1 hour individually and in teams with Project director Mike Romano each week to discuss their work on their projects. CONSENT APPLICATION: Interested students must apply to enroll in the seminar by sending a one-page statement of interest and resume by email with the subject line "application" to Mike Romano (mromano@stanford.edu). Applications will be considered on a rolling basis. Elements used in grading: Class Participation, Attendance, Written Assignments.

**LAW 2009. White Collar Crime. 3 Units.**

(Formerly Law 670) This course explores the law of economic and political crimes associated with the rubric "white collar crime." The class is divided thematically between mens rea issues and substantive issues. Among the substantive areas which are covered are: obstruction of justice, perjury, bribery and gratuities, mail and wire fraud, securities fraud, and money laundering. We will study specific federal statutes in considerable detail, while also speculating about the jurisprudence underlying these crimes, and related issues of prosecutorial discretion and attorney ethics. Special instructions: Students may write a paper in lieu of the final exam for Research credit. Also, classroom participation may be taken into account to some very small degree. After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation and final exam or paper.

**LAW 201. Civil Procedure I. 4 Units.**

This course is part of the required first-year JD curriculum. This course is a study of the process of civil litigation from the commencement of a lawsuit through final judgment under modern statutes and rules of court, with emphasis on the federal rules of civil procedure. May include class participation, written assignments, or other elements. Your instructor will advise you of the basis for grading.

**LAW 2010. Sentencing, Corrections, and Criminal Justice Policy. 3 Units.**

(Formerly Law 621) This introductory course will familiarize students with the history, structure, and performance of America's sentencing and corrections system for adult offenders. Sentencing is the process by which criminal sanctions are imposed in individual cases following criminal convictions. Corrections deals with the implementation and evaluation of criminal sentences after they are handed down. In fact, the two subject areas are inseparable. The course will examine sentencing and corrections from global and historical views, from theoretical and policy perspectives, and with close attention to many problem-specific areas. We will explore: (1) sentencing theories and their application; (2) the nature, scope and function of jails, prisons, probation and parole; (3) the impact of incarceration on crime, communities, and racial justice; (4) the effectiveness of rehabilitation programs; (5) the collateral consequences of a criminal conviction; (6) special prison populations (e.g., mentally ill) and policies (e.g., solitary confinement); (7) prison litigation and conditions of confinement; and (8) parole, risk prediction, and prisoner reentry. These topics will be considered as they play out in current political and policy debates. Guest lectures may include presentations by legal professionals, victims, offenders, and correctional leaders. We also plan to visit a correctional facility. This course is open to 2Ls, and 3Ls in the Law School. Special Instructions: Grades will be based on class participation, and either: (1) three reflection papers of 5 to 7 pages each, or (2) a longer research paper. Due dates will be listed in the class syllabus. After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the research (R) requirement, with consent of the instructor. Elements used in grading: Final grades will be based on either the three reflection papers (25% each) or the research paper (75%), and class participation (25%).

**LAW 2015. Advanced Criminal Law. 3 Units.**

The intensity of the current debates over criminal law and criminal justice policy is at an unusually high level, with strong and conflicting positions being staked out in the areas of race and crime, policing, incarceration and sentencing, drug policy, and guns. We will be discussing these topics with a mixture of doctrinal analysis of key issues, review of secondary commentaries on key aspects of criminal justice policy, and analysis of a few empirical papers that illuminate important elements relevant to these legal and policy debates. Elements used in grading: Grading will be based on attendance, class participation, one-to-two-page response papers to readings, and three six-page papers on topics distilled from each of the three three-week blocks in the course.

**LAW 2016. Violence and the Law. 2-3 Units.**

This seminar will explore how the law thinks about violence. Across various legal domains—e.g., criminal law, criminal procedure, juvenile justice, immigration, domestic violence, family law, civil rights, free speech, firearms regulation—we will study when and to what extent the law marks off violence as a category of distinct concern, how violence is defined, and what ideas the law reflects about how violence operates. Students may elect to write a substantial research paper or a series of short response papers. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Attendance, Class Participation, Response Papers or Final Paper.

**LAW 2018. Wrongful Convictions: Causes, Preventions and Remedies. 3 Units.**

(Formerly Law 381) Over the course of the past two decades there has been increasing recognition that, despite its commitment to the concept of proof beyond a reasonable doubt, our criminal justice system yields a steady stream of wrongful convictions. This Seminar will focus on some causes, preventions and potential remedies for this phenomenon. Subjects to be addressed include eyewitness identification, interrogations and confessions, jailhouse informant testimony, forensic evidence, the psychology of tunnel vision and confirmation bias, the role of appellate review and habeas corpus, the role of clemency, the impact of the problem on the death penalty, and issues around compensation of those who have been wrongly convicted. As we study these subjects, we will also reflect on whether taking some reforms too far will impair on the efficacy of legitimate law enforcement. The class will meet for two hours each week. In addition, there will be three additional evening or weekend sessions (to be scheduled at the convenience of the participants). During each of these additional sessions, students will watch a film involving a wrongful conviction and will engage in conversation about the particular case involved. Each student will be responsible for preparing a paper on an appropriate topic to be chosen in consultation with the instructor. Consent Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation; Paper.

**LAW 2019. Criminal Procedure: Theoretical Foundations. 2-3 Units.**

This course examines the theoretical foundations of criminal procedure—political, historical, and, above all, philosophical. What are the ideas at work in the American system of criminal procedure? How, historically, did the system develop, and why does it presently function as it does? Is the system broken and, if so, what principles should orient us in fixing it? This theoretical inquiry has a practical point. Procedure plays a major role in the present crisis of American criminal justice. By examining criminal procedure's theoretical foundations, this course aims to develop competing "big picture," synthetic perspectives on the criminal justice crisis as a whole. Thus, for students interested in criminal justice reform, this course will equip you to take a philosophically richer view of the underlying policy issues. For students thinking about a career in criminal law, this course will equip you to engage in large-scale thinking about how criminal procedure should change, rather than just working within the doctrinal and institutional structures that exist at present. For students interested in legal academia, this course will develop your ability to read sophisticated theoretical material, to write in the same vein, and to relate theoretical ideas to policy prescriptions. Elements used in grading: Class participation and, based on individual student preference, either a final reflection paper or a final research paper. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on paper length. Cross-listed with Philosophy (PHIL 375K).

**LAW 2023. Law, Order & Algorithms. 3 Units.**

Data and algorithms are transforming law enforcement and criminal justice, a shift that is ripe for rigorous empirical and narrative exploration. This class is centered around several data-driven projects in criminal justice, with the goal of fostering greater understanding, transparency, and public accountability. Students work in interdisciplinary teams, using a combination of statistical and journalistic methods. Some of the work may be published by news organizations or may be used to advance data journalism investigations. Students with a background in statistics, computer science, law, public policy or journalism are encouraged to participate. Enrollment is limited, and project teams will be selected during the first week of class. Elements used in grading: Class Participation, Written Assignments, Final Paper. Cross-listed with Comparative Studies in Race & Ethnicity (CSRE 230), Management Science & Engineering (MS&E 330), Sociology (SOC 279).

**LAW 203. Constitutional Law. 3 Units.**

This course is part of the required first-year JD curriculum. This course offers an introduction to American constitutional law. In addition to examining questions of interpretive method, the course focuses on the powers of the federal government and the allocation of decision making authority among government institutions, including both federalism and separation of powers. Class participation, attendance, written assignments, and final exam. This course is open to first-year Law School students only.

**LAW 205. Contracts. 4 Units.**

This course is part of the required first-year JD curriculum. It provides exposure to basic contract law. The course will identify the scope and purpose of the legal protection accorded to interests predicated on contract and will focus on problems of contract formation, interpretation, performance, and remedies for breach.

**LAW 207. Criminal Law. 4 Units.**

This course is part of the required first-year JD curriculum. It examines the traditional general issues in the substantive criminal law, including the purposes of punishment and the appropriate limits on the use of the criminal sanction. It focuses predominantly on how criminal statutes are organized around objective offense elements (conduct, causation, and attendant circumstances) and mental states, and to a lesser degree on inchoate crimes, complicity, justification and excuse.

**LAW 217. Property. 4 Units.**

This course is part of the required first-year JD curriculum. It deals with possession and ownership of land and with the incidents thereof, including private and public restrictions on its use and development, nuisance, trespass, concurrent interests, landlord and tenant, and eminent domain. Attendance and final exam. Your instructor will advise you of other basis of grading. This course is open to first-year Law School students only.

**LAW 219. Legal Research and Writing. 2 Units.**

Legal Research and Writing is a two-unit course taught as a simulation. Students work on a legal problem starting with an initial interview, and they conduct fact investigation and legal research related to that problem. Students receive rigorous training in reading and analyzing legal authority, and in using persuasive strategies—legal analysis, narrative, rhetoric, legal theory, and public policy—to frame and develop legal arguments. Students write predictive memos and persuasive briefs, and are introduced to the professional norms of ethics, timeliness, and courtesy. This course is part of the required first-year JD curriculum.

**LAW 223. Torts. 4 Units.**

This course is part of the required first-year JD curriculum. It considers issues involved in determining whether the law should require a person to compensate for harm intentionally or unintentionally caused. These problems arise in situations as diverse as automobile collisions, operations of nuclear facilities, and consumption of defective food products. Among other considerations, the course explores various resolutions in terms of their social, economic, and political implications.

**LAW 224A. Federal Litigation in a Global Context: Coursework. 2 Units.**

This course is part of the required first-year JD curriculum. It is an introductory course in the litigation process. Students represent the plaintiff or defendant in a simulated global torts case set in a federal district court that raises complex issues of federal civil procedure. Students plan litigation strategy, draft pleadings, conduct discovery, write short briefs, and orally argue major motions. While developing students' written and oral advocacy skills, the course also focuses on substantive issues of civil procedure and transnational lawyering. Elements used in grading: attendance, class participation, oral argument, assignments in preparation for written briefs (outlines, drafts, research and citation assignments), written briefs, and professionalism. This course is open to first-year Law School students only.

**LAW 224B. Federal Litigation in a Global Context: Methods and Practice. 2 Units.**

This course is part of the required first-year JD curriculum. It is an introductory course in the litigation process. Students represent the plaintiff or defendant in a simulated global torts case set in a federal district court that raises complex issues of federal civil procedure. Students plan litigation strategy, draft pleadings, conduct discovery, write short briefs, and orally argue major motions. While developing students' written and oral advocacy skills, the course also focuses on substantive issues of civil procedure and transnational lawyering. Elements used in grading: attendance, class participation, oral argument, assignments in preparation for written briefs (outlines, drafts, research and citation assignments), written briefs, and professionalism. This course is open to first-year Law School students only.

**LAW 2401. Advanced Civil Procedure: Multiparty Litigation. 3 Units.**

(Formerly Law 253) This introduction to aggregative litigation will cover joinder of claims and parties, class actions, and multidistrict litigation, as well as related topics such as preclusion and brief coverage of remedies and choice of law. The focus will be both doctrinal and practice-oriented, and we will also consider broader questions of how the civil justice system should respond to mass harms as well as proposals for reform. This course is strongly recommended for students planning a practice in private or public civil litigation, managing or supervising litigation, or a judicial clerkship. It provides a basis for advanced courses such as complex litigation. Elements used in grading: Class participation, assignments and in-class Final (modified closed book). This course is open to first-year Law School students.

**LAW 2402. Evidence. 5 Units.**

(Formerly Law 290) Evidence rules constrain proof at criminal and civil trials. We will study the Federal Rules of Evidence, related case law, and those constitutional concepts that limit proof at criminal trials. Topics include relevance, unfair prejudice, character evidence, impeachment, the rape shield law, hearsay, the Confrontation and Compulsory Process Clauses, and expert testimony. Please note that the California Bar Examiners have posted this announcement: "Applicants should be prepared to answer questions that have issues concerning the Federal Rules of Evidence and the California Evidence Code. Applicants should be prepared to compare and contrast the differences between the Federal Rules and the California Evidence Code, especially where the California rules of evidence have no specific counterparts in the Federal Rules." This evidence course covers only the Federal Rules of Evidence and does not address the California Evidence Code. Though similar principles of law govern the Federal Rules and California Code, the two sets of rules are not identical. Students preparing for the California Bar Exam will have to learn some new material. Elements used in grading: Final exam (one-half essay and one-half multiple choice).

**LAW 2403. Federal Courts. 4 Units.**

(Formerly Law 283) This course considers the role of the federal courts in the federal system. It is both an advanced course in constitutional law and a course on the institutional design of the federal courts. On the first, we consider two great themes: the allocation of power between the states and the federal government – federalism – and the relationship between the federal courts and the political branches of the national government – separation of powers. On the second, we focus on the structure of the judicial system, the scope and limits of federal judicial power, essential aspects of federal court procedure, and the evolving structural response of the federal courts to changes in technology, commerce, government, and a multitude of factors that affect the business of the federal courts and the role of federal judges. Topics may include the original and appellate jurisdiction of the federal courts, Supreme Court review of state court judgments, federal common law including implied rights of action, Congressional power to limit the jurisdiction of the federal courts and to create adjudicative bodies within the federal government but outside the requirements of Article III, state sovereign immunity, justiciability, abstention and other doctrines of restraint, and the role of the federal courts in the war on terrorism. This course is highly recommended for students planning to practice in the federal courts, and many judges consider it essential preparation for a judicial clerkship. This course complements Constitutional Litigation (Law 641/Law 7011), and students, especially those who plan to clerk, will benefit from taking both courses. Elements used in grading: Class Participation, Exam.

**LAW 2404. Global Litigation. 4 Units.**

(Formerly Law 749) German owned VW admits that it included a "defeat device" in the software for its diesel cars so they could fraudulently pass US environmental tests, and is sued by thousands of US consumers in state and federal courts in the US. Very quickly, the cases are consolidated here in the federal court in Northern California. Meanwhile, special purpose foundations are established in the Netherlands to seek a settlement with VW on behalf of European consumers under the Dutch collective settlement act, and a securities lawsuit on behalf of investors whose share values have dropped dramatically is filed in Germany, using that country's special group litigation procedure. The Dutch foundations may be coordinating their actions with US lawyers, the shareholders in Germany are represented by the local partners of a leading US-based litigation boutique, and the shareholder suit is funded by a UK-based international litigation financing firm. In 2011, US-based Apple sues Korea-based Samsung for patent infringement in N.D. CA and Samsung counter-sues in Korea, Japan and Germany. A year later more than 50 lawsuits are ongoing in more than 10 countries. Two years later the companies agree to drop their litigation outside the US and focus their resources on their US litigation battle. Apple wins a big judgment in the federal court in San Jose but in the past several years its award has been whittled down and now it is headed for the U.S. Supreme Court for reconsideration. Samsung's counsel of record is Kathleen Sullivan, former dean of Stanford Law School. Philip Morris' Hong Kong subsidiary files a claim in an international arbitration tribunal charging that Australia's public health protection statute regarding tobacco marketing violates Australia's bi-lateral investment treaty with Hong Kong. The arbitration claim is filed after the parent company unsuccessfully challenged Australia's statute before the High Court. In December 2015 the arbitration tribunal rules that it does not have jurisdiction over Philip Morris' claim effectively dismissing it. But controversy over Philip Morris' attempt to use investment arbitration to challenge a health regulation derails international trade negotiations between the US and the EU. These high profile cases illustrate an important aspect of complex litigation: across many different substantive domains, in court and ADR proceedings, disputes that used to be contained within national borders are now trans-national. The seminar will consider the doctrinal, procedural and practical challenges that arise when litigation goes global. We will consider the high profile cases in which these issues have played out in recent years and meet some of the lawyers who are creating a new virtual international court system for the resolution of global disputes. The goal of the seminar is to develop an understanding of how the global dimension of high-stakes complex disputes shapes parties' and lawyers' strategies and judges' decisions. The seminar will meet 3 times a week. A small number of seminar sessions will be conducted in collaboration with law faculty and students in Canada, the Netherlands and Germany, three countries that have adopted procedures for dealing with large-scale civil litigation in distinctive fashion. Special Instructions: Students on the waitlist for the course will be admitted if spots are available on the basis of priority and degree program. Elements used in grading: Class participation and course paper.

**LAW 2406. Conflict of Laws. 3 Units.**

(Formerly Law 251) Instances are common in law where more than one legal authority potentially governs a particular event, occurrence or transaction. When the outcome required by these authorities differs, which law governs? Beginning with the classic problem of choosing an applicable law in cases with facts touching more than one jurisdiction, this course is designed broadly to explore the variety of theories and systems used to resolve this question. The course thus uses state/state conflicts to develop a set of approaches and then extends these to such other problems as adjudicatory jurisdiction, judgments, federal subject-matter jurisdiction, and public and private international law. Elements used in grading: Attendance, preparation, participation and final examination.

**LAW 2502. Climate Change Policy: Economic, Legal, and Political Analysis. 4 Units.**

(Formerly Law 746) This course will advance students' understanding of economic, legal, and political approaches to avoiding or managing the problem of global climate change. Beyond focusing on economic issues and legal constraints, it will address the political economy of various emissions-reduction strategies. The course will consider policy efforts at the local, national, and international levels. Theoretical contributions as well as empirical analyses will be considered. Specific topics include: interactions among overlapping climate policies and between new policies and pre-existing legal or regulatory frameworks; the role that jurisdictional or geographic scale can play in influencing the performance of climate policy approaches; and numerical modeling and statistical analyses of climate change policies. Elements used in grading: Class Participation, Written Assignments, Final Exam. Cross-listed with Economics (ECON 159).

**LAW 2503. Energy Law. 3 Units.**

(Formerly Law 455) The supply of a reliable, low-cost and clean energy supply for the United States is a key determinant of current and future prosperity. Perhaps as a result, electric utilities are among the most heavily regulated of large firms. This statutory and regulatory framework is composed of a complex patchwork of overlapping state and federal rules that is constantly evolving to meet emerging challenges to the energy system. In this course, students will acquire a basic understanding of the law of rate-based regulation of utilities. We will then examine the history of natural gas pipeline regulation in the United States, concluding with the introduction of market competition into US natural gas markets and the advent of shale gas. Next, we will cover the basics of the electricity system, including consumer demand, grid operations, and power plant technologies and economics. We will then revisit cost of service rate regulation as it has been applied in the electricity context. Next we will examine reform of both rate-regulated and wholesale market-based structures, focusing on various attempts to introduce market competition into aspects of the industry and to strengthen incentives for utility investment in energy efficiency. Finally, students will examine various approaches to subsidization of utility scale renewable energy and the growth of distributed energy. Throughout, the course will focus on the sometimes cooperative, sometimes competing, but ever evolving federal and state roles in regulating the supply of electric power. Students will write two 1000 word response papers to questions related to readings and outside speakers in addition to taking a final exam. Elements used in grading: Class participation (20%), written assignments (40%), and final exam (40%).

**LAW 2504. Environmental Law and Policy. 3 Units.**

(Formerly Law 603) Environmental law is critically important and endlessly fascinating. In this course, we will look at the major statutes and policies used, at both the federal and state levels, to protect humans and the environment against exposure to harmful substances, including the Clean Air Act, Clean Water Act, Superfund, the Resource Conservation & Recovery Act, and laws designed to regulate toxic substances. This class will also examine the challenges of global air pollution, including climate change and ozone depletion. The class will look not only at the substance of these laws and policies, but also at enforcement challenges, alternative legal mechanisms for advancing environmental policies (such as voter initiatives and common-law actions), the role of market mechanisms in addressing environmental problems, and constitutional restrictions on environmental regulation. As part of the class, students will engage in a series of situational case studies designed to provide a better sense of the real-world issues faced by environmental lawyers and to teach students the skills and tactics needed to solve those issues. Elements used in grading: Attendance, Class Participation, Exam.

**LAW 2505. Land Use Law. 3 Units.**

(Formerly Law 338) This course focuses on the pragmatic (more than theoretical) aspects of contemporary land use law and policy, including: the tools and legal foundation of modern land use law; the process of land development; vested property rights, development agreements, and takings; growth control, sprawl, and housing density; and direct democracy over land use. We explore how land use decisions affect environmental quality and how land use decision-making addresses environmental impacts. Special Instructions: All graduate students from other departments are encouraged to enroll, and no pre-requisites apply. Student participation is essential. Roughly two-thirds of the class time will involve a combination of lecture and classroom discussion. The remaining time will engage students in case studies based on actual land use issues and disputes. This class is limited to 40 students, with an effort made to have students from SLS (30 students will be selected by lottery) and students from Earth Systems (10 students). Elements used in grading: Attendance, class participation, writing assignments, and final exam. Elements used in grading: Attendance, Class Participation, Final Exam. This course is cross-listed with Earth Systems (EARTHYSYS 238).

**LAW 2506. Natural Resources Law and Policy. 3 Units.**

(Formerly Law 281) Governance of natural resources presents difficult and contentious issues of law and public policy. Debate rages over issues such as proposals to reform the Endangered Species Act, how to manage public lands and whether to privatize them, whether the President can unilaterally revoke the protected status of national monuments, and how to prevent disastrous overfishing of the world's oceans. This course will present a survey of major areas of natural resources law, with particular attention to public-lands law (the law of national parks, forests, wilderness areas, etc.), biodiversity, and agriculture. Additional topics will include environmental justice and the constitutional dimensions of ecological challenges. Throughout the course, we will consider the historical and political context of natural resources law, examining how new ideas and social movements in the past helped to shape current laws, and asking how today's ferment might foreshadow future lawmaking. We will not treat either water law or energy law in depth. Elements used in grading: Class Participation, Final Exam.

**LAW 2508. The Business of Water. 2 Units.**

One of the fastest growing economic sectors is the water field, and private water companies are playing an increasingly important role around the world in water management. In many cases, private companies have made important contributions to meeting water needs (e.g., in the development of new technologies and expanding water supplies). In other cases, however, the involvement of private companies has proven controversial (e.g., when private companies have taken over public water supply systems in developing countries such as Bolivia). This course will look at established or emerging businesses in the water sector and the legal, economic, and social issues that they generate. These businesses include investor-owned water utilities, water technology companies (e.g., companies investing in new desalination or water recycling technologies), water-right funds (who directly buy and sell water rights), social impact funds, innovative agricultural operations, water concessionaires, and infrastructure construction companies and investors. Each week will focus on a different business and company. Company executives will attend the class session and discuss their business with the class. In most classes, we will examine (1) the viability and efficacy of the company's business plan, (2) the legal and/or social issues arising from the business' work, and (3) how the business might contribute to improved water management and policy. Each student will be expected to write (1) two short reflection papers during the course of the quarter on businesses that present to the class, and (2) a 10- to 15-page paper at the conclusion on the class on either a water company of the student's choice or a policy initiative that can improve the role that business plays in improving water management (either in a particular sector or more generally). Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper.

**LAW 2509. Clean Energy Project Development and Finance. 3 Units.**

(Formerly Law 774) This case study-oriented course will focus on the critical skills needed to evaluate, develop, finance (on a non-recourse basis), and complete standalone energy and infrastructure projects. The primary course materials will be documents from several representative projects – e.g., solar, wind, storage, carbon capture, transmission, combined heat & power – covering key areas including market and feasibility studies, environmental permitting and regulatory decisions, financial disclosure from bank and bond transactions, and construction, input, and offtake contracts. For virtually every clean energy project, legal documents and financial/business models tend to highly customized. By examining actual projects and transactions we can learn how developers, financiers, and lawyers work to get deals over the finish line—deals that meet the demands of the market, the requirements of the law, and (sometimes) broader societal goals, in particular climate change, economic competitiveness, and energy security. Elements used in grading: Class Participation (35 %), Lecture-based Assignment (15 %), Group Project (50 %). Absences affect grade. Also open to engineering graduate students. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Cross-listed with Graduate School of Business (GSBGEN 335).

**LAW 2510. California Coast: Science, Policy and Law. 4 Units.**

(Formerly Law 514) This interdisciplinary course integrates the legal, scientific, and policy dimensions of how we characterize and manage resource use and allocation along the California coast. We will use this geographic setting as the vehicle for exploring more generally how agencies, legislatures, and courts resolve resource-use conflicts and the role that scientific information and uncertainty play in the process. Our focus will be on the land-sea interface as we explore contemporary coastal land-use and marine resource decision-making, including coastal pollution, public health, ecosystem management; public access; private development; local community and state infrastructure; natural systems and significant threats; resource extraction; and conservation, mitigation and restoration. Students will learn the fundamental physics, chemistry, and biology of the coastal zone, tools for exploring data collected in the coastal ocean, and the institutional framework that shapes public and private decisions affecting coastal resources. There will be 3 to 4 written assignments addressing policy and science issues during the quarter, as well as a take-home final assignment. Special Instructions: In-class work and discussion is often done in interdisciplinary teams of students from the School of Law, the School of Engineering, the School of Humanities and Sciences, and the School of Earth, Energy, and Environmental Sciences. Students are expected to participate in class discussion and field trips. In place of weekly class meetings on Friday mornings, we will have 2-3 Saturday field trips throughout the quarter. Elements used in grading: Participation, including class session and field trip attendance, writing and quantitative assignments. Cross-listed with Civil & Environmental Engineering (CEE 175A/275A).

**LAW 2512. Cities and Sustainability: Current Issues, Policy, and Law. 2 Units.**

Cities are on the front lines of solving many of society's sustainability problems, from advancing green buildings and clean energy, to preparing for the effects of climate change. With a diminishing role of the federal government on environmental policy and regulation, it is up to sub-nationals like states and cities to lead innovation and deployment of clean energy, resilience strategies, water management, and more. This class will explore the evolving role of cities in advancing sustainability from the lens of law, policy, planning, and governance. Some of the topics we will discuss in-depth include climate mitigation, clean energy, green buildings, climate adaptation and resilience, water supply and reuse, land use and transportation, and more. Case studies will focus on U.S. cities with some emphasis on California. Overarching themes across all content areas include legal constraints of city authority, governance, socioeconomic tradeoffs, and the roles of various types of institutions in developing, advancing, and advocating for local policy change. Elements used in grading: Attendance, Class Participation, Written Assignments, Exam.

**LAW 2513. Climate: Politics, Finance and Infrastructure. 2-3 Units.**

While climate change is often considered an 'environmental problem', the risks and opportunities embedded in a changing climate go well beyond the frame of the natural environment. This course will reframe climate as a macroeconomic challenge, one in which multilateral politics, global investment and physical and institutional infrastructure must be understood and reconsidered. Based on scholarly analysis and guest speakers, this interdisciplinary course will cover the past, present and future pillars of climate politics and finance. Starting with the policy framework established by past global climate negotiations, the bulk of the course will investigate current innovations at the intersection of finance and policy, including risk management and disclosure, blended finance, distributed solutions, and resilience measures. The final sessions will consider the future, taking a look at how future leaders might solve the greatest challenge of our time. Elements used in grading: Students may take the course for 2 units (section 1) or 3 units (section 2). Section 1 and 2 students will both receive grades for attendance, in class participation and guest-speaker questions. Section 1 students will also complete a group presentation on the design of a financial, legal or policy intervention with the potential to reduce emissions on a large scale. Section 2 students will be required to write a research paper meeting the Law School's R paper requirements. This class is limited to 25 students, with an effort made to have students from SLS (15 students will be selected by lottery) and 10 non-law students by consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor.

**LAW 2515. Environmental Justice. 3 Units.**

(Formerly 768) This course will introduce environmental justice as a social movement, including its central substantive concerns (the needs of humans in the built environment rather than the need to protect the environment from humans) and its methods (community-based political organizing rather than professionalized judicial or legislative action). The bulk of the course will then pursue a broader conception of environmental justice today by using social science research, theory, and case studies to investigate the civil rights and poverty aspects of environmental safety and natural resources. The course will include units on: (1) toxic exposure and public health disparities stemming from the disproportionate siting of locally-unwanted land uses in poor neighborhoods of color; (2) access to natural resources and basic public services, including clean water, wastewater disposal, and open space; (3) tools in environmental justice advocacy (including community-based lawyering, Title VI of the Civil Rights Act of 1964, the Fair Housing Act, common law nuisance actions, and transactional lawyering); (4) environmental justice issues in Indian Country, and (5) environmental justice issues in climate change policy. Much of the course material, including student presentations, will be grounded in the experiences and advocacy histories of specific communities, both urban and rural, across the country. Elements used in grading: Class participation, in-class presentation, final paper.

**LAW 2517. Modern Crosscurrents in Energy and Environmental Law. 3 Units.**

This course explores the close relationship between energy and environmental law. We will work through the major energy sectors and, for each, discuss key environmental law and policy issues that are influencing energy production and use. Our focus will be on current issues. We'll explore environmental issues that are traditionally associated with the energy sector, including air emissions, waste disposal and cleanup, and oil spills, while also covering new environmental issues emerging from the energy sector including climate change-related regulatory and business risk issues, energy infrastructure permitting issues, and environmental pressure points on the utility industry and on renewable energy and conventional energy projects, more generally. Elements used in grading: Exam; one written assignment; class participation.

**LAW 2518. U.S. Environmental Law in Transition. 1 Unit.**

This course offers an accessible survey of timely topics in environmental law and policy as the United States transitions presidential administrations. Taught by two practicing lawyers, the class introduces students from any background to the interactions between local, state, and federal environmental law as they apply to critical policy issues. We will analyze major changes in federal policy, providing historical context for the transformations now underway in the laws and institutions that shape environmental outcomes in the United States. Elements used in grading: Attendance, Class Participation, Final Paper. Cross-listed with Earth Systems (EARTHSYS 108 & 208).

**LAW 2519. Water Law. 3 Units.**

(Formerly Law 437) This course will study how society allocates and protects its most crucial natural resource – water. The emphasis will be on current legal and policy debates, although we will also examine the history of water development and politics. Although the course will focus on United States law and policy, insights from the course are applicable to water regimes throughout the world, and we will occasionally look at law and policy elsewhere in the world for comparison. Among the many issues that we will consider are: how to allocate water during periods of scarcity (particularly as climate change leads to more extremes); alternative means of responding to the world's growing demands for water (including active conservation); the appropriate role for the market and private companies in meeting society's water needs; protection of threatened groundwater resources; environmental limits on water development (including the U.S. Endangered Species Act and the "public trust" doctrine); constitutional issues in water governance; Indian water rights; protection of water quality; challenges to substantively reforming existing water law; and interstate and international disputes over water. Students will be expected to participate actively in classroom discussions. Elements Used in Grading: Class participation, attendance and final exam.

**LAW 2520. Climate Law and Policy. 3 Units.**

This course offers an interdisciplinary, graduate-level survey of current and historical efforts to regulate emissions of greenhouse gases in the United States and around the world. Students will read primary legal documents—including statutes, regulations, and court cases—in order to evaluate the forces and institutions shaping American climate policy. Additional perspectives from climate science, economics, and political science will provide context as students analyze the evolution of climate law and policy regimes. Elements used in grading: Grades will be based on class attendance, class participation, and either written assignments and an exam (section 01) or a final paper (section 02). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Cross-listed with Environment and Resources (ENVRES 222).

**LAW 3001. Health Law: Finance and Insurance. 3 Units.**

(Formerly Law 348) This course provides the legal, institutional, and economic background necessary to understand the financing and production of health services in the U.S. We will discuss the Affordable Care Act, health insurance (Medicare and Medicaid, employer-sponsored insurance, the uninsured), the approval process and IP protection for pharmaceuticals, and antitrust policy. We may discuss obesity and wellness, regulation of fraud and abuse, and medical malpractice. The syllabus for this course can be found at <https://syllabus.stanford.edu>. Elements used in grading: Participation, attendance, and final exam. Cross-listed with Graduate School of Business (MGTECON 331), Health Research & Policy (HRP 391) & Public Policy (PUBLPOL 231).

**LAW 3002. Health Law: Quality and Safety of Care. 3 Units.**

(Formerly Law 727) Concerns about the quality of health care, along with concerns about its cost and accessibility, are the focal points of American health policy. This course will consider how legislators, courts, and professional groups attempt to safeguard the quality and safety of the health care patients receive. The course approaches "regulation" in a broad sense. We will cover regimes for determining who may deliver health care services (e.g. licensing and accreditation agencies), legal and ethical obligations providers owe to patients (e.g. confidentiality, informed consent), individual and institutional liability for substandard care, and various proposals for reforming the medical malpractice system. We will also discuss the Patient Protection and Affordable Care Act (aka, "Obamacare"), which is launching many new initiatives aimed at assuring or improving health care quality. Special Instructions: Any student may write a paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class Participation, Exam or Final Paper. Cross-listed with School of Medicine (MED 209).

**LAW 3003. Health Law: The FDA. 3 Units.**

(Formerly Law 458) This course will examine the Food and Drug Administration. It will focus largely on the FDA's regulation of drugs and biologics, but will also cover its regulation of medical devices, nutritional supplements, and its jurisdiction over special legal, social, and ethical issues arising from advances in the biosciences. Special Instructions: The class is open to all law students and graduate or professional students from other parts of the University. Substantial class attendance is required; in addition, the quality of class participation will play a small role in grading. Elements used in grading: Attendance, class participation, and final exam (In-school, open book). Cross listed with Health Research and Policy (HRP 209).

**LAW 3004. Law and Biosciences: Genetics. 2 Units.**

(Formerly Law 480) This seminar will focus on ethical, legal, and social issues arising from advances in our knowledge of human genetics. These will drawn from topics such as forensic uses of genetics, genetic testing, widespread whole genome sequencing, genome editing, genome synthesis, the consequences of genetics for human reproduction, and the ethics of genomic biobanks for research, among other things. Students are required to write a research paper for this course. Special Instructions: The class is open to all law students and graduate or professional students from other parts of the University. Substantial class attendance is required; in addition, the quality of class participation will play a small role in grading. Students will be required to submit an independent research paper. Elements used in grading: Class participation, attendance and final paper. Cross-listed with Health Research & Policy (HRP 221).

**LAW 3005. Law and Biosciences Workshop. 1-2 Unit.**

(Formerly Law 654) This workshop seminar will provide students with the opportunity to examine and critique cutting-edge research and work in the field of law and the biosciences presented by different speakers from Stanford and elsewhere. Although it is open to all students, the seminar is designed especially for those with an interest in the field who wish to stay abreast of current issues, work, and ideas. In each class, an academic expert, policy maker, or practitioner will present his or her current research or work and engage in a robust discussion. Students may take this class for one or two units. It will meet eight times for 2 hours, 15 minutes per session; students will need to attend at least six of the eight sessions and, for each session attended, write a reflection piece of roughly three double-spaced pages, due just before the speaker's presentation. The class is open to first-year Law School students. Elements used in grading: Class participation, attendance, and written assignments.

**LAW 3006. Law and Biosciences: Neuroscience. 2 Units.**

(Formerly Law 368) This seminar examines legal, social, and ethical issues arising from advances in the biosciences. This year it will focus on neuroscience. It will examine how neuroscience will affect the law, and society, through improvements in predicting illnesses and behaviors, in "reading minds" through neuroimaging, in understanding responsibility and consciousness, in "treating" criminal behavior, and in cognitive enhancement. Students who have taken the Law and the Biosciences (Genetics) seminar in past years may receive additional credit for taking this year's class. The class is open to 1Ls. Elements used in grading: Class participation, attendance and final research paper. Cross-listed with Health Research & Policy (HRP 211).

**LAW 3009. Health Law: Improving Public Health. 3 Units.**

(Formerly Law 762) This course examines how the law can be used to improve the public's health. The major questions explored are, what authority does the government have to regulate in the interest of public health? How are individual rights balanced against this authority? What are the benefits and pitfalls of using laws and litigation to achieve public health goals? The course investigates these issues as they operate in a range of specific contexts in public health, including the control and prevention of infectious disease; preventing obesity; reducing tobacco use; ensuring access to medical care; reducing firearm injuries; and responding to public health emergencies. In these contexts, we will ask and answer questions such as, what do the Constitution and key statutes permit? What makes a good public health law? Where do we see success stories—and failures—in public health law? What ethical and economic arguments justify government intervention to shape individuals' and companies' health-related behaviors? Instruction is through interactive lectures with a significant amount of class discussion and some group exercises. Class Participation, Written Assignments, Final Exam. Cross-listed with Medicine (MED 237).

**LAW 3010. Mental Health Law. 2 Units.**

This class will review basic issues surrounding mental health law. Units will include a) Mental health in the criminal justice system; b) forced treatment and hospitalization; c) qualification for government benefits; d) discrimination under ADA; e) incapacity and other issues in the civil law context. Elements used in grading: Class Participation, Written Assignments, Final Paper.

**LAW 3254. How to Ask a Question. 2 Units.**

(Formerly Law 715A) Asking questions is at the core of the role of an attorney. Whether it is interviewing a potential new client, interrogating a witness in a deposition, or conducting a direct or cross examination at trial, knowing how to ask a question is an essential lawyering skill. We'll explore textual materials and real life case examples in transcripts, videotape, and cinema to determine the principals and best practices for questioning. We'll learn how to prepare for questioning, how to focus, narrow, and broaden an examination, how to obtain key admissions, how to deal with a difficult opponent, when to stop asking, and how to use what's been obtained in court or otherwise to win for your clients. This course will give you the skills and tools needed for the critical roles of understanding your clients and your cases and successfully representing their causes. Class attendance is required. Shanin Specter is a founding partner of Kline & Specter, P.C., in Philadelphia, concentrating in catastrophic injury litigation. He has obtained more than 200 settlements or verdicts in excess of \$1 million and is a member of the Inner Circle of Advocates, whose membership is limited to the top 100 plaintiffs' attorneys in the United States. Elements used in grading: assessment of two brief and one longer reaction papers, as well as classwork.



**LAW 3258. Responsibility for Risk: Perspectives on Liability Insurance. 2-3 Units.**

This seminar will explore the intellectual foundations of the institution of insurance, including the following key questions: How is insurance to be conceived: from a contract perspective? a tort perspective? a private governmental perspective? Correlatively, what are the economic and ethical dimensions of risk classifications and management? How serious are the concerns about moral hazard and adverse selection—core concepts of insurance law? What standards should be used to resolve insurance bad faith claims? And, when a party is sued and the liability insurer controls the party's defense, how should the defense lawyer hired by the insurer navigate—and conceive of—this triangular relationship? The pervasive role of insurance in addressing societal concerns about accidental harm is vitally important but has been remarkably under-examined in the traditional law school curriculum. Special Instructions: Grades will be based on class attendance, class participation, and either several short reflection papers (section (01)) or an independent research paper (section (02)). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on paper length. Elements used in grading: Class participation, class attendance, reflection papers or research paper. Early drop deadline.

**LAW 3502. Art and the Law. 2 Units.**

(Formerly Law 236) This course covers the legal, public policy, and ethical issues that concern artists, art dealers, auction houses, museums, collectors, and others who comprise the world of visual art. Our focus will be on artists' rights (including copyright, resale royalties, moral rights, and freedom of expression issues), how the market in art functions (such as the artist-dealer relationship, auction rules, and issues faced by collectors), and the legal and ethical rules governing the collection, donation, and display of visual art, particularly for museums and their donors. The course focuses on certain recurrent themes: How do statutes and courts define (or attempt to define) art—and how is art defined differently for different legal purposes? How does the special character of art justify or require different treatment under the law from that accorded other tangible personal property, and how does (and should) the expressive nature of art affect the way it is owned, protected, regulated, or funded? We anticipate having two or three visitors to the class during the quarter, such as a gallery owner, auctioneer, and museum director. In addition, we will also have the students participate in at least one or two interactive negotiation simulation exercises inspired by real situations and controversies in the art world. Graduate students from other departments are welcome to take this course with the permission of the instructor. This class is limited to 30 students, with an effort made to have students from SLS (25 students will be selected by lottery) and 5 non-law students by consent of instructor. Elements used in grading: Class participation, attendance, final exam.

**LAW 3504. History of American Law. 3 Units.**

(Formerly Law 318) This course examines the growth and development of American legal institutions with particular attention to crime and punishment, slavery and race relations, the role of law in developing the economy, and the place of lawyers in American society, from colonial times to the present. Special Instructions: Any student may write a paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Final exam or paper. Automatic grading penalty waived for writers. Cross-listed with History (HISTORY 152 - Consent of instructor required) & (HISTORY 352B).

**LAW 3505. Law and Culture in American Fiction. 3 Units.**

(Formerly Law 345) This seminar examines the way literary texts register changes in property law, the law of contracts, intellectual property and legal constructions of race, gender, and privacy, especially as they relate to the maintenance of personal identity, community stability, and linguistic meaning. The terms and stakes of these relationships will inform our readings of the texts themselves, as well as our understanding of their representations of law. The writers whose work we will consider include James Fenimore Cooper, Herman Melville, Henry James, Nella Larsen, Willa Cather, William Faulkner, and Sherman Alexie. Each week, a novel or story will be paired with relevant legal and historical readings. We will also consider the points of contact between literary narrative and narrative in law. English Department cognate course. Special instructions: Course requirements include class attendance and participation, three short response papers, and two longer papers. For Research "R" credit, students may petition to complete one long paper based on independent research. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, attendance, written assignments and final paper. Automatic grading penalty waived for writers.

**LAW 3506. Law and Empire in U.S. History. 2-3 Units.**

This course will examine the interrelationship between legal norms and empire in the history of the United States. Topics in this part will include the Constitution as an imperial document; law and the expansion of the United States in western North America, Puerto Rico, and Hawaii; the Insular Cases; and current debates over extraterritoriality and the War on Terror. Substantial readings will consist of scholarly articles, historical cases, and primary sources, and will be provided online. Requirements for the course include regular class participation and, at the students' election, either response papers or a historiographical essay. Students may also elect to complete a research paper, in which case they will receive 3 units and "R" credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Cross-listed with History (HISTORY 354F).

**LAW 3507. Law and the Rhetorical Tradition. 3 Units.**

(Formerly Law 304) In this interdisciplinary seminar we will explore the rhetorical underpinnings of legal argument. In the first half of the course, we will acquaint ourselves with relevant elements of the rhetorical tradition. In the second half, we will analyze a variety of legal texts (both written and oral) with an eye to the use and function of rhetorical principles, as well as the ways form and content are mutually constitutive. This course aims both to increase students' understanding of rhetoric as readers and interpreters of legal texts and to develop students' skills as writers and speakers. Students will be expected to participate in class discussion in addition to completing a series of writing assignments including the rhetorical analysis of legal and non-legal texts and the revision of students' legal writing. Special Instructions: This course can satisfy the Research "R" requirement. The instructor and the student must agree whether the student will receive "R" credit. For "R" credit, the paper is substantial and is based on independent research. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, attendance, assignments, final paper. Automatic grading penalty waived for writers.

**LAW 3508. Law and Visual Culture. 3 Units.**

(Formerly Law 760) We know it when we see it. But what kind of knowledge does a smartphone or dashboard camera video offer? We tend to treat certain kinds of video as unmediated representations of reality, even though as sophisticated consumers of media we should know better. Neuroscience, empirical research, and cultural theory all refute this so-called reality effect. But the desire that drives it—the desire for definitive proof of what did or did not happen—arises from very real experience, and is inextricably connected to the legal process. This seminar tracks the legal reception of modern visual representation from the confusion about the admissibility of photographs in the late 19th century (is it like a drawing? is it like eyewitness testimony?) to the debate about cameras in the courtroom in the late 20th century (do judges and jurors decide differently when the proceedings are subject to public scrutiny?) to the frequent and strategic deployment of visual media in pretrial and litigation practice today. We will also explore the prominent role of video in today's conversation about policing and race. Course materials range from film theory to social psychology to presentations by practicing attorneys. Special Instructions: This course can satisfy the Research "R" requirement. The instructor and the student must agree whether the student will receive "R" credit. For "R" credit, the paper is substantial and is based on independent research. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements Used in Grading: Class Participation. Attendance, Written Assignments, Final Paper. Automatic grading penalty waived for writers.

**LAW 3510. Psychological Development: Myth, Law, and Practice. 2 Units.**

(Formerly Law 491) Collective myths from a variety of traditions and cultures capture enduring psychological truths about human choices and the human condition. Lawyers at various stages in their careers have their own personal myths, sometimes conscious and sometimes not. These personal myths embody key tendencies that determine or heavily influence each lawyer's personal and professional path. This course uses some salient collective myths as well as modern psychological material to create a powerful backdrop for self-examination and self-development. It offers a space and time for each student to consider his or her own personal and professional direction through the course materials, class interactions, and a series of reflection papers. The course benefits from the collaboration of Ron Tyler, Director of the Criminal Defense Clinic, who will conduct a session focusing on mindfulness practices. Elements used in grading: A series of reflection papers totaling at least 18-pages.

**LAW 3511. Writing Workshop: Law and Creativity. 3 Units.**

(Formerly Law 239) Practicing law is very much a creative enterprise. Effective advocates and counselors provide innovative and thoughtful solutions to complex problems. But there often isn't enough attention devoted in law school either to thinking creatively or to reflecting in a creative way on the issues students confront inside and outside the classroom. This course will respond to this gap by building a bridge between law and the arts, with the goal of helping students hone their ability to think creatively and use disciplined imagination. Law & Creativity will meet twice a week and have dual components designed to inform one another. The first session will be structured as a seminar in which students gather to examine and discuss creative treatments of legal and professional issues in a variety of media (including film, fiction, and nonfiction). The second session will follow the creative-writing workshop model in which students submit their own fiction and creative nonfiction pieces for group discussion. Through the workshop process, students will develop the skills necessary to constructively critique and workshop one another's work, and learn a variety of techniques for improving their own creative writing. Elements used in grading: Class attendance, participation and final paper.

**LAW 3512. Markets, Morals and the Law. 2 Units.**

What things should or should not be for sale - and why? This course will consider several examples of "blocked exchanges" or "contested commodities," including the trade in reproductive services, body parts, environmental resources, political rights and obligations, and the varieties of human labor. With readings drawn from law, philosophy, and moral and political economy, the purpose of the course will be to examine a range of contemporary controversies over commodification and to consider arguments about the appropriate scope and limits of market activity. The assigned reading will be substantial, varied, and demanding. Elements used in grading: Attendance, Class Participation, Final Paper. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 3514. Law and Inequality. 1 Unit.**

This reading group will focus on the challenges presented to law by the long-term growth of economic inequality. In addition to exploring evidence of rising inequality (including the work of Thomas Piketty and others), we will examine legal and other scholarship that seeks to understand law's contribution to inequality and legal responses that might reduce inequality or ameliorate its effects. Meeting Time: TBD with instructor. Elements used in grading: Attendance, Class Participation. Same as: Reading Group

**LAW 3515. Law and Humanities Workshop: History, Literature, and Philosophy. 2-3 Units.**

(Formerly Law 516) The Law and Humanities Workshop: History, Literature, and Philosophy is designed as a forum in which faculty and students from the Law School and from various humanities departments can discuss some of the best work now being done in law and humanities. Every other week, an invited speaker will present his or her current research for discussion. In the week prior to a given speaker's presentation, the class will meet as a group to discuss secondary literature relevant to understanding and critiquing the speaker's research. Students will then read the speaker's paper in advance of the following week's workshop presentation. Students have two options. Those taking the course for 2 units are required to write a brief response to each speaker's paper. There will be a total of four speakers, and thus four papers. Guidance will be provided concerning how to frame these response papers, which will be due every two weeks - i.e., on the day before the speaker presents. Students taking the course for 3 units are required to write a research paper on a law and humanities topic that they choose (in consultation with the professors). Law students who complete this 3-unit track will receive an "R" credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Enrollment will be limited to 30 students - 20 from SLS who will be selected by lottery and 10 from H&S. Elements used in grading: Class participation, attendance, and writing assignments. Cross-listed with the Department of History (HIST 308F).

**LAW 3517. Law and Literature. 3-4 Units.**

After its heyday in the 1970s and 1980s, many wondered whether the law and literature movement would retain vitality. Within the last decade there has, however, been an explosion of energy in the field, which has expanded beyond the boundaries of the literary text narrowly conceived and incorporated a range of other genres and humanistic approaches. Several recent or forthcoming books survey the range of emerging scholarship and the potential for new directions within the field. Using one of these—*New Directions in Law and Literature* (Oxford, 2017)—as a guide, this course will delve into a variety of topics that law and literature approaches can illuminate. These include, among others, conceptions of sovereignty and non-sovereign collectivities, the construction of the citizen and refugee, competing visions of marriage and its alternatives, law and the rhetorical tradition, and theoretical perspectives on intellectual property. Nearly every session will pair recent scholarship in the field with a literary or artistic work, ranging from Claudia Rankine's *Citizen* to Shakespeare's *Merchant of Venice*. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 3 or 4 units, depending on the paper length. This class is limited to 22 students, with an effort made to have students from SLS (16 students will be selected by lottery) and six non-law students by consent of instructor. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper. Cross-listed with English (ENGLISH 350).

**LAW 3518. Law and Psychology. 3 Units.**

This course will examine the implications of psychological theory and research for normative legal theory and for contemporary legal policies, procedures, and practices. The course will draw on contemporary cognitive, social, and clinical psychology to address the concepts of intent, responsibility, deterrence, retribution, morality, and procedural and distributive justice. We will examine evidence law (e.g. eyewitness testimony, polygraphy, expert testimony, psychiatric diagnosis and prediction), procedure (e.g., trial conduct, jury selection, settlement negotiations, alternative dispute resolution), and various topics in criminal law, torts, contracts, property, discrimination, family law, and other areas. We will compare "rational actor" and psychological perspectives on decision making by juries, judges, attorneys, and litigants. Special Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Series of shorter papers or final independent research paper totaling 28 pages.

**LAW 3519. Law and the Greek Classics. 1 Unit.**

This one credit course, based on materials taught at the Aspen Institute, will read and discuss selected classical Greek documents (in translation, of course) of particular relevance to the contemporary practice of law. We will begin with a reading of two Platonic dialogues – *Crito* and the *Apologia* – to frame the question of whether Socrates should have resisted the lawful, but unjust, verdict condemning him to death. We'll focus of the tension between law and justice, perhaps peeking forward to Melville's *Billy Budd*, and MLK Jr.'s *Letter from the Birmingham Jail*. We will continue with the third play in Aeschylus' *Oresteia*, focusing on the decision to remit Orestes to the judgment of the people of Athens, rather than to the Furies, in connection with the murder of Clytemnestra. We'll focus on the decision to vest secular authorities with the definition of justice. We'll close with a reading of *Antigone*, focusing on the relationship between the individual and the state, and the gendered nature of justice. I often end the seminar with an informal public reading of the *Antigone*. I play Creon, maybe this year in a Trump mask. I anticipate four to five meetings, usually over dinner in one of the seminar rooms. Meeting Time: TBD with instructor. Discussion will be informal, and non-hierarchical. Elements used in grading: Attendance, Class Participation.  
Same as: Reading Group

**LAW 400. Directed Research. 1-4 Unit.**

Directed Research is an extraordinary opportunity for students beyond the first-year to research problems in any field of law. The final product must be embodied in a paper or other form of written work involving a substantial independent effort on the part of the student. A student must submit a detailed petition of at least 250 words, approved by the sponsoring faculty member, outlining his or her proposed project and demonstrating that the research is likely to result in a significant scholarly contribution. A petition will not be approved for work assigned or performed in a course, clinic, or externship for which the student has or will receive credit. A petition must indicate whether the product is intended for publication in a law review or elsewhere. A student may petition for "Directed Research: Curricular Development" when the work involves assisting a Law School faculty member in developing concepts or materials for new and innovative law school courses. Both the supervising faculty member and the Associate Dean for Curriculum must approve petition for "Directed Research: Curricular Development." Students must meet with the instructor frequently for the purposes of report and guidance. Unit credit is by arrangement. Students whose projects warrant more than four units should consider a Senior Thesis or the Research Track. See SLS Student Handbook for requirements and limitations. With the approval of the instructor, a directed research project of two-units or more may satisfy one research writing course (R course). Elements used in grading: As agreed to by instructor. Directed Research petitions are available on the Law School Registrar's Office website (see Forms and Petitions).

**LAW 4001. Communications Law: Broadcast and Cable Television. 3 Units.**

(Formerly Law 447) Most people watch television on a regular basis (although not necessarily on TV). Television entertains, delivers the news, and provides an important forum for debating political issues. Focusing on communications law and first amendment law, the course will discuss how and why regulation shapes what we see on TV, and how it attempts to ensure that television can fulfill its functions for society. For example, why is cable television so expensive? Why can comedians swear on cable TV, but not on broadcast TV? Should regulators care as much about violence as they do about indecency? Can we trust the market to give the audience what it wants? Will the market provide content that is in the public interest, such as local news or educational programming, or do regulators need to intervene? Should we care if media outlets are increasingly owned by a few small conglomerates? And how does the Internet affect the need for ownership regulation? The course mostly focuses on the U.S., but highlights developments elsewhere where appropriate. Special instructions: Students may take Communications Law: Internet and Telephony and Communications Law: Broadcast and Cable Television in any order (neither is a prerequisite for the other). There are no prerequisites for this course. No technical background is required. Elements used in grading: Class participation, attendance, final exam.

**LAW 4003. Current Issues in Network Neutrality. 2 Units.**

(Formerly Law 731) Due to the change in administration, the future of net neutrality in the US is in question again. Network neutrality rules are based on a simple principle: Internet service providers like Verizon or Comcast that connect us to the Internet should not control what happens on the Internet. Net neutrality rules prohibit ISPs from blocking or slowing down websites, making some sites more attractive than others, or charging sites fees to reach people faster. After a long, public fight that mobilized more than 4 million people across the political spectrum, the Federal Communications Commission (FCC) adopted strong net neutrality rules in February 2015. Now these rules might be on the chopping block. FCC Chairman Pai, who opposed the rules when they were adopted, has declared his intention to roll back the rules, while expressing some support for "net neutrality principles." At the same time, Republicans in Congress have indicated they might consider a legislative solution. Through lectures, class discussions, and guest speakers, the seminar will introduce students to the key questions underlying the net neutrality debate so that they can become informed participants in this debate. Do we need net neutrality rules, and, if yes, what should they be? What are the options for addressing net neutrality at the FCC and in Congress? How do past court decisions constrain the FCC's options for adopting net neutrality rules? While the class focuses on the net neutrality debate in the U.S., the underlying policy questions are general and directly applicable to ongoing net neutrality debates around the world. The class is open to law students and students from other parts of the university. Students do not need to have any technical background to participate in the class; any necessary background will be taught in class. Elements used in grading: Short written assignments, class participation, attendance. Students are expected to attend all sessions of the class and participate in the class discussion. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 4004. Cybersecurity: A Legal and Technical Perspective. 2 Units.**

This class will use the case method to teach basic computer, network, and information security from technology, law, policy, and business perspectives. Using real world topics, we will study the technical, legal, policy, and business aspects of an incident or issue and its potential solutions. The case studies will be organized around the following topics: vulnerability disclosure, state sponsored sabotage, corporate and government espionage, credit card theft, theft of embarrassing personal data, phishing and social engineering attacks, denial of service attacks, attacks on weak session management and URLs, security risks and benefits of cloud data storage, wiretapping on the Internet, and digital forensics. Students taking the class will learn about the techniques attackers use, applicable legal prohibitions, rights, and remedies, the policy context, and strategies in law, policy and business for managing risk. Grades will be based on class participation, two reflection papers, and a final exam. Special Instructions: This class is limited to 65 students, with an effort made to have students from SLS (30 students will be selected by lottery) and students from Computer Science (30 students) and International Policy Studies (5 students). Elements used in grading: Class Participation (20%), Written Assignments (40%), Final Exam (40%). Cross-listed with Computer Science (CS 203) and International Policy Studies (IPS 251).

**LAW 4005. Introduction to Intellectual Property. 4 Units.**

(Formerly Law 409) This is an overview course covering the basics of intellectual property law – trade secrets, patents, copyrights, and trademarks, as well as selected other state intellectual property rights. This course is designed both for those who are interested in pursuing IP as a career, and those who are looking only for a basic knowledge of the subject. There are no prerequisites, and a scientific background is not required. Elements used in grading: Class participation and final exam (4-hour, open-book, in-class final).

**LAW 4006. Intellectual Property and Antitrust Law. 3 Units.**

(Formerly Law 459) This is an advanced seminar focusing on antitrust law as it applies to the creation, licensing, and exercise of intellectual property rights. At least one IP or antitrust class is a prerequisite, and ideally both. Papers will be due before the Law School deadline. Draft papers will be due in time for student presentations. Elements used in grading: Class participation and final paper. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 4007. Intellectual Property: Copyright. 3 Units.**

(Formerly Law 324) This course provides an introduction to copyright law and policy. Students will learn the fundamental substantive and procedural features of copyright law, including subject matter requirements and limitations on protection with respect to validity, infringement, and defenses, as well as the boundaries between federal copyright law and other IP regimes. It will explore the source and nature of copyright protection, as well as the various justifications offered for such protection. In addition to familiarity with the Copyright Act and extensive case law, students will gain an understanding of copyright policy. Whose work should be protected, to what extent, and under what circumstances? Which unauthorized uses should count as infringing, and why? Special emphasis will be placed on the evolution of copyright in the digital era, since copyright law has evolved nearly constantly, in connection with new technologies, creative practices, and business models, as well as legislative and political shifts. There is no prerequisite for this course. Elements used in grading: Attendance, Class Participation, Exam.

**LAW 4008. Intellectual Property: Copyright Licensing, Principles, Law and Practice. 2 Units.**

(Formerly Law 625) This course will combine in-depth study, through reading assignments and lectures, of US law governing copyright transactions (contract formalities and construction; recordation and title practice; termination of transfers) and copyright contract drafting and negotiation exercises (book publishing agreement; videogame production and distribution agreement). Elements used in grading: Class Participation, Written Assignments. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 4009. Intellectual Property: International and Comparative Patent Law. 2 Units.**

(Formerly Law 796) Patentable goods and services are increasingly important in today's global information economy, and they frequently cross national borders, physically or electronically. This course will include a comparative examination of the major national patent systems, a survey of the principal international patent treaties, and discussions of related transnational patent issues. We will examine these topics both from the perspective of global patent practitioners – who face challenges such as securing large international patent portfolios and strategizing multinational patent litigation – and from the perspective of the academics and policymakers who are engaged in ongoing patent harmonization debates. Prerequisites: Introduction to Intellectual Property or consent of instructor. Law students enrolled in this class will have the option of participating in a one-week extension of the course (Law 4030) in Tokyo, Japan during spring break for an additional credit. Students may enroll for this course alone or for both this course and Law 4030. The overseas option is limited to 12 students. (See Law 4030 for application instructions and deadline). Elements used in grading: class participation, attendance, and short writing assignments.

**LAW 4010. Intellectual Property: Patents. 3 Units.**

(Formerly Law 326) In this course we cover the major aspects of patent law, primarily as applied in the United States: patentability (including patentable subject matter, novelty, nonobviousness, enablement, and definiteness); infringement; and remedies. The emphasis is on essential legal principles and a policy analysis of the patent system. The course is designed to be useful both as solid background for non-patent-specialists and for those planning a career in the field. Introduction to Intellectual Property or consent of the instructor is a prerequisite for this course. No technical background is required. Law students enrolled in this class will have the option of participating in a one-week extension of the course (Law 4030) in Tokyo, Japan during spring break for an additional credit. Students may enroll for this course alone or for both this course and Law 4030. The overseas option is limited to 12 students. (See Law 4030 for application instructions and deadline). Elements used in grading: Class participation, attendance, and final exam.

**LAW 4011. Intellectual Property: The Business & Law of Technology & Patent Licensing. 3 Units.**

(Formerly Law 753) If you practice in any technology-related area (whether transactions, corporate, or litigation), you will encounter licensing, as it is the principal means by which technology and patent rights are disseminated, exploited and commercialized. It is fundamental to Silicon Valley and beyond, including in software, mobile, consumer devices, autonomous cars, semiconductors and pharmaceuticals. This is a practice-oriented course covering the fundamentals of licensing technology and patents, including business considerations, drafting, negotiations and strategic considerations. We will also consider the role of licensing in mergers and acquisitions, litigation and antitrust contexts. The course is structured based on a real-world hypothetical involving entrepreneurs who spin out university-developed inventions into startup companies and then seek to commercialize the technology and patents to leading companies in a specified technology industry (such as smartphones, autonomous cars, "internet of things" or the like). We will also have a guest lecturer from a major technology company with significant licensing dimensions (which in the past have included Google, Waymo, and Qualcomm). Elements used in grading: Class Participation, Final Exam.

**LAW 4012. Intellectual Property: Trademark and Unfair Competition Law. 3 Units.**

(Formerly 337) Brands today constitute one of the main sources of business value, often outstripping the value of physical assets and, indeed, of a company's other intellectual property. This course will focus on the exploitation of merchandising values (such as brand names and logos), celebrity values (such as product endorsements) and competitive advantage (such as technical know-how) under federal and state trademark, unfair competition, right of publicity and trade secret laws. Elements used in grading: Final Exam.

**LAW 4013. Information Privacy Law. 2 Units.**

(Formerly Law 775) This course will explore the roots of privacy law, its evolution in the 20th century in the face of ever changing technology, and the challenges of individual control over or government regulation of information in the modern era where institutions and individuals need and reveal information constantly, but also seek basic dignity and safety from harm. Privacy law is comprised of torts, contracts, constitutional law, statutory law, international law, soft law norms, and affected by emerging technologies. We will discuss all of these things, as well as incorporate developments in the news, from the perspective of the various privacy stakeholders—consumers, regulators and business. Elements used in grading: Final Exam.

**LAW 4014. Law, Technology, and Liberty. 2 Units.**

New technologies from gene editing to networked computing have already transformed our economic and social structures and are increasingly changing what it means to be human. What role has law played in regulating and shaping these technologies? And what role can and should it play in the future? This seminar will consider these and related questions, focusing on new forms of networked production, the new landscape of security and scarcity, and the meaning of human nature and ecology in an era of rapid technological change. Readings will be drawn from a range of disciplines, including science and engineering, political economy, and law. The course will feature several guest speakers. There are no formal prerequisites in either engineering or law, but students should be committed to pursuing novel questions in an interdisciplinary context. The enrollment goal is to balance the class composition between law and non-law students. Elements used in grading: Attendance, Class Participation, Written Assignments. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. This course is cross-listed with Bioengineering (BIOE 242) and Engineering (ENGR 243).

**LAW 4015. Modern Surveillance Law. 2 Units.**

(Formerly Law 692) This seminar provides an in depth look at modern government surveillance law, policies and practices. It is taught by Richard Salgado, director of law enforcement and information security at Google and a former prosecutor at the U.S. Department of Justice's Computer Crime and Intellectual Property Section, and Todd Hinnen, a partner at Perkins Coie and a former head of U.S. Department of Justice's National Security Division. The course will cover the technology, law and policy of government surveillance of the Internet and other communications technologies. We will focus on U.S. government surveillance for national security, criminal law enforcement and public safety purposes, but also address the relationship with other jurisdictions. Technologies and practices covered will include wiretapping, stored data collection and mining, location tracking and developing eavesdropping techniques. Legal regimes will include the Fourth Amendment, the Foreign Intelligence Surveillance Act, the USA Freedom Act, USA Patriot Act, the Electronic Communications Privacy Act, and CALEA among others. Elements used in grading: Two papers, timely submission of topics and outlines, and class participation.

**LAW 4016. Patent Litigation Workshop. 3 Units.**

(Formerly Law 322) This course simulates the strategy and pretrial preparation of a patent lawsuit. The course materials include information typical to a patent lawsuit: a patent, file history, prior art, and information regarding the accused product. Students will represent either the patentee or the accused infringer. Students will draft claim construction charts, infringement charts, take and defend depositions, and brief and argue claim construction and motions for summary judgment of infringement and invalidity. Some knowledge of patent law is presumed. Special Instructions: IP: Patents (Law 326) is a prerequisite for this course, but can be taken coterminously. Students must attend the first class session (or contact the instructor) or they will be dropped from the class or waitlist. Elements used in grading: Attendance, participation, writing assignments, exercises and oral arguments.

**LAW 4017. Advanced Torts: Defamation, Privacy, and Emotional Distress. 3 Units.**

(Formerly Law 373) This course will examine the theoretical foundations and common law development of the range of tort remedies designed to afford protection to the interests in personality. Defamation, the right of privacy, and claims of emotional distress and harassment will receive particular attention, along with the constitutional defenses to these claims, based on the First Amendment, and recent issues novel to the Internet era. Elements used in grading: Final Exam.

**LAW 4018. Intellectual Property: International and Comparative Copyright. 2 Units.**

(Formerly Law 745) Few copyright licenses today fail to reach across national borders, and copyright litigation increasingly calls for a general understanding of foreign copyright law. This course will focus on the counselling considerations that surround the exploitation of music, film, literature and other copyrighted works in foreign markets through licensing, litigation, or both. The course will survey the principal legal systems and international treaty arrangements for the protection of copyrighted works as well as the procedural questions that lie at the threshold of protection. Elements used in grading: class participation; two reflection papers.

**LAW 4019. Legal Informatics. 2-3 Units.**

(Formerly Law 729) The management of information is crucial to the proper functioning of any legal system. A good legal system relies on information about the world itself (such as evidence of who did what and when) as well as more purely legal information (such as court rulings, statutes, contracts, and so forth). Legal Informatics is the theory and practice of managing such information. It covers both legal theory and information theory. It also covers elements of general information processing technology as well as applications of that technology in the administration of law. While the concept of Legal Informatics is not new, its importance is greater than ever due to recent technological advances - including progress on mechanized legal information processing, the growth of the Internet, and the proliferation of autonomous systems (such as self-driving cars and robots), as well as globalization of the legal industry. The upshot of these advances is the emergence of practical legal technology that is qualitatively superior to what has gone before. This technology is capable of dramatically changing the legal profession, improving the quality and efficiency of legal services and disrupting the way law firms do business. The technology is also capable of popularizing the law - bringing legal understanding and legal tools to everyone in society, not just legal professionals. Through this class students gain an understanding of the unique challenges and opportunities the legal system and the legal industry are facing in light of this tech-driven transformation of our legal system, and learn about innovative new approaches seeking to address them. Particular attention will be given to Computational Law, the branch of Legal Informatics concerned with the mechanization of legal analysis. Expert guest-speakers from academia and industry will provide for a diverse and interdisciplinary experience. Successful legal technology entrepreneurs and thought leaders in the legal technology space will provide a practical angle to the discussion. Class sessions include: Legal Document Search and Legal Document Analysis, Consumer Law, Computational Law and Logical Worksheets, Dialog Systems / Expert Systems, Predictive Analytics, Legal Ethics and the Unauthorized Practice of Law. Grades will be based on class participation (25% of grade) and one of the following two options: Option 1 (section 01): Legal Technology Project (individual or group; 75% of grade). Students can identify a legal information problem and develop a legal tech project, individually or as part of a team, to address the problem by preparing a technical demonstration project/prototype and in form of a written report about the project. Students will be asked to build their own system using Neota Logic, <https://www.neotalogic.com/>, or Stanford's Worksheets system, <http://worksheets.stanford.edu>. Option 2 (section 02): Independent Research Paper (individual; 75% of grade). Students shall write an independent research paper on a legal informatics topic. You are invited to propose a topic and a working title and to discuss your topic ideas with us. The topic and the working title of the research paper must be approved by the instructors, before you start your detailed research. Independent research papers require by definition that students include other research materials besides the readings for class. Students electing option 2 will receive Research (R) credit. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the length of the research paper. If you wish to earn 2 units, the research paper shall be at least 18 pages in length (double-spaced, 12-point font size, 1-inch margins). If you wish to earn 3 units, the research paper shall be at least 26 pages in length (double-spaced, 12-point font size, 1-inch margins). You can find examples of papers written by last year's students on the CodeX website at <https://law.stanford.edu/codex-the-stanford-center-for-legal-informatics/codex-publications/#slnav-semantic-papers>. Each student can choose one of the above two options, whichever he/she prefers. After the term begins, students electing option 2 can transfer from section (01) into section (02), with consent of the instructor. During the course, students will be asked to provide a brief description of their project. There are no prerequisites for this class. Elements used in grading: Class Participation, Attendance, Legal Technology Project, Research Paper. Cross-listed with Computer Science (CS 204).

**LAW 4020. Lawyering for Innovation: A Case Study. 3 Units.**

(Formerly Law 769) Strategic lawyering in the 21st century requires a combination of critical skillsets, including facility with technology, product design, partnerships, dispute resolution, and policy. No issue in the digital age has demonstrated this better than the history of and litigation surrounding Google Books. For over a decade, from the inception of the product to the resolution of its legal issues, lawyers were integrally involved with engineers and the business every step of the way. They helped design its features, defend it from lawsuits, craft a settlement, and advocate complementary policy positions. On a broader level, the history of ebooks is a microcosm of the opportunities and challenges of the digital age: new technologies to reproduce and distribute works, changing consumer norms, massive disruptions to economic interests, evolving concepts of fair use, increased access to information, fears about piracy, and threats to competition. Every one of these issues requires skilled lawyering in close partnership with business leadership. This seminar will focus on strategic lawyering at the cutting edge of innovation by closely studying, among other things, the history of Google Books and the evolution of copyright in the digital age. We will look at how leading businesses, including Google, Apple, Amazon and Microsoft, have each used law, litigation, and policy as tools to advance their business interests. We will focus on developments related to ebooks, and also study analogous issues involving the music, movie, and newspaper industries. The seminar will include guest speakers who have led legal strategies to further innovation. Some copyright experience is helpful but not essential. The course is open to graduate students throughout the university, especially the Graduate School of Business, the Department of Communication, and the Journalism Program. Special Instructions: Students on the waitlist for the course will be admitted if spots are available on the basis of their position on the waitlist and degree of study. Elements used in grading: Grading will be based upon weekly reflections, class participation, and a short final paper (or, for those opting for Research credit, a longer paper based on independent research). A version of this course was taught at Stanford Law School in 2015 and Harvard Law School in 2016. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor.

**LAW 4021. Free Speech in the Age of the Internet. 2 Units.**

Taught by top policy leaders from Google/YouTube, Facebook and Twitter, this course will explore the way free speech norms have evolved in the age of the Internet and the pivotal role online platforms play in the information available worldwide. From the content policy issues that evolved in the face of violent geopolitical disputes (from the Arab Spring to the Ukraine), to the Right to be Forgotten in Europe, the challenges posed by terrorist propaganda online, and the role platforms play in social movements like #blacklivesmatter, this course will allow students to critically engage the balance between freedom of information and other important social values, such as privacy and security. After the term begins, students accepted into the course can transfer from section (01) into section (02), with consent of the instructor. Elements used in grading: Attendance, Class Participation, Written Assignments; Exam or Final Paper.

**LAW 4022. Communications Law: Internet and Telephony. 3 Units.**

(Formerly Law 481) The internet has enabled new forms of innovation, content production and political participation that are transforming our economy, society and democratic system. Technical, legal and economic choices will affect whether the Internet can realize its potential or not. Communications law - the law that governs both the physical infrastructures for communications services such as cable and telephone networks as well as the communication services which are provided over these infrastructures - has become one of the most important arenas in which choices affecting the future of the information society are made. The debates over network neutrality or the right ways to foster broadband deployment are examples of this trend. At the same time, the Internet's ability to support a variety of different communications services such as telephony, information services or video over the same physical network infrastructure challenges the existing communications law, which is based on the assumption that different physical infrastructures offer different communications services. What can regulators and legislators do to allow the Internet to realize its economic, social, cultural, and political potential? How can we foster the deployment of more broadband networks? And how can policymakers allow applications like Internet telephony and traditional telephony to coexist without giving one an unfair advantage over the other? The course will address how current law deals with these questions, but also explore what regulators and legislators may do to better deal with the challenges posed by the Internet. The course is mostly focused on the US, but highlights developments elsewhere where appropriate. Special Instructions: Students may take Communications Law: Internet and Telephony and Communications Law: Broadcast and Cable Television in any order (neither is a prerequisite for the other). There are no prerequisites for this course. No technical background is required. Elements used in grading: Class participation, attendance, final exam.

**LAW 4024. Patent Prosecution. 2 Units.**

(Formerly 321) This skill-based course examines the core requirements and strategies for drafting and prosecuting a patent application before the U.S. Patent & Trademark Office (US PTO). The class brings in real inventors and US PTO patent examiners to give students a real-world experience of developing a patent, understanding patentability and building patent portfolios, and getting a patent application prosecuted through the patent office. Students will interact with the inventors and examiners to gain the experience of getting a patent issued – through interactions with an inventor to develop an idea and draft a patent application, responding to rejections and office actions from the US PTO after filing the patent application, through interactions with examiners to interview the office action and getting the application issued. This course is open to people with technical or non-technical backgrounds – all you require is an interest in patent law. A solid understanding of patent claims and internal mechanics (which this class focuses on) will be helpful experience and background for students interested in pursuing any patent litigation or transactional practice. Students are evaluated on participation, in-class and take-home exercises, and projects relating to the drafting and prosecution of a patent application.

**LAW 4025. Intellectual Property: Trade Secrets. 3 Units.**

(Formerly Law 499) With the increasing importance of technology to industry and the ease with which information can now be downloaded and shared, trade secret protection has become one of the most important issues in intellectual property today. The law has to strike a balance between encouraging and protecting commercial investment in research, and preserving an individual's right to change employment or to compete directly against a former employer. In addition to examining the law and the theory behind it, we will emphasize the practical aspects of protecting information as a trade secret. We will discuss the challenges and issues involved in litigating trade secret cases, creating corporate programs to protect trade secrets, and drafting agreements. We will feature several guest speakers and will highlight topics of current interest, such as "inevitable disclosure," non-competition agreements, trade secrets and the Internet, and cybercrime. The class should be of interest to students who expect to practice intellectual property law as well as to students who expect to be involved in corporate transactions and labor law. Elements used in grading: Class participation and final exam.

**LAW 4026. Free Expression in a Networked World. 2-3 Units.**

This seminar explores cutting-edge questions at the intersection of the First Amendment, the internet, and new technologies. The internet and digital media technologies have opened up new spaces for expression – spaces that are designed and controlled by a handful of private companies. For example, Facebook, Twitter, and Google's algorithms determine what content is presented to us; software designed by Facebook and Twitter identifies and filters content like fake news; and new kinds of "speakers" like bots tweet and share information. The engineering and design choices underlying these technologies have significant implications for our ability to express ourselves and for democracy. But our expressive rights are increasingly in tension with platform companies' statutory immunities, like CDA 230, and, potentially, their constitutional claims to speech and press rights. Lawyers operating in this space – whether from the perspective of technology companies, policymakers, regulators, or academia – need to understand not only traditional First Amendment doctrine, but also the statutes and technologies that shape the behavior of private actors and the spaces in which expression occurs. They need to grapple with questions of responsibility and accountability, and with the proper balance between private and public control. This course prepares students to deal with the complex dynamics underlying these issues. Every other week, a scholar or practitioner at the cutting edge of these topics will present their research or discuss their professional experiences. Students will read any materials provided in advance, and the class will engage in a discussion with the guest. In the week before the speaker's presentation, we will meet as a group to discuss key literature informing the scholar's work or the practitioner's experiences. Special Instructions: Enrollment will be limited to 15 students from both SLS and H&S. Experience with First Amendment doctrine is helpful, but not required. Grades will be based on class attendance, class participation, and either five reflection papers (section (01)) or an independent research paper (section (02)). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on paper length. Elements used in grading: Class participation, class attendance, reflection papers or research paper. CONSENT APPLICATION: To apply for this course, students must complete and submit the Consent Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms).

**LAW 4028. Intellectual Property: Advanced Copyright. 2 Units.**

Copyright law is the primary legal regime governing human creativity, and it plays some role in nearly all creative industries today. Consequently, copyright law has far-reaching economic and cultural implications. In this seminar, we will consider the interests of some of the different groups affected by the copyright regime, including creators, technologists, audiences, institutions, and heirs. Course readings will cover copyright case law and scholarship; research on creative practices and relevant business models; the role of copyright law in innovation policy; and legal versus extralegal modes of protecting the fruits of creative labor. Throughout, we will assess the fairness, efficacy, and alignment of copyright protection and remedies available, to whom, when, and for what reasons. The course aims to deepen students' knowledge of copyright law and scholarship; to equip students to develop principled policy arguments about the scope of copyright protection; and to enable students to evaluate reforms and alternatives to copyright in light of how these might serve different entities in the copyright ecosystem. Elements used in grading: Attendance, Class Participation, Written Assignments.

**LAW 4029. Video Game Law. 3 Units.**

This seminar discusses a variety of legal issues raised by video games and game platforms. We will devote substantial attention to intellectual property matters, but will also include business and licensing issues, tort law, the First Amendment, and legal issues presented by virtual reality. Students will write and present an original research paper on a topic related to the class. This is a 3-unit seminar that satisfies the R requirement. Introduction to Intellectual Property or equivalent is a prerequisite. Enrollment is limited to 12 students, and will be by consent of the instructors. Interested students should submit a paragraph explaining their background and interest in the course. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 403. Senior Thesis. 5-8 Units.**

An opportunity for third-year students to engage in original research and to prepare a substantial written-work product on the scale of a law review article. The thesis topic should be chosen no later than two weeks after the beginning of the seventh term of law study and may be chosen during the sixth term. The topic is subject to the approval of the thesis supervisor, who may be any member of the Law School faculty under whose direction the student wishes to write the thesis and who is willing to assume the responsibility therefor. An oral defense of the thesis before members of the faculty, including the thesis supervisor, will be conducted late in the student's ninth academic term. Acceptance of the thesis for credit requires the approval of the thesis supervisor and one or more other members of the faculty who will be selected by the supervisor. Satisfactory completion of the senior thesis will satisfy graduation requirements to the extent of (a) 5 - 8 units of credit and (b) two research courses. The exact requirements for a senior thesis are in the discretion of the supervising faculty member. Special Instructions: Two Research credits are possible. Elements Used in Grading: Paper.



**LAW 4030. Intellectual Property: Patents - Japan Field Study. 1 Unit.**

This is the Tokyo, Japan component of Intellectual Property: International and Comparative Patent Law (Law 4009) and Intellectual Property: Patents (Law 4010). Students enrolled in either Law 4009 or Law 4010 may apply for this optional field study component, for which students will travel to Tokyo for one week during spring break 2018. Class sessions will take place primarily at Waseda Law School. Students will also meet with local lawyers, clients, and government officials, including at the Japanese Patent Office, the Intellectual Property High Court, and the Ministry of Economy, Trade and Industry. Enrollment is limited to 12 students. PLEASE NOTE: Students will need a passport and visa to travel to Japan. Elements used in grading: class participation and short writing assignments. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website. See Consent Application Form for instructions and submission deadline.

**LAW 4031. Disruptive Technologies: Their Impact on Our Laws, and the Laws' Impact on the Technology. 2 Units.**

The advent of a highly disruptive technology necessarily butts up against existing laws, regulations and policies designed for the status quo as well as established businesses. This course takes the examples of driverless cars and artificial intelligence and examines the new and challenging legal questions and opportunities presented by these technologies. We will also discuss how business leaders, lawyers and technologists in these areas can navigate and create legal, regulatory and policy environments designed to help their businesses not only survive but thrive. Through a combination of readings, classroom discussions, expert guest speakers from the relevant technology and policy fields and student presentations, this course explores the promise of these technologies, the legal and regulatory challenges presented and the levers in-house counsel and business leaders in these fields can invoke to better navigate the inevitable obstacles facing these highly disruptive technologies. There are no formal prerequisites in engineering or law required, but students should be committed to pursuing novel questions in an interdisciplinary context. Elements used in grading: class preparation and short reflection papers. This course is open to School of Engineering and graduate students with consent of the instructor.

**LAW 4032. Advanced Negotiation of Patent Reform Policies. 2 Units.**

Patent reform has been a hotly debated topic in recent years in the intellectual property field. Different industries and players have differing and often competing views of our patent system—how effective it is in promoting innovation and what, if any, reform is needed. Students will play the role of counsel on one or more teams representing the interests of particular stakeholder groups. The teams will engage in a series of mock negotiations on actual legislative or administrative patent reform proposals with other teams, as well as mock legislative or administrative engagements before Congress or the United States Patent and Trademark Office respectively. The goal is to achieve consensus on patent reforms that best serve the stakeholders' individual and collective interests, all in an environment of competing interests. Through experience-based learning and simulations, students will gain an understanding of some of the most current patent policy issues being debated in Congress and before the United States Patent and Trademark Office. This seminar will also teach students how to: (1) evaluate from their client's perspective complex, legislative and administrative, patent policy proposals; and (2) strategize, prepare for, participate in, negotiate and advocate for beneficial reforms. Prerequisites: Introduction to Intellectual Property. Grading Criteria: The seminar requires that students to do the required reading, actively participate in class and the mock negotiations and legislative or administrative engagements, and write a series of at least three short assignments.

**LAW 4035. Cyber Law: International and Domestic Legal Frameworks for Cyber Policy. 3 Units.**

Was Russia's interference in the 2016 U.S. elections an act of war? When do cyber attacks constitute a use of force? Is sovereignty in cyberspace different than in other domains, and can states meaningfully defend their sovereignty in cyberspace? Is "hacking back" against cyber thieves the legal equivalent of defending one's own property? This course explores the domestic and international law of cyberspace and its application to significant practical challenges. It also addresses broader legal policy questions, including the extent to which law acts as a constraint on state and non-state actors in cyberspace, whether the application of existing law to cyber activities is sufficient or new laws and norms are needed, and how they could be developed. Policy and law students are welcome; no previous legal knowledge is required. Elements used in grading: Attendance, class participation, writing assignments, and a final exam. Cross-listed with International Policy Studies (IPS 269).

**LAW 4038. Does Google Need a Foreign Policy? Private Corporations & International Security in the Digital Age. 3 Units.**

Facebook has more users than any nation has citizens. Apple CEO Tim Cook speaks more often with Chinese President Xi Jinping than President Trump does. Google's revenues exceed the GDPs of more than half the world's countries. Cybersecurity companies produce weapons that once only foreign governments wielded. These and other technology companies are increasingly caught in the maw of global politics whether it's entering challenging new foreign markets, developing platforms that enable millions of people around the world to organize for both noble and nefarious aims, or developing products that can become tools of intelligence agencies worldwide for surveillance, counterintelligence, and information warfare. In several respects, tech companies wield more power than governments. We examine the changing role of corporations in international politics, the role of the state, and critical challenges that large technology companies face today in particular. We discuss contending perspectives about key issues with guest lectures by industry and US government leaders as well as simulations of foreign policy crises from the board room to the White House Situation Room. No background in political science or computer science is required. Admission based on application. Elements used in grading: Class participation, midterm policy memo, final policy memo, participate in final course simulation tech company summit. CONSENT APPLICATION: Admission based on application. Instructor consent required. Please send an application email to the teaching assistant, Taylor McLamb, at twj@stanford.edu, that includes: your major, an explanation why you want to take the course, and how your background fits with the subject matter (not to exceed three paragraphs). The application deadline is Friday, November 17 and notification of course acceptance will be sent on Thursday, November 30. International Policy Studies (IPS 245) and Public Policy (PUBLPOL 245).

**LAW 406. Research Track. 9-12 Units.**

The Research Track is for students who wish to carry out a research project of a scope larger than that contemplated for a Senior Thesis. Research Track projects are to be supervised by two or more professors, at least one of whom must be a member of the Law School faculty. At least one faculty member in addition to the supervisors must read the written product of the research, and the student must defend the written work orally before the readers. Students will be admitted to Research Track only if they have a demonstrated capability for substantial independent research, and propose a significant and well-formulated project at the time of application. Special Instructions: Two Research credits are possible. Elements Used in Grading: Paper.

**LAW 411. Directed Writing. 1-4 Unit.**

Teams of students may earn "Directed Writing" credit for collaborative problems involving professional writing, such as briefs, proposed legislation or other legal writing. Only projects supervised by a member of the faculty (tenured, tenure-track, senior lecturer, or professor from practice) may qualify for Directed Writing credit. It will not necessarily be appropriate to require each member of the team to write the number of pages that would be required for an individual directed research project earning the number of units that each team member will earn for the team project. The page length guidelines applicable to individual papers may be considered in determining the appropriate page length, but the faculty supervisor has discretion to make the final page-length determination. Students must meet with the instructor frequently for the purposes of report and guidance. Unit credit is by arrangement. A petition will not be approved for work assigned or performed in a course, clinic, or externship for which the student has or will receive credit.

**LAW 5001. China Law and Business. 3 Units.**

(Formerly Law 245) This introductory course provides an overview of the Chinese legal system and business environment and examines Chinese legal rules and principles in select business-related areas. These areas include intellectual property, dispute resolution, foreign investment vehicles, mergers and acquisitions, antimonopoly law, and environment. Through active class participation and analysis of legal and business cases, students will learn both the law in the books and the law in action, as well as strategies that businesses could use to overcome limitations in the Chinese legal system. Leaders from the law and business community will be invited to share their experiences and insights. This course is particularly suitable for law students and students enrolled in the MBA program and/or the East Asian Studies Program. Undergraduates who have permission from the instructor may also take this course. A Stanford Non-Law Student Course Registration Form is available on the SLS Registrar's Office website. Elements used in grading: Class participation (30%) and extended take-home exam (70%).

**LAW 5002. Comparative Law. 3 Units.**

(Formerly Law 311) The big question in comparative law today - and one that is of key importance to anyone interested in international law - is whether we are currently witnessing a convergence of national legal systems. This course examines this question, as well as the related problem of American exceptionalism, by exploring key aspects of contemporary Western European legal systems. We will study a range of legal institutions and practices, including such topics as legal education, the role of judges and judging, constitutional courts and judicial review, criminal procedure and punishment, and the rise and regulation of consumer culture. In contrast to the traditional comparative law course, we will also devote substantial time to such pressing public-law questions as racial equality and affirmative action, gender equality and sexual harassment, and church-state relations. In lieu of the final exam, students may opt to write four response papers to the assigned readings (each 5 to 7 double-spaced pages long). After the term begins, students accepted into the course can transfer from section (01) into section (02), with consent of the instructor. Elements used in grading: Class participation; and exam or response papers.

**LAW 5005. European Union Law. 2-3 Units.**

(Formerly Law 451) The U.S. and the European Union (which comprises 28 European states and 500 million people) have the largest bilateral trade relationship in the world. Over 50% of the world's GDP is generated on the Transatlantic Marketplace. U.S. companies rely on the EU market for more than half of their global foreign profits, and U.S. investment in the EU is currently three times greater than U.S. investment in the whole of Asia. In recent years, this has tremendously heightened the need for a sound understanding of the legal system of the EU, especially for business and technology lawyers. Responding to this need, this course will, first, examine the internationally unique legal system of the EU as such, as it is applicable to any field of substantive and procedural EU law. Thus, we will look at the legal nature and the different sources of EU law and its relationship with the national law of the EU Member States, including European human rights and fundamental rights protection standards. We will cover the relevant EU law enforcement actions including state liability issues for breach of EU law as well as the jurisdiction of both European Courts and relevant remedies in national courts. Secondly, we will explore the legal framework governing business activities in the EU, from the perspective of a business entity as an internationally operating actor in a European business environment. In this context, we will focus on the most essential fields of EU business law, i.e. (a) the four fundamental economic freedoms of the European Internal Market for goods, services, capital, and persons (enterprises, workforce, immigration), including the legal and economic implications of Brexit, (b) EU competition (antitrust) law, and (c) the new digital European Internal Market and EU data protection and privacy laws. Special attention will be given to the question how companies established outside the EU can efficiently use EU business law to pursue their interests in the EU. Additional study and research opportunities for students in EU law, building on this course, can be found on the SLS EU Law Initiatives website ([www.law.stanford.edu/eulaw](http://www.law.stanford.edu/eulaw)). Special Instructions: After the term begins, students accepted into the course can transfer, with consent of the instructor, from section (01) into section (02), which meets the R requirement. Students in section (1) will complete the course with a one-day take-home exam. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the paper length. Elements used in grading: Class participation, one-day take-home exam or research paper.

**LAW 5006. International Business Transactions and Litigation. 3 Units.**

(Formerly Law 766) Lawyers are increasingly asked to advise clients with global operations: Twitter reacts to free speech limitations in Turkey, governments around the world regulate Facebook's user data, Nike weighs the legal risk from factory fires in Bangladesh, investors consider spending billions in China without legal protections common elsewhere, companies worry about the consequences of being complicit in human rights violations, governments threaten to expropriate intellectual and real property, and US litigators face court rulings abroad that may conflict with the orders of US courts. What legal problems arise when firms go global? Through a series of case studies, we put you in the driver's seat and ask you to consider the challenges of doing business around the world, subject to multiple and sometimes inconsistent national laws. We will examine how treaties, international agreements, and informal norms can constrain or supplement national laws and review the risks of doing business in nations whose laws are ineffective or unreliable. We also consider some of the costs of globalization. We'll hear from current or former general counsel from global firms such as Intel and G.E. Elements used in grading: a short paper, class participation, and written assignments.

**LAW 5007. International Business Negotiation. 3 Units.**

(Formerly Law 504) This course is structured around a quarter-long, simulated negotiation exercise which provides an in-depth study of the structuring and negotiating of an international business transaction. This class will be taught in counterpart with a class at Berkeley Law School. Students in this class will represent a U.S. pharmaceutical company, and the students in the class at Berkeley will represent an African agricultural production company. The two companies are interested in working together to exploit a new technology developed by the pharmaceutical company that uses the cassava produced by the African agricultural production company. The form of their collaboration could be a joint venture, a licensing agreement or a long term supply contract. The negotiations between the two classes will take place through written exchanges and through real-time negotiation which will be conducted both in-person and via videoconferences. The purpose of the course is to provide students with an opportunity (i) to experience the sequential development of a business transaction over an extended negotiation, (ii) to study the business and legal issues and strategies that impact the negotiation, (iii) to gain insight into the dynamics of negotiating and structuring international business transactions, (iv) to learn about the role that lawyers and law play in these negotiations, (v) to give students experience in drafting communications, and (vi) to provide negotiating experience in a context that replicates actual legal practice with an unfamiliar opposing party (here, the students at Berkeley). Students will also learn about the legal and business issues that may arise in joint ventures, supply agreements and licensing agreements. The thrust of this course is class participation and active involvement in the negotiations process. Students are expected to spend time outside of class, working in teams, to prepare for class discussions involving the written exchanges, as well as preparing for the live negotiations. Class discussions will focus on the strategy for, and progress of, the negotiations, as well as the substantive legal, business and policy matters that impact on the negotiations. In addition to the regular Monday class, classes will meet for the live negotiations on two Thursday evenings on-campus at 7:00 PM (10/19 and 10/26) and three Saturday mornings at 10:30 AM (10/7, 10/14 and 11/11) in the San Francisco office of DLA Piper (555 Mission Street; close to Montgomery St. BART station). Due to the Thursday and Saturday classes, this class will conclude on November 13. The course will be limited by lottery to twelve (12) law students (additional students from business or engineering may also participate). Attention Waitlist Students: Students on the waitlist for the course will be admitted if spots are available on the basis of their position on the waitlist and degree of study; all waitlist students are encouraged to attend the first class and will be notified as spaces become available. Attention Non-Law Students: You must complete and submit a Non-Law Student Course Add Request Form to the Law School Registrar's Office (Room 100). See Stanford Non-Law Student Course Registration on the SLS Registrar's Office website. Prerequisites: A course in basic negotiations (e.g., Law 7821) or comparable prior experience is recommended. A primer on basic negotiations skills will be offered at a time TBD as an alternative for students who have not had a prior negotiations class or experience. Elements used in grading: Class participation, written assignments and final paper.

**LAW 5008. International Commercial Arbitration. 3 Units.**

(Formerly Law 575) This course provides a rigorous introduction to the law, theory and practice of international commercial arbitration. International commercial arbitration which has become the default means of settling international disputes and with clients increasingly involved in international business transactions and cross-border activity, is a rapidly growing practice area in law firms of every size. The practice is peripatetic, with many international arbitration lawyers basing themselves in law firms in New York, Washington D.C., Paris, Hong Kong, Singapore, and other major world commercial centers. The course will deal with the internationalist elements of the subject matter, but also examine international commercial arbitration from an American perspective. Students can expect to review both foreign and US commentaries, statutes and case law. The course will comprise of five main topics: (1) an introduction to the field of international commercial arbitration; (2) the agreement to arbitrate; (3) the arbitrators; (4) the arbitration process; and (5) the arbitral award. The intent is to provide a strong academic understanding of the various theories and principles, but with a strong practical bent. Elements used in grading: Attendance, Class Participation, Final Exam.

**LAW 5009. International Conflict Resolution. 2 Units.**

(Formerly Law 656) This seminar examines the challenges of managing and resolving intractable political and violent intergroup and international conflicts. Employing an interdisciplinary approach drawing on social psychology, political science, game theory, and international law, the course identifies various tactical, psychological, and structural barriers that can impede the achievement of efficient solutions to conflicts. We will explore a conceptual framework for conflict management and resolution that draws not only on theoretical insights, but also builds on historical examples and practical experience in the realm of conflict resolution. This approach examines the need for the parties to conflicts to address the following questions in order to have prospects of creating peaceful relationships: (1) how can the parties to conflict develop a vision of a mutually bearable shared future; (2) how can parties develop trust in the enemy; (3) how can each side be persuaded, as part of a negotiated settlement, to accept losses that it will find very painful; and (4) how do we overcome the perceptions of injustice that each side are likely to have towards any compromise solution? We will consider both particular conflicts, such as the Israeli-Palestinian conflict and the South African transition to majority rule, as well as cross-cutting issues, such as the role international legal rules play in facilitating or impeding conflict resolution, the intragroup dynamics that affect intergroup conflict resolution efforts, and the role of criminal accountability for atrocities following civil wars. Special Instructions: Section 01: Grades will be based on class participation, written assignments, and a final exam. Section 02: Up to five students, with consent of the instructor, will have the option to write an independent research paper for Research (R) credit in lieu of the written assignments and final exam for Section 01. After the term begins, students (max 5) accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. This class is cross-listed with International Policy Studies (IPS 250) and Psychology (PSYCH 383).

**LAW 5010. International Human Rights. 3 Units.**

(Formerly Law 330) This course examines the law of international human rights, analyzing various categories of rights, from civil and political human rights, to social and economic human rights, to group and collective rights. It studies the structure and processes of international and regional courts that adjudicate human rights claims and international treaty bodies that report on State human rights action. It explores debates about the normative justifications for human rights, and whether and how these debates impact upon the application and enforcement of human rights. Special Instructions: Students have the option to write a long research paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation; exam or final long research paper.

**LAW 5011. International Investment Law. 3 Units.**

(Formerly Law 583) The past few decades have seen a dramatic increase in the number of bilateral investment treaties and other agreements with investment-related provisions (such as NAFTA), followed by a sharp rise in the number of disputes between private investors and sovereign states pursuant to investor-state dispute settlement (ISDS) provisions. The rise of international investment arbitration has generated a new and exciting practice area in global law firms. This course will cover four broad areas: (I) the historical and policy origins of international investment law; (II) the substantive obligations and standards governing the investor-state relationship; (III) the investor-state arbitration process; and (IV) current controversies over the legitimacy and desirability of ISDS. The course uses materials from international investment treaty texts, case law, and commentaries to enable students to evaluate and apply legal doctrine to future situations. Students may choose between a series of weekly response papers or a larger research paper, and will serve as discussion facilitators along with the instructors. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructors. Elements used in grading: Class participation, attendance and paper(s).

**LAW 5012. International Criminal Justice. 3 Units.**

(Formerly Law 752) The establishment of a global system of international justice reveals that the promises made during the Nuremberg era are not mere history. Over the past decade, the international community has undertaken a considerable investment in enforcing international criminal law in conflict and post-conflict situations with the establishment of the international criminal tribunals for the former Yugoslavia, Rwanda, Sierra Leone, East Timor, Cambodia, and Lebanon. As these ad hoc institutions wind down, the International Criminal Court (ICC) has become fully functional, although it is plagued by challenges to its legitimacy, erratic state cooperation, and persistent perceptions of inefficacy and inefficiency. Moreover, the global commitment to international justice remains inconsistent as calls for criminal accountability for the situations in Sri Lanka, South Sudan, and Syria-among others-go unanswered. This intensive mini-course in the new September Term will introduce students to the law, institutions, and actors that constitute the system of international criminal justice and to the political environment in which it operates. The classroom component (offered at Stanford during the first week of the course) will offer an elemental analysis of international crimes as they have evolved in international law and focus on the challenges of interpreting these norms in a criminal prosecution. Jurisprudence from the various international tribunals will be scrutinized with an emphasis on understanding the prosecution's burden, available defenses, and sources of proof. The course will culminate in a visit to The Hague in the second week of the course, during which time students will meet with principals from the tribunals, including prosecutors, judges, administrators, and members of the defense bar. In addition to the substance of international criminal law, this course will also serve as an introduction to international legal reasoning, law-making, and institutional design. It will complement existing courses at the Law School covering comparative law, international organizations, international human rights, and public international law. Elements used in grading: The course grade will be based on a series of short papers and active in-class engagement with the assigned materials. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 5013. International Law. 4 Units.**

(Formerly Law 479) This course provides a general introduction to international law and its role in today's complex and interdependent world. We will begin by considering fundamental questions about the nature of international law, such as: the sources of international law (including treaties and customary international law); the subjects of international law; the origins of international law in the sovereign equality of states; principles of state responsibility; the bases upon which states may exercise jurisdiction; and the global governance challenges arising from the absence of assured mechanisms for the interpretation or enforcement of international law. We will then examine the operation of international law in the U.S. legal system. In the second half of the course, we will look at a series of contemporary international law topics and issues, including international human rights law, the law governing coercion and the use of armed force, the law of armed conflict, international environmental law, and international criminal law. Throughout, we will consider current issues and problems arising in the international arena and the extent to which international law actually affects the behavior of states. This course provides a general grounding in public international law and a foundation for more advanced or specialized international law courses. Elements used in grading: Class participation, optional paper, and final exam.

**LAW 5014. International Trade Law. 3 Units.**

(Formerly Law 285) This course will survey the law and policy of the World Trade Organization and related legal arrangements such as NAFTA, as well as national laws regarding "unfair" international trade practices. Topics will include the political economy of the treaty framework, the relationship between international and domestic law, bilateralism versus multilateralism, the WTO dispute resolution system, nondiscrimination obligations in international trade, regional trade agreements, the relation between WTO obligations and domestic environmental/health/safety regulations and controversies relating to these issues, subsidies in international trade, antidumping law, trade in services, and currency manipulation. Any student may write a paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, attendance and final exam or research paper.

**LAW 5015. International Dealmaking: Vienna Field Negotiation. 2 Units.**

This course is structured around a week-long, simulated negotiation exercise which provides an in-depth study of the structuring and negotiating of an international business transaction. This class will be taught in counterpart with a class at University of Vienna Law School. Students in this class will represent a U.S. pharmaceutical company, and the students in the class at Vienna will represent an African agricultural production company. The two companies are interested in working together to exploit a new technology developed by the pharmaceutical company that uses the cassava produced by the African agricultural production company. The form of their collaboration could be a joint venture, a licensing agreement or a long-term supply contract, or some combination. The negotiations between the two classes will take place through written exchanges and through real-time negotiation which will be conducted in-person. The purpose of the course is to provide students with an opportunity (i) to experience the sequential development of a business transaction over an extended negotiation, (ii) to study the business and legal issues and strategies that impact the negotiation, (iii) to gain insight into the professional and cultural dynamics of negotiating and structuring international business transactions, (iv) to learn about the role that lawyers and law play in these negotiations, (v) to give students experience in drafting communications, and (vi) to provide negotiating experience in a context that replicates actual legal practice with an unfamiliar opposing party. Students will also learn about the legal and business issues that may arise in joint ventures, supply agreements and licensing agreements. The thrust of this course is class participation and active involvement in the negotiations process. Students are expected to spend time outside of class, working in teams, to prepare for class discussions involving the written exchanges, as well as preparing for the live negotiations. Class discussions will focus on the strategy for, and progress of, the negotiations, as well as the substantive legal, business and policy matters that impact on the negotiations. The course will be limited by consent to eight (8) students. Prerequisites: A course in basic negotiations (e.g., Law 7821) or comparable prior experience is recommended. Elements used in grading: Class participation, written assignments and final paper. There will be two preparatory sessions at Stanford during February and March 2018. Students in the class will travel to Vienna on or before Saturday, March 24th. Class sessions will begin on Sunday afternoon, March 25, and continue all day Monday, March 26 through Wednesday, March 28th. [Cultural tour and closing dinner on Thursday, March 29th, and depart for USA on Friday, March 30th].

**LAW 5016. Japanese Law, Society and Economy. 3 Units.**

This course provides a critical introduction to the institutions and actors that comprise the Japanese legal system. Throughout the course, law is examined within the broader context of Japanese social, political, and economic institutions. Topics covered include the legal profession, constitutional law, dispute resolution, family law, employment law, contracts, and corporate law. Thematically, the course offers an extended exploration of the "transplantation" of foreign law and the role of law in Japan's social structure and economic development. All readings and instruction are in English. Japanese language ability and knowledge of Japan are not required. Elements used in grading: Attendance, Class Participation, Written Assignments and Final Exam.

**LAW 5017. Law in Latin America. 2 Units.**

(Formerly Law 582) The course has two main goals: to introduce students to the civil law tradition and to gain an understanding of the ways in which the law is practiced and lived in Latin American and Spain. Special attention is given to law firms, courts and legal education. The course will be especially useful for those expecting to have contact with Latin American countries or Spain in their practice of law and for those interested in comparative law or Latin American studies. All required readings are in English. In addition, students may review and present elective readings in Spanish and Portuguese. The ability to read in these languages is appreciated but not required. Elements used in grading: Class Participation, Written Assignments, Final Paper.

**LAW 5018. Legal Institutions and Global Economic Development. 3 Units.**

This course will cover readings on the relationship between legal institutions and economic development across different countries. Some topics are set by the instructor, while others arise depending on the interests of students as they develop their paper topics. Topics in the past have included the role of legal and colonial origins, rights in property and contract, natural resources, political stability, governance/corruption, and social and economic rights. Readings will emphasize both broad themes and policy in these areas, with a special emphasis on considering varieties of evidence, including case studies, comparative history, statistical studies with observational data, and field experiments. No prior background in empirical methods is necessary or required. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Attendance, Class Participation; Written Assignments or Final Research Paper.

**LAW 5021. Current Topics in International Economic Law. 2 Units.**

This seminar will explore select topics in international economic law, including but not limited to: the formation of new free trade agreements (in particular the proposed Pacific and Atlantic partnerships); the inclusion of "next generation" issues into trade agreements; the expanding use of investment arbitration; the architecture of the Eurozone in relation to recent European Union jurisprudence and policy; and the global regulation of cross-border financial flows. An introductory course in international trade law (or equivalent preparation) is prerequisite. In addition to a final paper, students will be expected to produce weekly reading responses. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper.

**LAW 5023. The Rule of Law - The Foundation of Functional Communities. 2 Units.**

(Formerly Law 679) We will seek to determine a useful meaning of the notion of the rule of law to identify some measurement of adherence and to explore the importance of the rule of law in terms of economic, socio-political and human development. We will focus on accountable government; just laws; open processes for the enactment, administration and enforcement of laws and effective dispute resolution. Readings and discussion will include the works of ancient philosophers, political theorists and jurists from the 17th to the 20th century, modern political economists and contemporary scholars. This seminar will feature several experts in the field as guest lectures and requires three reaction papers from all participants. Elements Used in Grading: Class participation, written assignments and series of short reaction papers.

**LAW 5025. Global Poverty and the Law. 3 Units.**

With more than a billion people living on less than \$2 a day, global poverty is one of the biggest challenges currently facing humanity. Even though those who suffer the most are located in the developing world, many of the policies, economic opportunities, and legal actions that offer the biggest potential for global poverty alleviation are made in the United States. This course will provide an introduction to the study of global poverty. What causes poverty? Why have some parts of the developing world done better at alleviating poverty than other parts? Can the world ever be free of poverty, as the World Bank's official motto suggests? And most importantly, what can aspiring lawyers do to improve the condition of the world's impoverished? These are some of the questions this course is designed to address. This course is designed especially for future lawyers and policymakers who seek a deeper understanding of the developing world. After a brief overview that will familiarize students with the major concepts and empirical debates in poverty and development studies, we will examine a variety of 'causes' of poverty, from poor governance to lack of economic opportunity to the role of society. Since this course is just as much about what can be done, we shall also consider applied approaches to poverty alleviation. These types of interventions include political/legal reforms such as anti-corruption initiatives, 'rule of law' interventions, right to information programs, privatization, and community-driven development models; economic solutions such as cash transfers and microfinance; and technological approaches such as new methods for measuring policy impact and the application of new technologies for state identification and distribution programs. In addition to more typical scholarly readings, students will review poverty alleviation policy proposals and contracts made by various stakeholders (academics, NGOs, states, international bodies, etc.). Grading is based on participation, a presentation of research or a proposal, and, in consultation with the professor, a research paper. The research paper may be a group project (Section 01) graded MP/R/F or an individual in-depth research proposal either of which could be the basis for future field research (Section 02) graded H/P/R/F. Students approved for Section 01 or Section 02 may receive R credit. After the term begins, students accepted into the course can transfer from Section 01 into Section 02 with consent of the instructor. Automatic grading penalty waived for research paper. This course is taught in conjunction with the India Field Study component (Law 5026). Students may enroll for this course alone or for both this course and Law 5026 with consent of the instructor (12 students will come to India). See Law 5026 for application instructions. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Cross-listed with International Policy Studies (IPS 281).

**LAW 5026. Global Poverty, Corruption, and the Law: India Field Study. 1 Unit.**

This is the India Field Study component of Global Poverty and the Law (Law 5025). For details, see course description for Law 5025. Corruption is one of the most difficult challenges facing societies across the developing world. Why is corruption so pervasive and what can be done to address it? During spring break 2018, this course will be held in Delhi, India and will consist of conversations with lawyers, politicians, scholars, leaders in civil society, and senior bureaucrats who are active in anti-corruption efforts. Students will also meet frontline bureaucrats (i.e., cops and government teachers) who will share their own perspectives about the problem. Enrollment is limited to 12 students. PLEASE NOTE: Students will need a passport and a visa to travel to India. Students will be required to attend two dinner meetings during the Winter Quarter in preparation for the trip. Elements used in grading: class participation and short writing assignments. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website. See Consent Application Form for instructions and submission deadline.

**LAW 5027. Social Conflict, Social Justice, and Human Rights in 21st Century Latin America. 2 Units.**

This course will consider significant sources of social conflict, efforts to achieve social justice and the relevance and impact of human rights norms and oversight mechanisms in Latin America in the 21st Century. Led by Prof. James Cavallaro, the course will involve weekly sessions, each focusing on a particular topic. Readings will provide the basis for short student reflection papers to be prepared in advance of each session. The class will generally involve an initial presentation, followed by seminar-style discussion. Topics will include the human rights crisis facing Mexico, in particular, forced disappearances, summary executions and torture. We will consider, for example, the forced disappearance of 43 students in September 2014 (Ayotzinapa) in at least one session. The current political and human rights crisis facing Venezuela will be considered, likely by an expert guest speaker. So too will the peace process in Colombia and the Special Jurisdiction for Peace. Other sessions will consider social conflict and justice issues across the region. These issues will include the resurgence of populism in the United States and Latin America and its effects on social justice and human rights, the continued relevance of the Organization of American States and its human rights bodies, migration and human rights, the rights of indigenous and traditional peoples and models of development, among others. Elements used in grading: Grades will be based on class participation, and either several short reflection papers (section 01) or a final paper (section 02). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 5028. Regional Human Rights Protections: The Inter-American System. 3 Units.**

This course provides an in-depth introduction to the doctrine, practice and critiques of the Inter-American Human Rights System ("IASHR"). Students will examine the major instruments for human rights protections in the IASHR, the Inter-American Court and Commission's procedure and jurisprudence, as well as the obstacles and opportunities that civil society, victims, and advocates encounter when engaging the inter-American system. The Course will consider issues of implementation, and the types of measures and forms of relief that can be sought from the Court and the Commission. The inter-American system has played a crucial role in opening spaces for debate on human rights protections in Latin America and the Caribbean, increasing protections at the domestic level, and supporting civil society in its quest for accountability for massive human rights violations. The system has also played a role in civil society efforts to bring the human rights debate home, including in the United States. Students will have an opportunity to cast a comparative look at the inter-American and the European Human Rights systems and to consider the comparative advantages, disadvantages and complementary potential of regional human rights systems and universal international human rights and criminal justice bodies. Cross Registration: This Course is open to graduate students across the university, with permission of the instructor. Preference for cross-registration by non-Law School students will be given to students enrolled in the Master of Arts program in Latin American Studies. Elements used in grading: Class Participation, Attendance, Short Written Assignments, Final Paper. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 5029. Human Trafficking: Historical, Legal, and Medical Perspectives. 3 Units.**

(Formerly Law 675) This course offers an interdisciplinary approach to understanding the extent and complexity of the global phenomenon of human trafficking, including trafficking for forced prostitution, labor exploitation, and organ harvesting. In each of these areas, we will focus on human rights violations and remedies. The course aims to:

1. Provide the historical context for the development and spread of human trafficking.
2. Analyze current international and domestic legal and policy frameworks to combat trafficking and evaluate their practical implementation.
3. Examine the medical, psychological, and public health issues involved.
4. Stimulate ideas for new interventions.

Instruction will combine lectures and small group discussion, and uses problem-based learning. Students interested in service learning should also enroll in History 6W/7W (FemGen 6W/7W), a two-quarter service learning workshop. Elements used in grading: Attendance; participation; written assignments; and final exam. This class is cross-listed with Feminist, Gender and Sexuality Studies (FEMGEN 5C, FEMGEN 105C), History (HISTORY 5C, 105C), Human Biology (HUMBIO 178T), International Relations (INTNLREL 105C) & School of Medicine General (SOMGEN 205).

**LAW 5031. Law and Society in Late Imperial China. 3 Units.**

(Formerly Law 773) Our purpose in this colloquium is to understand how law in the Qing dynasty (1644-1912) functioned as an instrument of autocratic power, a field of interaction between state and society, and a vital feature of social life. To this end, we shall survey Qing law "from the top down" (the perspective of the imperial center, its ideology, and its political imperatives), but also "from the bottom up" (the perspective of quotidian practice at the local level). We shall explore the friction between ideology and practice within the dynasty's formal legal system, but also the field of customary practice that flourished outside the formal system, sometimes in conflict with it. Readings have been selected to introduce the work of major historians (in English) and to cover a range of basic concepts and problems in this field. One important theme is how scholarly interpretation and debate have changed over time, especially as a result of the opening of Qing legal archives for research. Another theme is the question of what concepts and vocabulary are most appropriate for this field of study. What are the advantages and disadvantages of analyzing the Chinese legal tradition in comparison to the West? Is it possible to understand it "on its own terms"? Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper. Cross-listed with Chinese (CHINA 392B) and History (HISTORY 392B).

**LAW 5033. International Justice. 2-3 Units.**

(Formerly Law 786) Mass atrocities—including genocide, war crimes, and crimes against humanity—continue to rage around the world, from Syria and South Sudan to Iraq and Myanmar. This course examines origins, operations, and outcomes of historical and contemporary international justice measures to address such heinous crimes. We will consider the full range of judicial, legislative, and executive "transitional justice" mechanisms available to policymakers as societies emerge from periods of violence and repression. These mechanisms include war crimes tribunals (such as the International Criminal Court), truth commissions, amnesties, lustration, exile, indefinite detention, lethal force, and inaction. The course draws on various case studies, including present-day Syria and Iraq, Rwanda and the Balkans in the 1990s, and World War II. Readings address the legal, political, and philosophical underpinnings of justice; questions of institutional design; and how different societies have balanced competing policy imperatives. Students may take the course for two or three units depending on the length of the paper. Students will receive Research credit for the seminar. This class is limited to 20 students, with an effort made to have students from SLS (15 students will be selected by lottery) and five non-law students by consent of instructor. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper.

**LAW 5037. Qing Legal Documents. 3 Units.**

How to use Qing legal documents for research. Winter: sample documents that introduce the main genres including: the Qing code and commentaries; magistrates' handbooks and published case collections; and case records from Chinese archives. Prerequisite: advanced reading ability in Chinese. Elements used in grading: Students complete research papers. This course is cross-listed with History (HISTORY 495A) and Chinese (CHINA 495A).

**LAW 5101. Afghanistan Legal Education Project (ALEP) Seminar. 3 Units.**

(Formerly 259A) The Afghanistan Legal Education Project (ALEP) Seminar is only open to student preselected in spring 2017. The ALEP Seminar will begin with an intensive bootcamp taught by ALEP leadership and members of the law faculty at American University of Afghanistan (AUAF). We will explore the Afghan sociopolitical and legal context, rule of law efforts and challenges in Afghanistan, and the role of legal education in legal development. Participants will learn from Afghan law professors about Shari'a law, customary law, Afghan civil law, and the challenges presented by Afghanistan's pluralistic legal system in preparation to work on legal curriculum to be taught at AUAF. The bootcamp will be highly participatory and requires full attendance. During the remainder of the quarter, participants will receive training in curriculum creation and organizational development in preparation for authoring an Afghan legal textbook and assuming ALEP programmatic responsibilities. Elements used in grading: Grading is based on mandatory attendance of the boot camp, participation, assignments, and authoring a new chapter and/or revision of an existing textbook chapter. Consent Process: Only students selected in spring 2017 have consent to take the ALEP Seminar. Their names will be given to the Registrar, who will automatically enroll them in the course in fall 2017.

**LAW 5102. Advanced Afghanistan Legal Education Seminar. 3 Units.**

(Formerly Law 453A) Students who participate in the Afghanistan Legal Education Seminar in the fall quarter will continue their work in the Advanced Seminar in the winter or spring quarter. Only students selected for the Afghanistan Legal Education Project (ALEP) in spring 2017 may participate. Students will author textbook chapters, assume programmatic responsibilities, and meet regularly as a team and individually with the ALEP faculty. Elements used in grading: Attendance, Written Assignments, Final Paper.

**LAW 5103. State-Building and the Rule of Law Seminar. 3 Units.**

(Formerly Law 259) The State-Building and Rule of Law Seminar is centrally concerned with bridging theory and practice. The seminar introduces the key theories relevant to state-building generally and strengthening the rule of law in particular. This course explores the multidisciplinary nature of development – through readings, lectures, guest lectures, and seminar discussions – and asks how lawyers fit in and contribute to the process. Essentially, in a given context, what is the relationship of law to political, social, and economic change? This course will employ case studies as a way to analyze rule-of-law practice within development theory. The set of developing countries considered within the scope of this workshop is broad. It includes, among others, states engaged in post-conflict reconstruction, e.g., Cambodia, Timor Leste, Rwanda, Iraq, Sierra Leone; states still in conflict, e.g., Afghanistan, Somalia; the poorest states of the world that may not fall neatly into the categories of conflict or post-conflict, e.g., Nepal, Haiti; least developed states that are not marked by high levels of violent conflict at all, e.g., Bhutan; and more developed states at critical stages of transition, e.g., Tunisia, Georgia, Hungary. Grading is based on participation, a presentation of research or a proposal, and, in consultation with the professor, a research paper. The research paper may be a group project (Section 01) graded MP/R/F or an individual in-depth research proposal either of which could be the basis for future field research (Section 02) graded H/P/R/F. Students approved for Section 01 or Section 02 may receive EL credit or R credit. Automatic grading penalty waived for submission of the final work products. CONSENT APPLICATION: The seminar is open by consent to up to sixteen (16) JD, SPILS, and LLM students, and graduate students from other departments within Stanford University. To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 5104. Advanced State-Building and Rule of Law Seminar. 3 Units.**

(Formerly Law 453) Students who participate in the State-Building and Rule of Law Seminar in the fall quarter may seek consent to continue their work in the Advanced Seminar in winter or spring quarter. Six students per quarter will be allowed to participate. Students will work on individual applied or scholarly research projects developed in collaboration with the professor, and meet regularly as a group to discuss shared research challenges and issues. There may be funds available for fieldwork necessary to complete applied research projects. Determinations will be made by the professor and Rule of Law Program. Students may write a paper for Research credit with instructor consent. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Attendance, Written Assignments, Final Paper.

**LAW 5201. Foreign Legal Study: Bucerius Law School. 9-14 Units.**

(Formerly Law 404B) This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See Foreign Legal Study Program at <https://law.stanford.edu/education/only-at-sls/global-initiative/foreign-legal-studies-program/>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.

**LAW 5204. Foreign Legal Study: Hebrew University of Jerusalem. 9-14 Units.**

(Formerly Law 404H) This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See Foreign Legal Study Program at <https://law.stanford.edu/education/only-at-sls/global-initiative/foreign-legal-studies-program/>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.

**LAW 5207. Foreign Legal Study: Institut d'Etudes Politiques de Paris. 9-14 Units.**

(Formerly Law 404I) This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See Foreign Legal Study Program at <https://law.stanford.edu/education/only-at-sls/global-initiative/foreign-legal-studies-program/>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.

**LAW 5210. Foreign Legal Study: National University of Singapore. 9-14 Units.**

(Formerly Law 404S) This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See Foreign Legal Study Program at <https://law.stanford.edu/education/only-at-sls/global-initiative/foreign-legal-studies-program/>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.

**LAW 5213. Foreign Legal Study: Peking University Law School. 9-14 Units.**

(Formerly Law 404P) This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See Foreign Legal Study Program at <https://law.stanford.edu/education/only-at-sls/global-initiative/foreign-legal-studies-program/>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.

**LAW 5216. Foreign Legal Study: Waseda University. 9-14 Units.**

(Formerly 404W) This course is for J.D. students who have been approved by the Law School to study at one of the following schools: Bucerius Law School (BLS): Hamburg, Germany, Hebrew University of Jerusalem (HU): Jerusalem, Israel, Institut d'Etudes Politiques de Paris (Sciences Po): Paris, France, National University of Singapore (NUS): Singapore, Peking University Law School (PKU): Beijing, China, or the Waseda University Law School (WLS): Tokyo, Japan. See Foreign Legal Study Program at <https://law.stanford.edu/education/only-at-sls/global-initiative/foreign-legal-studies-program/>. Elements used in grading: Satisfactory evaluation of course work at the exchange institution.



**LAW 5801. Legal Studies Workshop. 1 Unit.**

(Formerly Law 496) The Legal Studies Workshop is designed to support students working on a piece of legal scholarship with an eye to publication. The workshop will meet every other week in the winter and spring quarters, and (we expect) most quarters over the next two years. Students may sign up for as many quarters they wish, and will receive one credit for each quarter they are enrolled. Each session will be devoted to presentations of one or two student works-in-progress. Every student is expected to present his or her own work at least once over the quarters she or he is enrolled in the Workshop, and to provide constructive oral feedback on others' work. We welcome students who are just starting to explore their interest in an academic career; if you have any questions about whether the course is suitable for you, please contact Prof. Barbara Fried (bfried@stanford.edu) or Prof. Bernadette Meyler (bmeyler@law.stanford.edu). Attendance is mandatory (except of course for extenuating circumstances). There are no written requirements for the course, and no requirement that the work presented be original to the Workshop. Students may wish to use the Workshop as an opportunity to expand on seminar papers or pursue independent research projects for which they are getting separate credit through one of the research tracks (e.g., directed research, dissertation). Whether students are working on a new project or revising an old, the expectation is that students will develop their topics independently of the course. Students who would like to participate in the Workshop but feel they need help in developing a workable research topic should consult faculty members ahead of time. Elements used in grading: Class participation and attendance. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 5802. Modern American Legal Thought. 3 Units.**

(Formerly Law 500) The course is a survey of the theories of law and adjudication that have been most important in this country since the Civil War, concluding with an introduction to significant contemporary schools of legal thought. We will consider Formalist (Langdellian) Legal Science, Sociological Jurisprudence, American Legal Realism, the Legal Process School, Law and Moral Philosophy, Public Choice Theory, Law and Economics, Feminist Jurisprudence, Critical Race Theory, the Law and Society movement, and Empirical Legal Studies. The readings are drawn principally from primary materials – the important contemporary manifestos and critiques of the schools of thought studied, along with writings that involve their application to concrete legal problems or reveal their influence on others. Enrollment allowing, students may be asked to help co-teach some of the sessions. Contact Prof. Fried (bfried@stanford.edu) if you would like to look at a syllabus from prior years before deciding whether to enroll. Special Instructions: If any student would like to write a research paper in lieu of the final exam, he or she should consult the instructor before the start of the course. After the term begins, students accepted into the course can transfer from section (01) (Final exam option) into section (02) (Final paper option) with consent of the instructor. Section (02) meets the R requirement. Elements used in grading: Class Participation plus Final Exam or Final Paper.

**LAW 5805. Animal Law. 1 Unit.**

(Formerly Law 652) All nonhuman animals have been legal things that lack the capacity for legal rights for centuries. The struggle to extend legal personhood, which is the capacity to possess legal rights, to at least some nonhuman animals has turned to the courts. Lawsuits alleging that a captive nonhuman animal is a legal person entitled to her bodily liberty pursuant to common law or civil law habeas corpus have been litigated, and continue to be litigated, in the United States, Argentina, Brazil, and Costa Rica. We will study what legal rights are, where they come from, and why humans have sometimes lacked them, as well as some of those lawsuits, the grounds they allege and the arguments they make, and arguments made against them by their critics. This class will meet on Thursday the first three weeks of Spring Quarter (April 6, April 13, and April 20). Elements used in grading: Attendance, Class Participation, Final Paper.

**LAW 5806. Jurisprudence. 3 Units.**

This course examines the diverse ways in which the philosophy of law bears on the practice of law. Our subject is thus a set of philosophical concepts, particularly legal positivism and natural law, but the approach is not purely conceptual. Rather, we will examine both the philosophical concepts in the abstract and how those philosophical concepts are reflected or actualized in the craft of legal argumentation, in the intellectual history of law, and in contemporary questions of politics and government. Above all, we will ask which conception of law best contributes to legal justice. The course consists in three units. Unit I is about theories of the nature of law, focusing on legal positivism and natural law. Unit II is about theories of particular departments of law, focusing on tort law and criminal law. Unit III takes a philosophical perspective on being a lawyer, focusing on questions of what principles define lawyers' role in society and what ideals give the life of a lawyer meaning. Grading is based on class participation, two in-class moot court presentations, and, based on individual student preference, either a final exam (a one-day take-home essay with a word limit) or a final research paper. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Cross-listed with Philosophy (PHIL 375J).

**LAW 6001. Legal Ethics. 3 Units.**

(Formerly Law 335) A survey of the major legal and ethical issues presented in the practice of law. We will examine the concept of the lawyer endorsed by the rules of professional responsibility, the principal-agent relationship, and common law doctrines governing law practice in both civil and criminal settings. We will also assess the tensions between this concept of the lawyer and the personal, political, and economic constraints of law practice. To this end, emphasis will be given not only to the law of lawyering but to the history and sociology of the American legal profession, theories of role morality and professional identity, the sources of cognitive bias that affect perception and judgment, and techniques for navigating ethical dilemmas. Elements used in grading: Attendance, class participation, in-class exercises, short papers and final exam.

**LAW 6003. The American Legal Profession. 3 Units.**

(Formerly Law 685) This course will deal with selected aspects of the history, organization, economics, ethics, and possible futures of the legal profession in the United States. Likely topics will include, in addition to the ABA's Model Rules of Professional Conduct: demographic changes in the profession, the evolution of law firms, bar associations, and law schools from the early twentieth century to the present; the development of corporate law, personal injury, mass torts, prosecutorial and criminal defense practices, and the "public-interest" bar; the dominant professional ethic of adversary-advocacy, and its critics; the regulation of lawyers; the economics of the market for legal services; the organization and culture of law firm practice; the role of the lawyer as counselor; and the export of American lawyering models abroad. 8-hour self-scheduled take-home examination, with option of writing a research paper. Special Instructions: Students have the option to write a long research paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, attendance, final paper or final exam.

**LAW 6004. Legal Ethics: The Plaintiffs' Lawyer. 3 Units.**

(Formerly Law 555) This course uses a study of plaintiffs' lawyers as a vehicle to explore many of the most controversial and important issues at the intersection of tort law, civil procedure, and legal ethics. Specifically, in this course, we will study who personal injury lawyers are, how they find clients, how they fund litigation, and how they usher complex cases to conclusion. In so doing, we will address: the role and regulation of lawyers, the use and abuse of the contingency fee, the legality and normative consequences of solicitation and attorney advertising, the propriety of secret settlements and expansive protective orders, the rise and impact of "alternative litigation finance," and the vexing issues posed by class actions, aggregate actions, consolidated actions, and multidistrict litigations (MDLs). The final segment of the course will involve a series of case studies, where students will test their knowledge of the Model Rules of Professional Conduct and have the opportunity to see the course's themes echoed and expressed in recent real-world controversies. Importantly, though the course is nominally focused on "the plaintiffs' lawyer," it does not just equip students to practice on one side of the "v." Rather, through our grounded study of legal ethics, advanced civil procedure, and contemporary legal practice, students will acquire tools that will be helpful across all kinds of civil litigation. The final paper will be due shortly after the course's conclusion. Elements used in grading: Class participation, reflection papers, final paper, and group presentation.

**LAW 6005. Technological, Economic and Business Forces Transforming the Private Practice of Law. 2 Units.**

(Formerly Law 388) The private commercial practice of law is undergoing fundamental change. Modern technological, economic and business forces are placing extreme pressure on the traditional private attorney law firm model. These forces will transform, eliminate or replace virtually every aspect of legal services provided by attorneys. Traditional foundations of the large law firm model such as "billable" hours, summer associate programs, large staffs (e.g., paralegals and secretaries) and high associate-to-partner ratios are becoming (or have already become) relics of a bygone era. Today, the business need for clients to select a one-stop, full-service law firm for their important legal work has, in a variety of circumstances, disappeared. Sophisticated clients are utilizing a wide range of legal services firms and companies for their legal work. As a result, the diversity of legal business models and manner of providing legal services has greatly expanded. Often individual lawyers (or very small firms) can provide high-level legal services by assembling "virtual" teams in which each team member handles a different constituent part of the representation. "In-sourcing," "out-sourcing" and the transferring of large portions of work to non-lawyer legal support vendors are all becoming fixtures of the legal economy. This rapid increase in diversity on both the supply and demand side of the legal economy will greatly alter the skills and prerequisites required for the successful private practice of law. The course is composed of two parts. In part one, the technological, economic and business practices transforming the legal profession are identified and their impact on the traditional approaches to private practice law firms will be examined. In part two, the course focuses on how individual lawyers can adapt to or embrace the forces transforming law to improve their practice and succeed in the new environment. Part two of the course will additionally focus on how specific skills such as project management, social networking and information management will be crucial to a successful legal career. Part two of the course will also discuss how the changing legal environment creates new ethical and professional challenges for attorneys. Elements used in grading: Attendance, class participation and written assignments.

**LAW 6006. Introduction to Legal Design. 3 Units.**

(Formerly Law 761) Intro to Legal Design is a 9-week course for law students & other graduate students to reimagine how legal services are delivered, & to learn how to use human-centered design methods to create breakthrough solutions to complex problems. The students will work with project partners - including legal aid groups, courts, and private law firms -- on legal service challenges to help the partners solve real problems they & their users face. For each challenge, students will work on interdisciplinary teams, with close coaching from designers, engineers & lawyers. Students will learn design methods to create new innovations that make legal services more accessible & engaging. Elements used in grading: Class Participation, Attendance, Written Assignments.

**LAW 6015. Innovations in the Delivery of Legal Services. 2 Units.**

This is an era of groundbreaking change in the legal profession. Twenty years ago, email was unheard of at most law firms. Today, artificial intelligence, machine learning, and online services are creating a fundamental shift in how law is practiced. Beyond technology, massive challenges to the code of professional responsibility, from multi-disciplinary practices to law firms filing for IPOs, are reshaping the legal landscape. This course focuses on the opportunities and challenges these disruptions create for the new lawyer. Students will gain hands-on experience with some of the most innovative organizations in the legal community. Significant time will also be spent analyzing changes anticipated to impact the legal industry in the next decade. Elements used in grading: Attendance, Class Participation, Final Paper.

**LAW 681C. Discussion: Group Behavior. 1 Unit.**

This discussion group will look at how ethical choices are shaped by organizational and group cultures. We'll read about some famous psychological experiments such as the Milgram and Zimbardo experiments; and some studies of decisions made in corporate organizations, government bureaucracies, and a battalion of ordinary middle-class Germans tasked with hunting down Jews; and talk about what insights from this work may be relevant to lawyers' ethics and working lives. Begin in Winter Quarter and run through Spring Quarter. Meeting Time: Wednesdays, 7:30 to 9:30 p.m. Meeting Dates: TBD. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Elements used in grading: Class attendance at all sessions and class participation.

**LAW 681J. Discussion: When Bad Things are Done by Good People. 1 Unit.**

Some people live their lives in a manner that would lead few to declare them good people. From Tony Soprano to Saddam Hussein to Bernie Madoff, we are all familiar with individuals who have made crime and violence a constant in their lives. There are far more people, though, who try generally to live good lives, but find themselves having acted or having failed to act in ways that are widely condemned as evil. In the first four of our five meetings, we will be looking (through some books, reports and films) at case studies of such circumstances, including (a) those in authority who have covered up evidence of sexual abuse; (b) prosecutors who have ignored evidence of a defendant's innocence, (c) lawyers who have turned blind eyes to client misconduct, and (d) soldiers who have committed acts they would have once found unimaginable. In our fifth session we will consider contrasting case studies of individuals who resisted great pressure and kept their moral compasses well-calibrated. Throughout our inquiry, we will reflect in particular on the power of institutions and authority in affecting ethical mores. Winter Quarter. Class meeting dates: Five Wednesday Evenings from 7:00 to 9:00 p.m. (precise dates TBD). DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS Registrar's Office website (see Registration and Selection of Classes for Stanford Law Students and then see Consent of Instructor Forms). See Ranking Form for instructions and submission deadline. Elements used in grading: Class attendance at all sessions and class participation.

**LAW 681U. Discussion: Injuries. 1 Unit.**

Very generally speaking, we try, as individuals, to avoid injuring people and, collectively, to adopt policies that minimize injury, in the sense that we don't want to make people worse off, in some hedonic sense, or deprive them of options or capacities that we think they ought to have. Moreover, our legal system frequently compensates people who are injured (and therefore must ascertain if, and how badly, they are injured.) What we get the chance to investigate and discuss in this discussion group is what we mean when we say that people are injured by some particular practices or outcomes that might seem, without much reflection, to be obviously injurious. More particularly, we will discuss five issues: (1) In our first session, we will work out the implications of an academic literature that seems to explore what I see to be one of the finest of one-line jokes ("Nothing matters, and what if it did?"). The literature on hedonic adaptation might seem to suggest that we can neither injure others nor improve their lots: very quickly, people return to a (generally mildly positive) fixed equilibrium state even when seemingly very good or very bad things happen to them. We will explore the literature and its limits. (2) In the final four sessions, we will explore four conditions or practices that seem intuitively injurious and problematic and try to figure out more precisely what might be bad about them, or whether they are actually injurious in the ways that we might at first think: we will explore what is injurious about poverty, discrimination, sexual harassment, and even the big one, death. Begin in Winter Quarter and run through Spring Quarter. Class times will be determined: 3 in winter and 2 in spring, on an evening that works for all those enrolled. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 682A. Discussion: Authoritarianisms. 1 Unit.**

What is authoritarianism? What is the authoritarian personality? In what social, psychological, economic, and political climates does authoritarianism take root and become an object of desire? In what ways does the rule of law bend to and even reflect authoritarian impulses? Although it is common to think of constitutionalism as anti-authoritarian, and of authoritarianism as anathema to constitutionalism (after all, what do formal legal "constraints" on state power inscribed in fundamental law mean in an authoritarian state – a state free to act as it wishes?), in what ways and to what ends have authoritarian and quasi-authoritarian regimes relied on constitutional law and in what ways do authoritarian impulses manifest in supposedly liberal democratic regimes? Finally, and crucially for our purposes, what roles have lawyers played in erecting and resisting authoritarianism? In this reading group we will address these questions through a wide range of source material in law, history, cognitive psychology, political theory, and fiction. Begin in Winter Quarter and run through Spring Quarter. Meeting Time: Tuesdays, 5:30 to 7:30 p.m. Meeting Dates: TBD. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Elements used in grading: Attendance and active participation are requirements of the seminar.

**LAW 682B. Discussion: Beyond Neoliberalism. 1 Unit.**

Scholars' and policy makers' thinking about political economy evolves as one understanding of the role of government ceases to reflect people's aspirations and views of social reality and is superseded by another. The laissez faire thinking of the 19th century was replaced by Keynesian management in response to the Great Depression. After WWII, Keynesian thinking was challenged, by 'neoliberalism'—a challenge that began to achieve success in the 1970s in response to perceived failures of government, high inflation, and other economic and social woes. By the mid-1980s, neoliberalism had become the new conventional wisdom, and liberals as well as conservatives accepted its core premises: that society consists of atomized individuals competing rationally to advance their own interests; that this behavior, in aggregate, produces good social outcomes and economic growth; that free markets are therefore the best way to allocate societal resources and government should intervene only to remedy market failures. Disagreements about what constitutes such failures and about corrective interventions persisted, but the general premises were widely embraced by policymakers and politicians—the so-called Washington Consensus. Today, that consensus is breaking down. Neoliberal policies have generated profound wealth inequality and have little to offer to address the perceived threats of globalization and emerging technologies like artificial intelligence and robotics. But what should come next? Our readings in the course will explore a variety of themes related to these debates. How did neoliberalism come to dominate political discourse? What are its core tenets? What kinds of challenges are being presented to them, and what might an alternative approach to political economy for the 21st century look like? Winter Quarter. Five Monday Evenings from 6:30 - 8:30 (precise dates TBD). DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Elements used in grading: Class attendance at all sessions and class participation.

**LAW 682C. Discussion: Law and Development: Poverty, Institutions, and Geopolitics. 1 Unit.**

From economic grievances fueling conflict over territory to refugee emergencies to famine and health inequalities, problems of regional and global development often implicate law in its various forms. In this discussion seminar, we explore some key ideas and examples that illuminate law's role in shaping development. Among other topics, we will examine the role of institutions in perpetuating or breaking the cycle of poverty; how geopolitical pressures affect domestic political and economic conditions; the relationship of health and wealth to well-being; the role of lawyers; and ethical questions bearing on law's role in development. Readings will include selections from academic and policy-oriented books and articles, as well as fiction and documentary films. Begin in Autumn Quarter and run through Winter Quarter. Class will meet Tuesdays and Wednesdays from 6:30 - 8:30 p.m. (precise dates TBD). DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Elements used in grading: Attendance and participation.

**LAW 682D. Discussion: Science and the Law. 1 Unit.**

In an attempt to reach "correct," justified outcomes, areas of the law ranging from criminal justice to toxic torts look to science as a source of disinterested, objective fact. But while science is indeed at its heart a search for objective truths about the world, the incorporation of scientific results into legal institutions is often both fraught and unsatisfying. Problems may arise due to a misunderstanding of the underlying science by lawyers and judges, different norms in the legal and scientific worlds, or even for the simple reason that scientific results are not immutable but rather are often subject to reinterpretation and refinement. In this discussion group, we will explore a range of questions at the intersection of science and law. We will discuss how scientists reach consensus on the interpretation of research results, including the role of peer review and whether science is beset by a "replication crisis." We will compare how different legal processes incorporate scientific findings, ranging from active solicitation of expert input to independent research by legal decisionmakers. And, most importantly, we will discuss where and how these processes go wrong, and how communication from scientists to lawyers and policymakers might be improved. Spring Quarter. Class meeting dates: Five Mondays from 7:30 to 9:30 p.m. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS website (click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Elements used in grading: Attendance at all sessions and participation.

**LAW 682E. Discussion: Tocqueville's Democracy in America. 1 Unit.**

The young Frenchman Alexis de Tocqueville traveled extensively in the Jacksonian America of the 1830s, and wrote a two-volume book based on his observations. Widely regarded as the most perceptive commentary ever written on the character of the American republic, it deals with the social preconditions for democracy, issues of religion, race, and gender, the conflict between freedom and equality, and the potential danger of soft despotism. The assigned readings will be excerpts from the book. We will meet five Tuesday evenings during winter and spring quarters, from 6:30 to 9:00, at my home. Precise dates will be determined in consultation with the class. We will begin each session with an informal dinner at 6:30, leaving about two hours for discussion. I will ask two students to lead the discussion each session. Enrollment will be limited to eight students. DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Elements used in grading: Class attendance at all sessions and class participation.

**LAW 682F. Discussion: Understanding America. 1 Unit.**

As the election of 2016 underscored, we in the United States live in a polarized and fractured society, where there is, increasingly, a lack of interaction, dialog, and understanding between groups. In this discussion seminar, we will try to escape our particular niches and enclaves to seek the perspectives of those who occupy different segments of contemporary American society. In so doing, we will engage fundamental questions about identity, difference, and how best to build a new pluralism. We will work with students to compile our final reading list, though the list will include some of the following: Ta-Nehisi Coates, *Between the World and Me*; J.D. Vance, *Hillbilly Elegy: A Memoir of a Family and Culture in Crisis*; George Packer, *The Unwinding: An Inner History of the New America*; Jessica Valenti, *Sex Object*; Arlie Hochschild, *Strangers in Their Own Land*; Katherine J. Cramer, *The Politics of Resentment: Rural Consciousness in Wisconsin and the Rise of Scott Walker*; Domingo Martinez, *The Boy Kings of Texas*; and T.M. Luhrmann, *When God Talks Back: Understanding the American Evangelical Relationship with God*. Begin in Autumn Quarter and run through Winter Quarter. Class meeting dates: Five Tuesday Evenings from 7:00 – 9:00 (precise dates TBD). DISCUSSIONS IN ETHICAL & PROFESSIONAL VALUES COURSES RANKING FORM: To apply for this course, 2L, 3L and Advanced Degree students must complete and submit a Ranking Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Elements used in grading: Class attendance at all sessions and class participation.

**LAW 7001. Administrative Law. 4 Units.**

(Formerly Law 238) Federal, state and local administrative agencies affect vast areas of life and law practice. Their domain includes regulation of the environment, immigration, professional licensing, and many other areas of the economy as well as the provision of government benefits. It's fair to say that today we live in an administrative state – which some would like to deconstruct. Administrative law is about the procedures (mostly prescribed by the federal and state Administrative Procedure Acts as well as constitutional due process) that agencies must follow when they adopt regulations or adjudicate disputes. It's also about the legislative, executive, and judicial checks and balances that control the agencies. In particular, the course explores the nature and scope of judicial review of agency action. Elements used in grading: Final Exam (essay, three hours, open book).

**LAW 7002. Beyond the Common Law: Tort Reform and Tort Alternatives. 2-3 Units.**

(Formerly Law 563) Over the past century, tort law has been under sustained attack. Using a broad mix of case law, case studies, and scholarly analysis, this seminar will interrogate those attacks—including their historical roots, their theoretical justifications, and their practical effects. We will first study "replacement reforms"—attempts to jettison the common law in favor of alternative compensation mechanisms, including workers' compensation, auto no-fault, the September 11th Victim Compensation Fund, and the Vaccine Injury Compensation Program, housed within the U.S. Court of Claims. Second, we will study modern tort reform initiatives, often dubbed "discouragement reforms," which have chiseled away at damages and chilled personal injury victims' incentives and capacity to seek relief. Finally, we will study the United States Supreme Court's own tort reform activity, including recent jurisprudence limiting punitive damages, preferencing arbitration, and granting broad preemptive effect to agency actions. Through this analysis, students will develop a deeper and richer understanding of the tort system, its contemporary operation and excesses, and the uneasy but undeniably important place tort law—and civil litigation more generally—occupies in contemporary American society. Special Instructions: Grades will be based on class attendance, class participation, and either several short reflection papers (section (01)) or an independent research paper (section (02)). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on paper length. Elements used in grading: Class participation, class attendance, reflection papers or research paper. Early drop deadline.

**LAW 7003. Cities in Distress. 2-3 Units.**

(Formerly Law 735) In 2013, the City Detroit became the 28th city to declare municipal bankruptcy or to enter a receivership for fiscal crisis since late 2008, marking a window of time that saw five of the six largest municipal bankruptcies in American history. Despite the end of the Great Recession, serious fiscal challenges remain for many urban and rural local governments. This course will focus on these places and what they need from state and local government. Rather than a survey of municipal bankruptcy or restructuring law, the course will function as a seminar on state and local governance in the face of decline and poverty, especially due to the loss and automation of industrial employment. Subjects will include: (1) the basics of local finance; (2) an introduction to the primary causes of local fiscal distress; (3) tools for state and federal governance of city finances and financial distress (including municipal bankruptcy and state receiverships); and (4) the local public sector's role in anti-poverty work. The course will feature readings focused on places (both urban and rural) across the country, including in California, Oregon, the Northeast, the Great Lakes/Rust Belt region, and the Appalachian region. Students will have two options for this course. In Section 1, students will enroll for 2 units of course credit. Section 1 grades will be based on class participation and weekly reflection papers of 3-5 pages each week for most of our topics. In Section 2, a smaller number of students will enroll for 3 units of course credit. Section 2 grades will be based on an original research paper for R-Research Paper credit. Completion or co-enrollment with Local Government or Land Use Law is advisable but not required. Elements Used in Grading: Class Participation, Attendance, Written Assignments. CONSENT APPLICATION: To apply for either section of this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7005. Constitutional Politics. 2-3 Units.**

This seminar will explore various ways in which constitutional law interacts with the political process. Topics covered will include the appointment and confirmation process for federal judges, judicial campaigns and elections in the states, various approaches to "popular constitutionalism," ratification of constitutional amendments, judicial activism as a political issue, public opinion and the Supreme Court, court-curbing legislation, and the role of interest groups in constitutional litigation. Readings will include cases, as well as perspectives from legal scholars, political scientists and historians. Students will be assigned to prepare and circulate discussion questions for one week of the class. Students can choose to write a final R paper or take an exam. Students writing the paper may take the class for 2 credits or write a longer paper for 3 credits. The paper will be due at the law school's paper deadline for fall quarter classes. Students taking the exam will be asked to answer one or more essay questions about the major issues covered in the class. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: The grade will be based on the paper or exam, along with class participation.

**LAW 7006. Civil Liberties and the Response to Terrorism. 3 Units.**

This seminar will address a series of interrelated issues that have arisen from America's response to 9/11, including: torture, detention, surveillance, profiling, and dissent. Each of these issues raises a discrete set of legal and policy questions. However, each also offers the chance to explore how the system of checks and balances can and should work during periods of national crisis, the relevance of traditional constitutional constraints on executive power in a national security context, and the enforceability of international legal norms in domestic courts. Elements used in grading: Attendance, Class Participation, Final Paper.

**LAW 7007. Constitutional Law: Religion and the First Amendment. 4 Units.**

(Formerly Law 602) This course covers the major doctrines and decisions interpreting the provisions of the First Amendment affecting religion, especially the free exercise and establishment clauses. The principal focus is on modern Supreme Court cases and doctrine, but the course also emphasized the historical, philosophical, and theological roots of first amendment principles. Elements used in grading: Final Exam (take-home).

**LAW 7008. American Constitutional History from the Civil War to the War on Poverty. 3 Units.**

(Formerly Law 738) This course addresses U.S. constitutional history from the post-Civil War Reconstruction period through the mid-20th century. Because of the breadth of the subject matter, the view will necessarily be partial. In particular we will take as our focus the way the Constitution has provided a point of political mobilization for social movements challenging economic and social inequality. Topics covered include: Civil War Reconstruction and restoration; the rise of corporate capitalism and efforts to constrain it; Progressive Era regulation; the New Deal challenge to federalism and the anti-New Deal backlash; government spending; WWII and the Japanese Internment; the Civil Rights Era, and the War on Poverty. Readings will include both legal and historical materials with a focus on the relationship between law and society. Readings will include both legal and historical materials with a focus on the relationship between law and society. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper. Paper extensions will be granted with instructor permission. No automatic grading penalty for late papers. Cross-listed with American Studies (AMSTUD 155) and History (HISTORY 155).

**LAW 7010. Constitutional Law: The Fourteenth Amendment. 3 Units.**

(Formerly Law 255) This course examines various aspects of the Fourteenth Amendment, with special attention to equal protection and substantive due process. Topics addressed will include equal protection in relation to race, gender, and sexual orientation, and substantive due process in relation to privacy, sexuality, and reproductive justice. Elements used in grading: Class attendance and participation and exam.

**LAW 7011. Constitutional Litigation. 4 Units.**

(Formerly Law 641) This is a course in advanced and applied constitutional law. It focuses on one of the central ways in which constitutional claims are actually litigated: in lawsuits against public officials and local governments. The bulk of the course looks at litigation under 42 U.S.C. § 1983. We will consider topics such as what it means to act "under color of state law;" absolute and qualified immunities; government liability for the acts of individual officials; remedies for constitutional violations, including monetary and injunctive relief; structural reform litigation; and the remedial issue nearest and dearest to many lawyers' hearts: attorney's fees awards. This course is particularly useful for students who plan to clerk in Federal courts, as much of their dockets involves §1983 litigation. This course complements Federal Courts (Law 283) and students who plan to clerk will benefit from taking both courses. Elements used in grading: Participation, Attendance, Exam.

**LAW 7012. Constitutional Law: Speech and Religion. 4 Units.**

(Formerly Law 612) This is a course about the freedoms of speech, press, religion, association, and assembly under the First Amendment. Two-thirds of the course will be about freedoms of speech, press, and assembly. We will examine historical context, doctrinal development, and current caselaw. We will ask why government regulates speech (to prevent harms? to protect sensibilities? to redistribute power? to advance the interests and ideas of the politically powerful?), how government regulates speech (by aiming at messages? by aiming at markets? by aiming at when and where speech takes place? by conditioning subsidies?), and what justifications are ever sufficient for limiting speech. We will include consideration of the institutional press and new technologies including the Internet, as well as the rights of private organizations to determine their membership and organization. About a third of the course will be about religion. We will ask how the twin constraints of the Free Exercise and Establishment Clauses relate, looking especially at notions of neutrality, voluntarism, separation, and accommodation. Elements used in grading: Exam.

**LAW 7014. Constitutional Theory. 3 Units.**

The guiding question of this course will be how we should think about the role of the U.S. Constitution in American law and American life. In considering this issue, we will address debates about constitutional interpretation (including both originalism and living constitutionalism), the nature and features of constitutional change within the American context, the role of federalism and the separation of powers in the constitutional scheme, and the nature of American constitutionalism as opposed to English and continental European models. We will tackle these debates in the context of some specific contemporary controversies about the Constitution, including: How do the civil rights movement and other social movements impact our understanding of the Constitution? Does the Constitution reject a European-style inquisitorial process in favor of an Anglo-American vision of due process?; How important is consensus within the Supreme Court to establishing the legitimacy of constitutional meanings?; and; What is the Constitution, and how much does it include outside of the written document? Throughout we will be contemplating the extent to which our interpretation of the constitution depends on our vision of American democracy and the good society. Requirements for the course include regular class participation and either four response papers or a substantial research paper; students who take the research paper option will receive four units and "R" credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Attendance, Class Participation; Response Papers or Final Paper.

**LAW 7015. Contemporary Issues in Constitutional Law. 3 Units.**

(Formerly 448) This is an advanced constitutional law seminar for students who have already taken the introductory Constitutional Law course. The seminar will provide an opportunity for in-depth discussion of competing theories of constitutional interpretation, the role of the Supreme Court in our political system, and analysis of judicial behavior. Each week, these themes will be examined through the lens of a current "hot topic" in constitutional law - for example, affirmative action, same-sex marriage, religious liberty, the death penalty, executive power, campaign finance, immigration, abortion, and other topics. This is not a "spectator" class; all students will be expected to participate actively in class discussion each week. This is a good seminar for students interested in clerking or pursuing academia. Prerequisite: Constitutional Law. Elements used in grading: Attendance, Participation, Written Assignments.

**LAW 7016. Critical Race Theory. 3 Units.**

(Formerly Law 671) This course will cover the most important writing in critical race theory as it relates to law and jurisprudence. We will review the relationship between skeptical jurisprudence as developed in legal realism and Critical Legal Studies to the struggle for racial justice and the ambivalent relationship of civil rights lawyers to mainstream legal strategies for social change. We will review the critique of rights, the use of narrative in legal scholarship and the emergence of the critique of "intersectionality" as a challenge to conventional racial politics. Special Instructions: Students have the option to write an independent research paper for Research credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation and final paper.

**LAW 7017. Creation of the Constitution. 4 Units.**

(Formerly Law 230) The course begins with readings setting forth the intellectual and experiential background of the framing, including common law and natural rights theory, republicanism, economic & political scientific ideas, and colonial and post-Independence experience. We then study large parts of the debates at the Constitutional Convention, primarily using Madison's Notes. Major topics are the principle of representation, the extent and enumeration of national powers, the construction of the executive and judicial branches, and slavery. Next come the ratification debates, including readings from antifederalist writers, *The Federalist*, and speeches in ratification conventions. We conclude with the addition of the Bill of Rights. Classes consist of a combination of lecture and extensive participation by students. Elements used in grading: Class participation, In-class exam, supplemented by short take-home essay. Cross-listed with History (HISTORY 153).

**LAW 7018. Disability Law. 3 Units.**

(Formerly Law 644) This is a survey course of disability rights law, with an emphasis on federal and state statutes and case law. Areas of concentration include employment, government services, public accommodations, education, housing, mental health treatment and involuntary commitment, and personal autonomy. We will review such statutes as the Americans with Disabilities Act (ADA), Rehabilitation Act (Sec. 504), Individuals with Disabilities Education Act (IDEA), and the Fair Housing Act Amendments. The course examines disability from a civil and human rights perspective. Elements used in grading: Grades will be based on class participation (50%), and either several short reflection papers (50%) - Section 01 or a long independent research paper (50%) - Section 02. The student must consult with the instructor on the paper's topic, scope and format. After the term begins, students accepted into the course can transfer from Section 01 into Section 02, which meets the R requirement, with consent of the instructor. Non-law students may enroll with instructor consent. This class is limited to 45 students, with an effort made to have students from SLS (35 students will be selected by lottery) and 10 non-law students by consent of instructor.

**LAW 7019. Employment Discrimination. 3 Units.**

(Formerly Law 349) This course will examine legal responses to the barriers to workplace equality that are faced by minority groups. The course will survey the relevant doctrine, focusing primarily on federal employment discrimination statutes, but also addressing more expansive antidiscrimination protections under some state statutes, and local ordinances. Covered topics include sexual and racial harassment, sexual orientation discrimination, and affirmative interventions aimed at increasing the minority group and/or female representation in certain job categories or segments of the labor market. In addition to surveying the doctrine as it stands and as it has developed over time, we will also explore the doctrinal and conceptual difficulties inherent in identifying invidious discrimination and in devising appropriate remedies. Elements used in grading: Class participation and exam.

**LAW 7020. Ethics On the Edge: Business, Non-Profit Organizations, Government, and Individuals. 2 Units.**

(Formerly Law 724) The objective of the course is to explore the increasing ethical challenges in a world in which technology, global risks, and societal developments are accelerating faster than our understanding can keep pace. We will unravel the factors contributing to the seemingly pervasive failure of ethics today among organizations and leaders across all sectors: business, government and non-profit. A framework for ethical decision-making underpins the course. The relationship between ethics and culture, global risks (poverty, cyber-terrorism, climate change, etc.) leadership, law and policy will inform discussion. Prominent guest speakers will attend certain sessions interactively. A broad range of international case studies might include: the Rohingya crisis in Myanmar; civilian space travel (Elon Musk's Mars plans); designer genetics; social media ethics (e.g. Facebook and Russia and on-line sex trafficking); free speech on University campuses (and Gawker type cases); artificial intelligence; Brexit; corporate and financial sector scandals (Epi pen pricing, hedge funds, Wells Fargo, Volkswagen emissions testing manipulation); and non-profit sector ethics challenges (e.g. should NGOs engage with ISIS). Final project in lieu of exam on a topic of student's choice. Attendance required. Class participation important (with multiple opportunities to earn participation credit beyond speaking in class). Strong emphasis on rigorous analysis, critical thinking and testing ideas in real-world contexts. Students wishing to take the course who are unable to sign up within the enrollment limit should contact Brenna Boerman at [brennab@stanford.edu](mailto:brennab@stanford.edu). The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. Everyone will be challenged. Distinguished Career Institute Fellows are welcome and should contact Dr. Susan Liautaud directly at [susanl1@stanford.edu](mailto:susanl1@stanford.edu). NOTE: This course does not meet the SLS Ethics requirement. Elements used in grading: Class Participation, Attendance, Written Assignments, and Final Paper. Cross-listed with Ethics in Society (ETHICSOC 234R), Public Policy (PUBLPOL 134, PUBLPOL 234).

**LAW 7021. Family Law. 3 Units.**

(Formerly Law 293) If there were no legal institution called marriage, would we want to create one? In the context of people's intimate relationships, when and how does the law facilitate and reinforce people's preferences/choices, and when does and should it restrict them? What are (and should be) the sources of legally enforceable obligations between intimates or family members? How does and should the law take account of children, who cannot fend for themselves? This course will consider these questions and more. Elements used in grading: Exam, with minor adjustments for class participation.

**LAW 7022. Federal Habeas Corpus. 2 Units.**

This course covers the history of the Great Writ and the evolution of the scope of federal habeas corpus review and relief; the Suspension Clause; habeas review in capital cases including stays of execution; alternatives to habeas review; state post-conviction proceedings; the Antiterrorism and Effective Death Penalty Act (AEDPA); and jurisdictional issues in both the trial and appellate courts. The course will be valuable to students seeking federal judicial clerkships as well as those interested in prosecutorial work or post-conviction representation. Elements used in grading: Exam.

**LAW 7023. Federalism. 3 Units.**

(Formerly Law 742) This course is an overview of legal and policy issues connected to federalism. We will examine a set of core theoretical questions - the values federalism serves; the relationship of federalism and individual and minority rights; and the role of judges in enforcing federalism through judicial review - across a wide range of contemporary legal debates (e.g., same-sex marriage, health care, immigration, voting rights). While much of the seminar will focus on the United States, we will also consider federalism in comparative context by examining the constitutions and legal doctrines of other regimes. Special Instructions: After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class Participation, Written Assignments or Research Paper.

**LAW 7024. Food Law and Policy. 2-3 Units.**

This seminar explores legal and policy issues related to our food system, including the regulation of food supply, food safety, nutrition / obesity, marketing / labeling, security, and animal treatment. We will examine how laws and regulations affect the production, distribution, sale, and consumption of food and whether particular regulatory approaches (e.g., product bans, product standards, government subsidies, taxes, information disclosure, or labeling) are more effective in achieving public goals. Instructions: Grades will be based on class attendance, class participation, and either several short reflection papers (section (01)) or an independent research paper (section (02)). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on paper length. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7025. Employment Law. 3 Units.**

(Formerly Law 339) Workplace issues have become one of the fastest-growing areas of state and federal law. Employment-related lawsuits filed in federal court have tripled in volume in the past decade, and now account for a tenth of all civil cases. Many state courts have experienced a similar burgeoning of their employment law caseloads. This course examines this diverse, rewarding, and rapidly evolving area of legal practice by considering the diverse array of laws and institutions that regulate the employment relationship. The focus of the course is on laws that affect employees in non-unionized settings, such as protections against dismissal without cause, wage and hour restrictions, workplace privacy, covenants not to compete, the Family and Medical Leave Act, and mandatory arbitration of employment disputes. The course does not cover either Employment Discrimination or Labor Law, both of which are offered as separate courses. Special Instructions: Regular, punctual attendance is required. If you expect (or are unexpectedly forced) to miss more than two classes, please consult with the instructor as soon as possible, as exceptions will be considered on a case-by-case basis. Early Add/Drop Deadline: Add/Drop decisions must be made the first week of class. Exceptions are at the instructor's discretion and will be considered on a case-by-case basis. Elements used in grading: Final Exam.

**LAW 7026. Immigration Law, Policy and Constitutional Rights. 3 Units.**

(Formerly Law 565) This survey course will provide a foundation in immigration law, the system of admission and removal, and the constitutional principles governing the regulation and rights of noncitizens. The course will also explore selected contemporary topics concerning immigrants' rights and immigration reform drawing on the instructor's extensive litigation to advance the constitutional and civil rights of noncitizens and service as a senior immigration advisor in the Obama administration. We will examine some current issues such as immigration detention; Trump executive orders; federal enforcement authority; state and local regulation of immigrants; constitutional prohibitions on 'alienage' discrimination; habeas corpus and Article III judicial review of removal orders; and the intersection of criminal and immigration law. Guest speakers may be invited for some topics. No prior course or background in immigration law is expected. Elements used in grading: Class participation and attendance (10%), final exam (90%).

**LAW 7027. Critical Race Theory. 1 Unit.**

This reading group will investigate unresolved issues in Critical Race Theory. Questions explored will include: What exactly are advocates for racial justice fighting for? That is, what does racial justice look like? What is the place of "culture" in our racial present and in a racial utopia? What are the roles of agency and structure -- individuals and institutions -- in perpetuating, and remedying, racial inequality? What is the role of law in undermining and/or entrenching racial stratification? Readings will be highly varied, coming from the fields of law, psychology, sociology, and anthropology, among others. Meeting Dates: This class will meet 4:15PM - 7:15PM on Thursday, September 29, October 27 and November 17. Elements used in grading: Grading will be based on participation, short reaction/response papers, and a final paper. Same as: Reading Group

**LAW 7028. Lawyers and Leadership. 3 Units.**

(Formerly Law 759) This course will examine the responsibilities and challenges for those who occupy leadership roles, with particular emphasis on those seeking to use law as a vehicle for social and organizational change. Topics will include characteristics and styles of leadership, organizational dynamics, forms of influence, decision making, conflict management, innovation, diversity, ethical responsibilities, scandal, civil and human rights, and public interest law. Materials will include cutting-edge research, case histories, problems, exercises, and media clips. Class sessions will include visitors who have occupied leadership roles. Requirements will include class participation, and either short written weekly reflection papers (2 to 3 pages and a short research paper (about 3-5 pages) or (2) a long paper (approximately 26-30 pages). After the term begins, students can transfer from section (01) into section (02), which meets the R requirement. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Paper.



**LAW 7029. Legislation and Administration. 3 Units.**

(Formerly Law 394) This course explores the world of legislation and administration that defines much of our modern legal order. By analyzing agencies, statutes, and legislative procedures, the course prepares students to think about the structures and processes of government, and how they influence legal outcomes that would otherwise be defined largely by social norms and common law adjudication. Drawing on examples from a variety of substantive areas, the course covers the legislative process, approaches to statutory interpretation, the role of agencies and the legislature in a system of separated powers, delegation to agencies, the interaction of common law doctrines and agency practices, and techniques of agency regulation and adjudication. First-year students are welcome. Special Instructions: Students who receive credit for Legislation (Law 319) and/or Statutory Interpretation (Law 425) may not receive credit for Legislation and Administration (Law 7029) and vice versa. Elements used in grading: Attendance, participation in in-class discussion and simulation and occasional short assignments, being on "panel" for selected classes, and a self-scheduled open-book exam. CONSENT APPLICATION: To apply for this course, students must complete and submit a simple Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7030. Federal Indian Law. 3 Units.**

(Formerly Law 600) This course will provide an overview of the field of federal Indian law. It will consider the origins and scope of tribal sovereignty as recognized under federal law, as well as current federal law on tribal criminal and civil jurisdiction. It will also explore the division of authority between tribal, federal, and state governments; federal statutory schemes governing Natives and Native nations; and constitutional issues affecting Natives. Additional current legal issues which may be covered based on class selection include Native land claims, gaming, family law, religious and cultural rights, and natural resources. The course includes an optional supplementary trip to the Yurok Reservation in northern California in early May. Elements used in grading: Class Participation, Final Exam.

**LAW 7031. Political Campaigning in the Internet Age. 2 Units.**

This course will acquaint students with the changing environment for campaigns posed by the rise of the Internet. So much of the traditional way analysts have understood campaigns has revolved around television as the primary mode of campaign communication. The rise of the Internet, nonlinear television programming, and mobile communication enables new forms of campaigning. With particular focus on the 2016 campaign, this course will examine the relevant social science on these topics, while at the same time bringing in guest lecturers from industry, campaigns, and media. Requirements: Students will be required to complete a 25 page research paper on a topic relevant to the course. Law students enrolled in this class will have the option of participating in a one-week extension of the course (Law 7056) in Delhi, India during spring break for an additional credit. Students may enroll for this course alone or for both this course and Law 7056. The overseas option is limited to 12 students. (See Law 7056 for application instructions and deadline). Elements used in grading: Attendance, Final Paper. This course is cross-listed with Communication (COMM 153 & 253).

**LAW 7032. Public Interest Law and Practice. 2 Units.**

(Formerly Law 617) This course will examine the history, theoretical frameworks, strategies used by, and political position of public interest law practice and attorneys in the United States. We will consider the role of lawyers and the legal system in advancing social change; different career paths of public interest lawyers; ethical issues related to working as a public interest lawyer; the personal impacts of this type of career choice; and tactics deployed by lawyers in differing settings, from issue-based non-profits to government agencies, and private public interest law firms or legal services groups. Readings will include law review articles, legal pleadings and case studies that allow analysis and exploration of the tensions and challenges that exist within the legal system for public interest practitioners. Guest speakers will include leaders from the field. Students will also be exposed to practical skills outside of litigation that social change lawyers should understand. Students will be asked to produce several short papers throughout the quarter. Elements used in grading: Attendance, class participation, written assignments.

**LAW 7033. Race, Identity, and National Security. 2 Units.**

This course explores theoretical, historical, and legal policy questions at the intersection of race, group identity, and national security. Recent political events have thrust the relationship between race, religion, nationality, immigration status, and national security into the limelight, although the questions themselves are not new. How do national security threats affect the formation of racial identity within the United States, and how does race affect our understanding of national security? How should we conceptualize exclusion or discrimination based on nationality, religion, or ideology, as compared to race per se? What is the proper role of courts in addressing challenges to national security policy affecting minority communities? This seminar aspires to understand contemporary policy questions in light of a broader theoretical, historical, and legal context. Class attendance and robust participation in discussion is required. There are two options for assignments in this course. You can either write 5 response papers throughout the course, or a single 18-20 page research paper related broadly to the themes of the course (for R credit). Those who choose the research paper option will be expected to discuss and submit an outline of their research paper while the course is in session and to submit the final paper in accordance with standard law school requirements. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Attendance, Class Participation, Response Papers or Research Paper. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7034. Race and Public Education. 3 Units.**

From at least *Brown v. Board of Education*, and many would say before that, education has been central to racial justice movements in America. More than fifty years after *Brown*, most American schools remain segregated by race and class, and many advocates still argue that the struggle for quality education is the key civil rights issue of our time. This course will examine a host of education-related legal and policy issues that intersect with questions of race and class. Topics will include: desegregation and re-segregation, tracking, charter schools, school vouchers, high-stakes testing, the Common Core, school discipline, the "school to prison pipeline," and education in alternative schools, juvenile facilities, and adult prisons. This will be a discussion-oriented course that will operate more like a seminar than a lecture. This class is limited to 30 students, with an effort made to have students from SLS (20 students will be selected by lottery) and students from the School of Education (10 students). Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper.

**LAW 7036. Law of Democracy. 3 Units.**

(Formerly Law 577) This course is intended to give students a basic understanding of the themes in the legal regulation of elections and politics. We will cover all the major Supreme Court cases on topics of voting rights, reapportionment/redistricting, ballot access, regulation of political parties, campaign finance, and the 2000 presidential election controversy. The course pays particular attention to competing political philosophies and empirical assumptions that underlie the Court's reasoning while still focusing on the cases as litigation tools used to serve political ends. Law students enrolled in this class will have the option of participating in a one-week extension of the course (Law 7056) in Delhi, India during spring break for an additional credit. Students may enroll for this course alone or for both this course and Law 7056. The overseas option is limited to 12 students. (See Law 7056 for application instructions and deadline). Elements used in grading: Class participation and exam. Cross-listed with Communication (COMM 361) and Political Science (POLISCI 327C).

**LAW 7037. Poverty Law: Policy and Practice. 3 Units.**

(Formerly Law 614) This survey course will cover historical and contemporary policy debates about poverty in the U.S. Topics will include the constitutional treatment of poverty, as well as the legal and policy treatment of questions of access to specific social goods, such as housing, health care, education, and legal services. We will also discuss "hot topics" in the field, such as criminalization of poverty, international perspectives on poverty, wage theft, and recent policy analyses at the 20th anniversary of welfare reform. Materials will include practice-derived materials as well as scholarly treatment of the issues. Students with a range of backgrounds and perspectives on the issues are encouraged to enroll. While a survey class, lecturing will be minimal, with student leadership of and participation in discussion will be principal methodology. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Exam.

**LAW 7038. Remedies. 3 Units.**

(Formerly Law 393) The remedy is arguably the most important part of any lawsuit, and often the most neglected. This course considers the question of what plaintiffs are entitled to when they win a case and why. It will cover damages, punitive damages, restitution, unjust enrichment, and injunctive relief. While we will consider public remedies in constitutional cases, the majority of the course will focus on remedies in private law civil actions. Elements used in grading: Class participation and final exam.

**LAW 7039. Reproductive Justice. 1 Unit.**

(Formerly Law 490) This seminar explores Reproductive Justice ("RJ") as a paradigm for understanding reproductive oppression – that is, the subordination of individuals through their bodies, sexualities, and abilities to reproduce. The RJ paradigm picks up where a reproductive rights framework ends. It contends that the fight for equality and dignity in matters relating to reproduction continues beyond a successful argument that the Constitution ought to protect a "right" to privacy, "right" to access contraception, or "right" to an abortion. An RJ framework observes that "rights" are given meaning – and lose meaning – according to the race, class, age, sexual orientation, gender identity, immigration status, and physical and mental ability (among other attributes) of the rights bearer. As such, RJ analyzes reproductive experiences within a complex context and with respect to the multiple statuses of the persons involved. This seminar will explore RJ as it speaks to assisted reproductive technologies, health care policy, immigration, incarceration, environmental justice, and economic inequality, among other topics. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper. This class meets during the first two weeks of Winter Quarter.

**LAW 7040. Social Justice Impact Litigation: Issues and Strategies. 2 Units.**

(Formerly Law 572) This seminar explores strategic, legal, and ethical issues related to using law reform and social justice litigation to advance the constitutional and civil rights of vulnerable communities. The seminar is designed to allow students to understand and grapple with some of the doctrinal and strategic issues faced by social justice litigators. The course will be informed by the instructor's thirty years of litigating cases, including in the Supreme Court, to advance immigrants' rights as the founder and former national director of the ACLU Immigrants' Rights Project. Among the topics that may be included are selecting and using test cases; identifying plaintiffs; coalition litigation; strategic pleading; class action problems; the role of amicus briefs; suits for damages versus injunctive relief; standing and mootness; ethical problems; settlement strategies; use of public advocacy and media; the effect of lawsuits on policymakers and public officials; the role of government and agency lawyers; and litigation to achieve legislative change. Guest speakers will be invited. Enrollment is limited and the seminar is not open to 1L students. Students are expected to submit a series of reflections (totaling 18 pages) in response to seminar issues and guest speakers. In unusual cases, a student may be approved for Research (R) credit to write a substantial research paper on an approved topic of current significance. R credit is available only with the instructor's prior consent early in the quarter. Students approved for R credit will transfer from section (01) into section (02) after the term begins. Elements used in grading: Class participation (50%) and written submissions (50%). CONSENT APPLICATION: To apply for this course, students are asked to complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7041. Statutory Interpretation. 3 Units.**

(Formerly Law 425) Statutory law is the dominant source of contemporary law, and it is the form of law that lawyers are likely to confront most often in almost any area of practice. It is also an area of vibrant intellectual debate, as scholars, Supreme Court justices, and others debate the methods and aims of statutory interpretation. This course will stress both the practical and theoretical dimensions of interpretation. Students will learn and apply the methods of statutory interpretation. We will also spend considerable time on contemporary controversies, such as debates about textualist, purposive and dynamic interpretation; about the use of legislative history and canons of construction; about the special interpretive problems that arise in the context of direct democracy; and about the democratic and constitutional foundations of statutory interpretation itself. Readings will draw from political science as well as law. Elements used in grading: Class participation and final exam.

**LAW 7042. Law and Sexuality. 2-3 Units.**

(Formerly Law 576) This seminar will focus on how the law regulates sexuality. We will approach the material as an exercise in advanced constitutional law, exploring how courts have used—or might use—federal or state constitutional provisions to address issues regarding a wide array of issues involving sexuality. The core of the class will relate to contemporary controversies concerning sexual orientation and gender identity (including, for example, how sexual orientation and gender identity are defined, regulation of sexual conduct, marriage and parenting rights of same-sex couples, and religious liberty debates, among others). But we will also discuss other issues, including polygamy/polyamory and asexuality. We will maintain an interdisciplinary focus throughout as we consider how social, cultural, and political forces shape, and are shaped by, legal doctrine. All students taking the seminar for 2 units will either write a final research paper of approximately 18 pages (for R credit) or a take a final exam. Students who wish to write a longer R paper (approx. 26 pages) may enroll in the seminar for 3 units. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the paper length. Elements used in grading: Class participation; and paper or exam.

**LAW 7043. Strategic Litigation for Racial Justice. 1 Unit.**

(Formerly Law 715B) Recent events in our country have dramatically highlighted the fact that we are not a post-racial society, and that structural racism and implicit bias are as harmful to people and institutions as intentional discrimination. Currently, plaintiffs can only show a violation of the Equal Protection Clause of the 14th Amendment - and several other antidiscrimination laws - by proving intentional discrimination. This seminar will examine this "intent standard" and its significant barriers to racial justice litigation. The course will review social science research, including studies on implicit bias, racial anxiety, stereotyping, and other concepts, to explore how contemporary discrimination manifests. We will address how legal advocates and the law can utilize such research to challenge and remedy discrimination through strategic litigation. We will examine real-world examples of this, including in the context of school discipline and the school-to-prison pipeline. Meeting dates: This class will meet on three Fridays, October 21, October 28 and November 4. Students must attend all three classes. Early drop deadline: Students may not drop this course after the first class. Elements used in grading: Written assignments (reflection papers) and class participation.

**LAW 7044. Supreme Court Simulation Seminar. 3 Units.**

(Formerly Law 606) This seminar provides students with the opportunity to analyze, argue, hear oral arguments and draft opinions in cases that are currently pending before the Supreme Court of the United States. Professor Lawrence Marshall will serve as the instructor in the seminar, and several of the Law School's esteemed group of Supreme Court litigators are expected to participate in one or more of the sessions. The 18 students in the seminar will be divided into two courts. During each sitting, one of the courts will hear arguments in a case currently pending before the Supreme Court, while two of the students from the court not sitting that week will present oral arguments. The cases chosen will provide a mix of constitutional and statutory issues, as well as a mix between criminal and civil cases. Each student will be assigned the role of a particular Justice for the entire quarter. Each student's task while sitting on cases is to do his or her best to understand that particular justice, based on that justice's prior opinions and judicial philosophy. In this sense, the seminar is also intended to help promote insight into the role of judicial personality and philosophy within the decisional process. The weekly seminars will proceed as follows: In preparation for each week's session, all students (whether they are the two students arguing that week, the nine students judging that week, or the seven students observing that week) will read the lower courts' decisions, the briefs (the party briefs and selected amicus briefs) and the major precedents implicated. During the first portion of each week's session (approximately one hour), two of the students (who are members of the Court that is not sitting that week) will present oral arguments to the nine "justices" sitting that week. The arguments will be based on the briefs that were actually filed in the case. During the second segment of each week's session (approximately 45 minutes), the "justices" who are sitting that week will "conference" the case while the other non-sitting students, students who argued, instructors and guests will observe. Again, each student will be in the role of a particular justice. At the end of the "conference," the opinion-writing will be assigned to one "justice" in the majority and one "justice" in the dissent. During the final portion of each session (approximately one hour), the instructors, guests and students will engage in a broad discussion of what they just observed. This may include analysis of the briefing, discussion about the oral argument, reflections on the "conference," and, more generally, a discussion about the case and its significance. After each class, the student assigned to draft the majority opinion will have two weeks to circulate a draft to the "Court." The student writing the dissent will then have two weeks to circulate his or her opinion. The other sitting "justices" can join one of these opinions, request some changes as a condition of joining, or decide to write separately. Over the course of the Quarter, then, each student will argue one case, sit on four or five cases, and draft at least one opinion. Special instructions: 1. Because this is a simulation with assigned roles, students who are accepted into the seminar may not drop without permission of the instructor. 2. Because of the nature of the writing projects (with extensive interaction with other students), the normal deadline for Winter Quarter papers is waived and final papers must be submitted by the Spring Quarter deadline. Elements used in grading: Students will be graded based on the quality of their participation as justices, their oral argument, and their written opinions.

**LAW 7045. The Article III Judge. 2 Units.**

(Formerly Law 278) The contemporary debate over the proper role of a federal judge under the Constitution turns, in large measure, on what it is we think an Article III judge is doing when she is called upon to resolve a "case or controversy." Is she looking for the fair result? If so, by whose lights? Is she a political actor, or is she instead looking for a rule of decision that has been previously established by law (a "mere translator" of the law, in Justice Frankfurter's words). If so, by natural law or positive law? These are some of the questions we will consider in discussing what role a federal judge plays when she exercises "the judicial Power of the United States" conferred by Article III of the Constitution. Readings will include books and articles by some of the leading legal thinkers in the nation's history. Special Instructions: This class will meet the first three weeks of the quarter only. Elements used in grading: Class attendance and participation, reading the assigned material, and a 10-15 page paper that uses the readings to analyze a significant judicial opinion. Special Instructions: This class will meet the first three weeks of the quarter only.

**LAW 7046. The Welfare State. 3-5 Units.**

(Formerly Law 765) Much has been written in recent years about the decline of the welfare state. Numerous adjectives have been applied to describe a trend toward austerity -- death, demise, withering, reversal. One writer suggested that the welfare state had not died, it had merely "moved to Asia" along with industrialization. This seminar introduces students to the key literature, questions, and debates about the modern welfare state. We will consider the emergence, growth, and current status of the welfare state, primarily in Western Europe and North America. The course will examine classical theories about markets and the emergence of social provision. We will also consider the leading theoretical and empirical research addressing the emergence of the welfare state, looking at the American case in comparative perspective. Attention will be paid to social and political factors on state development including political parties, labor markets, gender, demographic change, and immigration. We will then turn to the trend toward austerity and retrenchment, and the effect of globalization for the future of the welfare state. Course Requirements. Participation/Discussion (25%). Students are responsible to complete all readings and to come to class prepared to actively participate in discussion. Each student is responsible to lead a portion of the discussion twice per quarter. Short Reaction Papers (25%). All students must complete 5 reaction papers related to the weekly readings of 2 to 3 pages in length. Reaction papers will include a list of questions to be addressed in that week's discussion. All reaction papers must be posted to coursework in advance of class so that the student(s) leading that week's discussion can incorporate the questions into that week's discussion. Final Options (50%). Students have the option of completing one final paper of 20 pages in length OR 4 essays of 5-6 pages each addressing the readings in weeks that the student did NOT complete reaction papers. Topics for 20 page papers must be approved by me in advance, and may be related to a student's dissertation or master's research or may be a stand-alone topic. Papers may take the form of a research proposal and need not contain original empirical research. Shorter papers should engage thoroughly with the literature on the selected topic, and should bring additional sources other than those read for class to bear on the topic of choice. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Cross-listed with Sociology (SOC 254 & SOC 354).

**LAW 7047. Rethinking Campus and School Title IX Policies and Procedures. 2-3 Units.**

I apologize in advance for the fact that there are no paragraph breaks in this description. It is not my fault. Please contact me directly if you have questions about the class and I will email you a more readable description. Thanks, MLD. Seminar with Concurrent Policy Lab: Rethinking Campus and School Title IX Policies and Procedures. Policy Lab Client: National Women's Law Center: Over the past six years, the issue of campus sexual assault has exploded into the public discourse. While definitive figures are difficult to obtain due to the necessarily private nature of these events, several recent studies estimate that between 20-25% of college women (and a similar proportion of students identifying as transgender and gender-nonconforming, as well as around 5-10% of male students) experience sexual assault. Survivors have come forward across the country with harrowing stories of assault followed by an insensitive or indifferent response from college administrators, launching one of the most successful, and surprising, social movements in recent memory. Statistics are equally disturbing in the middle and high school context. As a result, the federal government under President Obama stepped up its civil rights enforcement in this area, with over 250 colleges and universities currently under investigation for allegedly mishandling student sexual assault complaints. At the same time, students accused of sexual assault have complained of botched processes driven by a "campus rape over-correction" that denied them a fair disciplinary hearing. It is clear that schools are struggling to develop and implement policies and procedures that satisfy their legal obligations in this area. While the future of federal enforcement under the Trump Administration is uncertain, schools are still subject to federal and state law that require them to have policies and procedures to address sexual harassment and violence. This course focuses on the legal and policy issues surrounding the highly challenging area of investigation and adjudication of sexual assault and other gender-motivated violence on college campuses and in K12 schools. It will cover the federal and state legal frameworks governing these procedures including Title IX, the Violence Against Women Act, and the Clery Act, and examine current cases as well as the rapidly-evolving legal, federal regulatory, and political environment surrounding this issue. Guest speakers working in the area will help to broaden the class's understanding of the subject matter. Students in this seminar will have the opportunity to participate in the invitation-only national conference entitled The Way Forward: Title IX Advocacy in the Trump Era, which will be held May 1-2 at Stanford Law School and is organized in conjunction with the National Women's Law Center. See [<http://conferences.law.stanford.edu/thewayforward-title9/>] for more information on the conference. Concurrent Seminar and Policy Lab: The seminar is taught concurrently with the Policy Lab (also entitled "Rethinking Campus and School Title IX Policies and Procedures"). All students registered for the seminar participate in the Policy Lab, which works with the National Women's Law Center toward the development of a set of evidence-based and legally compliant model policies and procedures. Given all the controversy, surprisingly little is actually known about the policies and processes that are currently in use, nor is there any way of easily ascertaining what the majority of an institution's "peer schools" are doing with respect to solving a challenge or addressing an issue. There is no set of "best practices" to which school administrators can easily turn. Students will analyze cutting-edge issues related to school-based gender-motivated violence and work on a white paper for the NWLC that includes both legal and empirical research into the policies and procedures currently in use around the country. Throughout the class, students will have the opportunity to reflect on what they are learning and how it applies in a professional context. The eventual goal of this Policy Lab is the development in conjunction with NWLC of a free, web-based, open-source set of adaptable model policies and procedures that are targeted for different market segments (i.e., large private, large public, small private, HBCU, community colleges, and K12). Course Schedule and Optional Travel: The first three weeks of the class there will be two meetings per week, on Tuesday and Thursday from 4:15 to 6:15. Students will meet with Fatima Goss Graves, Senior Vice President for Program at the NWLC during week 2 to hear her expectations regarding the project and ask questions. During weeks 4-6 the class will meet once per week, on Thursday from 4:15-7:15 and small groups will work on their assigned sections of the project. On Thursday, May 4 (week 5), the class will meet with special guest Catherine Lhamon,

**LAW 7048. Legislation. 3 Units.**

(Formerly Law 319) Lawyers work in a legal system largely defined by statutes, and constantly shaped by the application of legislative power. This course is about statutes and the legislative institutions that create them. It discusses some of the key laws governing access to legislative power and the procedures that culminate in the production of statutes in the legislature. The course is divided into two parts. The first part will focus on the acquisition of legislative power. Key topics include bribery laws, lobbying and indirect influence on legislative activity, and campaign finance regulations. The second part will focus on the exercise of legislative power. Through a number of public policy case studies, students will better understand the organization of the U.S. Congress, the ways in which power is exercised in that institution, and the intersection between politics, the law, and policymaking. Elements used in grading: Class participation, final memo, and in-class presentation. (Cross-listed with PUBLPOL 319).

**LAW 7049. Advanced Torts: Law and Practice. 3 Units.**

Most of civil litigation is in tort. As society changes, this dynamism is reflected in the progression and regression of tort law. Taught by an experienced practitioner, this course will explore contemporary developments in the law of medical malpractice, product liability, mass torts, harms to reputation and dignity and other civil wrongs. We will consider a range of remedies including compensatory and punitive damages as well as their constriction through tort limitations. Knowledge of these substantive rights and remedies has greatest value if the arc and texture of suit is understood. So we'll also learn about insurance, negotiation, settlement and alternatives to trial. And we'll set all this in the broader context of how an attorney can guide a plaintiff or defendant to an appropriate economic and/or noneconomic remedy. Elements used in grading: Class attendance is mandatory and class participation is encouraged and valued. There will be a final exam.

**LAW 7050. Toxic Harms. 2 Units.**

(Formerly Law 280) This seminar will examine the concerns arising from exposure to toxic substances from a variety of perspectives. A principal focus will be tort liability, and a central theme in the course will be whether tort law is an effective method of compensating victims of toxic exposure and controlling the distribution and/or emission of toxic substances. In order to assess the efficacy of tort, it is essential to compare the liability system with alternatives such as restructured "public law" litigation, administrative compensation schemes, and regulatory control strategies. Moreover, it seems equally important that these options be grounded in a concrete understanding of the major current problem areas. To accomplish these aims, the course will focus on a number of specific present concerns, including tobacco, asbestos, anti-inflammatory drugs, and workplace emissions exposures. In each instance, we will look at the nature of the public health problem as well as ensuing tort litigation and regulatory activity. In addition to examining these distinctive problem areas, we will look at broader, cross-cutting institutional reform proposals that have received recent attention. Students in Section (01) will write three ten-page writing exercises on topics discussed in class. After the term begins, students accepted into the course can transfer from section (01) into section (02), and have the option to write a final independent research paper for Research credit, with instructor consent. Elements used in grading: Three ten-page writing exercises or final independent research paper. Early drop deadline.

**LAW 7051. Local Government Law. 3 Units.**

(Formerly Law 427) Local governments exert tremendous influence over socioeconomics, race relations, environmental health, political power, and housing and real estate. This public law course will investigate the law of these governments (including cities, counties, and special districts) from four vantage points: (1) local governments within the federalist system, including the balance of power between local, state, and federal governments; (2) horizontal questions of power, including hierarchy and specialization among local governments; interlocal cooperation and competition; and the creation, expansion, and dissolution of local entities; (3) innovative uses and delegations of local authority to achieve state or local public policy goals; and (4) the nature of local democracy and local finance, including citizen influence of local lawmaking through initiatives and referenda, alternative voting schemes, and responses to fiscal distress. Discussions and in-class projects in the course will be situated in locations ranging from rural towns to major metropolises across the country. This class is limited to 30 students, with an effort made to have students from SLS (25 students will be selected by lottery) and up to five non-law students by consent of instructor. Elements used in grading: Class participation; in-class presentation, and one-day take home exam.

**LAW 7054. The 45th President and the Constitution. 2-3 Units.**

We will survey a number structural constitutional issues raised during the Trump Presidency, including the role of the judiciary; the scope and limits of unilateral Presidential power; the relationship between state and federal governments; Congressional power to investigate; and the role of the Special Counsel. Among the substantive areas of coverage will be protection of voting rights; partisan gerrymandering; free speech; and religious freedom. Among the specific settings we will consider are the President's first and second immigration orders; the Global Gag Rule; the effort to de-fund Planned Parenthood; the President's acrimonious relationship with the press; conflict of interest issues, including the Emoluments Clauses; the legal status of the Affordable Care Act's mandatory coverage of contraception, including religious objections; the status of gay marriage, including religious exceptions; and the regulation of the mass media and the Internet. Participants in the seminar should have completed (or be enrolled in) the basic Constitutional Law course. After the term begins, a maximum of 20 students accepted into the course can transfer from Section 01 into Section 02 (long research paper option), which meets the R requirement, with consent of the instructor. Elements used in grading: Final paper.

**LAW 7055. American Legal History, 1930 - 2000: The New Deal, The Rights Revolution and Conservative Reaction. 2 Units.**

This course examines major transformations in American law brought about by the momentous social and political movements of the mid- to late 20th Century. Part I deals with the response of Franklin D. Roosevelt's New Deal to the economic catastrophe of the Great Depression. The New Deal resulted in a major expansion – against the resistance of conservative courts – in the size and responsibilities of the Federal government to regulate the economy and secure citizens against risks of unemployment, sickness and old age. Part II covers the expansion of the New Deal after World War II to new forms of welfare and regulation (such as Medicare and environmental law) and what we now call the Rights Revolution – movements of subordinated or marginalized groups to claim equal rights (African-Americans, women, the disabled, gays and lesbians) or fair treatment by government (criminal suspects, welfare recipients, mental patients, prisoners). Part III: Both the New Deal and the Rights Revolution provoked fierce political reactions in which the modern conservative movements arose and came to power. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class Participation, Attendance; Exam or Final Research Paper. Cross-listed with History (HISTORY 51G & 151G).

**LAW 7056. Law of Democracy - India: Field Study. 1 Unit.**

This is the Delhi, India component of Political Campaigning in the Internet Age (Law 7031) and Law of Democracy (Law7036). For details, see course description for Law 7031 and Law 7036. Students in this optional field study component will travel to Delhi, India for one week during spring break 2017. It accompanies courses in Law of Democracy and Political Campaigning in the Internet Age. Class sessions will take place primarily at the O.P. Jindal Global University, but will include visits to the Indian Parliament, Supreme Court, and National Electoral Commission. The Course will examine topics in regulation of democracy in a comparative perspective. Those topics include voting rights, campaign finance, regulation of political parties, and election administration. On the last day of the course, students will also have the option of participating in an international conference on comparative democracy to be held at O.P Jindal Law School. The course grade will be based on student essays examining a topic of the law of democracy in comparative perspective. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7057. Policy, Politics, and the Presidency: Understanding the 2016 Campaign from Start to Finish. 2 Units.**

The 2016 presidential campaign will go down in history as a unique blend of personality and politics. But what actually happened behind-the-scenes remains a mystery to most. This course will introduce students to the nuts-and-bolts of a presidential campaign. Each week, we will explore a different topic related to running for the presidency – policy formation, campaign finance laws and regulations, communications, grassroots strategy, and digital outreach – and feature high-profile guest speakers who have served in senior roles on both Democratic and Republican campaigns. Students, guests, and faculty will also participate in discussions on how these topics will related to the 2016 presidential contest, and how they might apply to future presidential campaigns. Elements used in grading: Attendance, Final Paper. Cross-listed with Public Policy (PUBLPOL 146, PUBLPOL 246) and Political Science (POLISCI 72).

**LAW 7058. Introduction to Antidiscrimination Law. 3 Units.**

(Formerly Law 734) This course will focus on the statutory legal rules (primarily federal) governing discrimination on the basis of race, national origin, sex, disability, and other protected classifications. With a rotation of instructors including and beyond Ford and Anderson, the course will include modules regarding: employment discrimination (including sexual harassment), fair housing law, voting rights, and disability law. Note: The course will be designed to minimize overlap with Ford's Employment Discrimination course, and thus students are welcome to take both. Elements used in grading: Class Participation, Attendance, Final Exam.

**LAW 7059. Labor Law. 2 Units.**

(Formerly Law 301) This course will cover the basic substantive and procedural aspects of the enforcement of the National Labor Relations Act (NLRA) in the U.S. economy today. After a brief introduction to the origin and history of collective bargaining laws, the course will examine how the protections and obligations of the NLRA actually operate in the modern workplace. Coverage will include legal issues in union organizing, union recognition, collective bargaining and workplace governance in a union context. The course will also emphasize the role of the NLRA in the non-union workplace, addressing such issues as the right to speak out at work (and limits thereon), and the rights of employees to engage in other concerted activity to advance their interests. Finally, the course will address the issue of arbitration of employment disputes in both the union and non-union workplace. Elements used in grading: Class Participation, Written Assignments.

**LAW 7060. Law and Continental Thought: Resistance. 2 Units.**

Dominant trends in continental thought will be studied with an emphasis on the complex evolution of the relationship between theories of the rule of law and the definition and assertion of liberal democratic rights, on the one hand, and the sources of systematic legal failure and justifications of resistance to law, on the other. The roots, development, and pathologies of post-structural theory will be a central preoccupation of the course, as will the tensions between post-structuralism and the premises of liberal democratic thought. Major works by a range of theorists (such as Marx, Freud, Nietzsche, Benjamin, Fanon, Lacan, Foucault, Bhabha, Butler, Said, Chakrabarty, Haraway, Crenshaw, Ranciere, and Agamben) will be situated in relation to historical and theoretical interpretations of discrete 19th and 20th century resistance movements. No prior work in philosophy or critical theory is required to enroll in the seminar. Students may elect to write an 'R' credit paper or complete a 10-12 page essay. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Grading Elements: attendance, active class participation and written assignments (essay or research paper).

**LAW 7061. Children Sexuality and the Law. 2-3 Units.**

This seminar focuses on federal and state law designed to protect children from sexual exploitation, as well as federal constitutional law regulating young adults' expressive rights with regard to gender and sexual identity. The seminar provides a general introduction to some of the laws governing children's sexual autonomy as well as necessary protections from sexual abuse; however, the seminar's primary purpose is to teach students about how the law discursively constructs children as it attempts to protect them. Specifically, students will explore how laws designed to protect children from sexual exploitation also naturalize certain assumptions about children's perceptions, cognitive capacities, interests and vulnerabilities. Our discussions will explore how the law, while attempting to catalogue and regulate the potential threats children face, also instantiates certain ideas about children's potential sex-related injuries and how these injures can affect them over time. Finally, seminar discussions will explore whether there are any inconsistencies between the understanding of childhood, sexual injury, capacity, and autonomy in various areas of state child protection laws, federal constitutional law, and relevant federal statutes. In addition to considering how laws regulating children's sexuality affect children, the seminar will also examine how the same laws effectively constrain adults' behavior, as well as shape our understanding of the role of certain social institutions. Laws intended to more generally protect children from sexual exploitation also regulate children's relationships to their parents, affect our understanding of the role of schools, and even our understanding of the role libraries and the internet play in educating citizens. Seminar discussions will focus on how discursive constructs and social understandings about children contained in law both constrain and enable us in discussions of child sexuality. We will also consider how these constructs and understandings empower certain institutions by legitimating certain kinds of intervention. Students can choose to write three short response papers for two units or a final research paper for three units. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the Research (R) requirement, with consent of the instructor. Elements used in grading: Attendance, Class Participation; Written Assignments or a Final Research Paper. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7062. Originalism. 2 Units.**

This two-credit seminar will explore the theory and practice of "originalism" – the idea that the Constitution should be interpreted in light of the meaning of its text to those who had authority to enact it. This is a controversial approach (as are the others) and we will read and consider critics as well as proponents, so that students can make up their own minds. The first part of the seminar will be devoted to the theory: how it works, what are its justifications, what are its flaws, the various versions. The remainder will be devoted to specific applications. Because there are far more topics than we have time to cover, students will vote on the first day for which topics we will take up. Among the choices are: executive power, speech and press, liberty under the Fourteenth Amendment, equality under the Fourteenth Amendment, gun rights, searches and seizures, and freedom of religion. Two students will assist in leading class discussions. Elements used in grading: Grades will be based 20% on participation and 80% on papers. Students will have the choice of one longer research paper or three shorter reflection papers. After the term begins, students accepted into the course can transfer from Section 01 into Section 02 (long research paper), which meets the R requirement, with consent of the instructor. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7063. Youth Law and Policy. 2 Units.**

(Formerly Law 795) This course examines current issues in youth law and policy with a focus on the potential and collateral effects of law on certain subpopulations of vulnerable youth. Substantively, the course focuses on case law and statutes in delinquency, dependency, education, public benefits, and health access with an attention to cross-section themes of poverty, economic justice, race, and youth voice. By the end of the course, students will have developed a better understanding of how litigation, legislation, and policy in youth law come about through examining recent developments in the field and the tools advocates have used to enact change. Any student may write a paper in lieu of the final exam with consent of instructor. After the term begins, students accepted into the course can transfer from the exam section (01) into paper section (02), with consent of the instructor. Elements used in grading: Class Participation, Attendance, Written Assignments; Exam or Final Paper.

**LAW 7065. One in Five: The Law, Politics, and Policy of Campus Sexual Assault. 3-4 Units.**

TRIGGER WARNING: Over the past three years, the issue of campus sexual assault has exploded into the public discourse. While definitive figures are difficult to obtain due to the necessarily private nature of these events, several recent studies estimate that between 20-25% of college women (and a potentially higher proportion of students identifying as transgender and gender-nonconforming, as well as around 5-10% of male students) experience sexual assault. People of color, LGBT students, disabled individuals and other vulnerable groups are at increased risk. This is also a significant problem in K12 education. Survivors have come forward across the country with harrowing stories of assault followed by what they describe as an insensitive or indifferent response from college administrators. These survivors have launched one of the most successful, and surprising, social movements in recent memory. As a result, the federal government under President Obama stepped up its civil rights enforcement in this area, with over 300 colleges and universities under investigation for allegedly mishandling student sexual assault complaints as of July 2017. At the same time, this heightened response has led to a series of high-profile lawsuits by accused students who assert that they were falsely accused or subjected to mishandled investigations that lacked sufficient due process protections. The one thing that survivors and accused students appear to agree on is that colleges are not handling these matters appropriately. Colleges have meanwhile complained of being whipsawed between survivors, accused students, interest groups, and enforcement authorities. The election of President Trump has now created significant uncertainty about how this issue will be handled by the Department of Education going forward. The Trump Administration took the extraordinary step this September of rolling back all of the Obama Administration guidance on this subject. Meanwhile Congress has been unable to pass legislation addressing the issue, though there are several bipartisan bills under consideration. This course focuses on the legal, policy, and political issues surrounding sexual assault on college campuses. We will learn background about sexual violence and the efforts to implement legal protections for survivors in the educational context. We will also study the basic legal frameworks governing campus assault, focusing on the relevant federal laws such as Title IX and the Clery Act. We will hear from guest speakers who are actively involved in shaping policy and advocating in this area, including lawyers, lobbyists, filmmakers, journalists, and policymakers. The subject matter of this course is sensitive and students are expected to treat the material with sensitivity. Much of the reading and subject matter may be upsetting and/or triggering for students who identify as survivors. There is no therapeutic component for this course, although supportive campus resources and Title IX staff are available for those who need them. This course was previously a Sophomore College Class that is now being offered as a regular quarter-length course. Enrollment is by INSTRUCTOR PERMISSION. Access the consent form here [feminist.stanford.edu/academics/undergraduate-program/forms](http://feminist.stanford.edu/academics/undergraduate-program/forms) or email [rmeisels@stanford.edu](mailto:rmeisels@stanford.edu) to request a form via email. Cross-listed with Feminist, Gender and Sexuality Studies (FEMGEN 143) and Sociology (SOC 188). Elements used in grading: Attendance, Class Participation, Written Assignment, Final Paper or Project.

**LAW 7067. Law and Policy in the Post-Obama Era. 1 Unit.**

This course will consider a number of current issues of law and policy that achieved prominence during the Presidency of Barack Obama and remain unresolved. These issues include: 1) immigration law reform and DACA, 2) the role of the Department of Justice in reforming local and federal criminal law enforcement, 3) the role of government policy in regulating the economy and financial system, in facilitating health insurance, and in remedying economic inequality, 4) the proper balance between national security and civil liberties/human rights, as exemplified by the debates over the status of the Guantanamo Bay detention facility and drone warfare. In each of these areas, and others, debates about law and policy had reached a seeming, or potential, consensus in early 2009, but that consensus quickly fell apart. In each area, the gap between differing formulations of law and policy that had existed until recently has widened. Keeping in mind the time limitations of this course, we will briefly examine most of these law and policy – the governing legal doctrines and policies, their evolution since 2009, and their present and future prospects. The course will ask: What accounts for these differing visions of law and policy? What accounts for the inability of the political and legal system to resolve them? What are the possible ways forward? Class format will consist mainly of readings and class discussion, and students are encouraged to bring their own perspectives to bear on these difficult and timely issues. Class will meet Monday-Thursday, January 8-11, 7:15 PM to 9:15 PM and Tuesday of the following week, January 16, 6:20 PM to 7:20 PM. Elements used in grading: Class Participation.

**LAW 7071. Philanthropy and Civil Society. 1 Unit.**

(Formerly Law 781) Associated with the Center for Philanthropy and Civil Society (PACS). Year-long workshop for doctoral students and advanced undergraduates writing senior theses on the nature of civil society or philanthropy. Focus is on pursuit of progressive research and writing contributing to the current scholarly knowledge of the nonprofit sector and philanthropy. Accomplished in a large part through peer review. Readings include recent scholarship in aforementioned fields. May be repeated for credit for a maximum of 3 units. Cross-listed with Education (EDUC 374), Political Science (POLISCI 334) and Sociology (SOC 374).

**LAW 7075. Family Law I: Regulating Marriage and other Intimate Relationships. 3 Units.**

Intimate sexual relationships are central to most people's lives. Marriage has long been the primary locus of such relationships, the foundation of family life. In recent decades, though, marriage has undergone unprecedented changes. Sustained political advocacy and judicial decisions have opened marriage to same sex couples. Yet marriage equality has triumphed at a time when marriage is less universal and less robust as a social institution than ever. More American adults than ever are unmarried; more than a third of those who do marry will divorce. Unprecedented numbers of children are now born to unmarried parents. And marriage rates and stability have diverged across racial and socioeconomic groups as never before. What is one to make of these changes? And how should law and policy respond? The course will examine the constitutional and statutory doctrine governing marriage and other intimate relationships. Throughout, we will consider the cultural and social understandings that undergird our past and current approaches to regulating intimate relationships. Elements used in grading: Attendance, Class Participation and Exam.

**LAW 7076. Race, Disadvantage, and Elite Education: the Allocation of Opportunity. 2 Units.**

In recent years, selective universities have become more academically selective than ever. During the past half century their applicant pools have grown considerably—now including women, minorities, immigrants, and international students—while the sizes of their student bodies remain virtually unchanged. The broader social and economic context has shifted as well. With globalization, the advance of technology and the resulting labor market shifts, advanced education is seen as more important than ever to getting ahead. Yet, even as elite universities seem central to Americans' hopes and dream, they have also come under attack, viewed as disconnected from, and alien to, "regular Americans." This course will engage these developments through considering a pivotal question: How do and should elite educational institutions choose among the many applicants vying for admission? Two principles loom large in the ethos of selective college admissions: diversity and merit. Throughout the course, we will take a critical stance toward these claims. For example, how much does and should merit shape admissions decisions? What are the rationales for using prior grades and test scores to assess applicants? Similarly, what are the costs and benefit of the diversity rationale? Should schools take account of race, socioeconomic class, or neither? Course readings will include judicial opinions and legal commentary, social science evidence and cultural criticism. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper.

**LAW 7077. Native Peoples and the Law. 1 Unit.**

This reading group of five evening meetings over the quarter will explore Native peoples' encounters with U.S. law as recounted in novels, documentaries, essays, and other material, emphasizing indigenous perspectives and voices. The class is intended as a complement to LAW7030: Federal Indian Law; students enrolled in that course will receive priority in admission, but all students are welcome, space permitting. Elements used in grading: Attendance, Class Participation. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Same as: Reading Group

**LAW 7501. Carrots, Sticks, Norms, and Nudges: Changing Minds and Behaviors. 3 Units.**

In this class, we will survey the current state of the science of behavior change. By the 1990s, social scientists had already built a massive literature on this topic, and an integrative consensus theoretical framework began to emerge. But in the past decade, this literature has been revitalized by dramatic new ideas and technologies, as well as significant improvements in evaluation methodology. We will focus on four types of strategies that apply equally to influence efforts by individuals, communities, non-profits, for-profits, and government: (1) Carrots: Positive incentives (rewards, awards, praise, recognition, discounts, rebates, property rights, etc.); (2) Sticks: Negative incentives (punishments, fines, shaming, guilt or liability verdicts, costs, etc.); (3) Norms: What other people believe I should do, and what I see others actually do (tipping points, bandwagons, cascades, herding, etc.); and (4) Nudges: Traditional methods of persuasion; use of defaults to encourage certain behaviors; engineering the environment; harm reduction for risky behaviors. We will examine the "how" and "why" and "when" of these approaches, but also their normative implications for ethics, justice, and public welfare. Course requirements include class attendance and participation, and five short written assignments. For Research "R" credit, students may petition to complete one long paper based on independent research. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, attendance, written assignments and/or final paper.



**LAW 7502. Economic Analysis of Law. 3 Units.**

(Formerly Law 528) This course will provide a broad overview of the scholarly field known as "law and economics." The focus will be on how legal rules and institutions can correct market failures. We will discuss the economic function of contracts and, when contracts fail or are not feasible, the role of legal remedies to resolve disputes. We will also discuss at some length the choice between encouraging private parties to initiate legal actions to correct externalities and governmental actors, such as regulatory authorities. Extensive attention will be given to the economics of litigation, and to how private incentives to bring lawsuits differ from the social value of litigation. The economic motive to commit crimes, and the optimal governmental response to crime, will be studied in depth. Specific topics within the preceding broad themes include: the Coase Theorem; the tradeoff between the certainty and severity of punishment; the choice between ex ante and ex post sanctions; negligence versus strict liability; property rules; remedies for breach of contract; and the American rule versus the English rule for allocating litigation costs. There is no formal economics prerequisite to take this course, though some prior training in economics will be helpful. Elements used in grading: Final exam (open-book) plus four short take-home problems during the quarter. Cross-listed with Public Policy (PUBLPOL 302B). (For students interested in a shorter introduction to economic analysis of law, see Law 7503, "Introduction to Law and Economics," which is a one-unit course also offered during the winter quarter that is graded on a mandatory pass-fail basis.)

**LAW 7503. Introduction to Law and Economics. 1 Unit.**

(Formerly Law 741) This course will introduce students to the "law and economics" way of thinking about the legal system. It is designed primarily for students who have little or no prior training in economics and who are unlikely to take more advanced courses in the field (such as the 3 unit Law 7502, "Economic Analysis of Law"). This class will meet for six 1.5 hour sessions during the first part of the quarter. We will focus on the core bodies of law taught to first-year law students: tort law, contract law, property law, criminal law, and civil procedure. For each of these bodies of law, the economic approach will be described in non-technical terms and then this approach will be used to examine a key case or key issue within that body of law. First-year law students are especially welcome in this course. There are no prerequisites to take this course. Elements used in grading: Two short take-home exercises (graded on a mandatory pass-fail basis).

**LAW 7504. Introduction to Organizational Behavior. 3 Units.**

(Formerly Law 327) Why do firms exist? Is their sustained success in markets possible? How do leaders choose and execute on a strategy? What should the role of firms be in society? This course will meet once a week to discuss these questions and others about business enterprise. Each week we will focus on interesting and engaging case studies that illustrate key components of strategic management in firms in the U.S. and abroad. The course is designed to be highly interactive, and the principles taught during this course can help students prepare for careers in which they will need to employ strategic thinking. Due to the interactive nature of the course, attendance and in-class participation are graded components. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper.

**LAW 7505. Law and Economics of the Death Penalty Seminar. 2-3 Units.**

(Formerly Law 397) This seminar will examine the legal and policy aspects of a capital punishment regime, with a focus on three primary issues: 1) the Supreme Court's forty-year effort to define what cases can permissibly receive the death penalty and the procedures under which it must be imposed; 2) the arguments for and against the death penalty, with a major focus on whether the death penalty deters, is administered in a racially biased way, or is otherwise implemented in an arbitrary and capricious manner; and 3) what the U.S. and international status of the death penalty is today and what the prospects are for the future in the wake of Justice Breyer's invitation in June 2015 to the Court to rule on the constitutionality of capital punishment in light of the existing empirical evidence. The principle text in the class will be Steiker and Steiker, *Courting Death: The Supreme Court and Capital Punishment*. Although the readings on deterrence and racial discrimination will entail some substantial statistical analysis, a background in statistics, though helpful, will not be required. Special Instructions: After the term begins, students can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on the paper length. Elements used in grading seminar: attendance, class participation, short response papers, and final paper or approved research with the professor.

**LAW 7506. Law and Economics Seminar I. 2-3 Units.**

(Formerly Law 344) This seminar will examine current research by lawyers and economists on a variety of topics in law and economics. Several sessions of the seminar will consist of an invited speaker, usually from another university, who will discuss his or her current research. Representative of these sessions have been discussions of compensation for government regulations and takings, liability rules for controlling accidents, the definition of markets in antitrust analysis, the role of the government as a controlling shareholder, and optimal drug patent length. Special Instructions: You may write a series of short commentaries on the guest speakers' papers, of which there will be four. Students electing this option will be graded on a Mandatory Pass/Restricted Credit/Fail basis and receive 2 units of credit. Alternatively, you may write a single research paper on a law and economics topic of your choice. This will satisfy the Law School's Research requirement. These papers will be graded on an Honors/Pass/Restricted Credit/Fail basis. (You may write a single longer paper for two quarters if you enroll in the Seminar in the Winter as well.) Students taking the seminar for R credit can take the seminar for either 2 or 3 units of credit, depending on the paper length. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. There is no formal economics prerequisite to take this seminar, though students doing the longer research papers typically have some prior training in economics. Students may take both Law and Economics Seminar I and Law and Economics Seminar II in either order (neither is a prerequisite for the other). This seminar is cross-listed with the Economics Department (same as Econ 354). Elements used in grading: Four commentaries or one research paper. Special note: Professor Polinsky will be the principal instructor, with Professor Donohue participating mainly when there are guest speakers. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7507. Law and Economics Seminar II. 2-3 Units.**

(Formerly Law 344) This seminar will examine current research by lawyers and economists on a variety of topics in law and economics. Several sessions of the seminar will consist of an invited speaker, usually from another university, who will discuss his or her current research. Representative of these sessions have been discussions of compensation for government regulations and takings, liability rules for controlling accidents, the definition of markets in antitrust analysis, the role of the government as a controlling shareholder, and optimal drug patent length. Special Instructions: You may write a series of short commentaries on the guest speakers' papers, of which there will be four. Students electing this option will be graded on a Mandatory Pass/Restricted Credit/Fail basis and receive 2 units of credit. Alternatively, you may write a single research paper on a law and economics topic of your choice. This will satisfy the Law School's Research requirement. These papers will be graded on an Honors/Pass/Restricted Credit/Fail basis. (You may write a single longer paper for two quarters if you enroll in the Seminar in the Autumn as well.) Students taking the seminar for R credit can take the seminar for either 2 or 3 units of credit, depending on the paper length. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. There is no formal economics prerequisite to take this seminar, though students doing the longer research papers typically have some prior training in economics. Students may take both Law and Economics Seminar I and Law and Economics Seminar II in either order (neither is a prerequisite for the other). Elements used in grading: Four commentaries or one research paper. Cross-listed with Economics (ECON 354). CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7508. Problem Solving and Decision Making for Public Policy and Social Change. 4 Units.**

(Formerly Law 333) Stanford graduates will play important roles in solving many of today's and tomorrow's major societal problems -- such as improving educational and health outcomes, conserving energy, and reducing global poverty -- which call for actions by nonprofit, business, and hybrid organizations as well as governments. This course teaches skills and bodies of knowledge relevant to these roles through problems and case studies drawn from nonprofit organizations, for-profit social enterprises, and governments. Topics include designing, implementing, scaling, and evaluating social strategies; systems thinking; decision making under risk; psychological biases that adversely affect people's decisions; methods for influencing individuals' and organizations' behavior, ranging from incentives and penalties to "nudges;" human-centered design; and pay-for-success programs. The concepts and tools taught in the classroom will be applied in a field project that addresses an actual policy problem facing the University. The course may be of interest to students in Law and Policy Lab practicums who wish to broaden their policy analysis skills. Elements Used in Grading: Class participation 30% (coming to class having done the readings, timely submission of questionnaires and problems, participating actively in class discussions, being a responsible member of your team for the team project, and not using laptops or mobile devices in class). Individual paper 30% and Team project 40%. Enrollment: Limited to 32 students, with priority given to students who register on or before the last day of the autumn quarter in the following order: Law School, MPP program, Sustainability Science and Practice Program, IPS program. After that date, any remaining places will be filled on a first-come, first-served basis. Students other than law students must seek the consent of the instructor. .

**LAW 7510. Research Design for Empirical Legal Studies. 3-4 Units.**

(Formerly Law 712) Empirical legal studies have become popular in the U.S. and are now spreading to non-U.S. law faculties as well. Usually the term applies to analyses of quantitative data and the researcher relies on data collected by others. But the term "empirical" properly encompasses both qualitative and quantitative data, including interviews, legal documents, survey research and experimental results. Analysts interested in using such data need to understand how they were collected, in order to decide what data can appropriately be used to answer different kinds of questions. Often to answer the questions of interest, a researcher needs to collect new data, which poses challenging questions about how to design an empirical research study. Answering these questions appropriately is important to ensure publication in a peer-reviewed journal, which is becoming increasingly important to legal academia. This seminar will introduce students to the wide range of research methods that can be used to answer empirical questions, provide a framework for choosing among methods, and explain how to use the methods. The project for the quarter is to design an empirical research study on a topic of your choice. Special Instructions: JD students can take the class for 3-4 units. SPILS students must take this class for 4 units. Students taking the course for 4 units must attend the additional session on Thursday, which is optional for others. After the term begins, JD students accepted into the course can transfer from section (01) into section (02), which can potentially satisfy the R requirement, with consent of the instructor. Consent Application for JD students: To apply for this course, JD students must e-mail Robert MacCoun at [maccoun@law.stanford.edu](mailto:maccoun@law.stanford.edu) and Diego Gil McCawley at [dgil@stanford.edu](mailto:dgil@stanford.edu). This course is REQUIRED for all SPILS fellows and BY CONSENT for all other students. Elements used in grading: Class participation, attendance, written assignments and final paper.

**LAW 7511. Sociology of Law. 3-4 Units.**

(Formerly Law 538) This course explores major issues and debates in the sociology of law. Topics include historical perspectives on the origins of law; rationality and legal sanctions; normative decision making and morality; cognitive decision making; crime and deviance, with particular attention to the problem of mass incarceration; the "law in action" versus the "law on the books;" organizational responses to law, particularly in the context of labor and employment; the roles of lawyers, judges, and juries; and law and social change with particular emphasis on the American civil rights movement. Special Instructions: Students are expected to attend a weekly TA-led discussion section in addition to lecture. Sections will be scheduled after the start of term at times when all students can attend. Paper requirements are flexible. Cross listed with the Sociology Department (Soc 136/236). See "Special Instructions" in course description above. Elements Used in Grading: Class participation, paper proposal, three short papers and a final paper (see syllabus for details).

**LAW 7512. Statistical Inference in Law. 3 Units.**

(Formerly Law 468) Drawing inferences from quantitative data lies at the heart of many legal and policy decisions. This course provides the tools, concepts, and framework for lawyers to become sophisticated consumers of quantitative evidence and social science. The course will focus on a number of empirical debates -- for example, does the death penalty deter murder, do concealed handgun laws influence crime -- as a springboard to teach the logic and terminology of statistical/econometric evaluation of law and policy (regression, statistical significance, identification). No background, beyond high school algebra, is assumed. Anyone who 1) will work in litigation (whether corporate, securities, antitrust, employment discrimination, environmental law) or in public policy, 2) wants to be a better citizen or 3) wants to understand the challenges of establishing causal relationships, and who doesn't already have a strong understanding of statistics will find this course useful. Elements Used in Grading: Attendance, written assignments, response papers, and a final project. To avoid math phobias and fears about ringers from the econ or stats departments, the course is graded as a mandatory pass-fail course.

**LAW 7514. Behavioral Law and Economics. 2-3 Units.**

The field of "law and economics" provides important lessons for how legal institutions should be designed, but many of those lessons rely on the assumption that individuals behave in the way that maximizes their self-interest. Research from the fields of psychology and behavioral economics casts doubt on this assumption in numerous legal contexts. This seminar will explore a range of topics about human decision-making, focusing on how research in this area should inform the design of policy. Special Instructions: Grades will be based on class attendance, class participation, and either several short reflection papers (section (01)) or an independent research paper (section (02)). After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Students taking the course for R credit can take the course for either 2 or 3 units, depending on paper length. Elements used in grading: class participation, class attendance, reflection papers or research paper. Early drop deadline.

**LAW 7801. Professional Development & Management Skills for Lawyers. 2 Units.**

(Formerly Law 519) This course will help students to develop the professional management skills that are essential for a successful legal career. The course will focus on team dynamics and leadership; influence and managing up; effectively communicating with clients, colleagues, other parties and tribunals; and managing expectations and unexpected adversity. For the final paper, students will have the option to write a reflection paper on one of the topics covered in class, or create a personal plan outlining the substantive knowledge, professional skills, and business focus the student needs to build a fulfilling law practice. Assignments and simulations will demonstrate and model various skills and instructors will provide real-time feedback to students on class exercises. The course is not limited to any particular type of practice (size or substantive area). Elements used in grading: Class participation and attendance, course exercises and written assignments.

**LAW 7802. Accounting. 3 Units.**

(Formerly Law 226) The objective of financial accounting is to measure economic activity for decision-making. Financial statements are a key product of this measurement process and an important component of firms' financial reporting activities. This course is aimed at developing students' ability to read, understand, and use corporate financial statements. The primary focus is on understanding the mapping between underlying economic events and financial reporting, and how this mapping can affect inferences about future firm profitability. To this end, the course will provide an introduction to: (1) Accrual accounting concepts, principles and conventions; (2) The process of preparing and presenting the primary financial statements (income statement, balance sheet, and statement of cash flows); (3) The judgment involved and discretion allowed in making accounting choices; (4) The effects of accounting discretion on the quality of the (reported) financial information; (5) The fundamentals of financial statement analysis. Class time will be allocated to a combination of short lectures and discussions of the assigned cases. The assigned cases are based on actual corporate financial statements and/or "real life" financial situations. Grading will be based on: class participation, attendance and written assignments. Early add/drop deadline.

**LAW 7803. Alternative Dispute Resolution: Law, Practice, and Policy. 3 Units.**

(Formerly Law 545) Clients in disputes increasingly call for lawyers with skill within a broad range of alternative dispute resolution processes. In this course, you will learn about the variety of dispute resolution procedures that operate under the ADR umbrella, within and outside of the court system (including mediation and arbitration). The goal is for students to understand the law and policy behind these alternatives relative to court adjudication, to be able to select the appropriate process for a client, and to effectively represent that client in the selected process. The teaching team includes third party neutrals and advocates from a range of contexts, including federal court, private mediation, private and public arbitration, and corporate legal counsel. Special class on Saturday, Feb. 24, 9a-3p. After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, discussion; three written assignments, final paper.

**LAW 7804. Alternative Dispute Resolution: Practicum. 2 Units.**

(Formerly Law 546) Effective client representation increasingly calls for lawyers with skill within a broad range of alternative dispute resolution processes. In this course, you will have the opportunity to observe 2-3 ADR processes being handled by Bay Area third-party neutral practitioners. Students in the class will meet periodically to review relevant law and policy, and to discuss observed cases. Grades will be based on seminar participation and 3 short papers. Co- or Prerequisites: Mediation or ADR. Elements used in grading: Class participation, attendance and written assignments. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7805. Career Development: Alchemy, Law, and Practice. 2 Units.**

(Formerly Law 772) Career development is embedded in life development. This course offers a space and time for each student to consider both through course materials, class interactions, and a series of reflection papers. The course includes one class facilitated in collaboration with the Office of Career Services focusing on a formal assessment via one or more psychological tests offered to each student. The materials for other class meetings are thought provoking works that have proven to be salient for considering career and life direction. Images and material from alchemy that embody what many consider to be a primary set of symbols for personal transformation provide a backdrop for the course. The course benefits from the collaboration of Michael Guasperini, a mythologist and lawyer whose primary vocation is working intimately with lawyers and firms during periods of personal and institutional transition. Mr. Guasperini has deep experience with the personal lives of hundreds of lawyers at various ages and levels of professional development, providing a valuable and practical perspective for self-reflection. Elements used in grading: Written Assignments (reflection papers).

**LAW 7806. Dispute System Design. 3 Units.**

(Formerly Law 613) Lawyers are often called upon to help design systems for managing and resolving conflicts that support or supplant existing legal structures. The crisis of September 11 led Congress to pass a law creating the September 11 Fund; a California Supreme Court challenge to its method of resolving health care disputes led Kaiser Permanente to reform its arbitration system; years of atrocities committed against the people of South Africa, Guatemala and many other countries led to the formation of truth commissions. Lawyers helped to structure these and many other conflict resolution systems. We'll use a case study model to survey different kinds of conflict prevention, management and resolution systems, and examine different factors in their design. Special Instructions: Grades will be based on class participation and Option 1 (section 01) a series of weekly short written assignments plus a 10-page case study; or Option 2 (section 02) weekly short written assignments plus a 26-page research paper involving independent research. Students electing option 2 (section 02) will be graded on the H/P/R/F system and will receive Research (R) credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Negotiation Seminar (LAW 615) is preferred but not required. Elements used in grading: Class participation, attendance, written assignments and final paper. Attendance at the first class is mandatory.

**LAW 7807. Facilitation for Attorneys. 2 Units.**

(Formerly Law 509) Most lawyers and other professionals spend a significant amount of time in meetings and working in teams or groups for a variety of purposes, and many report that this can be a frustrating experience. As the practice of law becomes more complex, it includes more and more situations where groups of people need to work together planning complex legal strategies, developing firm policies, working with corporations or other multi-person clients, or participating in shareholder meetings, public commissions and councils, corporate and non-profit Board of Directors meetings. Group functionality and outcomes can be significantly improved by any group members who has the awareness and skills of a facilitator, whether or not that person is formally designated as the facilitator. The interactive class methodology will combine discussion with many exercises and roleplays, putting facilitation tools into practice every step of the way. We will examine group dynamics and learn skills used by professional facilitators to prevent common problems and elicit the best work of a group. We will explore how to prepare effectively with clear goals, collaborative problem definition, inclusive process design and a well structured agenda. We will also discuss and practice core meeting management skills such as how to balance voice and participation, build consensus, inspire creativity and promote principled evaluation and decision-making. Finally, we will identify and apply communication skills that keep group sessions productive and tools to manage difficult moments and problem behaviors. Class Schedule dates: Oct. 13th. (4:30 – 9p.m.), Oct 14th. (9 – 5:15) and Oct. 21st. (9 – 5:15). Elements used in grading: Class attendance, participation and final paper.

**LAW 7808. Foreign and International Legal Research. 2 Units.**

(Formerly Law 461) This course will introduce students to concepts and skills used in international and foreign law research. Students will learn to construct successful research strategies for questions of foreign law, public international law, and private international law. Both primary and secondary authority will be covered in various formats. Students will understand how different legal systems and cultures influence the use and assessment of legal resources. The course will also equip students to critically evaluate current and future research tools. No pre-requisites or foreign language ability required. Advanced degree and non-law students are welcome to enroll in the course. Learning Outcomes – \*Identify primary and secondary sources of materials on international law and foreign legal systems. \*Develop effective research strategies using online and print resources. \*Critically evaluate research tools for international and foreign legal research. \*Appreciate cultural and historical influences on the development of legal systems and their relevance to legal research. \*Understand the role of language and translation tools in researching foreign and international law. Elements used in grading: Weekly assignments.

**LAW 7809. Advanced Legal Research. 3 Units.**

(Formerly Law 222) The course is designed to prepare law students for research in practice and clerkships. The course will review sources of legal authority and how this material is used, organized, published, indexed, and kept current. Objectives for the course are: 1) to show students how to find and evaluate legal research sources and use them effectively, with particular emphasis on cost-effective research; 2) to expand research skills in primary and secondary U.S. legal sources; and 3) to introduce students to the array of non-legal information resources useful to legal practice. Learning legal research requires a hands-on approach, so students will complete in-class exercises and homework assignments – all of which contribute to grading. There will not be a final exam. This course is open to Stanford graduate students with permission from the instructor.

**LAW 7815. Advanced Legal Writing: Business Transactions. 3 Units.**

(Formerly Law 664) This course offers comprehensive preparation for practice of the transactional lawyer. Students will learn the foundational tools necessary to write clear, effective, plain language business contracts and analyze other transactional writings used to manage and document complex business transactions. The course provides interactive lectures and a wide range of realistic drafting and research exercises, completed both inside and outside of class, both individually and collaboratively. These exercises help students improve their research, analysis, drafting, and editing skills and develop sensitivity to the expectations of attorneys and clients with whom they will be working. Students will learn the research and analytical tools necessary to interpret provisions in a variety of business agreements. Issues related to ethics in a transactional practice will also be addressed. The course should appeal especially to students interested in working for a law firm and practicing transactional law (be it corporate, venture, debt, intellectual property, mergers and acquisitions, entertainment, real estate, etc.). It will also appeal to those interested in business litigation, or those curious about the work of transactional lawyers. SPECIAL INSTRUCTIONS: Students on the waitlist for the course will be admitted if spots are available on the basis of priority and Degree of Study. Early drop deadline: Students may not drop this course after first week of class. Corporations (Law 242) is a prerequisite for all but LLM (CGP) students. Due to an overlap in content, students may not take both Advanced Legal Writing: The Art of the Deal and Advanced Legal Writing: Business Transactions. Elements used in grading: Class participation, attendance, written assignments, and final paper. Please consult the syllabus for paper and assignment deadlines.

**LAW 7816. Advanced Legal Writing: Litigation. 3 Units.**

(Formerly Law 674) Building on the skills developed in Federal Litigation, this course will give students additional practice with legal analysis, argument structure, and writing in either the pre-trial or appellate litigation context. Students will draft an office memo and a brief. Students also will complete short writing exercises in class to practice skills such as omitting surplus words, preferring active voice, using concrete words, punctuating carefully, etc. The goals of this class are to help students organize facts and principles in a succinct and logical way, to deepen their understanding of legal reasoning and writing, and to hone their advocacy skills. The course should appeal to students interested in litigation practice and those wishing to strengthen their writing. Special Instructions: Students on the waitlist for the course will be admitted if spots are available on the basis of priority and Degree of Study. Elements used in grading: Written work, class participation, and attendance.

**LAW 7817. Advanced Legal Writing: Global Litigation. 3 Units.**

This course offers an introduction to the practical, procedural and analytical aspects of private transnational litigation in the U.S. and Europe. Through a case simulation students will examine differences in legal systems and how to effectively navigate the challenges and opportunities presented when litigation goes global. With three instructors and limited student enrollment, the class provides an excellent opportunity for students to develop the research, writing and oral advocacy skills necessary for a successful transnational litigation practice. Elements used in grading: class participation, attendance, assignments.

**LAW 7818. Advanced Legal Writing: Technology Transactions. 3 Units.**

(Formerly Law 730) This course covers the foundations of drafting contracts in a modern commercial setting, primarily through weekly hands-on writing exercises that illustrate business problems commonly found in today's technology transactions law practice. Topics to be addressed will include basic contract anatomy, common clause ambiguities, structuring for readable "flow", and drafting-for-negotiation techniques. Final examination will involve crafting a full-length technology license agreement from a rough term sheet that appears to have been pecked out on some sort of mobile device. No prior business law coursework, intellectual property background, or martial arts proficiency required. Elements used in grading: Class Participation, Attendance, Written Assignments, Final Exam.

**LAW 7819. Mediation. 3 Units.**

(Formerly Law 638) As law is practiced today, attorneys are far more likely to participate in multiple mediations than trial. Mediation has become the preferred approach to conflict resolution in most states and many parts of the world. With the assistance of a mediator, parties can reach agreements at any stage in a dispute, in some cases avoiding litigation altogether, in other cases agreeing just before trial or when the case is on appeal. The course goals are to understand the nature of conflict and principles of conflict management, to develop the communication skills essential to effective mediation, to evaluate various mediation models and mediator styles, to practice all of the phases of a mediation and appropriate use of caucus, to consider the policy and ethical implications of the expanding use of mediation, and to develop the skills necessary to represent clients in mediation. The class methodology is highly experiential, with more than 1/3 consisting of practice from the perspective of client, advocate and mediator. The course also includes readings and discussions, brief interactive lectures, demonstrations and videotaped sessions. Each student receives individual feedback from an experienced Bay Area mediator and develops skills that will be useful in client development, negotiation and a variety of contexts beyond mediation. You are encouraged to apply if you have taken (or are concurrently taking) the basic negotiation class or its equivalent in studies or experience. Elements used in grading: Class participation, attendance, assignments. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7820. Moot Court. 2 Units.**

(Formerly Law 402) The major moot court activity at Stanford Law School is the Marion Rice Kirkwood Memorial Competition, which takes place each year during Autumn and Winter terms. Autumn term will be dedicated to brief writing and completion of the written portion of the Competition; the oral argument portion of the Competition will be conducted during the first four to five weeks of Winter term. Students on externship and in clinics may enroll if permitted by their respective programs. In Autumn term there are only a few class meetings, including a guest lecture on ethics, which can be recorded. In addition, there are individually scheduled conferences and practice arguments. In Winter term, students must participate in scheduled oral arguments. The preliminary rounds are in the evening; the semifinal and final rounds are in the late afternoon. Prior to the Competition itself, materials and lectures are provided on research, brief writing, and oral advocacy techniques. Registration for the Kirkwood Competition is by team. Each team is required to submit an appellate brief of substantial length and quality and to complete at least two oral arguments, one on each side of an actual case. The first draft of the brief is reviewed and critiqued by the course instructors. The course instructors and the Moot Court Board Presidents score the final draft of the brief. The course also offers digital recording and critiques of practice oral arguments. Panels of judges and local attorneys serve as judges who score the oral argument portion of the Competition. Teams are selected for the quarterfinal, semifinal, and final round of the Competition based on their brief and oral advocacy scores. The final round of the Competition is held before a panel of distinguished judges and the entire Law School community is invited to attend. Special Instructions: In order to maintain academic standards, enrollment in the Kirkwood Competition is limited to 20 two-person teams. This limit will be strictly enforced. Registration forms will be distributed Spring term. If the program is oversubscribed, a lottery will be held to determine participating teams and to establish a waiting list. The final drop deadline for the course will be the Friday of the first week of classes. Enrollment in both Autumn (2 units) and Winter (1 unit) terms is required. The final grade for both Autumn and Winter terms and the Professional Skills credit will be awarded upon the completion of the course requirements. Registration and Consent Instructions: Instructions on how to register for the Moot Court competition are sent out to students each year in Spring term for the coming academic year. The registration process is separate from the regular class registration process. Elements used in grading: Satisfactory completion of appellate brief and oral arguments. Early application and drop deadlines.

**LAW 7821. Negotiation. 3 Units.**

(Formerly Law 615) As a lawyer, you will probably negotiate more than you do anything else. You will negotiate not just over cases, but any time that you need something that you cannot get alone. You will negotiate with your boss, your clients, your paralegal, and all of their counterparts (plus the lawyers) on the other side. You will negotiate with "the system" whether it is the court, the government, the structure of society, or the law. You will also continue to negotiate with your family, your friends, and yourself. This course is designed to: (1) develop your understanding of negotiation, and your awareness of yourself as a negotiator; (2) give you some tools and concepts for analyzing and preparing for negotiations; (3) enhance your negotiating skills through frequent role plays, reflection, and feedback; and (4) teach you how to keep learning from your own negotiation experience. In addition to negotiation skills and theory, you will be introduced to issues of representation, ethics, and the place of negotiation in our legal system. The Negotiation Seminar is an intense, interactive course. We will require weekly preparation of readings, simulations, and written assignments. Basically, you will learn by reading about specific research and doing simulated negotiations – figuring out with the rest of the class what works and what does not, writing about what you're learning, and trying again. Because participation in the simulations is central to the course, attendance at all classes is required. Since we will begin our simulation exercises on the first day of class, all students who are interested in taking the course (whether enrolled or on the wait-list) need to be present for the first class. (Students who are not present will be dropped from the class or waiting list unless they have made previous arrangements with the instructor.) Add-drop decisions need to be resolved at the first class; no drops will be permitted thereafter. Once you commit to the class, you must complete it or receive a failing grade. Exceptions to this rule will be made by petition only. Elements used in grading: Class participation, attendance and written assignments.

**LAW 7822. Negotiation on the Ground: Discussions at the Intersection of Theory and Practice. 1 Unit.**

(Formerly Law 726) We can read any number of books about negotiation, but how do the concepts and principles play out in the real world? This dinner colloquium will meet with distinguished negotiators working in a variety of fields to reflect on and draw lessons from their deep and diverse experience. Guests for this term will speak on: studio and talent perspectives in entertainment negotiations; insights into negotiating strategy for impact litigation (same sex marriage and the "bathroom" laws); working relationship between inside and outside transactional counsel in M&A; and prosecution and defense perspectives on negotiating in the criminal justice system. Pre-Requisite: Negotiation Seminar or substantial equivalent. Schedule: Wednesday, 5:30-8:00pm. There will be four presentation/dinner discussion sessions during the Spring Quarter on April 4, April 25, May 9, and May 23. Elements used in grading: Class Participation and Attendance.

**LAW 7823. Advanced Negotiation: International. 3 Units.**

(Formerly Law 661) Understanding the fundamentals of negotiation and conflict resolution in the international domain is now more critical than ever. This hands-on, advanced seminar is designed to teach students how to prepare for, participate in, and critically evaluate complex multiparty negotiations in the public international field. Through experience-based learning and simulations, the course will expose students to various types of international conflict resolution processes. These processes include second track negotiation and dialogue, natural resource management and extractive industries, and peace agreements. Special attention will be paid to the role of mediators and facilitators in such processes, as well as lawyers and legal advocates. Prerequisites: Negotiation Seminar, its substantial academic equivalent, or substantial experience in the field. SPILS students are especially encouraged to enroll. This course is also open to cross-registration by graduate students in a variety of departments and programs including International Policy Studies. Please describe prior negotiations coursework and experience on your Consent Form. Any student deemed to be lacking the required foundational knowledge may still be admitted to the course, but required to attend an intensive bootcamp in basic negotiation theory and methods on Saturday, April 7th. Grading Criteria: The seminar requires that students do the assigned reading, prepare for and actively participate in class and simulations, and write a series of short assignments. CONSENT APPLICATION: To apply for this course, students must complete and submit the Consent Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms).

**LAW 7824. Advanced Negotiation: Public Policy. 3 Units.**

(Formerly Law 650) Advanced Negotiation courses are designed to take students beyond the two-party, lawyer-client negotiations that were the focus of the Negotiation Seminar, to examine many facets of negotiation complexity, both in terms of the participants and topics. This section of Advanced Negotiation will focus on multi-party negotiations, working in teams, group decision-making, and negotiating on behalf of organizations to solve complex problems in the economic development, environmental, and health policy sectors. The goals of the class are twofold, for students (1) to acquire an added theoretical base beyond what was covered in the Negotiation Seminar through which to analyze, prepare for, participate in and facilitate more complex, multiparty negotiations, and (2) to expand skills through deeper examination of various actual negotiation cases and complex simulations. Special Instructions: Attendance at and participation in the simulations is required. Passing is dependent upon active participation, submission of several assigned short reflection papers, and completion of a selected case analysis (a completed or ongoing multi-party public policy dialogue). Prerequisite: Negotiation Seminar (Law 7821) or its substantial equivalent. Advanced degree students (and graduate students in other departments and programs) are encouraged to enroll provided that they have previous negotiation training or equivalent practice experience. Elements used in grading: Class participation and engagement, including simulations; attendance; preparation for and contributions to discussion; and short written assignments.

**LAW 7825. Advanced Negotiation: Transactions. 3 Units.**

(Formerly Law 659) Advanced Negotiation takes students beyond the two-party, lawyer-client negotiations that were the focus of the Negotiation Seminar. Advanced Negotiation: Transactions places the student in more difficult and more nuanced simulations, working as individuals, pairs, and teams to negotiate on behalf of governments, unions and NGOs, as well as business entities. Simulations include critical-path supply agreements, vendor/collaborator contracts, cross-cultural joint ventures, airline reorganizations, big pharma arbitration resolution and multi-party private sector/government negotiations. The goals of the class include acquiring a designer's mindset for strategic preparation and tactical adjustment to changing scenarios; deeper analysis of the argumentative and persuasive elements of any negotiation; coalition formation and management, and improved tactical skills such as reading non-verbal cues, methods of questioning, response control, situational agility and, ultimately, improved confidence and competence. Special Instructions: Attendance at and participation in all simulations and debriefing sessions is required. Passing is dependent upon this active participation, a series of short papers and in-class presentation. Prerequisite: Negotiation Seminar (Law 615) or its substantial equivalent, as assessed by the instructor. This class is limited to 20 students, with an effort made to have students from SLS (16 students will be selected by lottery) and 4 non-law students by consent of instructor. Elements used in grading: Participation in negotiation and debriefs, thorough out-of-class preparation, and short papers.

**LAW 7826. Oral Argument Workshop. 2 Units.**

(Formerly Law 628A) Building on the skills developed in Federal Litigation, this simulation course will give students the unique opportunity to argue and judge pretrial motions from actual federal court cases. The instructor will provide the written briefs, and each week half the class will argue and half the class will judge a motion. Preparation will require reading the cases cited in the briefs and coming to class ready either to present an argument (attorneys) or interrogate counsel (judges). Students will critique each other both orally and in writing, and the instructor will provide oral critiques of all arguments. The goals of this class are: to train students to argue in court; to provide them with a chance to polish their public speaking skills and practice thinking on their feet; to prepare students to engage in challenging dialogue with both colleagues and future clients; and to improve self-confidence. Thus, while the context of the course is litigation, the objectives are much broader than the mastery of litigation technique. This course is not open to first year Law School students. Priority will be given to those students who commit to taking the class if given consent to enroll. Please indicate your commitment on the consent form. Elements used in grading: Class attendance, participation, and preparation. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7827. Advanced Legal Writing for American Practice. 3 Units.**

(Formerly Law 708) This course orients advanced degree students and upper class JD students to a range of legal writing genres used by lawyers in practice in American law offices and before American courts. At the core of these genres are the techniques of legal research, objective and persuasive legal writing, and related legal analysis. The course presents students with realistic legal writing scenarios that they address in and out of class. Students perform legal research and analysis as they complete assignments designed to incorporate methods that American lawyers use to analyze typical legal problems while advocating on behalf of a hypothetical client in a litigation matter. Class Participation, Attendance, Written Assignments.

**LAW 7828. Trial Advocacy Workshop. 5 Units.**

(Formerly Law 610) This lawyering skills course gives students an orientation to and constant practice in most basic pretrial and trial advocacy skills areas. Topics include: taking and defending depositions, trial evidence, including admission of trial exhibits in evidence and use of prior witness statements to refresh and impeach a witness, jury selection and voir dire, opening statements, direct and cross-examination of witnesses, expert witnesses, and closing arguments. Students will try a full jury case through to verdict with use of jurors and usually before a real judge in the courthouse in Palo Alto at the end of the course. Students will also have a chance to watch the jurors deliberate and talk with them after their verdict. The course takes place during seven weeks of the Autumn Quarter with two classes (one lecture and one workshop) per week on most weeks from 4:15-9:00 (these usually occur on M, W, or Th), plus one Saturday workshop and the final weekend of jury trials, Saturday and Sunday November 11 and 12. Each day's ending time will vary; most sessions will end before 9:00. For a detailed schedule, contact Stephanie Basso at sbasso@law.stanford.edu. The format for each topic begins with a lecture/discussion featuring video vignettes of various techniques and a live demonstration by an expert trial lawyer. Following the discussion portion of each topic are small group sessions during which each student practices the skills involved. Constructive feedback is given after each exercise by two of our faculty of very experienced Bay Area litigators and judges. Most exercises are also videoed for further one-on-one critique by another faculty member. The central philosophy of the workshop is that skills are best acquired in an experiential manner by seeing and doing. Frequent short, well-defined exercises followed by immediate constructive feedback in a non-competitive, non-threatening atmosphere provide the core of the program. The workshop directors are Tim Hallahan, Judge Sallie Kim and Sara Peters. Tim has taught similar programs at Harvard Law School, the University of San Francisco School of Law, Boalt Hall, the California Continuing Education of the Bar, and in private and public interest law firms around the country. Sallie is a United States Magistrate Judge in San Francisco and was a partner in a civil litigation firm and also previously taught a class at SLS and served as Associate Dean for Student Affairs. Sara is a trial attorney for a personal injury law firm in San Francisco. She graduated from Stanford Law School in 2008 and coaches the Stanford Law School mock trial team. Special Instructions: If you haven't taken Evidence you must contact Tim Hallahan before the course begins for some brief pre-course reading assignments. There are no papers or tests, but attendance at every session is required. Since we will begin our trial advocacy exercises on the first day of class, all students who are interested in taking the course (whether enrolled or on the wait-list) need to be present for the first class. (Students who are not present will be dropped from the class or waiting list unless they have made previous arrangements with the professor.) Add-drop decisions need to be resolved at the first class; no drops will be permitted thereafter. Exceptions to this rule will be made by petition only. Mandatory attendance. Elements used in grading: Attendance and in-class assignments. In addition, the Trial Advocacy Workshop is approved to offer Experiential Learning (EL) Credit. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 7830. Topics in American Legal Practice. 1 Unit.**

(Formerly Law 733) This course is designed to introduce international students to American legal practice. To do this, the course begins in the spring quarter by working with students to look ahead to their summer experience and begin to identify ways in which the culture or norms of the practice setting might be distinctive, or otherwise differ from the legal, political, or workplace culture of their home country. Then in the fall quarter, students are asked to write a 10-page paper, situated in the relevant literature(s), that uses the summer experience to examine one such set of issues. Elements used in grading: Final Paper.

**LAW 7831. Transition to Practice: Selected Topics. 1 Unit.**

This course is designed to explore issues of professional identity for students transitioning into the legal profession. It will begin in the spring quarter and continue into the fall quarter, and will require the writing of a paper. Elements used in grading: Final Paper.

**LAW 7833. Spanish for Lawyers. 2 Units.**

(Formerly Law 629) The Spanish for Lawyers course offers students the opportunity to enhance existing Spanish communication skills in legal practice. The course will emphasize speaking and listening comprehension through in-class presentations and dialogue. Students will also be given assignments to be completed outside of class. The course will introduce Spanish legal terminology in areas such as immigration, consumer protection, criminal, employment, housing and family law. Students will learn how to apply these language skills as future legal practitioners interacting with clients who possess limited English proficiency. Native or fluent guest participants will expose students to legal terminology, concepts and dialects from various Spanish-speaking countries. The goal of the class is to enable students to, at a minimum, conduct intake interviews with a Spanish-speaking client without the assistance of an interpreter in a culturally competent fashion. Elements used in grading: Attendance, Class Participation, Written Assignments.

**LAW 7836. Advanced Legal Writing: Appellate Litigation. 3 Units.**

(Formerly Law 718) This course will explore the art and science of appellate writing. We'll look at real-world examples of appellate briefs, learning from the brilliant briefs and discussing ways to fix the lousy ones. We'll also study the nuts and bolts of effective appellate writing, including advanced grammar and usage, organization, typography, methods for drafting and editing, and when to break the rules. This class should be useful to students planning appellate-court clerkships or those just looking to hone their legal writing skills. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper.

**LAW 7837. Advanced Legal Writing: Public Interest Litigation. 3 Units.**

(Formerly Law 792) Public-interest litigation is often an uphill battle. Civil rights plaintiffs have difficulty prevailing even when their fact-patterns are sympathetic, as can be seen in contexts from sexual harassment lawsuits to wage to hour claims and from police brutality and prison conditions cases to transnational human rights complaints. Yet when public interest impact litigation does succeed it can enable or even galvanize social movements-both domestic and international-and meaningfully change the legal landscape. This class will focus on the skills necessary to litigate public interest lawsuits, and, in particular, public interest impact litigation. We will focus on marrying research and analysis of statutory text and case law and harnessing the creativity necessary to win such lawsuits by using those research and analytical results to write two briefs from the perspective of public interest or pro-bono advocates. Along the way, we will examine some of the most important briefs of the twentieth and twenty-first centuries in various public interest contexts to unpack the rhetorical and analytical skills needed to persuade judges across the ideological spectrum. Grading will be based on a Mandatory P/R/F system, taking into account research and writing as well as class participation. SPECIAL INSTRUCTIONS: Students on the waitlist for the course will be admitted if spots are available on the basis of priority. Early drop deadline: Students may not drop this course after first week of class. Elements used in grading: Attendance, Class Participation, Written Assignments.



**LAW 7841. Teaching and Learning in Higher Education. 3 Units.**

(Formerly Law 303) This course is co-taught by Thomas Ehrlich, former dean of the Law School and now Consulting Professor at the Graduate School of Education and Mariatte Denman, Director of Educational Programs at the Office of the Vice Provost for Teaching and Learning (VPTL). It provides students from many disciplines throughout the university opportunities to gain the knowledge and skills needed to be effective teachers. Students watch and interview master teachers at Stanford, learn a range of effective pedagogical methods, and prepare a syllabus module for a workshop or class they might teach. They have an opportunity to practice teach in a supportive environment and gain feedback on their teaching. Elements used in grading: Class Participation, Written Assignments, Final Course or Workshop Syllabus Module. CONSENT APPLICATION: To apply for this course, SLS students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Cross-listed with The Vice Provost for Teaching and Learning (VPTL 297) and Education (EDUC 297).

**LAW 7843. Community-Led System Design. 2 Units.**

This class engages students in participatory/collaborative approaches to redesign complex systems. They will answer the question: how do we make our social legal systems better for people -- and how do we put people at the center of this redesign? The seminar has two parallel components: (1) Learn from a series of experts who have been taking a community-led approach to remaking a legal system (or analogous ones). Guest experts will present their current case studies to illustrate strategy and process design. (2) Select one of two system redesign challenges (see below) and develop their own prototype launching workshop. [For those students interested in continuing with the project, there will be a companion policy lab in the Spring Quarter 2018. This seminar is a prerequisite for the policy lab.] The two prospective system-leader partners are on the verge of major new overhauls of their current systems: (a) California Self-Help Services' guardianship/kid's custody redesign, with Bonnie Hough and the California Judicial Council as a partner, as they try to figure out how to remake the legal system for parents and family members (without lawyers) trying to get custody worked out for kids. (b) New York Chief Justice Task Force housing court/eviction redesign, with the Chief Judge Janet DiFiore's task force as the partner, as they try to figure out how to make the eviction system work better for users. Students will develop their own preliminary plan and prototype for a user-centered process for their partner. Students will learn about new approaches to policy-change, as well as the fundamentals of participatory design and community lawyering. They will operationalize these different approaches, to make them relevant and actionable in an actual legal system. They must synthesize a recommendation to their partner-leader about how they might create a better process to redesign a given court process/system. And they must create a prototype of a launching workshop, that can demonstrate how a wider process would work, while also testing their plan. Elements used in grading: Attendance, Class Participation, Written Assignments, Final Paper.

**LAW 8001. Corporate Governance and Practice Seminar. 2 Units.**

(Formerly Law 703) The seminar on corporate governance meets in the Autumn and Winter quarters and forms the core of the LL.M. Program in Corporate Governance & Practice. The course, designed to be taken in conjunction with Corporations in the fall, takes an economic approach to the analysis of corporate law. In particular, we ask why American corporation law has its particular structure. We will seek to understand how the separation of ownership and control produces agency costs, and the ways in which corporate law seeks to remedy these through techniques like disclosure, fiduciary duties and shareholder litigation, voting, and hostile takeovers. We will read and discuss ongoing debates among scholars and practitioners about the agency cost framework, the merits and limits of current legal policies, and the role of institutional arrangements like activist shareholders. We will also consider the relevance of these disputes, and the effectiveness of corporate law and governance more generally, in the context of a variety of real-life incidents. No knowledge of economics is presupposed, so the course will also introduce basic economics and finance concepts necessary to understand these concepts. Some course sessions, largely in the Winter, will feature outside speakers who will complement the discussions with real-world examples drawn from practice. Attendance and active participation are important to the success of the seminar and an important factor in the overall grade. Students are expected to have carefully read and reviewed assigned materials in advance of each session. Students may be also asked to prepare brief presentations to help guide discussions. Students will be required to submit short reflection papers that evaluate, critique, and discuss some or all of the key topics reviewed in the previous week's session. The class will be graded H/P/R/F in Autumn Quarter and MP/R/F in Winter Quarter. Elements used in grading: Class participation, attendance and assignments. This course is required for and limited to students in the Corporate Governance and Practice LL.M. Program.

**LAW 8002. Environmental Law and Policy Colloquium. 2 Units.**

(Formerly Law 706) The Environmental Law & Policy Colloquium offers students the opportunity to learn about cutting-edge legal topics related to environmental law, broadly defined to include, among other areas, pollution control, natural resources management, and energy development. The colloquium meets in two quarters. During the autumn quarter, students will learn about core concepts that underlie the administration of environmental law, exploring ideas from economics, philosophy, natural science, and law. In the autumn quarter, students will begin to develop a capstone research paper on a contemporary environmental law issue. During the spring quarter, the students will write and present their research papers. Elements used in grading include attendance and participation, problem sets, small writing assignments, and a final paper. This course is required for students in the Environmental Law & Policy LL.M. Program. All other students need instructor permission to enroll.

**LAW 8003. International Economic Law, Business & Policy (IELBP) Colloquium. 2 Units.**

(Formerly Law 711) This course enables IELBP advanced degree students to explore selected issues, case studies and policy debates in international economic law and business, global political economy, and transnational dispute resolution in a highly interactive seminar. The colloquium provides opportunities for students to engage in dialogue with experts in the field (including Stanford Law faculty and interdisciplinary scholars from other schools, departments or programs at Stanford University), to participate in cross-border negotiation simulations, and to discuss legal processes and strategic challenges with experienced international law practitioners. Students are expected to have carefully read assigned materials in advance of each session and to be well prepared to discuss the materials with the instructor and guest speakers. The course extends over two quarters (autumn and spring), and students are required to complete both quarters in order to satisfy the program requirement. The fall quarter colloquium will analyze issues and trends in international economic law, business and policy in the context of globalization and regionalism; students will engage in a policy analysis and advocacy project in small regional groups. The spring colloquium will focus on international economic law, business and policy issues faced by transnational legal practitioners. In each term, written requirements include several short reflection papers and a longer essay for potential publication in the IELBP LLM blog. Elements used in grading: Attendance, active participation and critical thinking are essential to the success of the seminar and are important factors in the grade in addition to written work.

**LAW 8004. Law, Science, and Technology Colloquium. 2 Units.**

(Formerly Law 704) The Law, Science & Technology Colloquium offers students in the Law, Science & Technology LLM Program the opportunity to discuss cutting-edge legal issues at the intersection of law and technology with leading experts in the field, including Stanford faculty, visiting scholars, technology and IP lawyers, entrepreneurs, and executives from Silicon Valley technology companies. During some class meetings, an invited guest lecturer will present research, a paper, or their experiences on a specific topic related to law, science, and technology. Following these presentations, students will participate with the lecturer in a discussion based on assigned readings, the presentation, and students' experience in the area. Attendance and preparation are vital to the success of the Colloquium and, accordingly, will constitute an important factor in the overall grade. Each student will also write papers that evaluate, critique, and discuss issues in the field. Students' grades are based on their papers and classroom performance (e.g., participation, attendance, etc.). This course is restricted to students in the Law, Science, and Technology LLM program, and satisfies their Colloquium requirement for the spring quarter.

**LAW 801. TGR: Project. 0 Units.****LAW 8011. SPILS Law and Society Seminar. 3 Units.**

(Formerly Law 701) This seminar is restricted to students who are in the SPILS program. The seminar deals with the relationship between legal systems and the societies in which they are embedded. The materials are drawn from studies of many different societies. Among the issues dealt with are: What influence does culture have on the operation of legal systems? What are the social forces which produce particular forms of law? What impact do legal interventions have on society and on human behavior? Elements used in grading: Exam.

**LAW 8012. SPILS Masters Thesis. 4 Units.**

(Formerly Law 705) The writing of a work of original scholarship in the area of research that each student chooses is necessary requirement of the JSM degree. During the winter quarter students are expected to submit two draft chapters: 1) any chapter of the fellow's choice in early February; and 2) a draft of the empirical research result's chapter in early March. During the spring quarter students are expected to finalize their research project, and write and submit their final thesis. Towards that end, students must complete and submit a draft of the whole thesis in early April. The final version, revised in response to the adviser's comments, must be submitted by the end of the quarter. The exact dates will be informed in advance by the teaching fellow. Elements used in grading: Thesis. This course is exclusive to SPILS students. The thesis is required for JSM graduation.

**LAW 8013. SPILS Research Methods Workshop. 2 Units.**

(Formerly Law 707) This is a mandatory course for SPILS Fellows as part of the program's core curriculum. Its main goal is to offer students an interdisciplinary perspective about socio-legal research, and research tools for implementing their individual research projects. This Winter term workshop will complement the Research Design for Empirical Legal Studies Seminar taken in the Autumn by 1) expanding and elaborating on some of the methods analyzed during the seminar; and 2) assisting students in using such methods towards their individual research project. The workshop will consist of specialized sessions, most of them tailored towards the work of empirical research that occurs after the data collection phase. During the quarter the fellows are expected to submit drafts of different chapters of their thesis. If appropriate, the workshop may also include group and/or individual sessions designed to address the very specific needs of the research undertaken by the SPILS Fellows. Elements used in grading: Class participation, attendance and written assignments. Enrollment is restricted to SPILS fellows. The seminar is required for JSM graduation.

**LAW 802. TGR: Dissertation. 0 Units.****LAW 8021. Introduction to American Law. 3 Units.**

(Formerly Law 709) This course is designed to introduce international students in the Exchange and Advanced Degree Programs (LL.M. and SPILS) to the key principles of American law. The course provides an overview of distinctive features of the U.S. legal system, including its history and institutions. Topics include: the role of precedent in the Common Law; distinctive elements of Civil Procedure and legal actions; the Branches of the U.S. Government and the Separation of Powers; Federalism; Due Process; Equal Protection. The course is offered before the start of the regular Law School quarter. Special Instructions: Required for LL.M. but optional for the SPILS and Exchange Program students. Open to LL.M., SPILS and SLS Exchange Program students only. The class starts on September 5 and runs through September 21. Final exam will be scheduled on Friday, September 22. Elements used in grading: Class attendance, participation, short written assignment and final exam.

**LAW 8022. Professional Responsibility. 3 Units.**

(Formerly Law 677) This course introduces students to the goals, rules and responsibilities of the American legal profession and its members. The course is designed around the premise that the subject of professional responsibility is the single most relevant to students' future careers as members of the bar. These issues come up on a constant basis and it is critical that lawyers be alert to spotting them when they arise and be educated in the methods of resolving them. As such, the course will address many of the most commonly recurring issues that arise, such as confidentiality, conflicts of interest, candor to the courts and others, the role of the attorney as counselor, the structure of the attorney-client relationship, issues around billing, the tension between "cause lawyering" and individual representation, and lawyers' duty to serve the underrepresented. In addition, we will delve into some more personal ethical issues that reflect on why students have chosen law as a profession and how lawyers compose careers that promote or frustrate those goals. At the start of each session (starting with the second session) there will be a brief quiz on the material that was covered in the readings and discussion of the prior session. During the period of the course, students will also be responsible for submitting one reflection paper (three-to-five pages) based on a prompt that will be circulated after each of the first six sessions (one paper for the entire course). These papers will be due by 11:59 on the last day the class meets. Grades will be based on the quizzes and the paper submitted, with the instructor retaining the right to take class participation into account. Attendance is mandatory and students must seek instructor approval for any absences not due to illness. This course is offered to foreign graduate students only. It is taught on an accelerated basis over the course of three weeks between orientation and the beginning of the Fall Quarter classes. Thus, the course meets on average nine hours per week. The exact meeting times will be set once the graduate students' schedules are set. Elements used in grading: Attendance, class participation, quizzes and written memo. Limited to LL.Ms, J.S.Ms and exchange students. Required for LL.Ms.

**LAW 8031. JSD Research Colloquium. 0 Units.**

(Formerly Law 218) Required for and limited to JSD candidates. The objective of the colloquium is to assist students in designing, conducting, analyzing and reporting their doctoral dissertation research. Weekly colloquium sessions are devoted to work in progress presentations by JSD candidates, supplemented by occasional guest lectures and discussions of cross-cutting issues of interest to doctoral students.

**LAW 805F. Policy Practicum: Endstage Decisions. 1-3 Unit.**

(Formerly Law 413Z) Medical decisions toward the end of life can be crucial and difficult for patients, doctors, and families. Law and medicine have been struggling to find ways to strike a balance between what the patients might want (or say they want), and what makes medical, economic, and ethical sense. One standard is the "Advanced Health Care Directive" (Directive), which guides doctors and surrogates (usually a family member) on what to do when faced with end-of-life dilemmas. Another form, adopted in just over half the states (including California) is the POLST (Physician Orders for Life-Sustaining Treatment). The two types are supposed to complement each other, but they are different in important ways. The Advanced Health Care Directive expresses what a person wants and/or appoints a surrogate in case the patient is unable to express her wishes. Anybody can fill out a Directive, at any time of life. Ideally, a copy goes to the surrogate, if one is appointed, and another to the primary care physician. The POLST form is meant for people who are seriously ill. The Directive (for example "no artificial nutrition by tube") is supposed to be controlling; the patient, of course, can change her mind; but there is no surrogate. It is an agreement between the patient and the doctor. Who uses these different forms? How effective are they? To what extent and in what situations are they useful? Working closely with Stanford Hospital as the client, students will not only look at current literature on the topic and build on past practicum research, but also conduct interviews with doctors, nurses, and other health care specialists with the goal of finding out what local hospitals and nursing homes are doing. The aim is to get a more realistic picture of the what one might call the living law of the Directive and the POLST. The ultimate goal is policy recommendations to improve the forms and associated laws and to examine alternative approaches. Elements used in grading: Class Participation, Final Paper. – NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Directed Writing, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 805R. Policy Practicum: Rethinking Campus and School Title IX Policies and Procedures. 1-3 Unit.**

Client: National Women's Law Center. This practicum continues policy research and advocacy undertaken in Spring 2017 (see description below). Day/Time: TBD scheduled in accordance with registered student availability. Students will refine and finalize policy and procedures, including suggestions from clients and stakeholders, and the priorities that emerged from "The Way Forward" Title IX Conference in Spring 2017 at Stanford Law School. We will seek further feedback from legal, survivor, and other stakeholder groups, and work in conjunction with the National Women's Law Center (NWLC) to disseminate the findings and recommendations to the target end-user groups. This Practicum builds on the skills of thinking about law in an integrated way and situating policy in a direct social context where it can be more readily applied. The project provides students with first-hand experience in gaining a broad and nuanced understanding of emerging social, legal, and policy dilemmas. Given all the controversy surrounding sexual assault on college campuses, surprisingly little is actually known about the policies and processes that are currently in use, nor any way of easily ascertaining what the majority of an institution's "peer schools" are doing with respect to solving a challenge or addressing an issue. There is no set of "best practices" to which school administrators can easily turn. The goal of the practicum is to produce a free, web-based, open-source set of adaptable model policies and procedures that are targeted to different market segments and stakeholders (i.e., large private, large public, small private, HBCU, community colleges, and K12). Enrollment is limited and preference will be given to students enrolled in the Spring 2017 Seminar/Policy Lab Practicum. Students from CS or EE or who have coding and have an interest in the design and building of the online platform would be welcome to join the Policy Lab as well. Over the past four years, the issue of campus sexual assault has exploded into the public discourse. While definitive figures are difficult to obtain due to the necessarily private nature of these events, several recent studies estimate that between 20-25% of college women (and a similar proportion of students identifying as transgender and gender-nonconforming, as well as around 5-10% of male students) experience sexual assault. Survivors have come forward across the country with harrowing stories of assault followed by an insensitive or indifferent response from college administrators, launching one of the most successful, and surprising, social movements in recent memory. Statistics are equally disturbing in the middle and high school context. As a result, the federal government has stepped up its civil rights enforcement in this area, with over 250 colleges and universities currently under investigation for allegedly mishandling student sexual assault complaints. At the same time, students accused of sexual assault have complained of botched processes driven by a "campus rape over-correction" that denied them a fair disciplinary hearing. It is clear that schools are struggling to develop and implement policies and procedures that satisfy their legal obligations in this area. This course focuses on the legal and policy issues surrounding the highly challenging area of investigation and adjudication of sexual assault and other gender-motivated violence on college campuses and in K12 schools. It covers the federal and state legal frameworks governing these procedures including Title IX, the Violence Against Women Act, and the Clery Act, and examines current cases as well as the rapidly evolving legal, federal regulatory, and political environment surrounding this issue. Guest speakers working in the area will help to broaden students' understanding of the subject matter. NOTES: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Directed Writing, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. Elements used in grading: Class Participation, Final Paper. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 805Y. Policy Practicum: Managing Gentrification. 2-3 Units.**

Gentrification is a concern for policy makers in successful and diverse cities. Gentrification can improve neighborhoods that suffer from underinvestment, but it can also cause the displacement of long-term residents, cherished landmarks and long-standing businesses and it can make neighborhoods homogenous, sterile and less able to meet the day-to-day needs of their residents. A gentrifying city can be a city in the process of losing the variety and dynamism that made it attractive to investors and successful people in the first place. And of course, gentrifying cities are unaffordable to low-income residents. Because of rising rents, many neighborhoods in San Francisco are already unable to sustain such businesses as dry cleaners, laundry services, drug stores and affordable restaurants. A neighborhood with nothing but fancy wine bars, chic clothing shops, gourmet restaurants and trendy coffee houses selling \$5 drip coffee is not in crisis, but a city with only such neighborhoods arguably is. This practicum builds on previous Policy Lab research, working closely with the San Francisco Mayor's Office of Housing and Community Development, to examine the challenges of gentrification in San Francisco. Issues include researching policy responses to the displacement of legacy businesses and non-profit enterprises and analyzing the effects of rising property values and rents on the diversity of businesses in San Francisco neighborhoods. Students interested in this policy lab should submit a consent form with a C/V and statement of interest to be reviewed by Professor Ford and San Francisco city officials. Students wishing to undertake R credit will perform additional research for a white paper analyzing the issues and results of the collective research. R credit is possible only by consent of the instructor. After the term begins, and with the consent of the instructor, students accepted into the course may transfer from section (01) into section (02), which meets the R requirement. Elements used in grading: Class Participation, Written Assignments, Final Paper. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 805Z. Policy Practicum: Rethinking INTERPOL's Governance Model. 2-3 Units.**

Today, the international community faces increasingly complex security challenges arising from transnational criminal activities. Effective international cooperation among national and local police agencies is critical in supporting efforts to combat cross-boundary criminal threats like terrorism, human and drug trafficking, and cybercrime. INTERPOL—the world's largest international police organization—is constantly innovating to respond effectively to the world's evolving threat landscape. As a leader in global policing efforts, INTERPOL launched the INTERPOL 2020 Initiative to review the Organization's strategy and develop a roadmap for strengthening its policing capabilities. INTERPOL 2020 will provide the strategic framework to ensure the Organization remains a leader and respected voice in global security matters. This practicum will allow students to assist INTERPOL in modernizing its organizational structure to better fight cyber-crime and terrorism. Students in this practicum will contribute to the Strategic Framework 2017-2020, focusing on comparative governance practices for international organizations. The practicum will analyze decision-making processes within the organization and across other similar organizations (acknowledging their respective mandates) with respect to specific issues identified by INTERPOL. The work product developed during the course of this practicum will serve as part of a framework for INTERPOL to guide and support the development of its governance model. Students in practicum will work directly with INTERPOL clients (via Video-conferencing and email) and may have opportunities to travel to INTERPOL headquarters in Lyon for meetings with clients to develop our policy guidance and provide policy briefings. In addition, selected students in the practicum may have the opportunity to pursue internships and/or externships at the Office of Legal Affairs, INTERPOL General Secretariat in Lyon, France and/or at INTERPOL Global Complex for Innovation in Singapore. Open to graduate students from outside the Law School and, in exceptional cases, to advanced undergraduate students, the practicum seeks those who demonstrate strong interest and background in global security and international law, organizational behavior, and strategic management. This practicum takes place for two quarters (Fall and Winter). Although students may enroll for either one or both quarters, we will give preference to students who agree to enroll for both quarters. Autumn Quarter is offered for 2 or 3 units. Winter Quarter is offered for 2 units. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Attendance, Class participation, Written Assignments, Final Paper. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline. Cross-listed with International Policy Studies (IPS 255).

**LAW 806A. Policy Practicum: Voting Technology. 2-3 Units.**

CLIENT: Committee on the Future of Voting of the National Academies of Sciences. The Committee on the Future of Voting is seeking Practicum research support for an exhaustive study of technology, standards, and resources for voting technologies, including challenges related to the 2016 election. As described on the website for National Academies of Science, Engineering, & Medicine, this "ad hoc committee, under the auspices of the Committee on Science, Technology and Law and the Computer Science and Telecommunications Board, will conduct a study that will: (1) document the current state of play in terms of technology, standards, and resources for voting technologies; (2) examine challenges arising out of the 2016 federal election; (3) evaluate advances in technology currently (and soon to be) available that may improve voting; and (4) offer recommendations that provide a vision of voting that is easier, accessible, reliable, and verifiable. The committee will issue a report at the conclusion of the study." Students in this Practicum will summarize the available literature and government reports on the state of voting technology and develop a bibliography to aid the Committee. The Practicum seeks to build a graduate team of students from law, computer science, and political science to examine issues specific to their academic areas. Students will meet regularly with Professor Persily one on one or in small teams, depending on the project. Additional information on the Committee can be found at the following link: <http://sites.nationalacademies.org/PGA/stl/voting/index.htm>. Students may enroll in any quarter and those seeking R credit may, with consent of the instructor, move from Section 1 (2 credits) to Section 2 (3 credits for R work), during the first week of the term. Elements used in grading: Class Participation, Final Paper.

**LAW 806B. Policy Practicum: Developmental Disabilities: Rights and Funding Challenges. 3 Units.**

In 1977, California became the first state in the US to grant individuals with developmental disabilities (DD) the right to the services and supports they need to live more independent and normal lives. The Lanterman Act, now codified in the California Welfare and Institutions Code, declared that "[a]n array of services and supports should be established which is sufficiently complete to meet the needs and choices of each person with developmental disabilities, regardless of age or degree of disability, and at each stage of life, and to support their integration into the mainstream life of the community." To this day, California is the only state in which the right of individuals with DD to be supported in the least restrictive environment is construed as a civil right and an individual entitlement, not merely a right to "take a number and wait in line" until sufficient state resources become available to meet their service and support needs. To effectuate the goals of the Lanterman Act, California divides responsibility between the Department of Developmental Services (DDS), a state agency, and a network of twenty-one private, nonprofit corporations called "regional centers" that are funded by DDS. Each regional center serves a different area of the state, providing services and supports to individuals with developmental disabilities in the local community. DDS is responsible for monitoring the regional centers and ensuring that they implement the Lanterman Act. In the early years after the Act's passage, DDS (and in turn, the regional centers) were largely funded through the state's general fund. Since the mid-1980s, however, a sizable portion of funding has been provided by the federal government. Through a special waiver program under Medicaid, individuals with DD who would otherwise be forced to reside in institutions can receive the services and supports they need to live in the community. The federal spending cuts contemplated by the Trump Administration, however, could pose an existential threat to the viability of this system. If the funds available to California through the Medicaid waiver program are significantly curtailed, it will be far more difficult for the state to support the integration of individuals with DD into the community. This policy lab will explore whether – and if so, how – the civil rights and individual entitlement embodied in the Lanterman Act can be preserved in a reduced funding environment. Students will investigate the nature and scope of the rights provided under the Act; the corresponding obligations under the Act of the legislature, DDS, and regional centers; and the tools that different branches of state government might bring to bear to effectuate the goals of the Act if the funding available through Medicaid is significantly reduced. Our co-clients are Disability Rights California, a nonprofit founded in 1978 whose mission is to "educate, investigate, and litigate to advance and protect the rights of Californians with disabilities" (see <http://www.disabilityrightsca.org/>), and the California State Council on Developmental Disabilities, "established by state and federal law as an independent state agency to ensure that people with developmental disabilities and their families receive the services and supports they need . . . to live independently and to actively participate in their communities" (see <https://scdd.ca.gov/>). Students may elect to take the course for either three units of research (R) credit or three units of experiential learning (EL) credit. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Class participation, Written Assignments, Final Paper. -- NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Directed Writing, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 806C. Policy Practicum: Fake News and Misinformation. 2-3 Units.**

CLIENT: Hewlett Foundation Madison Initiative. This Practicum works closely with the Hewlett Foundation Madison Initiative on an exhaustive study of fake news, misinformation, disinformation and propaganda and their implications for democracy in America and around the world. The client, the Hewlett Foundation Madison Initiative, is developing a grant-making program for interventions in the spread of fake news and misinformation which also promote accurate information for a healthy, deliberative democracy. The Practicum builds on the work of a Spring 2017 Practicum, led by Senator Russ Feingold, which analyzed the roles of major online platforms – Google, Facebook, Reddit, and Twitter – in proliferating fake news and misinformation in the 2016 election. Students will contribute to that study with their own independent research focusing on such issues as self-regulation by the platforms, legal and regulatory frameworks, analysis of algorithms and user data, and other issues that arise with current events or through ongoing research findings. Students will undertake literature reviews, legal case analysis, investigations of business practices and algorithms associated with the relevant platforms, surveys of the roles of foreign governments, and analysis of policy proposals to combat fake news, misinformation, disinformation, and propaganda. In addition to law, students in the fields of communications, computer science, journalism, political science, and public policy are especially welcome to join the research team. Students will meet one on one with Professor Persily to frame their research and discuss their findings. Students may enroll in any quarter. Those law students seeking R credit may, with consent of the instructor, move from section 1 to section 2. Section 1 is open enrollment for any law or graduate student. Undergraduates may, in exceptional cases, be admitted to the Practicum with consent of the instructor. Elements used in grading: Class participation, Final Paper. NOTES: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Directed Writing, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook.

**LAW 806D. Policy Practicum: Expanding Access to the Legal Bar for the Formerly Incarcerated. 3 Units.**

The Stanford Criminal Justice Center is undertaking a project to increase the participation of formerly incarcerated people in the legal profession who have an interest in pursuing legal careers but who face challenges in overcoming the moral character requirement to bar admission. The project includes surveying best practices, advocacy with the State Bar and could eventually lead to supporting California Bar applicants in moral character hearing determinations. This two-quarter lab will also host a national roundtable that brings together scholars, advocates, and Bar representatives to develop best practices, reported in a final white paper, on law school admission and Bar consideration of applicants with criminal records. We are seeking four to six law students to participate. Students may enroll in both quarters. Elements used in grading: Performance, Class participation, Written Assignments, Final Paper. NOTES: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Directed Writing, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 806E. Policy Practicum: Federal Indian Law: Tribal Code Development Assistance Project. 2-3 Units.**

The Yurok Tribe is the largest federally recognized Native nation in California. Students will assist the client, the Yurok Tribal Attorney's Office, by conducting research related to drafting tribal taxation code. The exact scope and nature of the research will be determined in consultation with the client. Students will produce policy research memos to share internally with the client. Because of the topic's complexity, coursework or background in federal Indian law or taxation is preferred but not required. Elements used in grading: Class Participation, Final Paper. NOTES: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Directed Writing, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 806F. Policy Practicum: Accountability for the Unintended Consequences of Impact Investing. 2-3 Units.**

As the impact investing industry grows exponentially into trillions of dollars, investors, scholars, and industry leaders are increasingly focused on improving metrics and standards. They recognize the need to define impact, critically evaluate philanthropic trade-offs, and apply due diligence standards to evaluate social and environmental risk. Despite this trend, however, no accountability framework exists to manage the potential for harm to people and the environment from impact investing. To ensure that impact investing lives up to its name, a system is needed that holds investors accountable for harm to local communities and their environments. Other traditional development finance institutions – such as OPIC or the World Bank's IFC – have been routinely applying policy and accountability frameworks for decades to manage their social and environmental risks and to remedy harm. When these institutions invest in a project, they bring environmental and human rights standards and citizen-driven complaint systems that local communities can use to address a grievance. If an impact investor (e.g. a private foundation, individual investor, or private bank's impact fund) is funding that same project without traditional development institutions involved, chances are there is no way that communities can have their voices heard or receive remedy for harm. Yet the failure to take seriously the risks of social and environmental harm can lead to catastrophic financial, human, and environmental outcomes. In "Accountability: The Golden Opportunity in Impact Investing" [https://ssir.org/articles/entry/accountability\\_the\\_golden\\_opportunity\\_in\\_impact\\_investing](https://ssir.org/articles/entry/accountability_the_golden_opportunity_in_impact_investing), Natalie Bridgeman Fields describes Accountability Counsel cases in Liberia and Mexico that demonstrate not only the importance of community-driven accountability but also concrete examples of an accountability framework. This project develops a system that enables impact project asset owners access to information about their asset's compliance, evaluation tools, and grievance systems. The practicum team will work closely with Accountability Counsel staff to develop an accountability and learning system for impact investment that guarantees that assets: (1) comply with policies to protect people and the environment, (2) have evaluation tools that assess their impact, and (3) offer grievance methods to address social or environmental harms associated when they do occur. The potential positive impact for impact investing grounded in an accountability framework is staggering. According to a recent report from Morgan Stanley, sustainable investment has grown more than 33 percent over the last two years to \$9 trillion, and will only continue to grow as impact investing becomes more accessible. If impact investing scales further without governance and accountability structures in place to prevent abuse and address harm, the consequences to local communities are dire. They will be certain to include the land grabs, contamination of water, labor rights abuses, and displacement of indigenous people that are typical of investments where there is weak rule of law and use of land and labor. Benefits of creating a robust accountability framework, if achieved, could spread beyond impact investing and could extend across global finance, including development finance, where existing frameworks could be improved based on leadership from the impact investing community. The practicum seeks interdisciplinary graduate students from law, international development, economics, project finance, impact investing, international human rights law, policy advocacy, business, and/or philanthropy. The research team will collaboratively produce a report for a sustained advocacy campaign with lessons and practices for accountability within impact investing. Elements used in grading: Attendance, Class Participation, Final Paper. NOTES: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Directed Writing, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for

**LAW 806G. Policy Practicum: UNCITRAL Transparency Registry. 2 Units.**

As the core legal body of the United Nations system in the field of international trade law, the United Nations Commission on International Trade Law (UNCITRAL) has developed procedural rules to promote transparency and public accessibility to treaty-based investor-state arbitration. In contrast to traditional closed proceedings, the new Rules on Transparency take into account both the public interest and the interest of the parties to resolve arbitration disputes in a fair and efficient manner. Focusing on the 2014 UN Convention on Transparency in Treaty-based Investor-State Arbitration, students will review UNCITRAL Working Group III documents to identify issues of concern and benefit for individual countries considering whether to sign and ratify the Convention. The research team will prepare a strategy working paper for the UNCITRAL secretariat, based on research and interviews conducted in the winter and spring quarters. The Project welcomes Law and IPS graduate students interested in international investor-state arbitration, but winter 2018 enrollment in this policy lab is a prerequisite for enrollment in spring 2018 quarter. Elements used in grading: Class Participation, Final Paper. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 806H. Policy Practicum: Community-Led System Design Practice. 2 Units.**

How do we re-make court processes and technology, so that they better support people trying to use the legal system? In this class, we work with the California Judicial Council and local state courts and self-help centers, to help them consult with court-users, test new technology and processes, and collaboratively design a better civil justice system. In particular, our class will focus on the Guardianship System, in which people, most often without lawyers, are trying to get custody of children whose parents are not able to care for them. Building off our Winter Quarter class, in which teams of students proposed various user testing and multi-stakeholder design workshops, our Policy Lab team will carry out these testing sessions and workshops. We will gather community input into how the Guardianship System can be made more engaging, navigable, and useful to litigants. Much of the work will be done on-site at local courts and self-help centers. Students will be training in user testing and design workshop facilitation. Their work will be presented to our partners, to guide their innovation agenda and future technology purchases. We encourage students who are interested in public service, design and technology, and community lawyering to join. Pre-requisites: We strongly encourage applicants to have taken the Winter Quarter class "Community Led System Design", but it is not required. All students in the class will have to take and pass the research ethics (CITI) online training, <https://humansubjects.stanford.edu/new/resources/training/citi.html> by end of Week 1. Elements used in grading: Class Participation, Final Paper. NOTE: Students may not count more than a combined total of eight units of directed research projects and policy lab practica toward graduation unless the additional counted units are approved in advance by the Petitions Committee. Such approval will be granted only for good cause shown. Even in the case of a successful petition for additional units, a student cannot receive a letter grade for more than eight units of independent research (Policy Lab practicum, Directed Research, Senior Thesis, and/or Research Track). Any units taken in excess of eight will be graded on a mandatory pass basis. For detailed information, see "Directed Research/Policy Labs" in the SLS Student Handbook. CONSENT APPLICATION: To apply for this course, students must complete and submit a Consent Application Form available on the SLS website (Click Courses at the bottom of the homepage and then click Consent of Instructor Forms). See Consent Application Form for instructions and submission deadline.

**LAW 881. Externship Companion Seminar. 2 Units.**

(Formerly Law 472) The practice of public interest law – whether in the criminal or civil context, or a government or non-profit setting – requires an attorney to consider a host of issues distinct from one in private practice. How should decisions be made about priorities with limited resources? Where an organization has a broad social justice mission, where does litigation on behalf of individual clients or a group of clients fit in? Prior to initiating litigation or advancing a defense, what quantum of evidence should an attorney require? What role, if any, should an attorney's personal beliefs play in a course of representation? Through directed supervision of their externships, as well as participation in weekly seminars, students will evaluate such questions in the context of their practical experience. Students are required to write weekly reflection papers of 2 to 3 pages. Elements used in grading: Attendance, class participation, weekly reflection papers and final reflection paper.



**LAW 882. Externship, Civil Law. 5-12 Units.**

(Formerly Law 474) Following approval of a student's application, the Civil Standard Externship Program (SEP) allows second and third year students to obtain academic credit for externing with select non-profit public interest, public policy, and government agencies in the Bay Area for one quarter. The Civil SEP allows students to (a) gain experience in a field where a clinical course is not offered, or (b) pursue advanced work in an area of prior clinical practice. Students may extern for 20, 24, 30, or 34 hours per week. For a complete description of the Civil SEP, students should read the Externship Handbook, which is available from the Levin Center for Public Service and Public Interest Law or online at: <http://www.law.stanford.edu/organizations/programs-and-centers/john-and-terry-levin-center-for-public-service-and-public-interest-law/externship-program-0>. Students wishing to enroll in an externship must meet various requirements that are set out in the Handbook. Students participating in the Civil SEP must also concurrently enroll in the Externship Companion Seminar (Law 881). An externship that otherwise meets the criteria for obtaining EL credit will be approved for EL credit when the field placement provides specialized experience complementary to a student's intended career path and comparable benefits cannot be obtained through other EL coursework at Stanford. Grading Elements used: Full participation and attendance, satisfactory evaluation by field placement supervisor, weekly reflection papers of two to three pages.

**LAW 883. Externship, Criminal Law. 5-12 Units.**

(Formerly Law 475) Following approval of a student's application, the Criminal Standard Externship Program (SEP) allows second and third year students to work for credit in criminal prosecutors' and defenders' offices in the Bay Area for one quarter. Students may extern for 20, 24, 30, or 34 hours per week. For a complete description of the Criminal SEP, students should read the Externship Handbook, which is available from the Levin Center for Public Service and Public Interest Law or online at: <http://www.law.stanford.edu/organizations/programs-and-centers/john-and-terry-levin-center-for-public-service-and-public-interest-law/externship-program-0>. Students wishing to enroll in an externship must meet various requirements that are set out in the Handbook. Students participating in the Criminal SEP must also concurrently enroll in the Externship Companion Seminar. An externship that otherwise meets the criteria for obtaining EL credit will be approved for EL credit when the field placement provides specialized experience complementary to a student's intended career path and comparable benefits cannot be obtained through other EL coursework at Stanford. Grading Elements used: Full participation and attendance, satisfactory evaluation by field placement supervisor, weekly reflection papers of two to three pages.

**LAW 884. Externship, Special Circumstances. 12 Units.**

(Formerly Law 473) Following approval of a student's application, the Special Circumstances Externship Program (SCEP) allows second and third year students to work for credit for one quarter in non-profit public interest, public policy, and government agencies outside of the Bay Area. Standards for approval of a SCEP placement are similar to those for Directed Research proposals, although they are higher. Because there is a preference for local civil and criminal SEP placements (see Law 882 and Law 883), your SCEP proposal must explain (a) how it meets the goals of the externship program; and (b) why a similar project cannot be accomplished in one of the placements offered in the Bay Area. SCEP placements outside the Bay Area must be full-time. Students wishing to undertake a SCEP placement obtain the supervision of a faculty member who will oversee their externship and an accompanying tutorial. For a full description of the SCEP, students should read the Externship Handbook, which is available from the Levin Center for Public Service and Public Interest Law or online at: <http://www.law.stanford.edu/organizations/programs-and-centers/john-and-terry-levin-center-for-public-service-and-public-interest-law/externship-program-0>. Students wishing to enroll in an externship must meet the various requirements that are set out in the Handbook. An externship that otherwise meets the criteria for obtaining EL credit will be approved for EL credit when the field placement provides specialized experience complementary to a student's intended career path and comparable benefits cannot be obtained through other EL coursework at Stanford. Grading Elements used: Full participation and attendance, satisfactory evaluation by field placement supervisor, weekly reflection papers of three to five pages, and a final reflection paper of a length to be determined by your faculty supervisor.

**LAW 902. Advanced Community Law Clinic. 2-7 Units.**

(Formerly Law 642) The Advanced Community Law Clinic offers law students who already have some significant civil clinical experience the opportunity to work under supervision on more advanced projects and cases being handled by the Stanford Community Law Clinic, including litigation and other matters. Advanced Clinic students will also work with Clinical Supervising Attorneys to provide direction and guidance to those enrolled in the Community Law Clinic for the first time, in areas in which Advanced Clinic students have already acquired some expertise. In addition, Advanced Clinic students may function as team leaders on larger projects in which the Clinic is engaged. Advanced students may arrange with the instructor to receive between two and seven units. No student may receive more than 27 overall clinical credits, however, during the course of the student's law school career. Special Instructions: Completion of the Community Law Clinic (Law 902A,B,C) or its equivalent is a prerequisite for the advanced clinic. Elements used in grading: Participation, reflective paper and project.

**LAW 902A. Community Law Clinic: Clinical Practice. 4 Units.**

(Formerly Law 640A) The CLC is the closest thing to a general legal services office among Stanford's clinical offerings. Based in East Palo Alto, the CLC provides students with the opportunity to provide direct legal services to low-income residents, while thinking critically about the role of lawyers and lawyering in addressing the problems of America's so-called "working poor." The Clinic's practice is in four areas: (1) housing (eviction defense and Section 8 termination); (2) wage and hour and related workers' rights; (3) social security and disability benefits; and (4) criminal record expungement. Each student handles his or her own caseload, which is comprised of cases matters in all of the practice areas. The practice areas are selected and designed to lie at the intersection where the community's unmet legal needs and students' learning needs correspond. The clinic's docket is fundamentally a trial docket. Students have first-chair responsibility for their cases, and perform all of the lawyering tasks necessary to advance their clients' interests, including interviewing, counseling, negotiation, fact investigation, legal research, and representation in the court and agency settings that hear the clients' cases. Skills emphasized include those trial lawyering skills, as well as time management and developing client-centered lawyering practices. Students may also have the chance to participate in outreach or policy-level projects, such as representing the clinic on a state or regional committee on a substantive issue, doing community education workshops at sites around the Peninsula, and/or legislative research and advocacy. In the clinic seminar and in regular supervision, students are encouraged to interrogate the effectiveness of the legal system at delivering "justice" for their clients and to explore creative ways that legal knowledge can be deployed to attack the social problems attendant to low wages, substandard and unstable housing, and other features of low-income life in Silicon Valley. Special Instructions: General Structure of Clinical Courses – The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend four or five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their law school

**LAW 902B. Community Law Clinic: Clinical Methods. 4 Units.**

(Formerly Law 640B) The CLC is the closest thing to a general legal services office among Stanford's clinical offerings. Based in East Palo Alto, the CLC provides students with the opportunity to provide direct legal services to low-income residents, while thinking critically about the role of lawyers and lawyering in addressing the problems of America's so-called "working poor." The Clinic's practice is in four areas: (1) housing (eviction defense and Section 8 termination); (2) wage and hour and related workers' rights; (3) social security and disability benefits; and (4) criminal record expungement. Each student handles his or her own caseload, which is comprised of cases matters in all of the practice areas. The practice areas are selected and designed to lie at the intersection where the community's unmet legal needs and students' learning needs correspond. The clinic's docket is fundamentally a trial docket. Students have first-chair responsibility for their cases, and perform all of the lawyering tasks necessary to advance their clients' interests, including interviewing, counseling, negotiation, fact investigation, legal research, and representation in the court and agency settings that hear the clients' cases. Skills emphasized include those trial lawyering skills, as well as time management and developing client-centered lawyering practices. Students may also have the chance to participate in outreach or policy-level projects, such as representing the clinic on a state or regional committee on a substantive issue, doing community education workshops at sites around the Peninsula, and/or legislative research and advocacy. In the clinic seminar and in regular supervision, students are encouraged to interrogate the effectiveness of the legal system at delivering "justice" for their clients and to explore creative ways that legal knowledge can be deployed to attack the social problems attendant to low wages, substandard and unstable housing, and other features of low-income life in Silicon Valley. Special Instructions: General Structure of Clinical Courses – The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend four or five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their law school

**LAW 902C. Community Law Clinic: Clinical Coursework. 4 Units.**

(Formerly Law 640C) The CLC is the closest thing to a general legal services office among Stanford's clinical offerings. Based in East Palo Alto, the CLC provides students with the opportunity to provide direct legal services to low-income residents, while thinking critically about the role of lawyers and lawyering in addressing the problems of America's so-called "working poor." The Clinic's practice is in four areas: (1) housing (eviction defense and Section 8 termination); (2) wage and hour and related workers' rights; (3) social security and disability benefits; and (4) criminal record expungement. Each student handles his or her own caseload, which is comprised of cases matters in all of the practice areas. The practice areas are selected and designed to lie at the intersection where the community's unmet legal needs and students' learning needs correspond. The clinic's docket is fundamentally a trial docket. Students have first-chair responsibility for their cases, and perform all of the lawyering tasks necessary to advance their clients' interests, including interviewing, counseling, negotiation, fact investigation, legal research, and representation in the court and agency settings that hear the clients' cases. Skills emphasized include those trial lawyering skills, as well as time management and developing client-centered lawyering practices. Students may also have the chance to participate in outreach or policy-level projects, such as representing the clinic on a state or regional committee on a substantive issue, doing community education workshops at sites around the Peninsula, and/or legislative research and advocacy. In the clinic seminar and in regular supervision, students are encouraged to interrogate the effectiveness of the legal system at delivering "justice" for their clients and to explore creative ways that legal knowledge can be deployed to attack the social problems attendant to low wages, substandard and unstable housing, and other features of low-income life in Silicon Valley. Special Instructions: General Structure of Clinical Courses – The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend four or five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their law school

**LAW 904. Advanced Criminal Defense Clinic. 2-7 Units.**

(Formerly Law 418) Advanced clinic allows students who have taken the Criminal Defense Clinic to continue working on cases. Participation in case rounds is required. Advanced clinic may be taken for 2-7 units. Students may not enroll in any clinic (basic or advanced) which would result in them earning more than 27 clinical units during their law school career. Students must have taken Criminal Defense Clinic (Law 904A,B,C). Elements used in grading: Class participation, attendance, written assignments and case work.

**LAW 904A. Criminal Defense Clinic: Clinical Practice. 4 Units.**

(Formerly Law 408A) Students in the Criminal Defense Clinic represent local residents in a wide range of misdemeanor cases in Santa Clara and San Mateo counties. Students are California Bar Certified and thus appear in court and argue cases with faculty standing by. Students take the lead role in all aspects of case development, including interviewing clients and witnesses, investigating facts, developing case strategy, negotiating with prosecutors, drafting and arguing motions, and occasionally trying cases before judges and juries. Common charges include drug use and possession, assault, theft, and vandalism. While students have primary responsibility for all aspects of their cases, all work is closely supervised. The Criminal Defense Clinic is an intensive, fast-paced, and demanding program of education and practical skills, taught through introductory training and ongoing workshops and skills practicums. The Clinic also addresses broader systemic issues such as implicit bias in the legal system, immigration consequences, economic disparities, and addiction. The goal of the Clinic is to train students how to conduct a criminal case while engaging in thoughtful reflection and providing holistic representation. The Clinic's broader goal is to provide lawyering skills and habits of mind transferrable to any student's chosen field of practice. While the work is often challenging and sometimes heartbreaking, it offers students a unique opportunity to put their skills, intellect, and compassion to use by serving people in a moment of great need. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Class participation, attendance, written assignments and case work and

**LAW 904B. Criminal Defense Clinic: Clinical Methods. 4 Units.**

(Formerly Law 408B) Students in the Criminal Defense Clinic represent local residents in a wide range of misdemeanor cases in Santa Clara and San Mateo counties. Students are California Bar Certified and thus appear in court and argue cases with faculty standing by. Students take the lead role in all aspects of case development, including interviewing clients and witnesses, investigating facts, developing case strategy, negotiating with prosecutors, drafting and arguing motions, and occasionally trying cases before judges and juries. Common charges include drug use and possession, assault, theft, and vandalism. While students have primary responsibility for all aspects of their cases, all work is closely supervised. The Criminal Defense Clinic is an intensive, fast-paced, and demanding program of education and practical skills, taught through introductory training and ongoing workshops and skills practicums. The Clinic also addresses broader systemic issues such as implicit bias in the legal system, immigration consequences, economic disparities, and addiction. The goal of the Clinic is to train students how to conduct a criminal case while engaging in thoughtful reflection and providing holistic representation. The Clinic's broader goal is to provide lawyering skills and habits of mind transferrable to any student's chosen field of practice. While the work is often challenging and sometimes heartbreaking, it offers students a unique opportunity to put their skills, intellect, and compassion to use by serving people in a moment of great need. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Class participation, attendance, written assignments and case work and

**LAW 904C. Criminal Defense Clinic: Clinical Coursework. 4 Units.**

(Formerly Law 408C) Students in the Criminal Defense Clinic represent local residents in a wide range of misdemeanor cases in Santa Clara and San Mateo counties. Students are California Bar Certified and thus appear in court and argue cases with faculty standing by. Students take the lead role in all aspects of case development, including interviewing clients and witnesses, investigating facts, developing case strategy, negotiating with prosecutors, drafting and arguing motions, and occasionally trying cases before judges and juries. Common charges include drug use and possession, assault, theft, and vandalism. While students have primary responsibility for all aspects of their cases, all work is closely supervised. The Criminal Defense Clinic is an intensive, fast-paced, and demanding program of education and practical skills, taught through introductory training and ongoing workshops and skills practicums. The Clinic also addresses broader systemic issues such as implicit bias in the legal system, immigration consequences, economic disparities, and addiction. The goal of the Clinic is to train students how to conduct a criminal case while engaging in thoughtful reflection and providing holistic representation. The Clinic's broader goal is to provide lawyering skills and habits of mind transferrable to any student's chosen field of practice. While the work is often challenging and sometimes heartbreaking, it offers students a unique opportunity to put their skills, intellect, and compassion to use by serving people in a moment of great need. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Class participation, attendance, written assignments and case work and

**LAW 906A. Criminal Prosecution Clinic: Clinical Practice. 4 Units.**

(Formerly Law 620A) The six students enrolled in the Criminal Prosecution Clinic advocate before the San Jose Superior Court under the guidance of Santa Clara County prosecutors. Students formulate case strategy, identify and interview witnesses, and conduct evidentiary motions, preliminary hearings, and occasional nonjury trials. The cases concern thefts, burglaries, assaults, weapons possession, drunk driving, drug offenses, and a range of less common crimes. Students offer testimony by police officers, crime victims, and other witnesses and cross-examine defense witnesses, including those defendants who take the stand. Clinic students spend at least four full days a week -- Mondays, Tuesdays, Thursdays, and Fridays -- at the D.A.'s office or in court. There generally will be two class sessions each week: a three-hour on-campus class on Wednesday mornings and a Tuesday lunch seminar at the D.A.'s office. Toward the beginning of our term, classes focus on skills training, including direct and cross-examination, admission of physical evidence, making and answering objections, and argument. Toward the end of the term our focus shifts to an examination and critique of the local mechanisms of criminal justice. Topics include the impact of race, gender, and class on the quality of justice; the institutional strengths and weaknesses of the actors in the system; prison conditions and prison reform; and the ethical issues that confront prosecutors and defense lawyers. Students typically tour the Santa Clara County crime lab, San Quentin Prison, and the Chaderjian Youth Correctional Facility in Stockton and have the option to spend an evening on a police ride-along. Students must submit regular written reflections on their experiences in and observations of the local justice system. Their assigned cases often will demand written court filings. During most weeks students will meet one-on-one with the faculty supervisor. Evidence is a prerequisite. Courses in criminal procedure (investigation) and trial advocacy are strongly encouraged. Students will be awarded three separate grades, each reflecting four units, for clinical practice, clinical methods, and clinical coursework. Elements used in grading include class attendance and participation, writing assignments, case preparation, and courtroom presentations and advocacy. Class attendance is mandatory. Grading is on the H/P system. Special Instructions: General Structure of Clinical Courses: All of the Law School's clinical courses, other than advanced clinics, are offered fulltime for twelve units. This format allows students to immerse themselves in the professional experience without having to balance clinical projects with other classes, exams, and papers. Students enrolled in a clinic may not enroll in any other class, seminar, directed research, or other credit-yielding activity within the Law School or University during their clinical quarter. Nor are they allowed to serve as teaching assistants expected to attend a class regularly. There is a limited exception for joint-degree students who are required to take specific courses each quarter and who would be foreclosed from taking a clinic unless allowed to co-register. These exceptions are approved case by case. The clinical quarter begins on the first day of classes and runs through the final day of exam period. Students should not plan personal travel during the Monday-to-Friday workweek without permission from onsite and faculty supervisors. Students are expected to be available by email or cell phone during workday hours Monday through Friday and are expected to devote at least thirty-five hours per week to various facets of this work. In some weeks casework may demand longer hours. Enrollment in a clinic is binding; once selected by a clinic to which he or she has applied, a student may not drop the course later except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (fulltime or advanced) that would result in their earning more than twenty-seven clinical units during their law school career. For more general information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website.

**LAW 906B. Criminal Prosecution Clinic: Clinical Methods. 4 Units.**

(Formerly Law 620B) The six students enrolled in the Criminal Prosecution Clinic advocate before the San Jose Superior Court under the guidance of Santa Clara County prosecutors. Students formulate case strategy, identify and interview witnesses, and conduct evidentiary motions, preliminary hearings, and occasional nonjury trials. The cases concern thefts, burglaries, assaults, weapons possession, drunk driving, drug offenses, and a range of less common crimes. Students offer testimony by police officers, crime victims, and other witnesses and cross-examine defense witnesses, including those defendants who take the stand. Clinic students spend at least four full days a week – Mondays, Tuesdays, Thursdays, and Fridays – at the D.A.'s office or in court. There generally will be two class sessions each week: a three-hour on-campus class on Wednesday mornings and a Tuesday lunch seminar at the D.A.'s office. Toward the beginning of our term, classes focus on skills training, including direct and cross-examination, admission of physical evidence, making and answering objections, and argument. Toward the end of the term our focus shifts to an examination and critique of the local mechanisms of criminal justice. Topics include the impact of race, gender, and class on the quality of justice; the institutional strengths and weaknesses of the actors in the system; prison conditions and prison reform; and the ethical issues that confront prosecutors and defense lawyers. Students typically tour the Santa Clara County crime lab, San Quentin Prison, and the Chaderjian Youth Correctional Facility in Stockton and have the option to spend an evening on a police ride-along. Students must submit regular written reflections on their experiences in and observations of the local justice system. Their assigned cases often will demand written court filings. During most weeks students will meet one-on-one with the faculty supervisor. Evidence is a prerequisite. Courses in criminal procedure (investigation) and trial advocacy are strongly encouraged. Students will be awarded three separate grades, each reflecting four units, for clinical practice, clinical methods, and clinical coursework. Elements used in grading include class attendance and participation, writing assignments, case preparation, and courtroom presentations and advocacy. Class attendance is mandatory. Grading is on the H/P system. Special Instructions: General Structure of Clinical Courses: All of the Law School's clinical courses, other than advanced clinics, are offered fulltime for twelve units. This format allows students to immerse themselves in the professional experience without having to balance clinical projects with other classes, exams, and papers. Students enrolled in a clinic may not enroll in any other class, seminar, directed research, or other credit-yielding activity within the Law School or University during their clinical quarter. Nor are they allowed to serve as teaching assistants expected to attend a class regularly. There is a limited exception for joint-degree students who are required to take specific courses each quarter and who would be foreclosed from taking a clinic unless allowed to co-register. These exceptions are approved case by case. The clinical quarter begins on the first day of classes and runs through the final day of exam period. Students should not plan personal travel during the Monday-to-Friday workweek without permission from onsite and faculty supervisors. Students are expected to be available by email or cell phone during workday hours Monday through Friday and are expected to devote at least thirty-five hours per week to various facets of this work. In some weeks casework may demand longer hours. Enrollment in a clinic is binding; once selected by a clinic to which he or she has applied, a student may not drop the course later except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (fulltime or advanced) that would result in their earning more than twenty-seven clinical units during their law school career. For more general information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website.

**LAW 906C. Criminal Prosecution Clinic: Clinical Coursework. 4 Units.**

(Formerly Law 620C) The six students enrolled in the Criminal Prosecution Clinic advocate before the San Jose Superior Court under the guidance of Santa Clara County prosecutors. Students formulate case strategy, identify and interview witnesses, and conduct evidentiary motions, preliminary hearings, and occasional nonjury trials. The cases concern thefts, burglaries, assaults, weapons possession, drunk driving, drug offenses, and a range of less common crimes. Students offer testimony by police officers, crime victims, and other witnesses and cross-examine defense witnesses, including those defendants who take the stand. Clinic students spend at least four full days a week – Mondays, Tuesdays, Thursdays, and Fridays – at the D.A.'s office or in court. There generally will be two class sessions each week: a three-hour on-campus class on Wednesday mornings and a Tuesday lunch seminar at the D.A.'s office. Toward the beginning of our term, classes focus on skills training, including direct and cross-examination, admission of physical evidence, making and answering objections, and argument. Toward the end of the term our focus shifts to an examination and critique of the local mechanisms of criminal justice. Topics include the impact of race, gender, and class on the quality of justice; the institutional strengths and weaknesses of the actors in the system; prison conditions and prison reform; and the ethical issues that confront prosecutors and defense lawyers. Students typically tour the Santa Clara County crime lab, San Quentin Prison, and the Chaderjian Youth Correctional Facility in Stockton and have the option to spend an evening on a police ride-along. Students must submit regular written reflections on their experiences in and observations of the local justice system. Their assigned cases often will demand written court filings. During most weeks students will meet one-on-one with the faculty supervisor. Evidence is a prerequisite. Courses in criminal procedure (investigation) and trial advocacy are strongly encouraged. Students will be awarded three separate grades, each reflecting four credits, for clinical practice, clinical methods, and clinical coursework. Elements used in grading include class attendance and participation, writing assignments, case preparation, and courtroom presentations and advocacy. Class attendance is mandatory. Grading is on the H/P system. Special Instructions: General Structure of Clinical Courses: All of the Law School's clinical courses, other than advanced clinics, are offered fulltime for twelve credits. This format allows students to immerse themselves in the professional experience without having to balance clinical projects with other classes, exams, and papers. Students enrolled in a clinic may not enroll in any other class, seminar, directed research, or other credit-yielding activity within the Law School or University during their clinical quarter. Nor are they allowed to serve as teaching assistants expected to attend a class regularly. There is a limited exception for joint-degree students who are required to take specific courses each quarter and who would be foreclosed from taking a clinic unless allowed to co-register. These exceptions are approved case by case. The clinical quarter begins on the first day of classes and runs through the final day of exam period. Students should not plan personal travel during the Monday-to-Friday workweek without permission from onsite and faculty supervisors. Students are expected to be available by email or cell phone during workday hours Monday through Friday and are expected to devote at least thirty-five hours per week to various facets of this work. In some weeks casework may demand longer hours. Enrollment in a clinic is binding; once selected by a clinic to which he or she has applied, a student may not drop the course later except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (fulltime or advanced) that would result in their earning more than twenty-seven clinical credits during their law school career. For more general information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website.

**LAW 908. Advanced Environmental Law Clinic. 2-7 Units.**

(Formerly Law 623) The Advanced Environmental Law Clinic provides students who have already taken the Environmental Law Clinic the opportunity to continue intense individual project work. Advanced students often work on matters they worked on as full-time students, but they also have the chance to work on new matters and develop new skills. Advanced students work closely with supervising faculty on their designated projects and are expected to take increasing responsibility for managing their work and representing clients. In addition, advanced students often serve as mentors to less experienced full-time students and thereby receive training in basic team building and supervision. Advanced students may arrange to receive between two and seven units. No student may receive more than 27 total clinical units during the course of the student's law school career. Elements used in grading: TBA.

**LAW 908A. Environmental Law Clinic: Clinical Practice. 4 Units.**

(Formerly Law 622A) Students enrolled in the Clinic provide legal assistance to national, regional and grassroots non-profit organizations on a variety of environmental issues, with a focus on complex natural resource conservation and biodiversity matters at the interface of law, science and policy. Working under the direct supervision of practicing environmental attorneys, Clinic students help screen new matters and potential clients; formulate strategies; research and develop factual and legal issues; and prosecute administrative and litigation proceedings. During the term, students may meet with clients, opposing counsel or agency decision-makers; review and prepare administrative records; develop expert testimony; draft comment letters, petitions, pleading or briefs; and/or attend and present arguments in administrative and court hearings. In regular one-on-one meetings with supervising faculty, there is a heavy emphasis on learning how to write persuasively and present oral arguments. Indeed, in any given quarter, our students typically prepare a mix of state and federal, and trial and appellate, court pleadings, and because all of our hearings during the academic year are conducted by students, many students also have the opportunity to present oral argument in front of one or more judges. In addition, students participate in a regular seminar where we examine strategic, ethical and substantive issues arising out of the Clinic's work. The Clinic is a particularly good place to learn how to conduct effective legal research, marshal facts in support of legal arguments, and, above all, write well. We practice at all levels of state and federal court and before many local, state and federal administrative agencies. Our work involves extensive motions practice and brief writing, and often involves administrative petitions and policy papers. Our work is inherently cross-disciplinary. No prior environmental experience or background is necessary, but an interest in learning about environmental and natural resources law is important. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their

**LAW 908B. Environmental Law Clinic: Clinical Methods. 4 Units.**

(Formerly Law 622B) Students enrolled in the Clinic provide legal assistance to national, regional and grassroots non-profit organizations on a variety of environmental issues, with a focus on complex natural resource conservation and biodiversity matters at the interface of law, science and policy. Working under the direct supervision of practicing environmental attorneys, Clinic students help screen new matters and potential clients; formulate strategies; research and develop factual and legal issues; and prosecute administrative and litigation proceedings. During the term, students may meet with clients, opposing counsel or agency decision-makers; review and prepare administrative records; develop expert testimony; draft comment letters, petitions, pleading or briefs; and/or attend and present arguments in administrative and court hearings. In regular one-on-one meetings with supervising faculty, there is a heavy emphasis on learning how to write persuasively and present oral arguments. Indeed, in any given quarter, our students typically prepare a mix of state and federal, and trial and appellate, court pleadings, and because all of our hearings during the academic year are conducted by students, many students also have the opportunity to present oral argument in front of one or more judges. In addition, students participate in a regular seminar where we examine strategic, ethical and substantive issues arising out of the Clinic's work. The Clinic is a particularly good place to learn how to conduct effective legal research, marshal facts in support of legal arguments, and, above all, write well. We practice at all levels of state and federal court and before many local, state and federal administrative agencies. Our work involves extensive motions practice and brief writing, and often involves administrative petitions and policy papers. Our work is inherently cross-disciplinary. No prior environmental experience or background is necessary, but an interest in learning about environmental and natural resources law is important. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their

**LAW 908C. Environmental Law Clinic: Clinical Coursework. 4 Units.**

(Formerly Law 622C) Students enrolled in the Clinic provide legal assistance to national, regional and grassroots non-profit organizations on a variety of environmental issues, with a focus on complex natural resource conservation and biodiversity matters at the interface of law, science and policy. Working under the direct supervision of practicing environmental attorneys, Clinic students help screen new matters and potential clients; formulate strategies; research and develop factual and legal issues; and prosecute administrative and litigation proceedings. During the term, students may meet with clients, opposing counsel or agency decision-makers; review and prepare administrative records; develop expert testimony; draft comment letters, petitions, pleading or briefs; and/or attend and present arguments in administrative and court hearings. In regular one-on-one meetings with supervising faculty, there is a heavy emphasis on learning how to write persuasively and present oral arguments. Indeed, in any given quarter, our students typically prepare a mix of state and federal, and trial and appellate, court pleadings, and because all of our hearings during the academic year are conducted by students, many students also have the opportunity to present oral argument in front of one or more judges. In addition, students participate in a regular seminar where we examine strategic, ethical and substantive issues arising out of the Clinic's work. The Clinic is a particularly good place to learn how to conduct effective legal research, marshal facts in support of legal arguments, and, above all, write well. We practice at all levels of state and federal court and before many local, state and federal administrative agencies. Our work involves extensive motions practice and brief writing, and often involves administrative petitions and policy papers. Our work is inherently cross-disciplinary. No prior environmental experience or background is necessary, but an interest in learning about environmental and natural resources law is important. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their



**LAW 910. Advanced Immigrants' Rights Clinic. 2-7 Units.**

(Formerly Law 274) The Immigrants' Rights Advanced Clinic offers the opportunity for students who have already successfully completed the Immigrants' Rights Clinic to pursue: a specific immigrants' rights advocacy project; advanced individual client representation; and/or working with the clinic director to provide direction/guidance to those enrolled in the Clinic for the first time. All advanced Clinic projects will be jointly designed by the director and the advanced student. Advanced students providing guidance/direction to first-time students will receive additional training on providing supervision. Special instructions: Advanced students are expected to attend the case-rounds portion of the weekly seminar, and to participate as needed in the lecture/discussion portion of the seminar. Advanced students may arrange with the instructor to receive between two and seven units. No student may receive more than 27 overall clinical units, however, during the course of the student's law school career. Elements used in grading: Attendance and participation in class, project work, writing assignments, and case preparation.

**LAW 910A. Immigrants' Rights Clinic: Clinical Practice. 4 Units.**

(Formerly Law 225A) The Immigrants' Rights Clinic offers students the opportunity to represent immigrants before the San Francisco Immigration Court, the Board of Immigration Appeals, and the Ninth Circuit Court of Appeals. Students in the clinic conduct mini-trials in immigration court, write motions and appellate briefs, interview clients and witnesses, investigate facts, develop case strategy, and argue cases. The Clinic represents immigrants with past criminal convictions, asylum seekers, and survivors of domestic violence. All clinic students also work on a variety of impact litigation and advocacy projects to address federal government immigration enforcement practices at the national and local levels, including impact litigation to challenge prolonged immigration detention, local and state advocacy to limit enforcement activity by police, the creation of model pleadings and know your rights materials for immigrant detainees, and advocacy with the federal agencies that regulate immigration. No prior substantive experience or background in immigration or immigrants' rights work is necessary. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Attendance and participation in class, case and project work and writing assignments. There are no prerequisites.

**LAW 910B. Immigrants' Rights Clinic: Clinical Methods. 4 Units.**

(Formerly Law 225B) The Immigrants' Rights Clinic offers students the opportunity to represent immigrants before the San Francisco Immigration Court, the Board of Immigration Appeals, and the Ninth Circuit Court of Appeals. Students in the clinic conduct mini-trials in immigration court, write motions and appellate briefs, interview clients and witnesses, investigate facts, develop case strategy, and argue cases. The Clinic represents immigrants with past criminal convictions, asylum seekers, and survivors of domestic violence. All clinic students also work on a variety of impact litigation and advocacy projects to address federal government immigration enforcement practices at the national and local levels, including impact litigation to challenge prolonged immigration detention, local and state advocacy to limit enforcement activity by police, the creation of model pleadings and know your rights materials for immigrant detainees, and advocacy with the federal agencies that regulate immigration. No prior substantive experience or background in immigration or immigrants' rights work is necessary. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Attendance and participation in class, case and project work and writing assignments. There are no prerequisites.

**LAW 910C. Immigrants' Rights Clinic: Clinical Coursework. 4 Units.**

(Formerly Law 225C) The Immigrants' Rights Clinic offers students the opportunity to represent immigrants before the San Francisco Immigration Court, the Board of Immigration Appeals, and the Ninth Circuit Court of Appeals. Students in the clinic conduct mini-trials in immigration court, write motions and appellate briefs, interview clients and witnesses, investigate facts, develop case strategy, and argue cases. The Clinic represents immigrants with past criminal convictions, asylum seekers, and survivors of domestic violence. All clinic students also work on a variety of impact litigation and advocacy projects to address federal government immigration enforcement practices at the national and local levels, including impact litigation to challenge prolonged immigration detention, local and state advocacy to limit enforcement activity by police, the creation of model pleadings and know your rights materials for immigrant detainees, and advocacy with the federal agencies that regulate immigration. No prior substantive experience or background in immigration or immigrants' rights work is necessary. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four credits. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical credits during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Attendance and participation in class, case and project work and writing assignments. There are no prerequisites.

**LAW 912. Advanced International Human Rights and Conflict Resolution Clinic. 2-7 Units.**

(Formerly Law 663) The International Human Rights and Conflict Resolution Advanced Clinic offers the opportunity for students who have already successfully completed an International Human Rights Clinic to pursue one or more specific projects in conjunction with the Clinic, either independently or in collaboration with colleague(s) enrolled in the regular clinic. Any travel will be strictly contingent on the Advanced Clinical student's availability and the needs of the project. Advanced Clinical students are expected to participate in as much of the regular clinical seminar and seminar simulations as possible given pre-existing scheduling constraints. Advanced students may arrange with the instructor to receive between two and seven units. No student may receive more than 27 overall clinical units, however, during the course of the student's law school career. Elements used in grading: Project work, writing assignments, case preparation, attendance and class participation.

**LAW 912A. International Human Rights and Conflict Resolution Clinic: Clinical Practice. 4 Units.**

(Formerly Law 658A) In the past half-century, human rights advocates have transformed a marginal utopian ideal into a central element of global discourse, if not practice. This course examines the actors and organizations behind this remarkable development, as well as the vast challenges faced by advocates in the recent past and today. Increasingly, human rights as a framework has become essential to a broad range of situations of tension and conflict. This course interrogates the nature of engagement by human rights practitioners, as well as approaches adopted by those focused on the management of violent conflict. What are the origins of the human rights movement and where is it headed? What does it mean to be a human rights activist? What are the main challenges and dilemmas facing those engaged in rights promotion and defense? How is conflict resolution consistent with human rights advocacy? When and where are these approaches in tension? The course also develops advocacy skills through in-class sessions, role play exercises and engagement in, and critical assessment of clinical projects in human rights. Class sessions introduce students to human rights advocacy and conflict management techniques through discussion of the readings and related issues, as well as through student presentations critiquing their participation in supervised clinical projects. The readings and seminar sessions expose students to some of the practical manifestations of the main debates and dilemmas within the human rights and conflict resolution movement(s). These include several of the ethical and strategic issues that arise in the course of doing fact-finding and advocacy and balancing the often differing agendas of western international nongovernmental organizations (INGOs) and their counterparts in the (frequently non-western) developing world. The readings also consider tensions within the field of conflict resolution, as well as between conflict resolution and human rights. Several class sessions will focus on fact-finding and advocacy skills. One or more of these sessions will be full-day, role play exercises. In these full-day sessions, students will engage in human rights research, documentation, negotiation and dispute management exercises, and advocacy role-playing. In some sessions, part of the class will be devoted to presentations by students and clinical 'rounds'. These presentations will consider one or more issues that arise in the course of students' own engagement in advocacy projects through the International Human Rights and Conflict Resolution Clinic. During the course of the quarter, students will also be required to draft several brief fact-finding/advocacy pieces (these will be explained in class), and write short, critical reflection papers (2-4 pages, double-spaced, or 500-1,000 words, thought pieces) on the readings. Special Instructions: - - General Structure of Clinical Courses. The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third,

**LAW 912B. International Human Rights and Conflict Resolution Clinic: Clinical Methods. 4 Units.**

(Formerly Law 658B) In the past half-century, human rights advocates have transformed a marginal utopian ideal into a central element of global discourse, if not practice. This course examines the actors and organizations behind this remarkable development, as well as the vast challenges faced by advocates in the recent past and today. Increasingly, human rights as a framework has become essential to a broad range of situations of tension and conflict. This course interrogates the nature of engagement by human rights practitioners, as well as approaches adopted by those focused on the management of violent conflict. What are the origins of the human rights movement and where is it headed? What does it mean to be a human rights activist? What are the main challenges and dilemmas facing those engaged in rights promotion and defense? How is conflict resolution consistent with human rights advocacy? When and where are these approaches in tension? The course also develops advocacy skills through in-class sessions, role play exercises and engagement in, and critical assessment of clinical projects in human rights. Class sessions introduce students to human rights advocacy and conflict management techniques through discussion of the readings and related issues, as well as through student presentations critiquing their participation in supervised clinical projects. The readings and seminar sessions expose students to some of the practical manifestations of the main debates and dilemmas within the human rights and conflict resolution movement(s). These include several of the ethical and strategic issues that arise in the course of doing fact-finding and advocacy and balancing the often differing agendas of western international nongovernmental organizations (INGOs) and their counterparts in the (frequently non-western) developing world. The readings also consider tensions within the field of conflict resolution, as well as between conflict resolution and human rights. Several class sessions will focus on fact-finding and advocacy skills. One or more of these sessions will be full-day, role play exercises. In these full-day sessions, students will engage in human rights research, documentation, negotiation and dispute management exercises, and advocacy role-playing. In some sessions, part of the class will be devoted to presentations by students and clinical 'rounds'. These presentations will consider one or more issues that arise in the course of students' own engagement in advocacy projects through the International Human Rights and Conflict Resolution Clinic. During the course of the quarter, students will also be required to draft several brief fact-finding/advocacy pieces (these will be explained in class), and write short, critical reflection papers (2-4 pages, double-spaced, or 500-1,000 words, thought pieces) on the readings. Special Instructions: - - General Structure of Clinical Courses. The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third,

**LAW 912C. International Human Rights and Conflict Resolution Clinic: Clinical Coursework. 4 Units.**

(Formerly Law 658C) In the past half-century, human rights advocates have transformed a marginal utopian ideal into a central element of global discourse, if not practice. This course examines the actors and organizations behind this remarkable development, as well as the vast challenges faced by advocates in the recent past and today. Increasingly, human rights as a framework has become essential to a broad range of situations of tension and conflict. This course interrogates the nature of engagement by human rights practitioners, as well as approaches adopted by those focused on the management of violent conflict. What are the origins of the human rights movement and where is it headed? What does it mean to be a human rights activist? What are the main challenges and dilemmas facing those engaged in rights promotion and defense? How is conflict resolution consistent with human rights advocacy? When and where are these approaches in tension? The course also develops advocacy skills through in-class sessions, role play exercises and engagement in, and critical assessment of clinical projects in human rights. Class sessions introduce students to human rights advocacy and conflict management techniques through discussion of the readings and related issues, as well as through student presentations critiquing their participation in supervised clinical projects. The readings and seminar sessions expose students to some of the practical manifestations of the main debates and dilemmas within the human rights and conflict resolution movement(s). These include several of the ethical and strategic issues that arise in the course of doing fact-finding and advocacy and balancing the often differing agendas of western international nongovernmental organizations (INGOs) and their counterparts in the (frequently non-western) developing world. The readings also consider tensions within the field of conflict resolution, as well as between conflict resolution and human rights. Several class sessions will focus on fact-finding and advocacy skills. One or more of these sessions will be full-day, role play exercises. In these full-day sessions, students will engage in human rights research, documentation, negotiation and dispute management exercises, and advocacy role-playing. In some sessions, part of the class will be devoted to presentations by students and clinical 'rounds'. These presentations will consider one or more issues that arise in the course of students' own engagement in advocacy projects through the International Human Rights and Conflict Resolution Clinic. During the course of the quarter, students will also be required to draft several brief fact-finding/advocacy pieces (these will be explained in class), and write short, critical reflection papers (2-4 pages, double-spaced, or 500-1,000 words, thought pieces) on the readings. Special Instructions: - - General Structure of Clinical Courses. The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third,

**LAW 914. Advanced Juelsgaard Intellectual Property and Innovation Clinic. 2-7 Units.**

(Formerly Law 287) Advanced clinic allows students who have taken the Advanced Juelsgaard Intellectual Property and Innovation Clinic to continue working on cases. Advanced clinic may be taken for 2-7 units. Students may not enroll in any clinic (basic or advanced) which would result in them earning more than 27 clinical units during their law school career. Elements used in grading: TBA.

**LAW 914A. Juelsgaard Intellectual Property and Innovation Clinic: Clinical Practice. 4 Units.**

(Formerly Law 266A) The Juelsgaard Intellectual Property and Innovation Clinic provides students the opportunity to understand and advocate for sound innovation policies. Students in the clinic will help shape the course and outcome of significant legal and policy debates before courts, legislators, regulatory bodies, and other policy makers. Our work focuses on the relationship between law, regulation and innovation in areas ranging from biotechnology to information technology, pharmaceuticals, clean technology, and the creation and distribution of information. Students will represent a variety of NGOs and non-profit entities and, in certain cases, groups or associations of innovators, entrepreneurs, technology users or consumers, economists, technologists, legal academics, and the like, and occasionally individual inventors, start-ups, journalists, or researchers. Students will address their client's complex issues through tools that may include amicus briefs; comments or testimony in rulemaking and regulatory proceedings (i.e., DMCA exemption requests, comments to OSTP on issues such as open access, privacy or open data, comments to the FTC as part of IP and innovation hearings and reports, comments to the PTO or FDA, etc.); comments or testimony on proposed legislation; and whitepapers or other "best practices" documents to encourage sensible and balanced legal approaches to innovation and creativity. Our policy advocacy will often involve intertwined factual, technological, business, economic, political and public relations considerations along with the substantive legal issues. Students in the clinic may be called upon to collaborate with technologists, researchers, doctors, economists, social scientists, industry experts, and others to develop and articulate the appropriate policy advocacy for their clients. The clinic seminar will focus on student-led workshops regarding client projects, and on engaging with current thinking around innovation, innovation economics and the impact of IP, antitrust, and other law and regulation on innovation. We will explore the process of policy advocacy, including various policy levers, the types of tools available to advocates and the strategies and tactics that may be employed, and will consider and critique a variety of case studies of previous advocacy, situating them in the larger context in which these efforts occurred. Students will critically examine the role of lawyers advocating for the public interest and for sound and sensible innovation policy outcomes and bring those lessons to bear on their own clinic work. A background in technology may be useful in some cases but is not necessary to a successful experience in the clinic. -- Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and

**LAW 914B. Juelsgaard Intellectual Property and Innovation Clinic: Clinical Methods. 4 Units.**

(Formerly Law 266B) The Juelsgaard Intellectual Property and Innovation Clinic provides students the opportunity to understand and advocate for sound innovation policies. Students in the clinic will help shape the course and outcome of significant legal and policy debates before courts, legislators, regulatory bodies, and other policy makers. Our work focuses on the relationship between law, regulation and innovation in areas ranging from biotechnology to information technology, pharmaceuticals, clean technology, and the creation and distribution of information. Students will represent a variety of NGOs and non-profit entities and, in certain cases, groups or associations of innovators, entrepreneurs, technology users or consumers, economists, technologists, legal academics, and the like, and occasionally individual inventors, start-ups, journalists, or researchers. Students will address their client's complex issues through tools that may include amicus briefs; comments or testimony in rulemaking and regulatory proceedings (i.e., DMCA exemption requests, comments to OSTP on issues such as open access, privacy or open data, comments to the FTC as part of IP and innovation hearings and reports, comments to the PTO or FDA, etc.); comments or testimony on proposed legislation; and whitepapers or other "best practices" documents to encourage sensible and balanced legal approaches to innovation and creativity. Our policy advocacy will often involve intertwined factual, technological, business, economic, political and public relations considerations along with the substantive legal issues. Students in the clinic may be called upon to collaborate with technologists, researchers, doctors, economists, social scientists, industry experts, and others to develop and articulate the appropriate policy advocacy for their clients. The clinic seminar will focus on student-led workshops regarding client projects, and on engaging with current thinking around innovation, innovation economics and the impact of IP, antitrust, and other law and regulation on innovation. We will explore the process of policy advocacy, including various policy levers, the types of tools available to advocates and the strategies and tactics that may be employed, and will consider and critique a variety of case studies of previous advocacy, situating them in the larger context in which these efforts occurred. Students will critically examine the role of lawyers advocating for the public interest and for sound and sensible innovation policy outcomes and bring those lessons to bear on their own clinic work. A background in technology may be useful in some cases but is not necessary to a successful experience in the clinic. -- Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and

**LAW 914C. Juelsgaard Intellectual Property and Innovation Clinic: Clinical Coursework. 4 Units.**

(Formerly Law 266C) The Juelsgaard Intellectual Property and Innovation Clinic provides students the opportunity to understand and advocate for sound innovation policies. Students in the clinic will help shape the course and outcome of significant legal and policy debates before courts, legislators, regulatory bodies, and other policy makers. Our work focuses on the relationship between law, regulation and innovation in areas ranging from biotechnology to information technology, pharmaceuticals, clean technology, and the creation and distribution of information. Students will represent a variety of NGOs and non-profit entities and, in certain cases, groups or associations of innovators, entrepreneurs, technology users or consumers, economists, technologists, legal academics, and the like, and occasionally individual inventors, start-ups, journalists, or researchers. Students will address their client's complex issues through tools that may include amicus briefs; comments or testimony in rulemaking and regulatory proceedings (i.e., DMCA exemption requests, comments to OSTP on issues such as open access, privacy or open data, comments to the FTC as part of IP and innovation hearings and reports, comments to the PTO or FDA, etc.); comments or testimony on proposed legislation; and whitepapers or other "best practices" documents to encourage sensible and balanced legal approaches to innovation and creativity. Our policy advocacy will often involve intertwined factual, technological, business, economic, political and public relations considerations along with the substantive legal issues. Students in the clinic may be called upon to collaborate with technologists, researchers, doctors, economists, social scientists, industry experts, and others to develop and articulate the appropriate policy advocacy for their clients. The clinic seminar will focus on student-led workshops regarding client projects, and on engaging with current thinking around innovation, innovation economics and the impact of IP, antitrust, and other law and regulation on innovation. We will explore the process of policy advocacy, including various policy levers, the types of tools available to advocates and the strategies and tactics that may be employed, and will consider and critique a variety of case studies of previous advocacy, situating them in the larger context in which these efforts occurred. Students will critically examine the role of lawyers advocating for the public interest and for sound and sensible innovation policy outcomes and bring those lessons to bear on their own clinic work. A background in technology may be useful in some cases but is not necessary to a successful experience in the clinic. -- Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and

**LAW 916. Advanced Organizations and Transactions Clinic. 2-7 Units.** (Formerly Law 279) Advanced clinic allows students who have taken the Organizations & Transactions Clinic to work on ongoing projects. Advanced students may arrange with the instructor to receive between two and seven units. No student may receive more than 27 overall clinical credits, however, during the course of the student's law school career. Students must have taken Organizations & Transactions Clinic (Law 272). Elements used in grading: Written assignments and client interactions.

**LAW 916A. Organizations and Transactions Clinic: Clinical Practice. 4 Units.**

(Formerly Law 272A) The O&T Clinic is targeted at both students planning to do M&A, finance, securities, IP licensing or other corporate or transactional work at major firms and those seeking to explore a non-litigation, advisory-oriented practice. In the clinic, students develop legal advice, learn to review and write contracts and governance materials, meet with client executives, examine commercial relationships, and receive extensive feedback about their work. No prior experience in business, finance, or corporate law is necessary. Students work on structural, programmatic, contractual, affiliation, and governance matters for corporate entities. Students typically represent multiple clients during the term, interact with client CEOs, CFOs, board members, and general counsels, and work in teams with other students and the instructors. Students receive detailed comments about the design, content, and execution of work-products and client communications, and about their performance in client meetings and calls. Students regularly assess their own work throughout the quarter and prepare a self-evaluation at the end of the term. O&T clients are all established Northern California nonprofit corporations. Most of the clients generate annual revenues in the range of \$1 - \$75 million; some are smaller and some are considerably larger. We focus on these organizations because they are corporations that typically have substantial governance and external disclosure obligations, active boards of directors, audited financial statements, complex programs, varied collaborations, and diverse funding sources and contractual relationships – all of which are relevant to and productive of corporate work – yet are small enough that the clinic's contact is a senior executive. We think they provide excellent material for students learning about organizational representation and institutional corporate practice. The course includes a seminar that generally meets twice a week. Seminar meetings focus on student-led workshops regarding client projects, and on orientation to corporate practice, including discussion of core commercial relationships such as acquisition, credit, and licensing, and practice skills such as transaction planning and management. Evaluation and grading are based on detailed points of emphasis that reflect ways of working we believe characterize an effective lawyer and responsible colleague. Course design and operation reflect the instructors' combined 40+ years of corporate practice representing consumer products, finance, technology, and life science companies, in both law firm and senior in-house roles. Information about prior projects is available from the instructors and on the SLS website. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately

**LAW 916B. Organizations and Transactions Clinic: Clinical Methods. 4 Units.**

(Formerly Law 272B) The O&T Clinic is targeted at both students planning to do M&A, finance, securities, IP licensing or other corporate or transactional work at major firms and those seeking to explore a non-litigation, advisory-oriented practice. In the clinic, students develop legal advice, learn to review and write contracts and governance materials, meet with client executives, examine commercial relationships, and receive extensive feedback about their work. No prior experience in business, finance, or corporate law is necessary. Students work on structural, programmatic, contractual, affiliation, and governance matters for corporate entities. Students typically represent multiple clients during the term, interact with client CEOs, CFOs, board members, and general counsels, and work in teams with other students and the instructors. Students receive detailed comments about the design, content, and execution of work-products and client communications, and about their performance in client meetings and calls. Students regularly assess their own work throughout the quarter and prepare a self-evaluation at the end of the term. O&T clients are all established Northern California nonprofit corporations. Most of the clients generate annual revenues in the range of \$1 - \$75 million; some are smaller and some are considerably larger. We focus on these organizations because they are corporations that typically have substantial governance and external disclosure obligations, active boards of directors, audited financial statements, complex programs, varied collaborations, and diverse funding sources and contractual relationships – all of which are relevant to and productive of corporate work – yet are small enough that the clinic's contact is a senior executive. We think they provide excellent material for students learning about organizational representation and institutional corporate practice. The course includes a seminar that generally meets twice a week. Seminar meetings focus on student-led workshops regarding client projects, and on orientation to corporate practice, including discussion of core commercial relationships such as acquisition, credit, and licensing, and practice skills such as transaction planning and management. Evaluation and grading are based on detailed points of emphasis that reflect ways of working we believe characterize an effective lawyer and responsible colleague. Course design and operation reflect the instructors' combined 40+ years of corporate practice representing consumer products, finance, technology, and life science companies, in both law firm and senior in-house roles. Information about prior projects is available from the instructors and on the SLS website. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately

**LAW 916C. Organizations and Transactions Clinic: Clinical Coursework. 4 Units.**

(Formerly Law 272C) The O&T Clinic is targeted at both students planning to do M&A, finance, securities, IP licensing or other corporate or transactional work at major firms and those seeking to explore a non-litigation, advisory-oriented practice. In the clinic, students develop legal advice, learn to review and write contracts and governance materials, meet with client executives, examine commercial relationships, and receive extensive feedback about their work. No prior experience in business, finance, or corporate law is necessary. Students work on structural, programmatic, contractual, affiliation, and governance matters for corporate entities. Students typically represent multiple clients during the term, interact with client CEOs, CFOs, board members, and general counsels, and work in teams with other students and the instructors. Students receive detailed comments about the design, content, and execution of work-products and client communications, and about their performance in client meetings and calls. Students regularly assess their own work throughout the quarter and prepare a self-evaluation at the end of the term. O&T clients are all established Northern California nonprofit corporations. Most of the clients generate annual revenues in the range of \$1 - \$75 million; some are smaller and some are considerably larger. We focus on these organizations because they are corporations that typically have substantial governance and external disclosure obligations, active boards of directors, audited financial statements, complex programs, varied collaborations, and diverse funding sources and contractual relationships – all of which are relevant to and productive of corporate work – yet are small enough that the clinic's contact is a senior executive. We think they provide excellent material for students learning about organizational representation and institutional corporate practice. The course includes a seminar that generally meets twice a week. Seminar meetings focus on student-led workshops regarding client projects, and on orientation to corporate practice, including discussion of core commercial relationships such as acquisition, credit, and licensing, and practice skills such as transaction planning and management. Evaluation and grading are based on detailed points of emphasis that reflect ways of working we believe characterize an effective lawyer and responsible colleague. Course design and operation reflect the instructors' combined 40+ years of corporate practice representing consumer products, finance, technology, and life science companies, in both law firm and senior in-house roles. Information about prior projects is available from the instructors and on the SLS website. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately



**LAW 918. Advanced Religious Liberty Clinic. 2-7 Units.**

(Formerly Law 688) Advanced clinic allows students who have taken the Religious Liberty Clinic to continue working on cases. Participation in rounds is required. Advanced clinic may be taken for 2-7 units; general rule of thumb is 4 hours of work per week per unit. Students may not enroll in any clinic (basic or advanced) which would result in earning more than 27 clinical units during their law school enrollment. Elements used in grading: Class participation, written assignments, and case work. Students must have taken Religious Liberty Clinic.

**LAW 918A. Religious Liberty Clinic: Practice. 4 Units.**

(Formerly Law 632A) The Religious Liberty Clinic is the only clinic of its kind in the country. The landmark program offers participating students a full-time, first-chair experience representing a diverse group of clients in legal disputes arising from a wide range of beliefs, practices, and circumstances. Students learn in class and engage through reflective and supervised practice the laws, norms, and limits affecting the exercise of religious freedom in a pluralistic society. Students are expected to counsel individual or institutional clients and litigate on their behalf with excellence, professionalism, and maturity. In clinic, students typically handle an accommodation project - e.g., represent a prisoner, student, or employee facing obstacles in the exercise of faith - as well as a longer-term litigation or development matter - e.g., represent a small church, synagogue, or mosque with zoning issues, or an individual challenging state preferences for particular beliefs. Opportunities to draft amicus briefs also arise. The clinic involves agency, trial, and appellate practice - though time constraints may not permit each student to work in all areas - under the empowering supervision of faculty and staff. Students work in assigned case teams but are also encouraged to help develop new clients and matters. Special Instructions: General Structure of Clinical Courses - - The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Clinical case/project work, clinical performance, seminar preparation and participation.

**LAW 918B. Religious Liberty Clinic: Clinical Methods. 4 Units.**

(Formerly Law 632B) The Religious Liberty Clinic is the only clinic of its kind in the country. The landmark program offers participating students a full-time, first-chair experience representing a diverse group of clients in legal disputes arising from a wide range of beliefs, practices, and circumstances. Students learn in class and engage through reflective and supervised practice the laws, norms, and limits affecting the exercise of religious freedom in a pluralistic society. Students are expected to counsel individual or institutional clients and litigate on their behalf with excellence, professionalism, and maturity. In clinic, students typically handle an accommodation project - e.g., represent a prisoner, student, or employee facing obstacles in the exercise of faith - as well as a longer-term litigation or development matter - e.g., represent a small church, synagogue, or mosque with zoning issues, or an individual challenging state preferences for particular beliefs. Opportunities to draft amicus briefs also arise. The clinic involves agency, trial, and appellate practice - though time constraints may not permit each student to work in all areas - under the empowering supervision of faculty and staff. Students work in assigned case teams but are also encouraged to help develop new clients and matters. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Clinical case/project work, clinical performance, seminar preparation and participation.

**LAW 918C. Religious Liberty Clinic: Clinical Coursework. 4 Units.**

(Formerly Law 632C) The Religious Liberty Clinic is the only clinic of its kind in the country. The landmark program offers participating students a full-time, first-chair experience representing a diverse group of clients in legal disputes arising from a wide range of beliefs, practices, and circumstances. Students learn in class and engage through reflective and supervised practice the laws, norms, and limits affecting the exercise of religious freedom in a pluralistic society. Students are expected to counsel individual or institutional clients and litigate on their behalf with excellence, professionalism, and maturity. In clinic, students typically handle an accommodation project - e.g., represent a prisoner, student, or employee facing obstacles in the exercise of faith - as well as a longer-term litigation or development matter - e.g., represent a small church, synagogue, or mosque with zoning issues, or an individual challenging state preferences for particular beliefs. Opportunities to draft amicus briefs also arise. The clinic involves agency, trial, and appellate practice - though time constraints may not permit each student to work in all areas - under the empowering supervision of faculty and staff. Students work in assigned case teams but are also encouraged to help develop new clients and matters. Special Instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week preparing for and participating in weekly discussions or other group work in their individual clinic (scheduling varies by clinic). Third, over the course of the quarter each clinic student (with the exception of those enrolled in the Criminal Prosecution Clinic) is required to prepare for and attend approximately five inter-clinic group sessions. Students will be awarded three separate grades for their clinical quarter, each reflecting four units. The three grades are broken into the following categories: clinical practice; clinical methods; and clinical coursework. Grading is pursuant to the H/P system. Enrollment in a clinic is binding; once selected into a clinic to which he or she has applied, a student may not later drop the course except in limited and exceptional cases. Requests for withdrawal are processed through the formal petition and clinical faculty review process described in the clinic policy document posted on the SLS website. Students may not enroll in any clinic (full-time or advanced) which would result in them earning more than 27 clinical units during their law school career. The rules described here do not apply to advanced clinics for students who are continuing with a clinic in which they were previously enrolled. For information about advanced clinics, please see the course descriptions for those courses. For more information about clinic enrollment and operations, please see the clinic policy document posted on the SLS website. Elements used in grading: Clinical case/project work, clinical performance, seminar preparation and participation.

**LAW 920. Advanced Supreme Court Litigation Clinic. 2-7 Units.**

(Formerly Law 423) The Advanced Supreme Court Litigation Clinic provides an opportunity for students who have already successfully completed the Supreme Court Litigation Clinic to continue their work in the Clinic. Work includes research and drafting petitions for certiorari and oppositions, merits briefs, and amicus briefs, compiling joint appendices, and preparing advocates for oral argument, as well as commenting on drafts of briefs being filed by lawyers in other cases. Advanced students will also continue to participate in the Clinic's discussion of cases during case rounds. For a more elaborate description of the clinic's content, see the course description for Course Number 436-0-01. Special instructions: Admission is by consent of instructor. Advanced students may arrange with the instructor to receive between two and seven units. No student may receive more than 27 overall clinical units, however, during the course of the student's law school career. Students have the option to receive R credit upon instructor approval. After the term begins, students accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Elements used in grading: Projects and participation.

**LAW 920A. Supreme Court Litigation Clinic: Clinical Practice. 4 Units.**

(Formerly Law 436A) The Supreme Court Litigation Clinic will expose students to the joys and frustrations of litigation before the Supreme Court of the United States. The bulk of the clinic will be run as a small law firm working on live cases before the Court. Students will participate in drafting petitions for certiorari and oppositions, merits briefs, and amicus briefs, compiling joint appendices, and preparing advocates for oral argument, as well as commenting (the technical term is "kibbitzing") on drafts of briefs being filed by lawyers in other cases. The precise nature of the cases will depend on the Court's docket, but in recent Terms, the clinic's cases have involved federal criminal law and procedure, habeas corpus, constitutional and statutory antidiscrimination and employment law, bankruptcy law, and the First Amendment. Our aim is to involve students as fully as possible in this type of litigation. The Clinic begins with an intensive introduction to the distinctive nature of Supreme Court practice, including the key differences between merits arguments and the certiorari process, the role of amicus briefs, and the Supreme Court Rules. After that, seminar meetings will be devoted primarily to collaborative work on the cases the clinic is handling. While students will be primarily responsible for working in teams on one case at a time, they will also be expected to acquire familiarity with the issues raised in other students' cases and will both edit each others' substantive work and assist each other and the instructors with the technical production work attendant on filing briefs with the Supreme Court. The course will involve substantial amounts of legal research. The Supreme Court operates on a tight, and unyielding deadline, and students must be prepared both to complete their own work in a timely fashion and to assist one another and the instructors on other cases. The instructors will not ask students to do any kind of "grunt work" that they themselves will not also be handling, but grunt work there will be: proofreading, cite-checking, dealing with the joint appendix, and the like. The nature of the work product means that while students will average thirty hours per week on their case-related work, that work will surely be distributed unevenly across the quarter. Unlike most other courts, the Supreme Court has no student practice rules. Thus, students will not be able to argue cases before the Court. But they will participate in moot courts on their cases, as both advocates and Justices. Each student will also have the opportunity to travel to Washington to see the Court in session, preferably with respect to a case on which the student has worked. Ideally students will already have experience with persuasive doctrinal writing, through a course like Federal Pretrial Litigation or through intensive supervision during their summer jobs or other clinics. Admission to the Clinic is by consent of the instructors. Students will need to submit a writing sample that reflects their facility with doctrinal legal arguments and the name of at least one reference who can comment on their legal analytic ability. -- Special instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours

**LAW 920B. Supreme Court Litigation Clinic: Clinical Methods. 4 Units.**

(Formerly Law 436B) The Supreme Court Litigation Clinic will expose students to the joys and frustrations of litigation before the Supreme Court of the United States. The bulk of the clinic will be run as a small law firm working on live cases before the Court. Students will participate in drafting petitions for certiorari and oppositions, merits briefs, and amicus briefs, compiling joint appendices, and preparing advocates for oral argument, as well as commenting (the technical term is "kibbitzing") on drafts of briefs being filed by lawyers in other cases. The precise nature of the cases will depend on the Court's docket, but in recent Terms, the clinic's cases have involved federal criminal law and procedure, habeas corpus, constitutional and statutory antidiscrimination and employment law, bankruptcy law, and the First Amendment. Our aim is to involve students as fully as possible in this type of litigation. The Clinic begins with an intensive introduction to the distinctive nature of Supreme Court practice, including the key differences between merits arguments and the certiorari process, the role of amicus briefs, and the Supreme Court Rules. After that, seminar meetings will be devoted primarily to collaborative work on the cases the clinic is handling. While students will be primarily responsible for working in teams on one case at a time, they will also be expected to acquire familiarity with the issues raised in other students' cases and will both edit each others' substantive work and assist each other and the instructors with the technical production work attendant on filing briefs with the Supreme Court. The course will involve substantial amounts of legal research. The Supreme Court operates on a tight, and unyielding deadline, and students must be prepared both to complete their own work in a timely fashion and to assist one another and the instructors on other cases. The instructors will not ask students to do any kind of "grunt work" that they themselves will not also be handling, but grunt work there will be: proofreading, cite-checking, dealing with the joint appendix, and the like. The nature of the work product means that while students will average thirty hours per week on their case-related work, that work will surely be distributed unevenly across the quarter. Unlike most other courts, the Supreme Court has no student practice rules. Thus, students will not be able to argue cases before the Court. But they will participate in moot courts on their cases, as both advocates and Justices. Each student will also have the opportunity to travel to Washington to see the Court in session, preferably with respect to a case on which the student has worked. Ideally students will already have experience with persuasive doctrinal writing, through a course like Federal Pretrial Litigation or through intensive supervision during their summer jobs or other clinics. Admission to the Clinic is by consent of the instructors. Students will need to submit a writing sample that reflects their facility with doctrinal legal arguments and the name of at least one reference who can comment on their legal analytic ability. -- Special instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours

**LAW 920C. Supreme Court Litigation Clinic: Clinical Coursework. 4 Units.**

(Formerly Law 436C) The Supreme Court Litigation Clinic will expose students to the joys and frustrations of litigation before the Supreme Court of the United States. The bulk of the clinic will be run as a small law firm working on live cases before the Court. Students will participate in drafting petitions for certiorari and oppositions, merits briefs, and amicus briefs, compiling joint appendices, and preparing advocates for oral argument, as well as commenting (the technical term is "kibbitzing") on drafts of briefs being filed by lawyers in other cases. The precise nature of the cases will depend on the Court's docket, but in recent Terms, the clinic's cases have involved federal criminal law and procedure, habeas corpus, constitutional and statutory antidiscrimination and employment law, bankruptcy law, and the First Amendment. Our aim is to involve students as fully as possible in this type of litigation. The Clinic begins with an intensive introduction to the distinctive nature of Supreme Court practice, including the key differences between merits arguments and the certiorari process, the role of amicus briefs, and the Supreme Court Rules. After that, seminar meetings will be devoted primarily to collaborative work on the cases the clinic is handling. While students will be primarily responsible for working in teams on one case at a time, they will also be expected to acquire familiarity with the issues raised in other students' cases and will both edit each others' substantive work and assist each other and the instructors with the technical production work attendant on filing briefs with the Supreme Court. The course will involve substantial amounts of legal research. The Supreme Court operates on a tight, and unyielding deadline, and students must be prepared both to complete their own work in a timely fashion and to assist one another and the instructors on other cases. The instructors will not ask students to do any kind of "grunt work" that they themselves will not also be handling, but grunt work there will be: proofreading, cite-checking, dealing with the joint appendix, and the like. The nature of the work product means that while students will average thirty hours per week on their case-related work, that work will surely be distributed unevenly across the quarter. Unlike most other courts, the Supreme Court has no student practice rules. Thus, students will not be able to argue cases before the Court. But they will participate in moot courts on their cases, as both advocates and Justices. Each student will also have the opportunity to travel to Washington to see the Court in session, preferably with respect to a case on which the student has worked. Ideally students will already have experience with persuasive doctrinal writing, through a course like Federal Pretrial Litigation or through intensive supervision during their summer jobs or other clinics. Admission to the Clinic is by consent of the instructors. Students will need to submit a writing sample that reflects their facility with doctrinal legal arguments and the name of at least one reference who can comment on their legal analytic ability. -- Special instructions: General Structure of Clinical Courses -- The Law School's clinical courses are offered on a full-time basis for 12 credits. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours

**LAW 922. Advanced Youth and Education Advocacy Clinic. 2-7 Units.**

(Formerly Law 662) The Youth and Education Advocacy Advanced Clinic provides an opportunity for students who have already successfully completed the Education Advocacy Clinic to continue their advocacy work in the Clinic and/or to pursue a discrete project related to educational equity advocacy. Examples of projects include strategic policy research and management consulting for public education institutions on specific topics (e.g., accountability programs, community outreach and engagement, school climate); investigation and preparation for impact litigation; and community education and outreach on a specific education-related issue. All projects will be jointly designed by the instructor and the advanced student. Advanced students will also continue to participate in the Clinic's discussion of cases during case rounds. Special instructions: Admission is by consent of instructor. Advanced students may arrange with the instructor to receive between two and seven units. No student may receive more than 27 overall clinical units, however, during the course of the student's law school career. Elements used in grading: Projects and class participation.

**LAW 922A. Youth and Education Law Project: Clinical Practice. 4 Units.**

(Formerly Law 660A) The Youth and Education Advocacy Clinic offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or strategic policy research and consulting. All students will have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with coalitions and/or other education-sector agencies to advance equity-minded educational policies and school reform. Students working on special education matters will have the opportunity to handle all aspects of their clients' cases. Students working in this area will interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation or special education due process hearings. This work will offer students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters will interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees or the county board of education. Students may also have the opportunity to participate in complex school reform litigation, including the monitoring and enforcement of a consent decree and corrective action plan in an ongoing special education lawsuit or appellate and trial work in a pathbreaking educational finance reform litigation. Finally, students who are interested in strategic policy research and management consulting on behalf of public education institutional clients (school districts, charter schools, state education agencies) will have the opportunity to participate in the multi-disciplinary collaboration with Consortium for Public Research and Leadership (CPRL). Through the CPRL, students will work with our partners at Columbia University on consulting projects for clients on topics such as accountability, community outreach, and school climate. The education clinic includes a one-week intensive training program held at the beginning of the quarter, weekly seminars that focus on legal skills and issues in law and education policy, regular case review, and a many opportunities for feedback and reflection with the instructors. Admission is by consent of instructor. Special Instructions: General Structure of Clinical Courses – The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. – Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. – Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. – The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week

**LAW 922B. Youth and Education Law Project: Clinical Methods. 4 Units.**

(Formerly Law 660B) The Youth and Education Advocacy Clinic offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or strategic policy research and consulting. All students will have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with coalitions and/or other education-sector agencies to advance equity-minded educational policies and school reform. Students working on special education matters will have the opportunity to handle all aspects of their clients' cases. Students working in this area will interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation or special education due process hearings. This work will offer students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters will interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees or the county board of education. Students may also have the opportunity to participate in complex school reform litigation, including the monitoring and enforcement of a consent decree and corrective action plan in an ongoing special education lawsuit or appellate and trial work in a pathbreaking educational finance reform litigation. Finally, students who are interested in strategic policy research and management consulting on behalf of public education institutional clients (school districts, charter schools, state education agencies) will have the opportunity to participate in the multi-disciplinary collaboration with Consortium for Public Research and Leadership (CPRL). Through the CPRL, students will work with our partners at Columbia University on consulting projects for clients on topics such as accountability, community outreach, and school climate. The education clinic includes a one-week intensive training program held at the beginning of the quarter, weekly seminars that focus on legal skills and issues in law and education policy, regular case review, and a many opportunities for feedback and reflection with the instructors. Admission is by consent of instructor. Special Instructions: General Structure of Clinical Courses – The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. – Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. – Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. – The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours." Second, students will spend approximately five-to-seven hours per week

**LAW 922C. Youth and Education Law Project: Clinical Coursework. 4 Units.**

(Formerly Law 660C) The Youth and Education Advocacy Clinic offers students the opportunity to participate in a wide variety of educational rights and reform work, including direct representation of youth and families in special education and school discipline matters, community outreach and education, school reform litigation, and/or strategic policy research and consulting. All students will have an opportunity to represent elementary and high school students with disabilities in special education proceedings, to represent students in school discipline proceedings, or to work with coalitions and/or other education-sector agencies to advance equity-minded educational policies and school reform. Students working on special education matters will have the opportunity to handle all aspects of their clients' cases. Students working in this area will interview and counsel clients, investigate and develop facts, work with medical and mental health professionals and experts, conduct legal and educational research, create case plans, and represent clients at individual education program (IEP) team meetings, mediation or special education due process hearings. This work will offer students a chance to study the relationship between individual special education advocacy and system-wide reform efforts such as impact litigation. Students working on school discipline matters will interview and counsel clients, investigate and develop facts, interview witnesses, conduct legal and educational research, create case plan, and represent clients at school discipline hearings such as expulsion hearings. Such hearings provide the opportunity to present oral and written argument, examine witnesses, and present evidence before a hearing officer. If appropriate and necessary, such proceedings also present the opportunity to represent students on appeal before the school district board of trustees or the county board of education. Students may also have the opportunity to participate in complex school reform litigation, including the monitoring and enforcement of a consent decree and corrective action plan in an ongoing special education lawsuit or appellate and trial work in a pathbreaking educational finance reform litigation. Finally, students who are interested in strategic policy research and management consulting on behalf of public education institutional clients (school districts, charter schools, state education agencies) will have the opportunity to participate in the multi-disciplinary collaboration with Consortium for Public Research and Leadership (CPRL). Through the CPRL, students will work with our partners at Columbia University on consulting projects for clients on topics such as accountability, community outreach, and school climate. The education clinic includes a one-week intensive training program held at the beginning of the quarter, weekly seminars that focus on legal skills and issues in law and education policy, regular case review, and a many opportunities for feedback and reflection with the instructors. Admission is by consent of instructor. Special Instructions: General Structure of Clinical Courses – The Law School's clinical courses are offered on a full-time basis for 12 units. This allows students to immerse themselves in the professional experience without the need to balance clinical projects with other classes, exams and papers. – Students enrolled in a clinic are not permitted to enroll in any other classes, seminars, directed research or other credit-yielding activities within the Law School or University during the quarter in which they are enrolled in a clinic. Nor are they allowed to serve as teaching assistants who are expected to attend a class on a regular basis. There is a limited exception for joint degree students who are required to take specific courses each quarter and who would be foreclosed from ever taking a clinic unless allowed to co-register. These exceptions are approved on a case-by-case basis. – Clinic students are expected to work in their clinical office during most business hours Monday through Friday. Students are also expected to be available by e-mail or cell phone when elsewhere during those hours. Because students have no other courses (and hence no exams or papers), the clinical quarter begins the first day of classes and runs through the final day of the examination period. Students should not plan personal travel during the Monday to Friday work week without prior authorization from the clinical supervisor. – The work during a typical week in a clinic is divided into three components. First, as they are for practicing attorneys, most of the hours of any week are taken up by work on client matters or case work (this time includes meetings with instructors to discuss the work). Again, as is the case for practicing lawyers, in some weeks these responsibilities demand time above and beyond "normal business hours."

## Master of Liberal Arts (MLA)

**MLA 100E. MLA Natural Science Elective. 1-2 Unit.**

**MLA 101A. Foundations I. 4 Units.**

Required of and limited to first-year MLA students. First of three quarter foundation course. Introduction to the main political, philosophical, literary, and artistic trends that inform the liberal arts vision of the world and that underlie the MLA curriculum.

**MLA 101B. Foundations II: the Middle Ages and Renaissance.. 4 Units.**

Required of and limited to first-year MLA students. Second of three quarter foundation course. Introduction to the main political, philosophical, literary, and artistic trends that inform the liberal arts vision of the world and that underlie the MLA curriculum.

**MLA 101C. Foundations III: the Enlightenment through Modernism. 4 Units.**

Required of and limited to first-year MLA students. First of three quarter foundation course. Introduction to the main political, philosophical, literary, and artistic trends that inform the liberal arts vision of the world and that underlie the MLA curriculum.

**MLA 102. An Introduction to Interdisciplinary Graduate Study. 4 Units.**

Limited to and required of second-year MLA students. Historical, literary, artistic, medical, and theological issues are covered. Focus is on skills and information needed to pursue MLA graduate work at Stanford: writing a critical, argumentative graduate paper; conducting library research; expectations of seminar participation. Readings include Homer, Thucydides, Camus, Mann, Kushner, and sacred, scientific, and historical writings.

**MLA 262. The Economics of Life and Death. 4 Units.**

**MLA 269. The Meaning of Life: Moral and Spiritual Inquiry through Literature. 4 Units.**

**MLA 274. From Slavery to Obama. 4 Units.**

**MLA 275. Shakespeare in Performance. 4 Units.**

**MLA 278. James Joyce's Ulysses. 4 Units.**

**MLA 279. When Worlds Collide: The Trial of Galileo. 4 Units.**

**MLA 280. British and American Fiction in the 19th and early 20th Century. 4 Units.**

**MLA 281. The Arts as History: Britain 1900-1956. 4 Units.**

**MLA 282. Indigenous Peoples and Environmental Problems. 4 Units.**

**MLA 283. Three 20th-century Minds: Eliot, Pound, and Yeats. 4 Units.**

This course considers three revolutionary thinkers as they each came to terms with what they saw as the encroaching chaos of the early 20th century.

**MLA 284. Problems in American Foreign Policy. 4 Units.**

This seminar examines in depth the problems facing American diplomacy. These include the several crises in the Middle East and relations with the Muslim World; the recent world economic recession; nuclear proliferation; problems and prospects in the relationship(s) with America's allies; persistent difficulties with and the possible promise of relations with China and Russia.

**MLA 285. The Age of Enlightenment. 4 Units.**

**MLA 286. Evolutionary Theories of Music. 4 Units.**

**MLA 287. Ancients vs Moderns. 4 Units.**

**MLA 288. Who Was Shakespeare?. 4 Units.**

**MLA 290. Conservation and Development Dilemmas in Latin America: Microcosm of the Galapagos. 4 Units.**

**MLA 291. The Politics of International Humanitarian Action. 4 Units.**

**MLA 292. The Bloomsbury Group. 4 Units.**

**MLA 293. Darwin, Marx, and Freud. 4 Units.**

**MLA 294. Text and Context: Art, Music, Poetry. 4 Units.**

**MLA 295. The American Enlightenment. 4 Units.**

**MLA 296. Reflections on the American Condition. 4 Units.**

**MLA 297. Islands as Model Systems: Geology, Evolution, Ecology, and Human Societies. 4 Units.**

**MLA 298. Heretics, Prostitutes, and Merchants: The Venetian Empire. 4 Units.**

**MLA 299. Evolution and Conservation in Galapagos. 4 Units.**

**MLA 300. Oxford Summer Programme. 2-4 Units.**

**MLA 301. Mary Magdalene: The Feminine Principle in Scripture, Literature, and Legend. 4 Units.**

**MLA 302. Paris: Capital of the Modern World. 4 Units.**

**MLA 303. CULTURES OF COLLECTING. 4 Units.**

**MLA 304. The Colorado River: A Case Study of the History and Future of Western Water. 4 Units.**

**MLA 305. Russia Encounters the Enlightenment: The Art, Culture, and Politics. 4 Units.**

**MLA 306. The Young Romantics: Mythmaking, Monstrosity, and Representation. 4 Units.**

**MLA 307. What Do We Mean When We Speak of Evil?. 4 Units.**

**MLA 308. Martin Luther King, Jr.: The Man, the Movement, and the Legacy. 4 Units.**

**MLA 309. Fairly Tales: Culture's Underground Rivers. 4 Units.**

**MLA 310. Modern Chinese History, Part I: Master Class in History and Historiography. 4 Units.**

MLA 311. Paleography: Study of Medieval and Early Modern Manuscripts. 4 Units.

MLA 312. The Visual and Literary Culture of the American Civil War. 4 Units.

MLA 313. The Responsibility of Intellectuals. 4 Units.

MLA 314. Social and Environmental Sustainability: The Costa Rican Case. 4 Units.

MLA 315. Vital Issues in American Foreign Policy. 4 Units.

MLA 316. Latin@ Literatures. 4 Units.

MLA 317. James Joyce: The Early Years. 4 Units.

MLA 318. Early English Literature: Manuscripts and Texts. 4 Units.

MLA 319. Modern Chinese History through Literature and Film. 4 Units.

MLA 320. Racial Identity in the American Imagination. 4 Units.

MLA 321. Great Ideas in Computer Science. 4 Units.

MLA 322. Coffee, Sugar, and Chocolate: Commodities and Consumption in World History. 120--1800. 4 Units.

MLA 323. What can Literature Tell Us About Human Rights?. 4 Units.

MLA 324. What is a Map?. 4 Units.

MLA 325. From Manuscript to Printed Edition: Early Works of Great English Authors. 4 Units.

MLA 326. Nature through Photography. 4 Units.

MLA 327. Modern and Contemporary Poetry. 4 Units.

MLA 328. The Scientific Revolution. 4 Units.

MLA 329. International Women's Health. 4 Units.

MLA 330. History of the African American Experience. 4 Units.

MLA 331. Monterey. 4 Units.

MLA 332. London: 101 Years in Fiction. 4 Units.

MLA 333. Brexit and the Rise of Nationalist Politics. 4 Units.

MLA 334. The Material Book: Ancient and Modern. 4 Units.

MLA 335. A Tale of Three Rivers. 4 Units.

MLA 336. Love as a force for Social Justice. 4 Units.

MLA 337. Science and Law in History. 4 Units.

MLA 338. William Blake: A Literary and Visual Exploration of the Illuminated Poetry. 4 Units.

MLA 339. The Human Predicament in Three Masterpieces. 4 Units.

MLA 340. Dante and the Sacred Feminine. 4 Units.

MLA 398. MLA Thesis in Progress. 0 Units.

Group meetings provide peer critiques, motivations, and advice under the direction of the Associate Dean.

MLA 399. MLA Thesis Final Quarter. 6 Units.

Students write a 75-100 page thesis that evolves out of work they pursued during their MLA studies.

MLA 9. European Thought and Culture in the 19th Century. 4 Units.

Major European thinkers and writers and their intellectual significance from the Enlightenment to modernism. Works by Voltaire, Austen, Wordsworth, Marx, Nietzsche, and Freud.

## Materials Science & Engineer (MATSCI)

**MATSCI 100. Undergraduate Independent Study. 1-3 Unit.**

Independent study in materials science under supervision of a faculty member.

**MATSCI 142. Quantum Mechanics of Nanoscale Materials. 4 Units.**

Introduction to quantum mechanics and its application to the properties of materials. No prior background beyond a working knowledge of calculus and high school physics is presumed. Topics include: The Schrodinger equation and applications to understanding of the properties of quantum dots, semiconductor heterostructures, nanowires, and bulk solids. Tunneling processes and applications to nanoscale devices; the scanning tunneling microscope, and quantum cascade lasers. Simple models for the electronic properties and band structure of materials including semiconductors, insulators and metals and applications to semiconductor devices. Time-dependent perturbation theory and interaction of light with materials with applications to laser technology. Recommended: ENGR 50 or equivalent introductory materials science course. (Formerly 157).

**MATSCI 143. Materials Structure and Characterization. 4 Units.**

Students will study the theory and application of characterization techniques used to examine the structure of materials at the nanoscale. Students will learn to classify the structure of materials such as semiconductors, ceramics, metals, and nanotubes according to the principles of crystallography. Methods used widely in academic and industrial research, including X-ray diffraction and electron microscopy, will be demonstrated along with their application to the analysis of nanostructures. Prerequisites: E-50 or equivalent introductory materials science course. (Formerly 153).

**MATSCI 144. Thermodynamic Evaluation of Green Energy Technologies. 4 Units.**

Understand the thermodynamics and efficiency limits of modern green technologies such as carbon dioxide capture from air, fuel cells, batteries, and solar-thermal power. Recommended: ENGR 50 or equivalent introductory materials science course. (Formerly 154).



**MATSCI 145. Kinetics of Materials Synthesis. 4 Units.**

The science of synthesis of nanometer scale materials. Examples including solution phase synthesis of nanoparticles, the vapor-liquid-solid approach to growing nanowires, formation of mesoporous materials from block-copolymer solutions, and formation of photonic crystals. Relationship of the synthesis phenomena to the materials science driving forces and kinetic mechanisms. Materials science concepts including capillarity, Gibbs free energy, phase diagrams, and driving forces. Prerequisites: MatSci 144. (Formerly 155).

**MATSCI 150. Undergraduate Research. 3-6 Units.**

Participation in a research project.

**MATSCI 151. Microstructure and Mechanical Properties. 3-4 Units.**

Primarily for students without a materials background. Mechanical properties and their dependence on microstructure in a range of engineering materials. Elementary deformation and fracture concepts, strengthening and toughening strategies in metals and ceramics. Topics: dislocation theory, mechanisms of hardening and toughening, fracture, fatigue, and high-temperature creep. Undergraduates register in 151 for 4 units; graduates register for 251 in 3 units. Same as: MATSCI 251

**MATSCI 152. Electronic Materials Engineering. 4 Units.**

Materials science and engineering for electronic device applications. Kinetic molecular theory and thermally activated processes; band structure; electrical conductivity of metals and semiconductors; intrinsic and extrinsic semiconductors; elementary p-n junction theory; operating principles of light emitting diodes, solar cells, thermoelectric coolers, and transistors. Semiconductor processing including crystal growth, ion implantation, thin film deposition, etching, lithography, and nanomaterials synthesis.

**MATSCI 156. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution. 3-4 Units.**

Operating principles and applications of emerging technological solutions to the energy demands of the world. The scale of global energy usage and requirements for possible solutions. Basic physics and chemistry of solar cells, fuel cells, and batteries. Performance issues, including economics, from the ideal device to the installed system. The promise of materials research for providing next generation solutions. Undergraduates register in 156 for 4 units; graduates register in 256 for 3 units. Prerequisites: MATSCI 145 and 152 or equivalent coursework in thermodynamics and electronic properties. Same as: EE 293A, ENERGY 293A, MATSCI 256

**MATSCI 158. Soft Matter in Biomedical Devices, Microelectronics, and Everyday Life. 4 Units.**

The relationships between molecular structure, morphology, and the unique physical, chemical, and mechanical behavior of polymers and other types of soft matter are discussed. Topics include methods for preparing synthetic polymers and examination of how enthalpy and entropy determine conformation, solubility, mechanical behavior, microphase separation, crystallinity, glass transitions, elasticity, and linear viscoelasticity. Case studies covering polymers in biomedical devices and microelectronics will be covered. Recommended: ENGR 50 and Chem 31A or equivalent. Same as: BIOE 158, CHEMENG 160

**MATSCI 159Q. Japanese Companies and Japanese Society. 3 Units.**

Preference to sophomores. The structure of a Japanese company from the point of view of Japanese society. Visiting researchers from Japanese companies give presentations on their research enterprise. The Japanese research ethic. The home campus equivalent of a Kyoto SCTI course. Same as: ENGR 159Q

**MATSCI 160. Nanomaterials Laboratory. 4 Units.**

Preference to sophomores and juniors. Hands-on approach to synthesis and characterization of nanoscale materials. How to make, pattern, and analyze the latest nanotech materials, including nanoparticles, nanowires, and self-assembled monolayers. Techniques such as soft lithography, self-assembly, and surface functionalization. The VLS mechanism of nanowire growth, nanoparticle size control, self-assembly mechanisms, and surface energy considerations. Laboratory projects. Enrollment limited to 24.

**MATSCI 161. Energy Materials Laboratory. 3-4 Units.**

A material that is currently being used in a cutting edge energy-related device such as a solar cell, battery or smart window will be thoroughly characterized throughout the quarter. Fabrication techniques could include electroplating, spin coating and thermal evaporation. There will be an emphasis in this course on characterization methods such as scanning electron microscopy, x-ray photoelectron spectroscopy, atomic force microscopy, optical microscopy, four-point probe measurements of conductivity, visible absorption and reflection spectroscopy and electrochemical measurements (cyclic voltammetry). Devices will be fabricated and their performance will be tested. In this Writing in the Major course, students will put together all of the data they collect during the quarter into a final paper. Undergraduates register for 161 for 4 units; graduates register for 171 for 3 units. Prerequisites: MATSCI 143 or equivalent course in materials characterization. Same as: MATSCI 171

**MATSCI 162. X-Ray Diffraction Laboratory. 3-4 Units.**

Experimental x-ray diffraction techniques for microstructural analysis of materials, emphasizing powder and single-crystal techniques. Diffraction from epitaxial and polycrystalline thin films, multilayers, and amorphous materials using medium and high resolution configurations. Determination of phase purity, crystallinity, relaxation, stress, and texture in the materials. Advanced experimental x-ray diffraction techniques: reciprocal lattice mapping, reflectivity, and grazing incidence diffraction. Enrollment limited to 20. Undergraduates register for 162 for 4 units; graduates register for 172 for 3 units. Prerequisites: MATSCI 143 or equivalent course in materials characterization. Same as: MATSCI 172, PHOTON 172

**MATSCI 163. Mechanical Behavior Laboratory. 3-4 Units.**

Technologically relevant experimental techniques for the study of the mechanical behavior of engineering materials in bulk and thin film form, including tension testing, nanoindentation, and wafer curvature stress analysis. Metallic and polymeric systems. In addition to regularly scheduled lecture (M/W), this course includes a three-hour lab session every other week (T/W/Th). Register for lecture section in addition to one lab section. Undergraduates register for 163 in 4 units; graduates register in 173 for 3 units. Same as: MATSCI 173

**MATSCI 164. Electronic and Photonic Materials and Devices Laboratory. 3-4 Units.**

Lab course. Current electronic and photonic materials and devices. Device physics and micro-fabrication techniques. Students design, fabricate, and perform physical characterization on the devices they have fabricated. Established techniques and materials such as photolithography, metal evaporation, and Si technology; and novel ones such as soft lithography and organic semiconductors. Prerequisite: MATSCI 152 or 199 or consent of instructor. Undergraduates register in 164 for 4 units; graduates register in 174 for 3 units. Same as: MATSCI 174

**MATSCI 165. Nanoscale Materials Physics Computation Laboratory. 3-4 Units.**

Computational exploration of fundamental topics in materials science using Java-based computation and visualization tools. Emphasis is on the atomic-scale origins of macroscopic materials phenomena. Simulation methods include molecular dynamics and Monte Carlo with applications in thermodynamics, kinetics, and topics in statistical mechanics. Undergraduates register for 165 for 4 units; graduates register for 175 for 3 units. Prerequisites: Undergraduate physics and MATSCI 144 or equivalent coursework in thermodynamics. MATSCI 145 recommended.

Same as: MATSCI 175

**MATSCI 171. Energy Materials Laboratory. 3-4 Units.**

A material that is currently being used in a cutting edge energy-related device such as a solar cell, battery or smart window will be thoroughly characterized throughout the quarter. Fabrication techniques could include electroplating, spin coating and thermal evaporation. There will be an emphasis in this course on characterization methods such as scanning electron microscopy, x-ray photoelectron spectroscopy, atomic force microscopy, optical microscopy, four-point probe measurements of conductivity, visible absorption and reflection spectroscopy and electrochemical measurements (cyclic voltammetry). Devices will be fabricated and their performance will be tested. In this Writing in the Major course, students will put together all of the data they collect during the quarter into a final paper. Undergraduates register for 161 for 4 units; graduates register for 171 for 3 units. Prerequisites: MATSCI 143 or equivalent course in materials characterization.

Same as: MATSCI 161

**MATSCI 172. X-Ray Diffraction Laboratory. 3-4 Units.**

Experimental x-ray diffraction techniques for microstructural analysis of materials, emphasizing powder and single-crystal techniques. Diffraction from epitaxial and polycrystalline thin films, multilayers, and amorphous materials using medium and high resolution configurations. Determination of phase purity, crystallinity, relaxation, stress, and texture in the materials. Advanced experimental x-ray diffraction techniques: reciprocal lattice mapping, reflectivity, and grazing incidence diffraction. Enrollment limited to 20. Undergraduates register for 162 for 4 units; graduates register for 172 for 3 units. Prerequisites: MATSCI 143 or equivalent course in materials characterization.

Same as: MATSCI 162, PHOTON 172

**MATSCI 173. Mechanical Behavior Laboratory. 3-4 Units.**

Technologically relevant experimental techniques for the study of the mechanical behavior of engineering materials in bulk and thin film form, including tension testing, nanoindentation, and wafer curvature stress analysis. Metallic and polymeric systems. In addition to regularly scheduled lecture (M/W), this course includes a three-hour lab session every other week (T/W/Th). Register for lecture section in addition to one lab section. Undergraduates register for 163 in 4 units; graduates register in 173 for 3 units.

Same as: MATSCI 163

**MATSCI 174. Electronic and Photonic Materials and Devices Laboratory. 3-4 Units.**

Lab course. Current electronic and photonic materials and devices. Device physics and micro-fabrication techniques. Students design, fabricate, and perform physical characterization on the devices they have fabricated. Established techniques and materials such as photolithography, metal evaporation, and Si technology; and novel ones such as soft lithography and organic semiconductors. Prerequisite: MATSCI 152 or 199 or consent of instructor. Undergraduates register in 164 for 4 units; graduates register in 174 for 3 units.

Same as: MATSCI 164

**MATSCI 175. Nanoscale Materials Physics Computation Laboratory. 3-4 Units.**

Computational exploration of fundamental topics in materials science using Java-based computation and visualization tools. Emphasis is on the atomic-scale origins of macroscopic materials phenomena. Simulation methods include molecular dynamics and Monte Carlo with applications in thermodynamics, kinetics, and topics in statistical mechanics. Undergraduates register for 165 for 4 units; graduates register for 175 for 3 units. Prerequisites: Undergraduate physics and MATSCI 144 or equivalent coursework in thermodynamics. MATSCI 145 recommended.

Same as: MATSCI 165

**MATSCI 190. Organic and Biological Materials. 3-4 Units.**

Unique physical and chemical properties of organic materials and their uses. The relationship between structure and physical properties, and techniques to determine chemical structure and molecular ordering. Examples include liquid crystals, dendrimers, carbon nanotubes, hydrogels, and biopolymers such as lipids, protein, and DNA. Prerequisite: Thermodynamics and ENGR 50 or equivalent. Undergraduates register for 190 for 4 units; graduates register for 210 for 3 units.

Same as: MATSCI 210

**MATSCI 192. Materials Chemistry. 3-4 Units.**

An introduction to the fundamental physical chemical principles underlying materials properties. Beginning from basic quantum chemistry, students will learn how the electronic configuration of molecules and solids impacts their structure, stability/reactivity, and spectra. Topics for the course include molecular symmetry, molecular orbital theory, solid-state chemistry, coordination compounds, and nanomaterials chemistry. Using both classroom lectures and journal discussions, students will gain an understanding of and be well-positioned to contribute to the frontiers of materials chemistry, ranging from solar-fuel generation to next-generation cancer treatments. Undergraduates register in 192 for 4 units; graduates register in 202 for 3 units.

Same as: MATSCI 202

**MATSCI 193. Atomic Arrangements in Solids. 3-4 Units.**

Atomic arrangements in perfect and imperfect solids, especially important metals, ceramics, and semiconductors. Elements of formal crystallography, including development of point groups and space groups. Undergraduates register in 193 for 4 units; graduates register in 203 for 3 units.

Same as: MATSCI 203

**MATSCI 194. Thermodynamics and Phase Equilibria. 3-4 Units.**

The principles of heterogeneous equilibria and their application to phase diagrams. Thermodynamics of solutions; chemical reactions; non-stoichiometry in compounds; first order phase transitions and metastability; thermodynamics of surfaces, elastic solids, dielectrics, and magnetic solids. Undergraduates register for 194 for 4 units; graduates register for 204 for 3 units.

Same as: MATSCI 204

**MATSCI 195. Waves and Diffraction in Solids. 3-4 Units.**

The elementary principals of x-ray, vibrational, and electron waves in solids. Basic wave behavior including Fourier analysis, interference, diffraction, and polarization. Examples of wave systems, including electromagnetic waves from Maxwell's equations. Diffracted intensity in reciprocal space and experimental techniques such as electron and x-ray diffraction. Lattice vibrations in solids, including vibrational modes, dispersion relationship, density of states, and thermal properties. Free electron model. Basic quantum mechanics and statistical mechanics including Fermi-Dirac and Bose-Einstein statistics. Prerequisite: MATSCI 193/203 or consent of instructor. Undergraduates register for 195 for 4 units; graduates register for 205 for 3 units.

Same as: MATSCI 205, PHOTON 205

**MATSCI 196. Defects in Crystalline Solids. 3-4 Units.**

Thermodynamic and kinetic behaviors of 0-D (point), 1-D (line), and 2-D (interface and surface) defects in crystalline solids. Influences of these defects on the macroscopic ionic, electronic, and catalytic properties of materials, such as batteries, fuel cells, catalysts, and memory-storage devices. Prerequisite: MATSCI 193/203. Undergraduates register for 196 for 4 units; graduates register for 206 for 3 units.

Same as: MATSCI 206

**MATSCI 197. Rate Processes in Materials. 3-4 Units.**

Diffusion and phase transformations in solids. Diffusion topics: Fick's laws, atomic theory of diffusion, and diffusion in alloys. Phase transformation topics: nucleation, growth, diffusional transformations, spinodal decomposition, and interface phenomena. Material builds on the mathematical, thermodynamic, and statistical mechanical foundations in the prerequisites. Prerequisites: MATSCI 194/204. Undergraduates register for 197 for 4 units; graduates register for 207 for 3 units.

Same as: MATSCI 207

**MATSCI 198. Mechanical Properties of Materials. 3-4 Units.**

Introduction to the mechanical behavior of solids, emphasizing the relationships between microstructure and mechanical properties. Elastic, anelastic, and plastic properties of materials. The relations between stress, strain, strain rate, and temperature for plastically deformable solids. Application of dislocation theory to strengthening mechanisms in crystalline solids. The phenomena of creep, fracture, and fatigue and their controlling mechanisms. Prerequisites: MATSCI 193/203.

Undergraduates register for 198 for 4 units; graduates register for 208 for 3 units.

Same as: MATSCI 208

**MATSCI 199. Electronic and Optical Properties of Solids. 3-4 Units.**

The concepts of electronic energy bands and transports applied to metals, semiconductors, and insulators. The behavior of electronic and optical devices including p-n junctions, MOS-capacitors, MOSFETs, optical waveguides, quantum-well lasers, light amplifiers, and metallo-dielectric light guides. Emphasis is on relationships between structure and physical properties. Elementary quantum and statistical mechanics concepts are used. Prerequisite: MATSCI 195/205 or equivalent.

Undergraduates register for 199 for 4 units; graduates register for 209 for 3 units.

Same as: MATSCI 209

**MATSCI 200. Master's Research. 1-15 Unit.**

Participation in a research project.

**MATSCI 201. Applied Quantum Mechanics I. 3 Units.**

Emphasis is on applications in modern devices and systems. Topics include: Schrödinger's equation, eigenfunctions and eigenvalues, solutions of simple problems including quantum wells and tunneling, quantum harmonic oscillator, coherent states, operator approach to quantum mechanics, Dirac notation, angular momentum, hydrogen atom, calculation techniques including matrix diagonalization, perturbation theory, variational method, and time-dependent perturbation theory with applications to optical absorption, nonlinear optical coefficients, and Fermi's golden rule. Prerequisites: MATH 52 and 53, EE 65 or PHYSICS 65 (or PHYSICS 43 and 45).

Same as: EE 222

**MATSCI 202. Materials Chemistry. 3-4 Units.**

An introduction to the fundamental physical chemical principles underlying materials properties. Beginning from basic quantum chemistry, students will learn how the electronic configuration of molecules and solids impacts their structure, stability/reactivity, and spectra. Topics for the course include molecular symmetry, molecular orbital theory, solid-state chemistry, coordination compounds, and nanomaterials chemistry. Using both classroom lectures and journal discussions, students will gain an understanding of and be well-positioned to contribute to the frontiers of materials chemistry, ranging from solar-fuel generation to next-generation cancer treatments.

Undergraduates register in 192 for 4 units; graduates register in 202 for 3 units.

Same as: MATSCI 192

**MATSCI 203. Atomic Arrangements in Solids. 3-4 Units.**

Atomic arrangements in perfect and imperfect solids, especially important metals, ceramics, and semiconductors. Elements of formal crystallography, including development of point groups and space groups. Undergraduates register in 193 for 4 units; graduates register in 203 for 3 units.

Same as: MATSCI 193

**MATSCI 204. Thermodynamics and Phase Equilibria. 3-4 Units.**

The principles of heterogeneous equilibria and their application to phase diagrams. Thermodynamics of solutions; chemical reactions; non-stoichiometry in compounds; first order phase transitions and metastability; thermodynamics of surfaces, elastic solids, dielectrics, and magnetic solids. Undergraduates register for 194 for 4 units; graduates register for 204 for 3 units.

Same as: MATSCI 194

**MATSCI 205. Waves and Diffraction in Solids. 3-4 Units.**

The elementary principals of x-ray, vibrational, and electron waves in solids. Basic wave behavior including Fourier analysis, interference, diffraction, and polarization. Examples of wave systems, including electromagnetic waves from Maxwell's equations. Diffracted intensity in reciprocal space and experimental techniques such as electron and x-ray diffraction. Lattice vibrations in solids, including vibrational modes, dispersion relationship, density of states, and thermal properties. Free electron model. Basic quantum mechanics and statistical mechanics including Fermi-Dirac and Bose-Einstein statistics. Prerequisite: MATSCI 193/203 or consent of instructor. Undergraduates register for 195 for 4 units; graduates register for 205 for 3 units.

Same as: MATSCI 195, PHOTON 205

**MATSCI 206. Defects in Crystalline Solids. 3-4 Units.**

Thermodynamic and kinetic behaviors of 0-D (point), 1-D (line), and 2-D (interface and surface) defects in crystalline solids. Influences of these defects on the macroscopic ionic, electronic, and catalytic properties of materials, such as batteries, fuel cells, catalysts, and memory-storage devices. Prerequisite: MATSCI 193/203. Undergraduates register for 196 for 4 units; graduates register for 206 for 3 units.

Same as: MATSCI 196

**MATSCI 207. Rate Processes in Materials. 3-4 Units.**

Diffusion and phase transformations in solids. Diffusion topics: Fick's laws, atomic theory of diffusion, and diffusion in alloys. Phase transformation topics: nucleation, growth, diffusional transformations, spinodal decomposition, and interface phenomena. Material builds on the mathematical, thermodynamic, and statistical mechanical foundations in the prerequisites. Prerequisites: MATSCI 194/204. Undergraduates register for 197 for 4 units; graduates register for 207 for 3 units.

Same as: MATSCI 197

**MATSCI 208. Mechanical Properties of Materials. 3-4 Units.**

Introduction to the mechanical behavior of solids, emphasizing the relationships between microstructure and mechanical properties. Elastic, anelastic, and plastic properties of materials. The relations between stress, strain, strain rate, and temperature for plastically deformable solids. Application of dislocation theory to strengthening mechanisms in crystalline solids. The phenomena of creep, fracture, and fatigue and their controlling mechanisms. Prerequisites: MATSCI 193/203. Undergraduates register for 198 for 4 units; graduates register for 208 for 3 units.

Same as: MATSCI 198

**MATSCI 209. Electronic and Optical Properties of Solids. 3-4 Units.**

The concepts of electronic energy bands and transports applied to metals, semiconductors, and insulators. The behavior of electronic and optical devices including p-n junctions, MOS-capacitors, MOSFETs, optical waveguides, quantum-well lasers, light amplifiers, and metallo-dielectric light guides. Emphasis is on relationships between structure and physical properties. Elementary quantum and statistical mechanics concepts are used. Prerequisite: MATSCI 195/205 or equivalent. Undergraduates register for 199 for 4 units; graduates register for 209 for 3 units.

Same as: MATSCI 199

**MATSCI 210. Organic and Biological Materials. 3-4 Units.**

Unique physical and chemical properties of organic materials and their uses. The relationship between structure and physical properties, and techniques to determine chemical structure and molecular ordering. Examples include liquid crystals, dendrimers, carbon nanotubes, hydrogels, and biopolymers such as lipids, protein, and DNA. Prerequisite: Thermodynamics and ENGR 50 or equivalent. Undergraduates register for 190 for 4 units; graduates register for 210 for 3 units.

Same as: MATSCI 190

**MATSCI 230. Materials Science Colloquium. 1 Unit.**

May be repeated for credit.

**MATSCI 241. Mechanical Behavior of Nanomaterials. 3 Units.**

Mechanical behavior of the following nanoscale solids: 2D materials (metal thin films, graphene), 1D materials (nanowires, carbon nanotubes), and 0D materials (metallic nanoparticles, quantum dots). This course will cover elasticity, plasticity and fracture in nanomaterials, defect-scarce nanomaterials, deformation near free surfaces, coupled optoelectronic and mechanical properties (e.g. piezoelectric nanowires, quantum dots), and nanomechanical measurement techniques. Prerequisites: Mechanics of Materials (ME80) or equivalent.

Same as: ME 241

**MATSCI 251. Microstructure and Mechanical Properties. 3-4 Units.**

Primarily for students without a materials background. Mechanical properties and their dependence on microstructure in a range of engineering materials. Elementary deformation and fracture concepts, strengthening and toughening strategies in metals and ceramics. Topics: dislocation theory, mechanisms of hardening and toughening, fracture, fatigue, and high-temperature creep. Undergraduates register in 151 for 4 units; graduates register for 251 in 3 units.

Same as: MATSCI 151

**MATSCI 256. Solar Cells, Fuel Cells, and Batteries: Materials for the Energy Solution. 3-4 Units.**

Operating principles and applications of emerging technological solutions to the energy demands of the world. The scale of global energy usage and requirements for possible solutions. Basic physics and chemistry of solar cells, fuel cells, and batteries. Performance issues, including economics, from the ideal device to the installed system. The promise of materials research for providing next generation solutions. Undergraduates register in 156 for 4 units; graduates register in 256 for 3 units. Prerequisites: MATSCI 145 and 152 or equivalent coursework in thermodynamics and electronic properties.

Same as: EE 293A, ENERGY 293A, MATSCI 156

**MATSCI 299. Practical Training. 1 Unit.**

Educational opportunities in high-technology research and development labs in industry. Qualified graduate students engage in internship work and integrate that work into their academic program. Following the internship, students complete a research report outlining their work activity, problems investigated, key results, and any follow-on projects they expect to perform. Student is responsible for arranging own employment. See department student services manager before enrolling.

**MATSCI 300. Ph.D. Research. 1-15 Unit.**

Participation in a research project.

**MATSCI 301. Engineering Energy Policy Change. 3 Units.**

Government policy profoundly affects all aspects of the energy ecosystem, including its supply, distribution, storage and utilization. Policy decisions also influence the pace and focus of innovation of new technologies, including through government-funded research and development programs. This course will equip graduate students, who have strong science and engineering backgrounds, with a basic ability to understand and shape the ideation and implementation of sound energy policy. Building on case studies of both aspirational and reactive US energy policy-making, students will design their own policy proposals for new, ambitious and achievable goals that advance a sustainable and prosperous future.

**MATSCI 302. Solar Cells. 3 Units.**

This course takes a comprehensive view of solar cells and what will need to be done to enable them to substantially change how the world obtains its electricity. After covering the fundamentals (light trapping, current flow in pn junctions, recombination) that are important for almost all photovoltaic technologies, the course will address technologies based on highly crystalline forms of silicon and gallium arsenide. The device simulator PC1D will be used to model solar cells. The course will then go through multijunctions cells with concentrators, low-cost thin-film solar cells, organic semiconductors, hybrid perovskites and nanowires. There will be discussions of module design and the economics of the solar industry. There will be a tour of a company that makes solar cells and guest lectures.

**MATSCI 303. Principles, Materials and Devices of Batteries. 3 Units.**

Thermodynamics and electrochemistry for batteries. Emphasis on lithium ion batteries, but also different types including lead acid, nickel metal hydride, metal air, sodium sulfur and redox flow. Battery electrode materials, electrolytes, separators, additives and electrode-electrolyte interface. Electrochemical techniques; advanced battery materials with nanotechnology; battery device structure. Prerequisites: undergraduate chemistry.

**MATSCI 311. Lasers in Materials Processing. 3 Units.**

Principles of laser operation. Optically and electrically pumped lasers. Materials for solid-state lasers. Fundamentals of laser/materials interactions. Applications in thin film technology and microfabrication; laser annealing of defects and crystallization of amorphous films. Laser-induced shock waves. Extreme non-equilibrium laser processing; ultra-fast (femtosecond) lasers and their novel uses; micro- and nanofabrication of fluidic and photonic devices; intracellular nano-surgery.

**MATSCI 312. New Methods in Thin Film Synthesis. 3 Units.**

Materials base for engineering new classes of coatings and devices. Techniques to grow thin films at atomic scale and to fabricate multilayers/superlattices at nanoscale. Vacuum growth techniques including evaporation, molecular beam epitaxy (MBE), sputtering, ion beam assisted deposition, laser ablation, chemical vapor deposition (CVD), and electroplating. Future direction of material synthesis such as nanocluster deposition and nanoparticles self-assembly. Relationships between deposition parameters and film properties. Applications of thin film synthesis in microelectronics, nanotechnology, and biology. SCPD offering.

**MATSCI 316. Nanoscale Science, Engineering, and Technology. 3 Units.**

This course covers important aspects of nanotechnology in nanomaterials synthesis and fabrication, novel property at the nanoscale, tools and applications: a variety of nanostructures including nanocrystal, nanowire, carbon nanotube, graphene, nanoporous material, block copolymer, and self-assembled monolayer; nanofabrication techniques developed over the past 20 years; thermodynamic, electronic and optical property; applications in solar cells, batteries, biosensors and electronics. Other nanotechnology topics may be explored through a group project. SCPD offering.

**MATSCI 320. Nanocharacterization of Materials. 3 Units.**

Current methods of directly examining the microstructure of materials. Topics: optical microscopy, scanning electron and focused ion beam microscopy, field ion microscopy, transmission electron microscopy, scanning probe microscopy, and microanalytical surface science methods. Emphasis is on the electron-optical techniques. Recommended: 193/203.

**MATSCI 321. Transmission Electron Microscopy. 3 Units.**

Image formation and interpretation. The contrast phenomena associated with perfect and imperfect crystals from a physical point of view and from a formal treatment of electron diffraction theory. The importance of electron diffraction to systematic analysis and recent imaging developments. Recommended: 193/203, 195/205, or equivalent.

**MATSCI 322. Transmission Electron Microscopy Laboratory. 3 Units.**

Practical techniques in transmission electron microscopy (TEM): topics include microscope operation and alignment, diffraction modes and analysis, bright-field/dark-field imaging, high resolution and aberration corrected imaging, scanning TEM (STEM) imaging, x-ray energy dispersive spectrometry (EDS) and electron energy loss spectrometry (EELS) for compositional analysis and mapping. Prerequisite: 321, consent of instructor. Enrollment limited to 12.

**MATSCI 323. Thin Film and Interface Microanalysis. 3 Units.**

The science and technology of microanalytical techniques, including Auger electron spectroscopy (AES), Rutherford backscattering spectroscopy (RBS), secondary ion mass spectroscopy (SIMS), ion scattering spectroscopy (ISS), and x-ray photoelectron spectroscopy (XPS or ESCA). Generic processes such as sputtering and high-vacuum generation. Prerequisite: some prior exposure to atomic and electronic structure of solids. SCPD offering.

**MATSCI 326. X-Ray Science and Techniques. 3 Units.**

This course provides an introduction to how x-rays interact with matter and how x-ray techniques can be used for developing new understanding of the properties of materials. Course topics include diffraction from ordered and disordered materials, x-ray absorption/emission spectroscopy, photoemission, and coherent scattering. Sources including synchrotrons and x-ray lasers and an introduction to time-resolved techniques. This course includes a parallel laboratory effort in which students will have an opportunity to carry out experiments at the Stanford Synchrotron Radiation Lightsource at the SLAC National Accelerator Laboratory. Same as: PHOTON 326

**MATSCI 331. Atom-based computational methods for materials. 3 Units.**

Introduction to atom-based computational methods for materials with emphasis on quantum methods. Topics include density functional theory, tight-binding and empirical approaches. Computation of optical, electronic, phonon properties. Bulk materials, interfaces, nanostructures. Molecular dynamics. Prerequisites - undergraduate quantum mechanics.

**MATSCI 343. Organic Semiconductors for Electronics and Photonics. 3 Units.**

The science of organic semiconductors and their use in electronic and photonic devices. Topics: methods for fabricating thin films and devices; relationship between chemical structure and molecular packing on properties such as band gap, charge carrier mobility and luminescence efficiency; doping; field-effect transistors; light-emitting diodes; lasers; biosensors; photodetectors and photovoltaic cells.

**MATSCI 346. Nanophotonics. 3 Units.**

Recent developments in micro- and nanophotonic materials and devices. Basic concepts of photonic crystals. Integrated photonic circuits. Photonic crystal fibers. Superprism effects. Optical properties of metallic nanostructures. Sub-wavelength phenomena and plasmonic excitations. Meta-materials. Prerequisite: Electromagnetic theory at the level of 242. Same as: EE 336

**MATSCI 347. Magnetic materials in nanotechnology, sensing, and energy. 3 Units.**

This course will teach the fundamentals of magnetism, magnetic materials, and magnetic nanostructures and their myriad of applications in nanotechnology, sensing, energy and related areas. The scope of the course include: atomic origins of magnetic moments, magnetic exchange and ferromagnetism, types of magnetic order, magnetic anisotropy, domains, domain walls, hysteresis loops, hard and soft magnetic materials, demagnetization factors, magnetic nanoparticles and nanostructures, spintronics, and multiferroics. The key applications include electromagnet and permanent magnet, magnetic inductors, magnetic sensors, magnetic memory, hard disk drives, energy generation and harvesting, biomagnetism, etc. Prerequisites: College level electricity and magnetism course or equivalent.

**MATSCI 353. Mechanical Properties of Thin Films. 3 Units.**

The mechanical properties of thin films on substrates. The mechanics of thin films and of the atomic processes which cause stresses to develop during thin film growth. Experimental techniques for studying stresses in and mechanical properties of thin films. Elastic, plastic, and diffusional deformation of thin films on substrates as a function of temperature and microstructure. Effects of deformation and fracture on the processing of thin film materials. Prerequisite: 198/208.

**MATSCI 358. Fracture and Fatigue of Materials and Thin Film Structures. 3 Units.**

Linear-elastic and elastic-plastic fracture mechanics from a materials science perspective, emphasizing microstructure and the micromechanisms of fracture. Plane strain fracture toughness and resistance curve behavior. Mechanisms of failure associated with cohesion and adhesion in bulk materials, composites, and thin film structures. Fracture mechanics approaches to toughening and subcritical crack-growth processes, with examples and applications involving cyclic fatigue and environmentally assisted subcritical crack growth. Prerequisite: 151/251, 198/208, or equivalent. SCPD offering.

**MATSCI 359. Crystalline Anisotropy. 3 Units.**

Matrix and tensor analysis with applications to the effects of crystal symmetry on elastic deformation, thermal expansion, diffusion, piezoelectricity, magnetism, thermodynamics, and optical properties of solids, on the level of J. F. Nye's *Physical Properties of Crystals*. Homework sets use Mathematica.

**MATSCI 380. Nano-Biotechnology. 3 Units.**

Literature based. Principles that make nanoscale materials unique, applications to biology, and how biological systems can create nanomaterials. Molecular sensing, drug delivery, bio-inspired synthesis, self-assembling systems, and nanomaterial based therapies. Interactions at the nanoscale. Applications and opportunities for new technology.

**MATSCI 381. Biomaterials in Regenerative Medicine. 3 Units.**

Materials design and engineering for regenerative medicine. How materials interact with cells through their micro- and nanostructure, mechanical properties, degradation characteristics, surface chemistry, and biochemistry. Examples include novel materials for drug and gene delivery, materials for stem cell proliferation and differentiation, and tissue engineering scaffolds. Prerequisites: undergraduate chemistry, and cell/molecular biology or biochemistry. Same as: BIOE 361

**MATSCI 382. Biochips and Medical Imaging. 3 Units.**

The course covers state-of-the-art and emerging bio-sensors, bio-chips, imaging modalities, and nano-therapies which will be studied in the context of human physiology including the nervous system, circulatory system and immune system. Medical diagnostics will be divided into bio-chips (in-vitro diagnostics) and medical and molecular imaging (in-vivo imaging). In-depth discussion on cancer and cardiovascular diseases and the role of diagnostics and nano-therapies.

Same as: EE 225, SBIO 225

**MATSCI 399. Graduate Independent Study. 1-10 Unit.**

Under supervision of a faculty member.

**MATSCI 400. Participation in Materials Science Teaching. 1-3 Unit.**

May be repeated for credit.

**MATSCI 801. TGR Project for MS Students. 0 Units.****MATSCI 802. TGR Dissertation for Ph.D Students. 0 Units.****MATSCI 81N. Bioengineering Materials to Heal the Body. 3 Units.**

Preference to freshmen. Real-world examples of materials developed for tissue engineering and regenerative medicine therapies. How scientists and engineers design new materials for surgeons to use in replacing body parts such as damaged heart or spinal cord tissue. How cells interact with implanted materials. Students identify a clinically important disease or injury that requires a better material, proposed research approaches to the problem, and debate possible engineering solutions.

**MATSCI 82N. Science of the Impossible. 3 Units.**

Imagine a world where cancer is cured with light, objects can be made invisible, and teleportation is allowed through space and time. The future once envisioned by science fiction writers is now becoming a reality, thanks to advances in materials science and engineering. This seminar will explore 'impossible' technologies - those that have shaped our past and those that promise to revolutionize the future. Attention will be given to both the science and the societal impact of these technologies. We will begin by investigating breakthroughs from the 20th century that seemed impossible in the early 1900s, such as the invention of integrated circuits and the discovery of chemotherapy. We will then discuss the scientific breakthroughs that enabled modern 'impossible' science, such as photodynamic cancer therapeutics, invisibility, and psychokinesis through advanced mind-machine interfaces. Lastly, we will explore technologies currently perceived as completely impossible and brainstorm the breakthroughs needed to make such science fiction a reality. The course will include introductory lectures and in-depth conversations based on readings. Students will also be given the opportunity to lead class discussions on a relevant 'impossible science' topic of their choosing.

**MATSCI 83N. Great Inventions That Matter. 3 Units.**

This introductory seminar starts by illuminating on the general aspects of creativity, invention, and patenting in engineering and medicine, and how Stanford University is one of the world's foremost engines of innovation. We then take a deep dive into some great technological inventions which are still playing an essential role in our everyday lives, such as fiber amplifier, digital compass, computer memory, HIV detector, personal genome machine, cancer cell sorting, brain imaging, and mind reading. The stories and underlying materials and technologies behind each invention, including a few examples by Stanford faculty and student inventors, are highlighted and discussed. A special lecture focuses on the public policy on intellectual properties (IP) and the resources at Stanford Office of Technology Licensing (OTL). Each student will have an opportunity to present on a great invention from Stanford (or elsewhere), or to write a (mock) patent disclosure of his/her own ideas.

**MATSCI 84N. Re-engineering the energy landscape. 3 Units.**

Why hasn't electricity from solar panels, wind turbines, and other environmentally friendly resources taken over our energy landscape? Why is a hybrid car or an all-electric vehicle so expensive? In this seminar we will explore energy technologies and focus on how development in materials science enables a greener future. This seminar takes a hands-on approach; we will make solar cells and batteries and generate our own electricity. We will also include field trips to companies running large-scale energy production and green energy for transportation. Lastly we will explore advanced energy materials research at Stanford and find what still needs to be done in order to achieve a sustainable energy landscape.

## Mathematics (MATH)

**MATH 101. Math Discovery Lab. 3 Units.**

MDL is a discovery-based project course in mathematics. Students work independently in small groups to explore open-ended mathematical problems and discover original mathematics. Students formulate conjectures and hypotheses; test predictions by computation, simulation, or pure thought; and present their results to classmates. No lecture component; in-class meetings reserved for student presentations, attendance mandatory. Admission is by application: <http://math101.stanford.edu>. Motivated students with any level of mathematical background are encouraged to apply. WIM.

**MATH 104. Applied Matrix Theory. 3 Units.**

Linear algebra for applications in science and engineering: orthogonality, projections, spectral theory for symmetric matrices, the singular value decomposition, the QR decomposition, least-squares, the condition number of a matrix, algorithms for solving linear systems. (Math 113 offers a more theoretical treatment of linear algebra.) Prerequisites: Math 51 and programming experience on par with CS106nnMath 104 and EE103/CME103 cover complementary topics in applied linear algebra. The focus of Math 104 is on algorithms and concepts; the focus of EE103 is on a few linear algebra concepts, and many applications.

**MATH 106. Functions of a Complex Variable. 3 Units.**

Complex numbers, analytic functions, Cauchy-Riemann equations, complex integration, Cauchy integral formula, residues, elementary conformal mappings. (Math 116 offers a more theoretical treatment.) Prerequisite: 52.

**MATH 107. Graph Theory. 3 Units.**

An introductory course in graph theory establishing fundamental concepts and results in variety of topics. Topics include: basic notions, connectivity, cycles, matchings, planar graphs, graph coloring, matrix-tree theorem, conditions for hamiltonicity, Kuratowski's theorem, Ramsey and Turan-type theorem. Prerequisites: 51 or equivalent and some familiarity with proofs is required.

**MATH 108. Introduction to Combinatorics and Its Applications. 3 Units.**

Topics: graphs, trees (Cayley's Theorem, application to phylogony), eigenvalues, basic enumeration (permutations, Stirling and Bell numbers), recurrences, generating functions, basic asymptotics. Prerequisites: 51 or equivalent.

**MATH 109. Applied Group Theory. 3 Units.**

Applications of the theory of groups. Topics: elements of group theory, groups of symmetries, matrix groups, group actions, and applications to combinatorics and computing. Applications: rotational symmetry groups, the study of the Platonic solids, crystallographic groups and their applications in chemistry and physics. Honors math majors and students who intend to do graduate work in mathematics should take 120. WIM.

**MATH 110. Applied Number Theory and Field Theory. 3 Units.**

Number theory and its applications to modern cryptography. Topics: congruences, finite fields, primality testing and factorization, public key cryptography, error correcting codes, and elliptic curves, emphasizing algorithms. WIM.

**MATH 113. Linear Algebra and Matrix Theory. 3 Units.**

Algebraic properties of matrices and their interpretation in geometric terms. The relationship between the algebraic and geometric points of view and matters fundamental to the study and solution of linear equations. Topics: linear equations, vector spaces, linear dependence, bases and coordinate systems; linear transformations and matrices; similarity; eigenvectors and eigenvalues; diagonalization. (Math 104 offers a more application-oriented treatment.)

**MATH 114. Introduction to Scientific Computing. 3 Units.**

Introduction to Scientific Computing Numerical computation for mathematical, computational, physical sciences and engineering: error analysis, floating-point arithmetic, nonlinear equations, numerical solution of systems of algebraic equations, banded matrices, least squares, unconstrained optimization, polynomial interpolation, numerical differentiation and integration, numerical solution of ordinary differential equations, truncation error, numerical stability for time dependent problems and stiffness. Implementation of numerical methods in MATLAB programming assignments. Prerequisites: MATH 51, 52, 53; prior programming experience (MATLAB or other language at level of CS 106A or higher).

Same as: CME 108

**MATH 115. Functions of a Real Variable. 3 Units.**

The development of real analysis in Euclidean space: sequences and series, limits, continuous functions, derivatives, integrals. Basic point set topology. Honors math majors and students who intend to do graduate work in mathematics should take 171. Prerequisite: 21.

**MATH 116. Complex Analysis. 3 Units.**

Analytic functions, Cauchy integral formula, power series and Laurent series, calculus of residues and applications, conformal mapping, analytic continuation, introduction to Riemann surfaces, Fourier series and integrals. (Math 106 offers a less theoretical treatment.) Prerequisites: 52, and 115 or 171.

**MATH 118. Mathematics of Computation. 3 Units.**

Notions of analysis and algorithms central to modern scientific computing: continuous and discrete Fourier expansions, the fast Fourier transform, orthogonal polynomials, interpolation, quadrature, numerical differentiation, analysis and discretization of initial-value and boundary-value ODE, finite and spectral elements. Prerequisites: MATH 51 and 53.

**MATH 120. Groups and Rings. 3 Units.**

Recommended for Mathematics majors and required of honors Mathematics majors. Similar to 109 but altered content and more theoretical orientation. Groups acting on sets, examples of finite groups, Sylow theorems, solvable and simple groups. Fields, rings, and ideals; polynomial rings over a field; PID and non-PID. Unique factorization domains. WIM.

**MATH 121. Galois Theory. 3 Units.**

Field of fractions, splitting fields, separability, finite fields. Galois groups, Galois correspondence, examples and applications. Prerequisite: Math 120 and (also recommended) 113.

**MATH 122. Modules and Group Representations. 3 Units.**

Modules over PID. Tensor products over fields. Group representations and group rings. Maschke's theorem and character theory. Character tables, construction of representations. Prerequisite: Math 120. Also recommended: 113.

**MATH 131P. Partial Differential Equations. 3 Units.**

An introduction to PDE; particularly suitable for non-Math majors. Topics include physical examples of PDE's, method of characteristics, D'Alembert's formula, maximum principles, heat kernel, Duhamel's principle, separation of variables, Fourier series, Harmonic functions, Bessel functions, spherical harmonics. Students who have taken MATH 171 should consider taking MATH 173 rather than 131P. Prerequisite: 53.

**MATH 136. Stochastic Processes. 3 Units.**

Introduction to measure theory,  $L_p$  spaces and Hilbert spaces. Random variables, expectation, conditional expectation, conditional distribution. Uniform integrability, almost sure and  $L_p$  convergence. Stochastic processes: definition, stationarity, sample path continuity. Examples: random walk, Markov chains, Gaussian processes, Poisson processes, Martingales. Construction and basic properties of Brownian motion. Prerequisite: STATS 116 or MATH 151 or equivalent. Recommended: MATH 115 or equivalent. <http://statweb.stanford.edu/~adembo/math-136/>.

Same as: STATS 219

**MATH 137. Mathematical Methods of Classical Mechanics. 3 Units.**

Newtonian mechanics. Lagrangian formalism. E. Noether's theorem. Oscillations. Rigid bodies. Introduction to symplectic geometry. Hamiltonian formalism. Legendre transform. Variational principles. Geometric optics. Introduction to the theory of integrable systems. Prerequisites: 51, 52, 53, or 61CM, 62CM, 63CM.

**MATH 138. Celestial Mechanics. 3 Units.**

Mathematically rigorous introduction to the classical N-body problem: the motion of N particles evolving according to Newton's law. Topics include: the Kepler problem and its symmetries; other central force problems; conservation theorems; variational methods; Hamilton-Jacobi theory; the role of equilibrium points and stability; and symplectic methods. Prerequisites: 53, and 115 or 171.

**MATH 142. Hyperbolic Geometry. 3 Units.**

An introductory course in hyperbolic geometry. Topics may include: different models of hyperbolic geometry, hyperbolic area and geodesics, Isometries and Mobius transformations, conformal maps, Fuchsian groups, Farey tessellation, hyperbolic structures on surfaces and three manifolds, limit sets. Prerequisites: some familiarity with the basic concepts of differential geometry and the topology of surfaces and manifolds is strongly recommended.

**MATH 143. Differential Geometry. 3 Units.**

Geometry of curves and surfaces in three-space and higher dimensional manifolds. Parallel transport, curvature, and geodesics. Surfaces with constant curvature. Minimal surfaces.

**MATH 145. Algebraic Geometry. 3 Units.**

An introduction to the methods and concepts of algebraic geometry. The point of view and content will vary over time, but include: affine varieties, Hilbert basis theorem and Nullstellensatz, projective varieties, algebraic curves. Required: 120. Strongly recommended: additional mathematical maturity via further basic background with fields, point-set topology, or manifolds.

**MATH 146. Analysis on Manifolds. 3 Units.**

Differentiable manifolds, tangent space, submanifolds, implicit function theorem, differential forms, vector and tensor fields. Frobenius' theorem, DeRham theory. Prerequisite: 62CM or 52 and familiarity with linear algebra and analysis arguments at the level of 113 and 115 respectively.

**MATH 147. Differential Topology. 3 Units.**

Smooth manifolds, transversality, Sard's theorem, embeddings, degree of a map, Borsuk-Ulam theorem, Hopf degree theorem, Jordan curve theorem. Prerequisite: 115 or 171.

**MATH 148. Algebraic Topology. 3 Units.**

Fundamental group, covering spaces, Euler characteristic, homology, classification of surfaces, knots. Prerequisite: 109 or 120.

**MATH 151. Introduction to Probability Theory. 3 Units.**

Counting; axioms of probability; conditioning and independence; expectation and variance; discrete and continuous random variables and distributions; joint distributions and dependence; central limit theorem and laws of large numbers. Prerequisite: 52 or consent of instructor.

**MATH 152. Elementary Theory of Numbers. 3 Units.**

Euclid's algorithm, fundamental theorems on divisibility; prime numbers; congruence of numbers; theorems of Fermat, Euler, Wilson; congruences of first and higher degrees; quadratic residues; introduction to the theory of binary quadratic forms; quadratic reciprocity; partitions.

**MATH 154. Algebraic Number Theory. 3 Units.**

Properties of number fields and Dedekind domains, quadratic and cyclotomic fields, applications to some classical Diophantine equations. Prerequisites: 120 and 121, especially modules over principal ideal domains and Galois theory of finite fields.

**MATH 155. Analytic Number Theory. 3 Units.**

Topics in analytic number theory such as the distribution of prime numbers, the prime number theorem, twin primes and Goldbach's conjecture, the theory of quadratic forms, Dirichlet's class number formula, Dirichlet's theorem on primes in arithmetic progressions, and the fifteen theorem. Prerequisite: 152, or familiarity with the Euclidean algorithm, congruences, residue classes and reduced residue classes, primitive roots, and quadratic reciprocity.

**MATH 158. Basic Probability and Stochastic Processes with Engineering Applications. 3 Units.**

Calculus of random variables and their distributions with applications. Review of limit theorems of probability and their application to statistical estimation and basic Monte Carlo methods. Introduction to Markov chains, random walks, Brownian motion and basic stochastic differential equations with emphasis on applications from economics, physics and engineering, such as filtering and control. Prerequisites: exposure to basic probability.

Same as: CME 298

**MATH 159. Discrete Probabilistic Methods. 3 Units.**

Modern discrete probabilistic methods suitable for analyzing discrete structures of the type arising in number theory, graph theory, combinatorics, computer science, information theory and molecular sequence analysis. Prerequisite: STATS 116/MATH 151 or equivalent.

**MATH 161. Set Theory. 3 Units.**

Informal and axiomatic set theory: sets, relations, functions, and set-theoretical operations. The Zermelo-Fraenkel axiom system and the special role of the axiom of choice and its various equivalents. Well-orderings and ordinal numbers; transfinite induction and transfinite recursion. Equinumerosity and cardinal numbers; Cantor's Alephs and cardinal arithmetic. Open problems in set theory. Prerequisite: students should be comfortable doing proofs.

**MATH 162. Philosophy of Mathematics. 4 Units.**

Mathematics is a very peculiar human activity. It delivers a type of knowledge that is particularly stable, often conceived as a priori and necessary. Moreover, this knowledge is about abstract entities, which seem to have no connection to us, spatio-temporal creatures, and yet it plays a crucial role in our scientific endeavors. Many philosophical questions emerge naturally: What is the nature of mathematical objects? How can we learn anything about them? Where does the stability of mathematics come from? What is the significance of results showing the limits of such knowledge, such as Gödel's incompleteness theorem? The first part of the course will survey traditional approaches to philosophy of mathematics ("the big Isms") and consider the viability of their answers to some of the previous questions: logicism, intuitionism, Hilbert's program, empiricism, fictionalism, and structuralism. The second part will focus on philosophical issues emerging from the actual practice of mathematics. We will tackle questions such as: Why do mathematicians re-prove the same theorems? What is the role of visualization in mathematics? How can mathematical knowledge be effective in natural science? To conclude, we will explore the aesthetic dimension of mathematics, focusing on mathematical beauty. Prerequisite: PHIL 150 or consent of instructor.

Same as: PHIL 162

**MATH 163. The Greek Invention of Mathematics. 3-5 Units.**

How was mathematics invented? A survey of the main creative ideas of ancient Greek mathematics. Among the issues explored are the axiomatic system of Euclid's Elements, the origins of the calculus in Greek measurements of solids and surfaces, and Archimedes' creation of mathematical physics. We will provide proofs of ancient theorems, and also learn how such theorems are even known today thanks to the recovery of ancient manuscripts.

Same as: CLASSICS 136

**MATH 171. Fundamental Concepts of Analysis. 3 Units.**

Recommended for Mathematics majors and required of honors Mathematics majors. Similar to 115 but altered content and more theoretical orientation. Properties of Riemann integrals, continuous functions and convergence in metric spaces; compact metric spaces, basic point set topology. Prerequisite: 61CM or 61DM or 115 or consent of the instructor. WIM.

**MATH 172. Lebesgue Integration and Fourier Analysis. 3 Units.**

Similar to 205A, but for undergraduate Math majors and graduate students in other disciplines. Topics include Lebesgue measure on Euclidean space, Lebesgue integration,  $L^p$  spaces, the Fourier transform, the Hardy-Littlewood maximal function and Lebesgue differentiation. Prerequisite: 171 or consent of instructor.

**MATH 173. Theory of Partial Differential Equations. 3 Units.**

A rigorous introduction to PDE accessible to advanced undergraduates. Elliptic, parabolic, and hyperbolic equations in many space dimensions including basic properties of solutions such as maximum principles, causality, and conservation laws. Methods include the Fourier transform as well as more classical methods. The Lebesgue integral will be used throughout, but a summary of its properties will be provided to make the course accessible to students who have not had 172 or 205A. In years when Math 173 is not offered, Math 220 is a recommended alternative (with similar content but a different emphasis). Prerequisite: 171 or equivalent.

**MATH 174. Calculus of Variations. 3 Units.**

An introductory course emphasizing the historical development of the theory, its connections to physics and mechanics, its independent mathematical interest, and its contacts with daily life experience. Applications to minimal surfaces and to capillary surface interfaces. Prerequisites: Math 171 or equivalent.

**MATH 175. Elementary Functional Analysis. 3 Units.**

Linear operators on Hilbert space. Spectral theory of compact operators; applications to integral equations. Elements of Banach space theory. Prerequisite: 115 or 171.

**MATH 177. Geometric Methods in the Theory of Ordinary Differential Equations. 3 Units.**

Hamiltonian systems and their geometry. First order PDE and Hamilton-Jacobi equation. Structural stability and hyperbolic dynamical systems. Completely integrable systems. Perturbation theory.

**MATH 19. Calculus. 3 Units.**

Introduction to differential calculus of functions of one variable. Review of elementary functions (including exponentials and logarithms), limits, rates of change, the derivative and its properties, applications of the derivative. Prerequisites: trigonometry, advanced algebra, and analysis of elementary functions (including exponentials and logarithms). You must have taken the math placement diagnostic (offered through the Math Department website) in order to register for this course.

**MATH 193. Polya Problem Solving Seminar. 1 Unit.**

Topics in mathematics and problem solving strategies with an eye towards the Putnam Competition. Topics may include parity, the pigeonhole principle, number theory, recurrence, generating functions, and probability. Students present solutions to the class. Open to anyone with an interest in mathematics.



**MATH 197. Senior Honors Thesis. 1-6 Unit.**

Honors math major working on senior honors thesis under an approved advisor carries out research and reading. Satisfactory written account of progress achieved during term must be submitted to advisor before term ends. May be repeated 3 times for a max of 9 units. Contact department student services specialist to enroll.

**MATH 198. Practical Training. 1 Unit.**

Only for undergraduate students majoring in mathematics. Students obtain employment in a relevant industrial or research activity to enhance their professional experience. Students submit a concise report detailing work activities, problems worked on, and key results. May be repeated for credit up to 3 units. Prerequisite: qualified offer of employment and consent of department. Prior approval by Math Department is required; you must contact the Math Department's Student Services staff for instructions before being granted permission to enroll.

**MATH 199. Independent Work. 1-3 Unit.**

For math majors only. Undergraduates pursue a reading program; topics limited to those not in regular department course offerings. Credit can fulfill the elective requirement for math majors. Approval of Undergraduate Affairs Committee is required to use credit for honors majors area requirement. Contact department student services specialist to enroll.

**MATH 20. Calculus. 3 Units.**

The definite integral, Riemann sums, antiderivatives, the Fundamental Theorem of Calculus, and the Mean Value Theorem for integrals. Integration by substitution and by parts. Area between curves, and volume by slices, washers, and shells. Initial-value problems, exponential and logistic models, direction fields, and parametric curves. Prerequisite: Math 19 or equivalent. If you have not previously taken a calculus course at Stanford then you must have taken the math placement diagnostic (offered through the Math Department website) in order to register for this course.

**MATH 205A. Real Analysis. 3 Units.**

Basic measure theory and the theory of Lebesgue integration. Prerequisite: 171 or equivalent.

**MATH 205B. Real Analysis. 3 Units.**

Point set topology, basic functional analysis, Fourier series, and Fourier transform. Prerequisites: 171 and 205A or equivalent.

**MATH 205C. Real Analysis. 3 Units.**

Continuation of 205B.

**MATH 21. Calculus. 4 Units.**

Review of limit rules. Sequences, functions, limits at infinity, and comparison of growth of functions. Review of integration rules, integrating rational functions, and improper integrals. Infinite series, special examples, convergence and divergence tests (limit comparison and alternating series tests). Power series and interval of convergence, Taylor polynomials, Taylor series and applications. Prerequisite: Math 20 or equivalent. If you have not previously taken a calculus course at Stanford then you must have taken the math placement diagnostic (offered through the Math Department website) in order to register for this course.

**MATH 210A. Modern Algebra I. 3 Units.**

Basic commutative ring and module theory, tensor algebra, homological constructions, linear and multilinear algebra, canonical forms and Jordan decomposition. Prerequisite: 122 or equivalent.

**MATH 210B. Modern Algebra II. 3 Units.**

Continuation of 210A. Topics in field theory, commutative algebra, and algebraic geometry. Prerequisites: 210A, and 121 or equivalent.

**MATH 210C. Lie Theory. 3 Units.**

Topics in Lie groups, Lie algebras, and/or representation theory. Prerequisite: math 210B. May be repeated for credit.

**MATH 215A. Algebraic Topology. 3 Units.**

Topics: fundamental group and covering spaces, basics of homotopy theory, homology and cohomology (simplicial, singular, cellular), products, introduction to topological manifolds, orientations, Poincare duality. Prerequisites: 113, 120, and 171.

**MATH 215B. Differential Topology. 3 Units.**

Topics: Basics of differentiable manifolds (tangent spaces, vector fields, tensor fields, differential forms), embeddings, tubular neighborhoods, integration and Stokes's Theorem, deRham cohomology, intersection theory via Poincare duality, Morse theory. Prerequisite: 215A.

**MATH 215C. Differential Geometry. 3 Units.**

This course will be an introduction to Riemannian Geometry. Topics will include the Levi-Civita connection, Riemann curvature tensor, Ricci and scalar curvature, geodesics, parallel transport, completeness, geodesics and Jacobi fields, and comparison techniques. Prerequisites 146 or 215B.

**MATH 216A. Introduction to Algebraic Geometry. 3 Units.**

Algebraic curves, algebraic varieties, sheaves, cohomology, Riemann-Roch theorem. Classification of algebraic surfaces, moduli spaces, deformation theory and obstruction theory, the notion of schemes. May be repeated for credit. Prerequisites: 210ABC or equivalent.

**MATH 216B. Introduction to Algebraic Geometry. 3 Units.**

Continuation of 216A. May be repeated for credit.

**MATH 216C. Introduction to Algebraic Geometry. 3 Units.**

Continuation of 216B. May be repeated for credit.

**MATH 217C. Complex Differential Geometry. 3 Units.**

Complex structures, almost complex manifolds and integrability, Hermitian and Kahler metrics, connections on complex vector bundles, Chern classes and Chern-Weil theory, Hodge and Dolbeault theory, vanishing theorems, Calabi-Yau manifolds, deformation theory.

**MATH 21A. Calculus, ACE. 5 Units.**

Students attend MATH 21 lectures with different recitation sessions: two hours per week instead of one, emphasizing engineering applications. Prerequisite: application; see <https://web.stanford.edu/dept/soe/osa/ace.fb>.

**MATH 220. Partial Differential Equations of Applied Mathematics. 3 Units.**

First-order partial differential equations; method of characteristics; weak solutions; elliptic, parabolic, and hyperbolic equations; Fourier transform; Fourier series; and eigenvalue problems. Prerequisite: Basic coursework in multivariable calculus and ordinary differential equations, and some prior experience with a proof-based treatment of the material as in Math 171 or Math 61CM (formerly Math 51H). Same as: CME 303

**MATH 221A. Mathematical Methods of Imaging. 3 Units.**

Image denoising and deblurring with optimization and partial differential equations methods. Imaging functionals based on total variation and l-1 minimization. Fast algorithms and their implementation. Same as: CME 321A

**MATH 221B. Mathematical Methods of Imaging. 3 Units.**

Array imaging using Kirchhoff migration and beamforming, resolution theory for broad and narrow band array imaging in homogeneous media, topics in high-frequency, variable background imaging with velocity estimation, interferometric imaging methods, the role of noise and inhomogeneities, and variational problems that arise in optimizing the performance of array imaging algorithms. Same as: CME 321B

**MATH 226. Numerical Solution of Partial Differential Equations. 3 Units.**

Hyperbolic partial differential equations: stability, convergence and qualitative properties; nonlinear hyperbolic equations and systems; combined solution methods from elliptic, parabolic, and hyperbolic problems. Examples include: Burger's equation, Euler equations for compressible flow, Navier-Stokes equations for incompressible flow. Prerequisites: MATH 220A or CME 302.

Same as: CME 306

**MATH 227. Partial Differential Equations and Diffusion Processes. 3 Units.**

Parabolic and elliptic partial differential equations and their relation to diffusion processes. First order equations and optimal control. Emphasis is on applications to mathematical finance. Prerequisites: MATH 136/STATS 219 (or equivalents) and MATH 131P + MATH 115/171 or MATH 173 or MATH 220.

**MATH 228. Stochastic Methods in Engineering. 3 Units.**

The basic limit theorems of probability theory and their application to maximum likelihood estimation. Basic Monte Carlo methods and importance sampling. Markov chains and processes, random walks, basic ergodic theory and its application to parameter estimation. Discrete time stochastic control and Bayesian filtering. Diffusion approximations, Brownian motion and an introduction to stochastic differential equations. Examples and problems from various applied areas. Prerequisites: exposure to probability and background in analysis.

Same as: CME 308, MS&E 324

**MATH 228A. Probability, Stochastic Analysis and Applications. 3 Units.**

The basic limit theorems of probability theory and their application to maximum likelihood estimation. Basic Monte Carlo methods and importance sampling. Markov chains and processes, random walks, basic ergodic theory and its application to parameter estimation. Discrete time stochastic control and Bayesian filtering. Diffusion approximations, Brownian motion and basic stochastic differential equations. Examples and problems from various applied areas. Prerequisites: exposure to probability and background in analysis.

**MATH 230A. Theory of Probability I. 2-4 Units.**

Mathematical tools: sigma algebras, measure theory, connections between coin tossing and Lebesgue measure, basic convergence theorems. Probability: independence, Borel-Cantelli lemmas, almost sure and  $L_p$  convergence, weak and strong laws of large numbers. Large deviations. Weak convergence; central limit theorems; Poisson convergence; Stein's method. Prerequisites: 116, MATH 171.

Same as: STATS 310A

**MATH 230B. Theory of Probability II. 2-3 Units.**

Conditional expectations, discrete time martingales, stopping times, uniform integrability, applications to 0-1 laws, Radon-Nikodym Theorem, ruin problems, etc. Other topics as time allows selected from (i) local limit theorems, (ii) renewal theory, (iii) discrete time Markov chains, (iv) random walk theory, (v) ergodic theory. Prerequisite: 310A or MATH 230A.

Same as: STATS 310B

**MATH 230C. Theory of Probability III. 2-4 Units.**

Continuous time stochastic processes: martingales, Brownian motion, stationary independent increments, Markov jump processes and Gaussian processes. Invariance principle, random walks, LIL and functional CLT. Markov and strong Markov property. Infinitely divisible laws. Some ergodic theory. Prerequisite: 310B or MATH 230B. <http://statweb.stanford.edu/~adembo/stat-310c/>.

Same as: STATS 310C

**MATH 231. Mathematics and Statistics of Gambling. 3 Units.**

Probability and statistics are founded on the study of games of chance. Nowadays, gambling (in casinos, sports and the Internet) is a huge business. This course addresses practical and theoretical aspects. Topics covered: mathematics of basic random phenomena (physics of coin tossing and roulette, analysis of various methods of shuffling cards), odds in popular games, card counting, optimal tournament play, practical problems of random number generation. Prerequisites: Statistics 116 and 200.

Same as: STATS 334

**MATH 231A. An Introduction to Random Matrix Theory. 3 Units.**

Patterns in the eigenvalue distribution of typical large matrices, which also show up in physics (energy distribution in scattering experiments), combinatorics (length of longest increasing subsequence), first passage percolation and number theory (zeros of the zeta function). Classical compact ensembles (random orthogonal matrices). The tools of determinantal point processes.

Same as: STATS 351A

**MATH 232. Topics in Probability: Percolation Theory. 3 Units.**

An introduction to first passage percolation and related general tools and models. Topics include early results on shape theorems and fluctuations, more modern development using hyper-contractivity, recent breakthrough regarding scaling exponents, and providing exposure to some fundamental long-standing open problems. Course prerequisite: graduate-level probability.

**MATH 233A. Topics in Combinatorics. 3 Units.**

Geometry of polynomials and non-constructive proofs in combinatorics: The independence polynomial, the Lovasz Local Lemma and Shearer's Lemma. Real-rooted polynomials, stable polynomials, Ramanujan graphs and the Kadison-Singer problem. Strongly Rayleigh measures and negative dependence. Applications in algorithms.

**MATH 233B. Topics in Combinatorics: Polyhedral Techniques in Optimization. 3 Units.**

LP duality and min-max formulas; matchings, spanning trees, matroids, matroid union and intersection; packing of trees and arborescences; submodular functions, continuous extensions and optimization.

**MATH 233C. Topics in Combinatorics. 3 Units.****MATH 234. Large Deviations Theory. 3 Units.**

Combinatorial estimates and the method of types. Large deviation probabilities for partial sums and for empirical distributions, Cramer's and Sanov's theorems and their Markov extensions. Applications in statistics, information theory, and statistical mechanics. Prerequisite: MATH 230A or STATS 310. Offered every 2-3 years. <http://statweb.stanford.edu/~adembo/large-deviations/>.

Same as: STATS 374

**MATH 235A. Topics in combinatorics. 3 Units.**

This advanced course in extremal combinatorics covers several major themes in the area. These include extremal combinatorics and Ramsey theory, the graph regularity method, and algebraic methods.

**MATH 235B. Modern Markov Chain Theory. 3 Units.**

This is a graduate-level course on the use and analysis of Markov chains. Emphasis is placed on explicit rates of convergence for chains used in applications to physics, biology, and statistics. Topics covered: basic constructions (metropolis, Gibbs sampler, data augmentation, hybrid Monte Carlo); spectral techniques (explicit diagonalization, Poincaré, and Cheeger bounds); functional inequalities (Nash, Sobolev, Log Sobolev); probabilistic techniques (coupling, stationary times, Harris recurrence). A variety of card shuffling processes will be studied. Central Limit and concentration.

**MATH 235C. Topics in Markov Chains. 3 Units.**

Classical functional inequalities (Nash, Faber-Krahn, log-Sobolev inequalities), comparison of Dirichlet forms. Random walks and isoperimetry of amenable groups (with a focus on solvable groups). Entropy, harmonic functions, and Poisson boundary (following Kaimanovich-Vershik theory).

**MATH 236. Introduction to Stochastic Differential Equations. 3 Units.**

Brownian motion, stochastic integrals, and diffusions as solutions of stochastic differential equations. Functionals of diffusions and their connection with partial differential equations. Random walk approximation of diffusions. Prerequisite: 136 or equivalent and differential equations.

**MATH 237. Default and Systemic Risk. 3 Units.**

Introduction to mathematical models of complex static and dynamic stochastic systems that undergo sudden regime change in response to small changes in parameters. Examples from materials science (phase transitions), power grid models, financial and banking systems. Special emphasis on mean field models and their large deviations, including computational issues. Dynamic network models of financial systems and their stability.

**MATH 238. Mathematical Finance. 3 Units.**

Stochastic models of financial markets. Forward and futures contracts. European options and equivalent martingale measures. Hedging strategies and management of risk. Term structure models and interest rate derivatives. Optimal stopping and American options. Corequisites: MATH 236 and 227 or equivalent. Same as: STATS 250

**MATH 239. Computation and Simulation in Finance. 3 Units.**

Monte Carlo, finite difference, tree, and transform methods for the numerical solution of partial differential equations in finance. Emphasis is on derivative security pricing. Prerequisite: 238 or equivalent.

**MATH 243. Functions of Several Complex Variables. 3 Units.**

Holomorphic functions in several variables, Hartogs phenomenon,  $d$ -bar complex, Cousin problem. Domains of holomorphy. Plurisubharmonic functions and pseudo-convexity. Stein manifolds. Coherent sheaves, Cartan Theorems A&B. Levi problem and its solution. Grauert's Oka principle. Prerequisites: MATH 215A and experience with manifolds.

**MATH 244. Riemann Surfaces. 3 Units.**

Riemann surfaces and holomorphic maps, algebraic curves, maps to projective spaces. Calculus on Riemann surfaces. Elliptic functions and integrals. Riemann-Hurwitz formula. Riemann-Roch theorem, Abel-Jacobi map. Uniformization theorem. Hyperbolic surfaces. (Suitable for advanced undergraduates.) Prerequisites: MATH 106 or MATH 116, and familiarity with surfaces equivalent to MATH 143, MATH 146, or MATH 147.

**MATH 245A. Topics in Algebraic Geometry. 3 Units.**

Topics of contemporary interest in algebraic geometry. May be repeated for credit.

**MATH 245B. Topics in Algebraic Geometry. 3 Units.**

May be repeated for credit.

**MATH 245C. Topics in Algebraic Geometry. 3 Units.**

May be repeated for credit.

**MATH 246. Topics in number theory: L-functions. 3 Units.**

The Riemann Zeta function and Dirichlet L-functions, zero-free regions and vertical distribution of the zeros, primes in arithmetic progressions, the class number problem, Hecke L-functions and Tate's thesis, Artin L-functions and the Chebotarev density theorem, Modular forms and Maass forms. Prerequisites: Algebraic Number Theory.

**MATH 248. Introduction to Ergodic Theory. 3 Units.**

Topics may include 1) subadditive and multiplicative ergodic theorems, 2) notions of mixing, weak mixing, spectral theory, 3) metric and topological entropy of dynamical systems, 4) measures of maximal entropy. Prerequisites: Solid background in "Measure and Integration" (Math 205A) and some functional analysis, including Riesz representation theorem and Hahn-Banach theorem (Math 205B).

**MATH 249A. Topics in number theory. 3 Units.**

Topics of contemporary interest in number theory. May be repeated for credit.

**MATH 249B. Topics in Number Theory. 3 Units.**

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**MATH 249C. Topics in Number Theory. 3 Units.**

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**MATH 256A. Partial Differential Equations. 3 Units.**

The theory of linear and nonlinear partial differential equations, beginning with linear theory involving use of Fourier transform and Sobolev spaces. Topics: Schauder and  $L^2$  estimates for elliptic and parabolic equations; De Giorgi-Nash-Moser theory for elliptic equations; nonlinear equations such as the minimal surface equation, geometric flow problems, and nonlinear hyperbolic equations.

**MATH 256B. Partial Differential Equations. 3 Units.**

Continuation of 256A.

**MATH 257A. Symplectic Geometry and Topology. 3 Units.**

Linear symplectic geometry and linear Hamiltonian systems. Symplectic manifolds and their Lagrangian submanifolds, local properties. Symplectic geometry and mechanics. Contact geometry and contact manifolds. Relations between symplectic and contact manifolds. Hamiltonian systems with symmetries. Momentum map and its properties. May be repeated for credit.

**MATH 257B. Symplectic Geometry and Topology. 3 Units.**

Continuation of 257A. May be repeated for credit.

**MATH 257C. Symplectic Geometry and Topology. 3 Units.**

Continuation of 257B. May be repeated for credit.

**MATH 258. Topics in Geometric Analysis. 3 Units.**

May be repeated for credit.

**MATH 262. Applied Fourier Analysis and Elements of Modern Signal Processing. 3 Units.**

Introduction to the mathematics of the Fourier transform and how it arises in a number of imaging problems. Mathematical topics include the Fourier transform, the Plancherel theorem, Fourier series, the Shannon sampling theorem, the discrete Fourier transform, and the spectral representation of stationary stochastic processes. Computational topics include fast Fourier transforms (FFT) and nonuniform FFTs. Applications include Fourier imaging (the theory of diffraction, computed tomography, and magnetic resonance imaging) and the theory of compressive sensing.

Same as: CME 372

**MATH 263A. Algebraic Combinatorics and Symmetric Functions. 3 Units.**

Symmetric function theory unifies large parts of combinatorics. Theorems about permutations, partitions, and graphs now follow in a unified way. Topics: The usual bases (monomial, elementary, complete, and power sums). Schur functions. Representation theory of the symmetric group. Littlewood-Richardson rule, quasi-symmetric functions, combinatorial Hopf algebras, introduction to Macdonald polynomials. Throughout, emphasis is placed on applications (e.g. to card shuffling and random matrix theory). Prerequisite: 210A and 210B, or equivalent.

**MATH 263B. Crystal Bases: Representations and Combinatorics. 3 Units.**

Crystal Bases are combinatorial analogs of representation theory of Lie groups. We will explore different aspects of these analogies and develop rigorous purely combinatorial foundations.

**MATH 263C. Topics in Representation Theory. 3 Units.**

May be repeated for credit.

**MATH 269. Topics in symplectic geometry. 3 Units.**

May be repeated for credit.

**MATH 270. Geometry and Topology of Complex Manifolds. 3 Units.**

Complex manifolds, Kahler manifolds, curvature, Hodge theory, Lefschetz theorem, Kahler-Einstein equation, Hermitian-Einstein equations, deformation of complex structures. May be repeated for credit.

**MATH 271. The H-Principle. 3 Units.**

The language of jets. Thom transversality theorem. Holonomic approximation theorem. Applications: immersion theory and its generalizations. Differential relations and Gromov's h-principle for open manifolds. Applications to symplectic geometry. Microflexibility. Mappings with simple singularities and their applications. Method of convex integration. Nash-Kuiper  $C^1$ -isometric embedding theorem.

**MATH 272. Topics in Partial Differential Equations. 3 Units.****MATH 273. Topics in Mathematical Physics. 3 Units.**

Covers a list of topics in mathematical physics. The specific topics may vary from year to year, depending on the instructor's discretion. Background in graduate level probability theory and analysis is desirable. Same as: STATS 359

**MATH 280. Evolution Equations in Differential Geometry. 3 Units.****MATH 282A. Low Dimensional Topology. 3 Units.**

The theory of surfaces and 3-manifolds. Curves on surfaces, the classification of diffeomorphisms of surfaces, and Teichmüller space. The mapping class group and the braid group. Knot theory, including knot invariants. Decomposition of 3-manifolds: triangulations, Heegaard splittings, Dehn surgery. Loop theorem, sphere theorem, incompressible surfaces. Geometric structures, particularly hyperbolic structures on surfaces and 3-manifolds. May be repeated for credit up to 6 total units.

**MATH 282B. Homotopy Theory. 3 Units.**

Homotopy groups, fibrations, spectral sequences, simplicial methods, Dold-Thom theorem, models for loop spaces, homotopy limits and colimits, stable homotopy theory. May be repeated for credit up to 6 total units.

**MATH 282C. Fiber Bundles and Cobordism. 3 Units.**

Possible topics: principal bundles, vector bundles, classifying spaces. Connections on bundles, curvature. Topology of gauge groups and gauge equivalence classes of connections. Characteristic classes and K-theory, including Bott periodicity, algebraic K-theory, and indices of elliptic operators. Spectral sequences of Atiyah-Hirzebruch, Serre, and Adams. Cobordism theory, Pontryagin-Thom theorem, calculation of unoriented and complex cobordism. May be repeated for credit up to 6 total units.

**MATH 283. Topics in Algebraic and Geometric Topology. 3 Units.**

May be repeated for credit.

**MATH 283A. Topics in Topology. 3 Units.****MATH 284. Topics in Geometric Topology. 3 Units.**

Incompressible surfaces, irreducible manifolds, prime decomposition, Morse theory, Heegaard diagrams, Heegaard splittings, the Thurston norm, sutured manifold theory, Heegaard Floer homology, sutured Floer homology.

**MATH 284A. Geometry and Topology in Dimension 3. 3 Units.**

The Poincaré conjecture and the uniformization of 3-manifolds. May be repeated for credit.

**MATH 284B. Geometry and Topology in Dimension 3. 3 Units.**

The Poincaré conjecture and the uniformization of 3-manifolds. May be repeated for credit.

**MATH 286. Topics in Differential Geometry. 3 Units.**

May be repeated for credit.

**MATH 298. Graduate Practical Training. 1 Unit.**

Only for mathematics graduate students. Students obtain employment in a relevant industrial or research activity to enhance their professional experience. Students submit a concise report detailing work activities, problems worked on, and key results. May be repeated for credit up to 3 units. Prerequisite: qualified offer of employment and consent of department. Prior approval by Math Department is required; you must contact the Math Department's Student Services staff for instructions before being granted permission to enroll.

**MATH 301. Advanced Topics in Convex Optimization. 3 Units.**

Modern developments in convex optimization: semidefinite programming; novel and efficient first-order algorithms for smooth and nonsmooth convex optimization. Emphasis on numerical methods suitable for large scale problems arising in science and engineering. Prerequisites: convex optimization (EE 364), linear algebra (Math 104), numerical linear algebra (CME 302); background in probability, statistics, real analysis and numerical optimization. Same as: CME 375

**MATH 305. Applied mathematics through toys and magic. 3 Units.**

This course is a series of case-studies in doing applied mathematics on surprising phenomena we notice in daily life. Almost every class will show demos of these phenomena (toys and magic) and suggest open projects. The topics range over a great variety and cut across areas traditionally pigeonholed as physics, biology, engineering, computer science, mathematics, but, instead of developing sophisticated mathematics on simple material, our aim is to extract simple mathematical understanding from sophisticated material which, at first, we may not yet know how to pigeonhole. In each class I will try to make the discussion self-contained and to give everybody something to take home, regardless of the background.

**MATH 355. Graduate Teaching Seminar. 1 Unit.**

Required of and limited to first-year Mathematics graduate students.

**MATH 360. Advanced Reading and Research. 1-10 Unit.****MATH 382. Qualifying Examination Seminar. 1-3 Unit.****MATH 391. Research Seminar in Logic. 1-3 Unit.**

Contemporary work. May be repeated a total of three times for credit. Same as: PHIL 391

**MATH 51. Linear Algebra and Differential Calculus of Several Variables. 5 Units.**

Geometry and algebra of vectors, matrices and linear transformations, eigenvalues of symmetric matrices, vector-valued functions and functions of several variables, partial derivatives and gradients, derivative as a matrix, chain rule in several variables, critical points and Hessian, least-squares, constrained and unconstrained optimization in several variables, Lagrange multipliers. Prerequisite: 21, 42, or the math placement diagnostic (offered through the Math Department website) in order to register for this course.

**MATH 51A. Linear Algebra and Differential Calculus of Several Variables, ACE. 6 Units.**

Students attend MATH 51 lectures with different recitation sessions: three hours per week instead of two, emphasizing engineering applications. Prerequisite: application; see <https://web.stanford.edu/dept/soe/osa/ace.fb>.

**MATH 52. Integral Calculus of Several Variables. 5 Units.**

Iterated integrals, line and surface integrals, vector analysis with applications to vector potentials and conservative vector fields, physical interpretations. Divergence theorem and the theorems of Green, Gauss, and Stokes. Prerequisite: 51 or equivalents.

**MATH 53. Ordinary Differential Equations with Linear Algebra. 5 Units.**

Ordinary differential equations and initial value problems, systems of linear differential equations with constant coefficients, applications of second-order equations to oscillations, matrix exponentials, Laplace transforms, stability of non-linear systems and phase plane analysis, numerical methods. Prerequisite: 51 or equivalents.

**MATH 61CM. Modern Mathematics: Continuous Methods. 5 Units.**

This is the first part of a theoretical (i.e., proof-based) sequence in multivariable calculus and linear algebra, providing a unified treatment of these topics. Covers general vector spaces, linear maps and duality, eigenvalues, inner product spaces, spectral theorem, metric spaces, differentiation in Euclidean space, submanifolds of Euclidean space, inverse and implicit function theorems, and many examples. The linear algebra content is covered jointly with Math 61DM. Students should know 1-variable calculus and have an interest in a theoretical approach to the subject. Prerequisite: score of 5 on the BC-level Advanced Placement calculus exam, or consent of the instructor.

**MATH 61DM. Modern Mathematics: Discrete Methods. 5 Units.**

This is the first part of a theoretical (i.e., proof-based) sequence in discrete mathematics and linear algebra. Covers general vector spaces, linear maps and duality, eigenvalues, inner product spaces, spectral theorem, counting techniques, and linear algebra methods in discrete mathematics including spectral graph theory and dimension arguments. The linear algebra content is covered jointly with Math 61CM. Students should have an interest in a theoretical approach to the subject. Prerequisite: score of 5 on the BC-level Advanced Placement calculus exam, or consent of the instructor. This sequence is not appropriate for students planning to major in natural sciences, economics, or engineering, but is suitable for majors in any other field (such as MCS ("data science"), computer science, and mathematics).

**MATH 62CM. Modern Mathematics: Continuous Methods. 5 Units.**

A continuation of themes from Math 61CM, centered around: manifolds, multivariable integration, and the general Stokes' theorem. This includes a treatment of multilinear algebra, further study of submanifolds of Euclidean space and an introduction to general manifolds (with many examples), differential forms and their geometric interpretations, integration of differential forms, Stokes' theorem, and some applications to topology. Prerequisite: Math 61CM.

**MATH 62DM. Modern Mathematics: Discrete Methods. 5 Units.**

This is the second part of a proof-based sequence in discrete mathematics. This course covers topics in elementary number theory, group theory, and discrete Fourier analysis. For example, we'll discuss the basic examples of abelian groups arising from congruences in elementary number theory, as well as the non-abelian symmetric group of permutations. Prerequisites: 61DM or 61CM.

**MATH 63CM. Modern Mathematics: Continuous Methods. 5 Units.**

A proof-based course on ordinary differential equations, continuing themes from Math 61CM and Math 62CM. Topics include linear systems of differential equations and necessary tools from linear algebra, stability and asymptotic properties of solutions to linear systems, existence and uniqueness theorems for nonlinear differential equations with some applications to manifolds, behavior of solutions near an equilibrium point, and Sturm-Liouville theory. Prerequisites: Math 61CM and Math 62CM.

**MATH 63DM. Modern Mathematics: Discrete Methods. 5 Units.**

Third part of a proof-based sequence in discrete mathematics. This course covers several topics in probability (random variables, independence and correlation, concentration bounds, the central limit theorem) and topology (metric spaces, point-set topology, continuous maps, compactness, Brouwer's fixed point and the Borsuk-Ulam theorem), with some applications in combinatorics. Prerequisites: 61DM or 61CM.

**MATH 70SI. The Game of Go: Strategy, Theory, and History. 1 Unit.**

Strategy and mathematical theories of the game of Go, with guest appearance by a professional Go player.

**MATH 79SI. Proof Positive: Principles of Mathematics. 1 Unit.**

What is a mathematical proof, and where do proofs come from? Students will become comfortable with fundamental techniques of mathematical proof through practice with interesting and accessible examples from many areas of math. Students will additionally hone their communication skills and develop their ability to formulate and answer precise mathematical questions. Topics include direct proof, proof by contrapositive, proof by contradiction, many applications of mathematical induction, constructing good definitions, and useful writing habits. The course is designed to prepare students who have completed or are concurrently enrolled in MATH 51 to succeed in introductory proof-based math classes at the level of MATH 115 or MATH 120, or to simply appreciate the nature of proof at a deeper level than is seen in high school geometry. To be considered for enrollment, please email [masonr@stanford.edu](mailto:masonr@stanford.edu) and attend the first class meeting on Tuesday, April 3 at 3PM in 300-303.

**MATH 802. TGR Dissertation. 0 Units.****MATH 80Q. Capillary Surfaces: Explored and Unexplored Territory. 3 Units.**

Preference to sophomores. Capillary surfaces: the interfaces between fluids that are adjacent to each other and do not mix. Recently discovered phenomena, predicted mathematically and subsequently confirmed by experiments, some done in space shuttles. Interested students may participate in ongoing investigations with affinity between mathematics and physics.

**MATH 87Q. Mathematics of Knots, Braids, Links, and Tangles. 3 Units.**

Preference to sophomores. Types of knots and how knots can be distinguished from one another by means of numerical or polynomial invariants. The geometry and algebra of braids, including their relationships to knots. Topology of surfaces. Brief summary of applications to biology, chemistry, and physics.

## Mechanical Engineering (ME)

**ME 1. Introduction to Mechanical Engineering. 3 Units.**

This course is intended to be the starting point for Mechanical Engineering majors. It will cover the concepts, engineering methods, and common tools used by mechanical engineers while introducing the students to a few interesting devices. We will discuss how each device was conceived, design challenges that arose, application of analytical tools to the design, and production methods. Main class sections will include lectures, demonstrations, and in-class group exercises. Lab sections will develop specific skills in freehand sketching and computational modeling of engineering systems. Prerequisites: Physics: Mechanics, and first quarter Calculus.

**ME 101. Visual Thinking. 4 Units.**

Lecture/lab. Visual thinking and language skills are developed and exercised in the context of solving design problems. Exercises for the mind's eye. Rapid visualization and prototyping with emphasis on fluent and flexible idea production. The relationship between visual thinking and the creative process. Limited enrollment, attendance at first class required.

**ME 102. Foundations of Product Realization. 3 Units.**

Students develop the language and toolset to transform design concepts into tangible models/prototypes that cultivate the emergence of mechanical aptitude. Visual communication tools such as sketching, orthographic projection, and 2D/3D design software are introduced in the context of design and prototyping assignments. Instruction and practice with hand, powered, and digital prototyping tools in the Product Realization Lab support students' implementation and iteration of physical project work. Project documentation, reflection, and in-class presentations are opportunities for students to find their design voice and practice sharing it with others.

**ME 103D. Engineering Drawing and Design. 1 Unit.**

Designed to accompany 203. The fundamentals of engineering drawing including orthographic projection, dimensioning, sectioning, exploded and auxiliary views, assembly drawings, and SolidWorks. Homework drawings are of parts fabricated by the student in the lab. Assignments in 203 supported by material in 103D and sequenced on the assumption that the student is enrolled in both courses simultaneously.

**ME 104B. Designing Your Life. 2 Units.**

The course employs a design thinking approach to help students develop a point of view about their life and career. The course focuses on an introduction to design thinking, the integration of work and worldview, and practices that support vocation formation. Includes seminar-style discussions, role-playing, short writing assignments, guest speakers, and individual mentoring and coaching. Open to juniors, seniors and 5th year coterminals, all majors. Additional course information at <http://www.designingyourlife.org>.

**ME 104S. Designing Your Stanford. 2 Units.**

DYS uses a Design Thinking approach to help Freshmen and Sophomores learn practical tools and ideas to make the most of their Stanford experience. Topics include the purpose of college, major selection, educational wayfinding, and innovating college outcomes - all applied through an introduction to Design Thinking. This seminar class incorporates small group discussion, in-class activities, field exercises, personal reflection, and individual coaching. Admission to be confirmed by email to Axess registered students prior to first class session. DYS uses a Design Thinking approach to help Freshmen and Sophomores learn practical tools and ideas to make the most of their Stanford experience. Topics include the purpose of college, major selection, educational wayfinding, and innovating college outcomes - all applied through an introduction to design mindsets and practices. This seminar class incorporates small group discussion, in-class activities, field exercises, personal reflection, and individual coaching. Additional course information at <http://www.designingyourstanford.org>.

Same as: EDUC 118S

**ME 105. Designing for Impact. 3 Units.**

This course will introduce the design thinking process and skills, and explore unique challenges of solving problems and initiating action for public good. Design skills such as need-finding, insight development, and prototyping will be learned through project work, with a particular emphasis on the elements required to be effective in the social sector. ME101 recommended.

**ME 10N. Form and Function of Animal Skeletons. 3 Units.**

Preference to freshmen. The biomechanics and mechanobiology of the musculoskeletal system in human beings and other vertebrates on the level of the whole organism, organ systems, tissues, and cell biology. Field trips to labs.

Same as: BIOE 10N

**ME 110. Design Sketching. 2 Units.**

Freehand sketching, rendering, and design development. Students develop a design sketching portfolio for review by program faculty. May be repeated for credit.

**ME 110B. Digital Design Principles and Applications. 2 Units.**

Building upon foundation design principles, project-based individual / group exploration and critique facilitates a self-guided learning process, where analytical problem-solving approaches are cultivated through real-time implementation in digital tools. A series of diverse projects are brought together in conjunction with related student project portfolio development. Class Prerequisites: Students must have completed ME110 with high levels of understanding, engagement. May be repeat for credit.

**ME 112. Mechanical Systems Design. 4 Units.**

Lecture/lab. Characteristics of machine elements including gears, bearings, and shafts. Design for fatigue life. Electric motor fundamentals. Transmission design for maximizing output power or efficiency. Mechanism types, linkage analysis and kinematic synthesis. Team-based design projects emphasizing the balance of physical with virtual prototyping based on engineering analysis. Lab for dissection of mechanical systems and project design reviews. Prerequisites: 80, 101. Recommended: 203, ENGR 15.

**ME 113. Mechanical Engineering Design. 4 Units.**

Capstone course. Mechanical engineering design is experienced by students as they work on team projects. Prerequisites: 80, 101, 112, 203. Enrollment limited to ME majors. One of two available capstone design courses.

**ME 115A. Introduction to Human Values in Design. 3 Units.**

An intensive project-based class that introduces the central philosophy of the product design program. Students learn how to use the lens of human needs to innovate at the intersection of technical factors (feasibility), business factors (viability), and human values (desirability). Students work toward mastery of the human-centered design methodology through several real-world, team-based projects. Students gain fluency in designing solutions ranging from physical products, to digital interfaces, to services and experiences. Students are immersed in building their individual and team capacities around core design process and methods, and emerge with a strong foundation in needfinding, synthesis, ideation, rapid prototyping, user testing, iteration, and storytelling.

**ME 115B. Product Design Methods. 3 Units.**

Problem-finding, problem-solving, intermediate creativity methods and effective techniques for researching human factors and presenting product concepts. Individual- and team-based design projects emphasizing advanced visual thinking and prototyping skills.

**ME 115C. Design and Business Factors. 3 Units.**

Design and Business Factors: Introduces business concepts critical to determining the success of new products and services. Students will learn to estimate the cost of R&D for new product development. Using financial analysis, ROI, and tollgates to reduce development risk will be explored using case studies and simulations. Students will develop a bill of materials and a profit and loss statement for a sample product concept, prototype a design consultancy, and create a business proposal for a proposed new product company.

**ME 115C. The Art and Science of Measuring Fluid Flows. 2 Units.**

The roles of fluid flows in natural systems such as swimming protozoa and planet-forming nebulae, and technologies such as biomolecular assay devices and jet engines. The analytical background for fluid sciences. Phenomena such as shock waves and vortex formation that create flow patterns while challenging engineers. Visualization and measurement techniques to obtain full-field flow pattern information. The physics behind these technologies. Field trips; lab work. (Eaton).

**ME 120. History and Philosophy of Design. 3 Units.**

Major schools of 19th- and 20th-century design (Arts and Crafts movement, Bauhaus, Industrial Design, and postmodernism) are analyzed in terms of their continuing cultural relevance. The relation of design to art, technology, and politics; readings from principal theorists, practitioners, and critics; recent controversies in industrial and graphic design, architecture, and urbanism. Enrollment limited to 65.

**ME 123. Computational Engineering. 4 Units.**

The design of wind turbines, biomedical devices, jet engines, electronic units, and almost every other engineering system, require the analysis of its flow and thermal characteristics to ensure optimal performance and safety. The continuing growth of computer power and the emergence of general-purpose engineering software has fostered the use of computational analysis as a complement to experimental testing. Virtual prototyping is a staple of modern engineering practice. This course is an introduction to Computational Engineering using commercial analysis codes, covering both theory and applications. Assuming limited knowledge of computational methods, the course starts with introductory training on the software, using a series of lectures and hands-on tutorials. We utilize the ANSYS software suite, which is used across a variety of engineering fields. Herein, the emphasis is on geometry modeling, mesh generation, solution strategy and post-processing for diverse applications. Using classical flow/thermal problems, the course develops the essential concepts of Verification and Validation for engineering simulations, providing the basis for assessing the accuracy of the results. Advanced concepts such as the use of turbulence models, user programming and automation for design are also introduced. The course is concluded by a project, in which the students apply the software to solve a industry-inspired problem.

**ME 124. Visual Expressions. 3 Units.**

A hands-on exploration of the elements and principles of 2D and 3D design common to all the visual arts. Through a mix of theory, analysis, and practice the student will develop his/her ability to interpret visual content and produce effective imagery. Limited enrollment, attendance at first class required.

**ME 125. Visual Frontiers. 3 Units.**

The student will learn how to use graphic design to communicate online, in person, and through printed matter. Fundamentals of visual communications will be applied to branding exercises, typographic studies, color explorations, drawing exercises, use of photography, and use of grid and layout systems.

**ME 12N. The Jet Engine. 3 Units.**

Preference to freshmen. This seminar describes how a jet engine works with examples given from modern commercial and military engines. We then explore the technologies and sciences required to understand them including thermodynamics, turbomachinery, combustion, advanced materials, cooling technologies, and testing methods. Visits to research laboratories, examination of a partially disassembled engine, and probable operation of a small jet engine. Prerequisites: high school physics and preferably calculus.

**ME 12SC. Hands-on Jet Engines. 2 Units.**

How jet engines transformed the world through intercontinental travel causing internationalization in daily life. Competition driving improvements in fuel economy, engine lifetime, noise, and emissions.

**ME 131A. Heat Transfer. 3-5 Units.**

The principles of heat transfer by conduction, convection, and radiation with examples from the engineering of practical devices and systems. Topics include transient and steady conduction, conduction by extended surfaces, boundary layer theory for forced and natural convection, boiling, heat exchangers, and graybody radiative exchange. Prerequisites: 70, 30 (formerly listed at ENGR30). Recommended: intermediate calculus, ordinary differential equations.

**ME 131B. Fluid Mechanics: Compressible Flow and Turbomachinery. 4 Units.**

Engineering applications involving compressible flow: aircraft and rocket propulsion, power generation; application of mass, momentum, energy and entropy balance to compressible flows; variable area isentropic flow, normal shock waves, adiabatic flow with friction, flow with heat addition. Operation of flow systems: the propulsion system. Turbomachinery: pumps, compressors, turbines. Angular momentum analysis of turbomachine performance, centrifugal and axial flow machines, effect of blade geometry, dimensionless performance of turbomachines; hydraulic turbines; steam turbines; wind turbines. Compressible flow turbomachinery: the aircraft engine. Prerequisites: 70, ENGR 30.

**ME 137. 3D Printing for Non-Technical Innovators. 1-3 Unit.**

3D Printing is a method of creation that requires only some basic computer skills and a few rules of thumb. This class will allow students to discover for themselves the potential and limitations of 3D Printing through a build intensive design project. This course is an excellent option for anyone who ever wanted to prototype an invention, create a work of art, customize a product or just make something cool – and yet lacked the skills or a fully equipped workshop. Students may enroll for 1 unit to attend the lectures or 3 units for the complete project course. No prior technical knowledge needed. Note: Course material is targeted toward non-ME Design and non-PD majors. An application is required for the 3-unit course option. Please complete the online application by Friday, March 25th. The application is available on the course website: [web.stanford.edu/class/me137](http://web.stanford.edu/class/me137).

Same as: ME 237

**ME 139. Educating Young STEM Thinkers. 3-5 Units.**

The course introduces students to the design thinking process, the national conversations about the future of STEM careers, and opportunities to work with middle school students and K-12 teachers in STEM-based after-school activities and intercession camps. The course is both theory and practice focused. The purpose is twofold; to provide reflection and mentoring opportunities for students to learn about pathways to STEM careers and to introduce mentoring opportunities with young STEM thinkers.

Same as: EDUC 139, EDUC 239, ME 231

**ME 13N. The Great Principle of Similitude. 3 Units.**

Basic rules of dimensional analysis were proposed by Sir Isaac Newton. Lord Rayleigh called the method  $\zeta$ The Great Principle of Similitude. $\zeta$  On its surface, it is a look at the relationships between physical quantities which uses their basic  $\zeta$ units. $\zeta$  In fact, it is a powerful and formalized method to analyze complex physical phenomena, including those for which we cannot pose, much less solve, governing equations. The method is also valuable to engineers and scientist as it helps perform back-of-the-envelope estimates and derive scaling laws for the design of machines and processes. The principle has been applied successfully to the study of complex phenomena in biology, aerodynamics, chemistry, sports, astrophysics, and forensics, among other areas. In this course, the students will be provided with the basic tools to perform such flexible and powerful analyses. We will then review particular example analyses. These will include estimating the running speed of a hungry tyrannosaurus rex, a comparison of the flights of mosquitos and jet airliners, the cost of submarines, and the energy released by an atomic weapon. We will then work together as a class to identify problems in everyday life and/or current world events to analyze with this powerful tool.

**ME 140. Advanced Thermal Systems. 5 Units.**

Capstone course. Thermal analysis and engineering emphasizing integrating heat transfer, fluid mechanics, and thermodynamics into a unified approach to treating complex systems. Mixtures, humidity, chemical and phase equilibrium, and availability. Labs apply principles through hands-on experience with a turbojet engine, PEM fuel cell, and hybrid solid/oxygen rocket motor. Use of MATLAB as a computational tool. Prerequisites: ENGR 30, ME 70, and 131A,B.

**ME 141. Alternative Energy Systems. 5 Units.**

Capstone course. Energy analysis, diagnostics and engineering of selected alternative energy systems with an integrated thermodynamic, heat transfer, and fluid mechanic approach. Mixtures, transport, reactions, electrochemical processes and photovoltaic effects. Labs apply principles through hands-on experience with selected alternative energy systems and their components. Use of MATLAB as an analysis tool.

**ME 14N. How Stuff Is Made. 3 Units.**

The design and engineering of products and processes, such as machining, fabric, food, and electrical goods. Tradeoffs in choice of materials, features, and process selection. Final project: students research and redesign the engineering and manufacturing aspects of a product and its processes with an eye toward sustainability. Includes several field trips to manufacturing facilities.

**ME 161. Dynamic Systems, Vibrations and Control. 3-4 Units.**

(Graduate students only enroll in 261.) Modeling, analysis, and measurement of mechanical and electromechanical systems. Numerical and closed form solutions of ordinary differential equations governing the behavior of single and multiple degree of freedom systems. Stability, resonance, amplification and attenuation, and control system design. Demonstrations and laboratory experiments. Prerequisite: Calculus (differentiation and integration), ordinary differential equations (e.g., CME 102 or MATH53), basic linear algebra (determinants and solving linear equations), and familiarity with basic dynamics ( $F=m*a$ ) and electronics ( $v=i*R$ ). ME undergraduates must enroll for 4 units with lab. All others should enroll for 3 units without lab. Same as: ME 261

**ME 16N. Energy & The Industrial Revolution - Past, Present & Future. 3 Units.**

When you flip a light switch, or drive to your neighborhood grocery store or do a Google search, it is easy to forget that we receive the benefit of 250 years of industrial revolution, which has been arguably the most remarkable period of human history. This revolution has resulted in exponential growth in the world's economy as well as unprecedented prosperity and improvements in our quality of life. The industrial revolution has been largely about how we sourced, distributed and used energy. It was and continues to be predominantly based on fossil energy. But the impact of our traditional energy sources on climate change is one of the most daunting issues of the 21st century because it will affect the world as a whole - the 7-10 billion people, businesses, nations, ecosystems. The choice that our society is asked to make is often posed as follows: Should we continue our exponential economic growth based on fossil fuels and ignore the environment, or should we reduce our greenhouse gas emissions at the cost of our economic growth? This is a false choice because it is based on extrapolating the past. It does not account for the capacity for innovations in technology, finance and business to create sustainable energy future, one that allows the economy and our environment to be mutually inclusive. In short, we need a new industrial revolution. This seminar course will: (a) provide a view of the current energy landscape and the magnitude of the challenge; (b) discuss some techno-economic trends that we are currently witnessing; and (c) identify opportunities to innovate in technology, finance and business that could create the foundations for a new industrial revolution.

**ME 17. The Science of Flames. 3 Units.**

This course is about what causes flames to look like they do and about what causes them to propagate. The physical and chemical phenomena that govern behaviors of flames will constitute the topics for discussion. The basic principles that govern flame phenomena include the conservation of mass, the first law of thermodynamics, and the momentum principle. Since flame processes are controlled by the rates of chemical reactions, these basic principles will be applied when account is made for the chemical transformations that occur when reactant bonds are broken and new bonds are formed, producing combustion products. In essence, this course serves as an introduction to combustion science.

**ME 170A. Mechanical Engineering Design- Integrating Context with Engineering. 4 Units.**

First course of two-quarter capstone sequence. Working in project teams, design and develop an engineering system addressing a real-world problem. Projects are based on themes addressing most pressing needs of human society; for 2017-2018 the theme is clean energy. Learn and utilize industry development process; first quarter focuses on establishing requirements and narrowing to top concept. Second quarter emphasizes engineering analysis, design risk assessment, build, test and iteration. Learn and apply professional communication skills in the areas of speaking, presenting, writing, and listening. This is the first quarter of a 2-quarter course. Students must also enroll in ME 170b; completion of 170b required to earn grade in 170a. Enrollment limited, by application only.

**ME 170B. Mechanical Engineering Design: Integrating Context with Engineering. 4 Units.**

Second course of two-quarter capstone sequence. Working in project teams, design and develop an engineering system addressing a real-world problem. Projects are based on themes, addressing most pressing needs of human society; for 2017-2018 the theme is clean energy. Learn and utilize industry development process; first quarter focuses on establishing requirements and narrowing to top concept, second quarter emphasizes engineering analysis, design risk assessment, build, test and iteration. Learn and apply professional communication skills in the areas of speaking, presenting, writing, and listening.

**ME 171E. Aerial Robot Design. 4 Units.**

(Graduate students only enroll in ME 271e or AA 248e) A result-focused introduction to the design of winged aerial robots capable of vertical takeoff and landing for a wide range of applications. Students will learn how to ideate specific aerial robot applications and make an appropriate design from scratch that meets mission requirements. Design skill outcomes include: robot need identification based on mission requirements; system ideation and sizing; making design performance tradeoffs; aerodynamic wing design; CAD assembly; communicating the design and its application. The hands-on lab experience includes prototyping the aerial robot mission, to inform system design, by building and flying quadcopters. Prerequisites: intro level undergraduate fluid mechanics or aerodynamics (e.g. ME 70 or AA 100) or equivalent; Intro level undergraduate electronics or Arduino experience; MATLAB experience. Same as: AA 248E, ME 271E

**ME 177. Global Engineers' Education. 3 Units.**

A project based course for those who would like to use their engineering backgrounds to address real world challenges faced by underserved communities globally. In direct collaboration with an underserved community from a rural village in India, students will develop engineering solutions to the challenge of sanitation and hygiene. Focus will be on working with the community rather than for them. Concepts covered will include designing with what designers care about at the center, articulating and realizing individual and community aspirations, ethics of engaging with underserved communities, and methodology of working sustainably with an underserved community.



**ME 181. Deliverables: A Mechanical Engineering Design Practicum. 3 Units.**

The goal of this course is to enable students to solve industry design challenges using modern mechanical design methods. Each week a new practical skill is introduced. These skills have been identified by recently graduated Stanford engineers as being critical to their work. Students then build their command of each skill by completing a simplified yet representative project and submitting deliverables similar to those required in industry. For example, students will learn about how to properly design parts with O-rings and then will be required to design a water-tight enclosure and submit CAD, mechanical drawings, and a bill of materials. Several of the classes feature recent Stanford graduates as guest lecturers. In addition to teaching applicable skills from their job and providing examples from industry, these engineers will also expose students to the range of responsibilities and daily activities that makeup professional mechanical design work. Prerequisites: ME203, ME103d and ME112 OR consent of instructor. Enrollment limited, students complete application on first day of class.

**ME 182. Electric Transportation. 3 Units.**

Transportation accounts for nearly one-third of American energy use and greenhouse gas emissions and three-quarters of American oil consumption. It has crucial impacts on climate change, air pollution, resource depletion, and national security. Students wishing to address these issues reconsider how we move, finding sustainable transportation solutions. An introduction to the issue, covering the past and present of transportation and its impacts; examining alternative fuel proposals; and digging deeper into the most promising option: battery electric vehicles. Energy requirements of air, ground, and maritime transportation; design of electric motors, power control systems, drive trains, and batteries; and technologies for generating renewable energy. Students will also have a fun opportunity for a hands-on experience with an electric car. Prerequisites: Introduction to calculus and Physics AP or elementary mechanics.

**ME 185. Electric Vehicle Design. 3 Units.**

This project based class focuses on the design and prototyping of electric vehicles. Students learn the fundamentals of vehicle design in class and apply the knowledge as they form teams and work on projects involving concept, specifications, structure, systems, integration, assembly, testing, etc. The class meets once a week to learn about the fundamentals, exchange their experiences, and coordinate between projects. The teams of 3-5 will work on their projects independently.

**ME 18Q. Teamology: Creative Teams and Individual Development. 3 Units.**

Preference to sophomores. Roles on a problem solving team that best suit individual creative characteristics. Two teams are formed for teaching experientially how to develop less conscious abilities from teammates creative in those roles. Reinforcement teams have members with similar personalities; problem solving teams are composed of people with maximally different personalities.

**ME 19. Pre-field Course for Alternative Spring Break: Design for Social Change. 1 Unit.**

Focus is on applying design, technology and innovation to catalyze social change. Topics include identifying social needs, learning different brainstorming methods, developing an applicable service model or product, prototyping, implementation, and reiteration. Reading and service components, followed by week-long Alternative Spring Break trip. See <http://d4sc.blogspot.com>. Enrollment limited to 12. May be repeated for credit.

**ME 190. Ethical Issues in Mechanical Engineering. 4 Units.**

Moral rights and responsibilities of engineers in relation to society, employers, colleagues, and clients; cost-benefit-risk analysis, safety, and informed consent; whistle blowing; engineers as expert witnesses, consultants, and managers; ethical issues in engineering design, manufacturing, and operations, and engineering work in foreign countries; and ethical implications of the social and environmental contexts of contemporary engineering. Case studies and field research. Enrollment limited to 25 Mechanical Engineering majors.

**ME 191. Engineering Problems and Experimental Investigation. 1-5 Unit.**

Directed study and research for undergraduates on a subject of mutual interest to student and staff member. Student must find faculty sponsor and have approval of adviser.

**ME 191H. Honors Research. 1-5 Unit.**

Student must find faculty honors adviser and apply for admission to the honors program.nn (Staff).

**ME 199A. Practical Training. 1 Unit.**

For undergraduate students. Educational opportunities in high technology research and development labs in industry. Students engage in internship work and integrate that work into their academic program. Following internship work, students complete a research report outlining work activity, problems investigated, key results, and follow-up projects they expect to perform. Meets the requirements for curricular practical training for students on F-1 visas. Student is responsible for arranging own internship/employment and faculty sponsorship. Register under faculty sponsor's section number. All paperwork must be completed by student and faculty sponsor, as the Student Services Office does not sponsor CPT. Students are allowed only two quarters of CPT per degree program. Course may be repeated twice.

**ME 200. Judging Historical Significance Through the Automobile. 1 Unit.**

This seminar is for students to learn how to assess the impact of historical importance through the lens of the automobile. Students will participate in discussions about measuring and judging historical importance from a number of perspectives - engineering, aesthetic, historical, etc. They will then decide on criteria and use these to be a part of a judging team at the Pebble Beach Concours d'Elegance. The Pebble Beach event is the leading concours for automobiles in the United States. Using the criteria established by the students, the judging team, including the students, will decide the recipient of the Stanford/Revs Automotive History Trophy for 2017 and have the opportunity to present it on the lawn at Pebble Beach Lodge in August. Must apply using this application: <http://revs.stanford.edu/course/703>. Must attend first class to be considered for acceptance, no exceptions.

**ME 201. Dim Sum of Mechanical Engineering. 1 Unit.**

Introduction to research in mechanical engineering for M.S. students and upper-division undergraduates. Weekly presentations by current ME Ph.D. and second-year fellowship students to show research opportunities across the department. Strategies for getting involved in a research project.

**ME 202. Mechaphonics: Smart Phone-Enabled Mechatronic Systems. 3 Units.**

Explore the use of smartphones and tablets as enabling components within modern mechatronic systems. Emphasis on leveraging Android resources (user interface, communications, sensors) in combination with the Arduino microcontroller platform to design and build complex mechatronic devices. Topics include: basic Android application development, Android communications, sensors, Arduino, Arduino peripherals. Large, open-ended team project. Android device and programming hardware required. Limited enrollment. Prerequisites: ME210, ME218, or permission of instructor.

**ME 203. Design and Manufacturing. 4 Units.**

Integrated experience involving need finding, product definition, conceptual design, detail design, prototype manufacture, public presentation of outcomes, archiving and interpreting the product realization process and its results. Presents an overview of manufacturing processes crucial to the practice of design. Corequisite: 103D or CAD experience. Recommended: 101.

**ME 204A. Bicycle Design and Frame-Building. 1 Unit.**

Lecture/lab. The engineering and artistic execution of designing and building a bicycle frame. Fundamentals of bicycle dynamics, handling, and sizing. Manufacturing processes. Films, guest lecturers, field trips. Each student designs and fabricates a custom bicycle frame. This course is now a two part course series ME204A&B. Limited enrollment. Prerequisite: 203 or equivalent.

**ME 204B. Bicycle Design and Frame-Building. 3 Units.**

The engineering and artistic execution of designing and building a bicycle frame. The fundamentals of bicycle dynamics, handling, and sizing. Manufacturing processes. Films, guest lecturers, field trips. Each student designs a custom bicycle frame that they continue from ME204A in winter quarter. Limited enrollment, admission by consent of instructors. Attendance at first lecture is required. Both ME204A and ME204B must be taken. Prerequisite: 203 or equivalent.

**ME 206A. Design for Extreme Affordability. 4 Units.**

Design for Extreme Affordability (fondly called Extreme) is a two-quarter course offered by the d.school through the School of Engineering and the Graduate School of Business. This multidisciplinary project-based experience creates an enabling environment in which students learn to design products and services that will change the lives of the world's poorest citizens. Students work directly with course partners on real world problems, the culmination of which is actual implementation and real impact. Topics include design thinking, product and service design, rapid prototype engineering and testing, business modelling, social entrepreneurship, team dynamics, impact measurement, operations planning and ethics. Possibility to travel overseas during spring break. Previous projects include d.light, Driptech, Earthenable, Embrace, the Lotus Pump, MiracleBrace, Noora Health and Sanku. Periodic design reviews; Final course presentation and expo; industry and adviser interaction. Limited enrollment via application. Must sign up for ME206A and ME206B. See [extreme.stanford.edu](http://extreme.stanford.edu).

**ME 206B. Design for Extreme Affordability. 4 Units.**

Design for Extreme Affordability (fondly called Extreme) is a two-quarter course offered by the d.school through the School of Engineering and the Graduate School of Business. This multidisciplinary project-based experience creates an enabling environment in which students learn to design products and services that will change the lives of the world's poorest citizens. Students work directly with course partners on real world problems, the culmination of which is actual implementation and real impact. Topics include design thinking, product and service design, rapid prototype engineering and testing, business modelling, social entrepreneurship, team dynamics, impact measurement, operations planning and ethics. Possibility to travel overseas during spring break. Previous projects include d.light, Driptech, Earthenable, Embrace, the Lotus Pump, MiracleBrace, Noora Health and Sanku. Periodic design reviews; Final course presentation and expo; industry and adviser interaction. Limited enrollment via application. Must sign up for ME206A and ME206B. See [extreme.stanford.edu](http://extreme.stanford.edu).

**ME 207. Movie Design. 2 Units.**

Learn the ins and outs of high-speed filmmaking in the digital age; writing, directing, shooting, and editing. We'll do it through a rapid prototyping approach to filmmaking. Whether you have tons of experience or none, you'll leave with new tactics that will up your storytelling, filmmaking, and design chops simultaneously. These techniques are useful whether you plan to move to Hollywood or create a video for the web. Project-based: students will design, write, shoot, edit, and screen a short film in the span of one week. It's going to be quick but intense, kind of like cross-fit for your storytelling and video creating muscles. You'll sweat a bit, but you'll feel confident afterwards. Students should be prepared to spend significant amount of out of class work-time creating movies: for one week + one weekend, see "Notes" for specific dates. Admission by application. See [dschool.stanford.edu/classes](http://dschool.stanford.edu/classes) for more information.

**ME 208. Patent Law and Strategy for Innovators and Entrepreneurs. 2-3 Units.**

This course teaches the essentials for a startup to build a valuable patent portfolio and avoid a patent infringement lawsuit. Jeffrey Schox, who is the top recommended patent attorney for Y Combinator, built the patent portfolio for Twilio (IPO), Cruise (\$1B acquisition), and 250 startups that have collectively raised over \$2B in venture capital. This course is equally applicable to EE, CS, and Bioengineering students. For those students who are interested in a career in Patent Law, please note that this course is a prerequisite for ME238 Patent Prosecution. Same as: MS&E 278

**ME 209. Imperfections in Crystalline Solids. 3 Units.**

To develop a basic quantitative understanding of the behavior of point, line and planar defects in crystalline solids. Particular attention is focused on those defects that control the thermodynamic, structural and mechanical properties of crystalline materials.

**ME 20N. Haptics: Engineering Touch. 3 Units.**

Students in this class will learn how to build, program, and control haptic devices, which are mechatronic devices that allow users to feel virtual or remote environments. In the process, students will gain an appreciation for the capabilities and limitations of human touch, develop an intuitive connection between equations that describe physical interactions and how they feel, and gain practical interdisciplinary engineering skills related to robotics, mechanical engineering, electrical engineering, bioengineering, and computer science. In-class laboratories will give students hands-on experience in assembling mechanical systems, making circuits, programming Arduino microcontrollers, testing their haptic creations, and using Stanford's student prototyping facilities. The final project for this class will involve creating a novel haptic device that could be used to enhance human interaction with computers, mobile devices, or remote-controlled robots.

**ME 21. Renaissance Machine Design. 3 Units.**

Preference to freshmen. Technological innovations of the 1400s that accompanied the proliferation of monumental art and architecture by Brunelleschi, da Vinci, and others who designed machines and invented novel construction, fresco, and bronze-casting techniques. The social and political climate, from the perspective of a machine designer, that made possible and demanded engineering expertise from prominent artists. Hands-on projects to provide a physical understanding of Renaissance-era engineering challenges and introduce the pleasure of creative engineering design. Technical background not required.

**ME 210. Introduction to Mechatronics. 4 Units.**

Technologies involved in mechatronics (intelligent electro-mechanical systems), and techniques to apply this technology to mechatronic system design. Topics include: electronics (A/D, D/A converters, op-amps, filters, power devices); software program design, event-driven programming; hardware and DC stepper motors, solenoids, and robust sensing. Large, open-ended team project. Prerequisites: ENGR 40, CS 106, or equivalents. Same as: EE 118

**ME 212. Calibrating the Instrument. 1 Unit.**

For first-year graduate students in the Joint Program in Design. Means for calibrating the designer's mind/body instrument through tools including improvisation, brainstorming, creative imaging, educational kinesiology, and Brain Gym. Current design issues; guest speakers; shared stories; and goal setting.

**ME 215C. Analytical Product Design. 3 Units.**

Analytical design experience for consumer product. Integration of models of engineering function, manufacturing costs, and market conditions. Introduction to modeling micro economics, market models, and consumer surveying as applied in product design. Introduction to consumer product cost modeling. Draw from other coursework to build engineering function model. Student teams build and link these models in an optimization framework to maximize profitability. Build prototypes for engineering function and form expression.

Same as: APD

**ME 216A. Advanced Product Design: Needfinding. 3-4 Units.**

Human needs that lead to the conceptualization of future products, environments, systems, and services. Field work in public and private settings; appraisal of personal values; readings on social ethnographic issues; and needfinding for a corporate client. Emphasis is on developing the flexible thinking skills that enable the designer to navigate the future. Prerequisites for undergraduates: ME115A, ME115B and ME203, or consent of the instructor.

**ME 216B. Advanced Product Design: Implementation 1. 4 Units.**

Summary project using knowledge, methodology, and skills obtained in Product Design major. Students implement an original design concept and present it to a professional jury. Prerequisite: 216A.

**ME 216C. Advanced Product Design: Implementation 2. 4 Units.**

ME216C: Implementation II is a continuation of ME216B. Students would develop project from ME216B to a further state of completion. Design will be completed, details about manufacturing, cost and production will be developed. Students will validate their projects by making them real in the world. Prerequisites for class are ME216A and ME216B. Prerequisite: 216A and 216B.

**ME 216M. Introduction to the Design of Smart Products. 4 Units.**

This course will focus on the technical mechatronic skills as well as the human factors and interaction design considerations required for the design of smart products and devices. Students will learn techniques for rapid prototyping of smart devices, best practices for physical interaction design, fundamentals of affordances and signifiers, and interaction across networked devices. Students will be introduced to design guidelines for integrating electrical components such as PCBs into mechanical assemblies and consider the physical form of devices, not just as enclosures but also as a central component of the smart product. Prerequisites include: CS106A, E40, and ME 210 or ME218 highly recommended, or instructor approval.

**ME 217. Design & Construction in Wood. 3 Units.**

Exploration of the design and construction of objects using wood including the rich history and current trends for furniture. Taught in the Product Realization Lab. Limited enrollment via application; see [stanford.edu/class/me217](http://stanford.edu/class/me217).

**ME 218A. Smart Product Design Fundamentals. 4-5 Units.**

Lecture/Lab. Team design project series on programmable electromechanical systems design. Topics: transistors as switches, basic digital and analog circuits, operational amplifiers, comparators, software design, state machines, programming in C. Lab fee. Limited enrollment.

**ME 218B. Smart Product Design Applications. 4-5 Units.**

Lecture/lab. Second in team design project series on programmable electromechanical systems design. Topics: user I/O, timer systems, interrupts, signal conditioning, software design for embedded systems, statecharts, sensors, actuators, noise, and power supplies. Lab fee. Limited enrollment. Prerequisite: 218A or passing the smart product design fundamentals proficiency examination.

**ME 218C. Smart Product Design Practice. 4-5 Units.**

Lecture/lab. Advanced level in series on programmable electromechanical systems design. Topics: inter-processor communication, system design with multiple microprocessors, architecture and assembly language programming for the PIC microcontroller, controlling the embedded software tool chain, A/D and D/A techniques, electronic manufacturing technology. Team project. Lab fee. Limited enrollment. Prerequisite: 218B.

**ME 218D. Smart Product Design: Projects. 3-4 Units.**

Lecture/lab. Industrially sponsored project is the culmination of the Smart Product Design sequence. Student teams take on an industrial project requiring application and extension of knowledge gained in the prior three quarters, including prototyping of a final solution with hardware, software, and professional documentation and presentation. Lectures extend the students' knowledge of electronic and software design, and electronic manufacturing techniques. Topics: chip level design of microprocessor systems, real time operating systems, alternate microprocessor architectures, and PCB layout and fabrication. Prerequisite: 218C.

**ME 219. The Magic of Materials and Manufacturing. 3 Units.**

Intended for design-oriented students who anticipate imagining and then creating new products with a focus on materiality and brand or design and business. Assumes basic knowledge of materials and manufacturing processes which results from taking ENGR 50, ME 203, or equivalent course/life experience. Goal is to acquire professional foundation information about materials and materiality from a product design point-of-view, manufacturing processes and business systems inside a factory, and story-telling by book authorship, essay writing, and multimedia presentation. Goal is for students to exhibit a deep and life-long love of materials and manufacturing in order to make great products and tell a good story about each one.

**ME 220. Introduction to Sensors. 3-4 Units.**

Sensors are widely used in scientific research and as an integral part of commercial products and automated systems. The basic principles for sensing displacement, force, pressure, acceleration, temperature, optical radiation, nuclear radiation, and other physical parameters. Performance, cost, and operating requirements of available sensors. Elementary electronic circuits which are typically used with sensors. Lecture demonstration of a representative sensor from each category elucidates operating principles and typical performance. Lab experiments with off-the-shelf devices. Recommended Pre-requisites or equivalent knowledge: Physics 43 electromagnetism, Physics 41 mechanics, Math 53 Taylor series approximation, 2nd order Ordinary Diff Eqns, ENGR40A/Engr40 or ME210, i.e. some exposure to building basic circuits.

**ME 221. Green Design Strategies and Metrics. 2 Units.**

Foundation in sustainable product design principles, reinforced by conceptual design projects. Discuss what aspects of sustainability matter most for different products. Application of dozens of strategies to improve product sustainability. Frameworks, measurements, and decision-making tools to navigate the complexities of designing greener products. Life-cycle analysis, materials, energy use, biomimicry, product-service systems, persuasive design, design for end-of-life, and systems thinking.

**ME 224. The Consumer Mind and Behavior Design. 3 Units.**

This course will introduce new theories and research concerning neuroscience and behavioral psychology to examine models for designing user habits. Students will learn how to use the latest behavior change methodologies from industry-leading experts to design or re-design a customer experience. Course topics will be taught in the context of design thinking: empathize-define-ideate-prototype-test. Students will leave the class having prototyped, tested, and improved a user behavior.

**ME 225. Mystery of Manufacturing. 3 Units.**

Mystery of Manufacturing is intended for design- and engineering-oriented students who anticipate or have an interest in launching products. Where the cousin of this class, ME219, is an overview of fabrication and factory systems, this course will look at manufacturing systems more holistically: what does it take to get a product from your idea into peoples' hands? We'll look at factors that drive location, distribution, and supply chain decisions, and we'll look closely at the inner workings of factories. This course assumes basic knowledge of materials and manufacturing processes resulting from ENGR 50, ME 203, ME 219 or equivalent course/life experience. The goal is to acquire a professional foundation in factory manufacturing systems and the business of manufacturing through story-telling, essay writing, and multimedia presentation. We hope students will exhibit a deep and life-long love of the complexity and flexibility of manufacturing systems in order to launch great products into the world.

**ME 226. Designing Sustainable Behavior. 1 Unit.**

How do you design a product so people will use it in the most sustainable way? Through practical design exercises you experience how selected design tools can help you affect the behavior of your target group. The course consists of an 8-hour workshop on Saturday April 6th in Studio2 at the d.school, followed by a group project finishing April 24th. Students may request to only audit the workshop by emailing [jdaae@stanford.edu](mailto:jdaae@stanford.edu). The course builds upon and contributes to an ongoing research project. Prerequisite: training in product design.

**ME 227. Vehicle Dynamics and Control. 3 Units.**

The application of dynamics, kinematics, and control theory to the analysis and design of ground vehicle behavior. Simplified models of ride, handling, and braking, their role in developing intuition, and limitations in engineering design. Suspension design fundamentals. Performance and safety enhancement through automatic control systems. In-car laboratory assignments for model validation and kinesthetic understanding of dynamics. Limited enrollment. Prerequisites: ENGR 105, consent of instructor.

**ME 228. The Future of Mechanical Engineering. 1 Unit.**

This seminar series provides an overview of current research in mechanical engineering and of its interface with other engineering and non-engineering disciplines. The seminar is targeted at senior mechanical engineering undergraduates and mechanical engineering graduate students. Presenters will be selected external speakers who feature exciting, cutting-edge applications of mechanical engineering.

**ME 22N. Smart Robots in our Mix: Collaborating in High Tech Environments of Tomorrow. 3 Units.**

This course invites students to explore rules of engagement in a global digitally interconnected world they will create with the robots in their society. The material will be taught in the context of ubiquitous integrated technology that will be part of their future reality. Human-robot interactions will be an integral part of future diverse teams. Students will explore what form will this interaction take as an emerging element of tomorrow's society, be it medical implanted technology or the implications of military use of robots and social media in future society. Students will learn to foster their creative confidence to explore collaboration by differences for social innovation in a digitally networked world.

**ME 231. Educating Young STEM Thinkers. 3-5 Units.**

The course introduces students to the design thinking process, the national conversations about the future of STEM careers, and opportunities to work with middle school students and K-12 teachers in STEM-based after-school activities and intercession camps. The course is both theory and practice focused. The purpose is twofold; to provide reflection and mentoring opportunities for students to learn about pathways to STEM careers and to introduce mentoring opportunities with young STEM thinkers.

Same as: EDUC 139, EDUC 239, ME 139

**ME 232. Additive Manufacturing- From Fundamentals to Applications. 3 Units.**

Additive manufacturing (AM) is an emerging technique for direct conversion of 3D computer aided designs into physical objects using a variety of approaches. AM technologies are simple and flexible processes that allow for the creation of very complex and customizable 3D objects in just a few process steps. This lecture gives an overview of available processes and current research in additive manufacturing. Students will get to know how AM can change the way we prototype and manufacture products in the future.

**ME 234. Introduction to Neuromechanics. 3 Units.**

Understanding the role of mechanics in brain development, physiology, and pathology. Mechanics of brain cells: neurons, mechanobiology, mechanotransduction. Mechanics of brain tissue: experimental testing, constitutive modeling, computational modeling. Mechanics of brain development: gyrification, cortical folding, axon elongation, lissencephaly, polymicrogyria. Mechanics of traumatic brain injury: high impact loading, neural injury. Mechanics of brain tumors, brain cancer, tumor growth, altered cytoskeletal mechanics. Mechanics of neurological disorders: autism, dementia, schizophrenia. Mechanics of brain surgery.

**ME 235. Understanding Superfans and their Heroes. 2-3 Units.**

Harness the power of the hero coefficient through a radical team-based, hands-on, multidisciplinary class. Students will learn and utilize the principles of Empathy-Define-Ideate-Prototype-Test components of the d.thinking process. Why do superfans love their heroes? You'll get to prototype and explore how superfans connect with their heroes, understanding this connective tissue works will give your own ideas a boost. We'll be studying heroes the likes of Dale Earnhardt, Michael Jordan and Stephen Colbert. Expect to leave this class ready to spread the word about heroes and superfans and make everyone at your company or on your team feel like one. You will hear from special guests and take a field trip to a racetrack. Sponsored by the Revs Program. Limited enrollment. FAQ and apply here: <http://revs.stanford.edu/course/693>.

**ME 236. Tales to Design Cars By. 1-3 Unit.**

Students learn to tell personal narratives and prototype connections between popular and historic media using the automobile. Explores the meaning and impact of personal and preserved car histories. Storytelling techniques serve to make sense of car experiences through engineering design principles and social learning, Replay memories, examine engagement and understand user interviews, to design for the mobility experience of the future. This course celebrates car fascination, and leads the student through finding and telling a car story through the REVS photographic archives, ethnographic research, interviews, and diverse individual and collaborative narrative methods-verbal, non-verbal, and film. Methods draw from socio-cognitive psychology design thinking, and fine art; applied to car storytelling. Course culminates in a final story presentation and showcase. Restricted to co-term and graduate students. Class Size limited to 18.

**ME 237. 3D Printing for Non-Technical Innovators. 1-3 Unit.**

3D Printing is a method of creation that requires only some basic computer skills and a few rules of thumb. This class will allow students to discover for themselves the potential and limitations of 3D Printing through a build intensive design project. This course is an excellent option for anyone who ever wanted to prototype an invention, create a work of art, customize a product or just make something cool – and yet lacked the skills or a fully equipped workshop. Students may enroll for 1 unit to attend the lectures or 3 units for the complete project course. No prior technical knowledge needed. Note: Course material is targeted toward non-ME Design and non-PD majors. An application is required for the 3-unit course option. Please complete the online application by Friday, March 25th. The application is available on the course website: [web.stanford.edu/class/me137](http://web.stanford.edu/class/me137).

Same as: ME 137

**ME 238. Patent Prosecution. 2-3 Units.**

The course follows the patent application process through the important stages: inventor interviews, patentability analysis, drafting claims, drafting a specification, filing a patent application, and responding to an office action. The subject matter and practical instruction relevant to each stage are addressed in the context of current rules and case law. The course includes four written assignments: an invention capture, a claim set, a full patent application, and an Office Action response. Prerequisites: Law 326 (IP:Patents), Law 409 (Intro IP), ME 208, or MS&E 278.

**ME 239. Mechanics of the Cell. 3 Units.**

Understanding cells as the fundamental building blocks of life. Cell biomechanics: understanding how cell biology and biochemistry influence the mechanical properties of the cell. Cell mechanobiology: understanding how the mechanical environment, load, pressure, stress or strain can influence the cell's shape and integrity, and eventually its biology and biochemistry. Characterizing, modeling, and simulating cell behavior: energy and entropy of biopolymers and biomembranes. Characterizing mechanotransduction.

**ME 23Q. The Worldly Engineer. 3 Units.**

Preference given to sophomores. Engineering, its practice and products placed in multi-disciplinary context. Topics include the history of the engineering profession and engineering education; cultural influences on design; the role of national and international public policy and economics; dependence on natural resources; environmental impact; contemporary workforce development. Emphasis is on cultivating an appreciation of these issues to enrich the educational and professional pursuit of engineering.

**ME 241. Mechanical Behavior of Nanomaterials. 3 Units.**

Mechanical behavior of the following nanoscale solids: 2D materials (metal thin films, graphene), 1D materials (nanowires, carbon nanotubes), and 0D materials (metallic nanoparticles, quantum dots). This course will cover elasticity, plasticity and fracture in nanomaterials, defect-scarce nanomaterials, deformation near free surfaces, coupled optoelectronic and mechanical properties (e.g. piezoelectric nanowires, quantum dots), and nanomechanical measurement techniques. Prerequisites: Mechanics of Materials (ME80) or equivalent. Same as: MATSCI 241

**ME 242B. Mechanical Vibrations. 3 Units.**

For M.S.-level graduate students. Covers the vibrations of discrete systems and continuous structures. Introduction to the computational dynamics of linear engineering systems. Review of analytical dynamics of discrete systems; undamped and damped vibrations of N-degree-of-freedom systems; continuous systems; approximation of continuous systems by displacement methods; solution methods for the Eigenvalue problem; direct time-integration methods. Prerequisites: AA 242A or equivalent (recommended but not required); basic knowledge of linear algebra and ODEs; no prior knowledge of structural dynamics is assumed.

Same as: AA 242B

**ME 243. Designing Emotion- for Reactive Car Interfaces. 1-3 Unit.**

Students learn to define emotions as physiology, expression, and private experience using the automobile and shared space. Explores the meaning and impact of personal and user car experience. Reflective, narrative, and socio-cognitive techniques serve to make sense of car experiences; replay memories; examine engagement; understand user interviews. This course celebrates car fascination, and leads the student through finding and telling the car experience through discussion, ethnographic research, interviews, and diverse individual and collaborative narrative methods-verbal, non-verbal, and in car experiences. Methods draw from socio-cognitive psychology, design thinking, and fine art, and are applied to the car drive along or mobility experience. Course culminates in a final individual narrative presentation and group project demonstration.

**ME 244. Mechanotransduction in Cells and Tissues. 3 Units.**

Mechanical cues play a critical role in development, normal functioning of cells and tissues, and various diseases. This course will cover what is known about cellular mechanotransduction, or the processes by which living cells sense and respond to physical cues such as physiological forces or mechanical properties of the tissue microenvironment. Experimental techniques and current areas of active investigation will be highlighted.

Same as: BIOE 283, BIOPHYS 244

**ME 24N. Designing the Car of the Future. 3 Units.**

Preference to freshmen. Automotive design drawing from all areas of mechanical engineering. The state of the art in automotive design and the engineering principles to understand vehicle performance. Future technologies for vehicles. Topics include vehicle emissions and fuel consumption, possibilities of hydrogen, drive-by-wire systems, active safety and collision avoidance, and human-machine interface issues.

**ME 250. Internal Combustion Engines. 1-5 Unit.**

Internal combustion engines including conventional and turbocharged spark ignition, and diesel engines. Lectures: basic engine cycles, engine components, methods of analysis of engine performance, pollutant emissions, and methods of engine testing. Lab involves hands-on experience with engines and test hardware. Limited enrollment. Prerequisites: 140.

**ME 257. Gas-Turbine Design Analysis. 3 Units.**

This course is concerned with the design analysis of gas-turbine engines. After reviewing essential concepts of thermo- and aerodynamics, we consider a turbofan gas-turbine engine that is representative of a business aircraft. We will first conduct a performance analysis to match the engine design with aircraft performance requirements. This is followed by examining individual engine components, including compressor, combustor, turbines, and nozzles, thereby increase the level of physical description. Aspects of modern engine concepts, environmental impacts, and advanced engine-analysis methods will be discussed. Students will have the opportunity to develop a simulation code to perform a basic design analysis of a turbofan engine. Course Prerequisites: ENGR 30, ME 70, ME 131B, CME 100. Same as: ME 357

**ME 25N. Energy Sustainability and Climate Change. 3 Units.**

One of the primary global challenges of the 21st century is providing the energy required to meet increasing demands due to population growth and economic development. A related challenge is mitigation of the effect of this energy growth on climate. This seminar will examine various scenarios for the energy resources required to meet future demand and the potential consequences on climate. The scientific issues underlying climate change and the coupling of energy use with changes in the global atmosphere that impact climate will be discussed.

**ME 260. Fuel Cell Science and Technology. 3 Units.**

Emphasis on proton exchange membrane (PEM) and solid oxide fuel cells (SOFC), and principles of electrochemical energy conversion. Topics in materials science, thermodynamics, and fluid mechanics. Prerequisites: MATH 43, PHYSICS 55, and ENGR 30 or ME 140, or equivalents.

**ME 261. Dynamic Systems, Vibrations and Control. 3-4 Units.**

(Graduate students only enroll in 261.) Modeling, analysis, and measurement of mechanical and electromechanical systems. Numerical and closed form solutions of ordinary differential equations governing the behavior of single and multiple degree of freedom systems. Stability, resonance, amplification and attenuation, and control system design. Demonstrations and laboratory experiments. Prerequisite: Calculus (differentiation and integration), ordinary differential equations (e.g., CME 102 or MATH53), basic linear algebra (determinants and solving linear equations), and familiarity with basic dynamics ( $F=m*a$ ) and electronics ( $v=i*R$ ). ME undergraduates must enroll for 4 units with lab. All others should enroll for 3 units without lab.

Same as: ME 161

**ME 262. Physics of Wind Energy. 3 Units.**

Formerly CEE 261. An introduction to the analysis and modeling of wind energy resources and their extraction. Topics include the physical origins of atmospheric winds; vertical profiles of wind speed and turbulence over land and sea; the wind energy spectrum and its modification by natural topography and built environments; theoretical limits on wind energy extraction by wind turbines and wind farms; modeling of wind turbine aerodynamics and wind farm performance. Final project will focus on development of a new wind energy technology concept. Prerequisites: CEE 262A or ME 351A.

Same as: CEE 261B, ENERGY 262

**ME 263. The Chair. 4 Units.**

Students design and fabricate a highly refined chair. The process is informed and supported by historical reference, anthropometrics, form studies, user testing, material investigations, and workshops in wood steam-bending, plywood forming, metal tube bending, TIG & MIG welding, upholstery & sewing. Pre-req: ME 203 Design and Manufacturing. May be repeat for credit.

**ME 264. d.science: Design for Science. 3-4 Units.**

Where does design fit into scientific research? In this class, we will design for how data are collected, how data are communicated, and how to apply scientific insights to community-based projects. This year's projects are inspired by the Citizen Science movement and The Year of the Bay. We will use human-centered design methods to understand the needs of bay area citizens through hands-on data collection, public data exploration and collaboration with local industry, government and research partners. With guest lectures from the design and science community, research mentors, and skills workshops, you will develop an actionable understanding of the challenges of collecting good data, the complexities of creating engaging stories with quantitative data, and the challenges of balancing insights from both human-centered design research and scientific research. One of the three class projects will involve visualizing and mapping big data. No prior programming or statistics experience required. Enrollment limited to 24. This course is open to graduate students from all schools and departments. Apply the first day of class.

**ME 265. Technology Licensing and Commercialization. 3 Units.**

Course focuses on how to bridge the gap between creation and commercialization with new ideas, inventions, and technology (not limited to mechanical engineering). Covers business strategies and legal aspects of determining what can be owned and licensed, how to determine commercial value, and what agreements and other paperwork is necessary. Discussion includes aspects of Contract and Intellectual Property law as well as provisions of license agreements and their negotiation. All materials provided including many sample documents.

**ME 267. Ethics and Equity in Transportation Systems. 3 Units.**

Transportation is a crucial element of human life. It enables communication with others, provides access to employment / economic opportunity, and transports goods upon which we depend. However, transportation also generates negative impacts: pollution, noise, energy consumption and risk to human life. Because of its enormous capability to affect our lives, transportation is one of the most highly regulated businesses in the world. These regulations are designed to promote social welfare, improve access, and protect vulnerable populations. This course examines the origins and impacts of transportation policy and regulation: who benefits, who bears the cost, and how social and individual objectives are achieved.

**ME 268. Robotics, AI and Design of Future Education. 1 Unit.**

The seminar will feature guest lectures from industry and academia to discuss the state of the affairs in the field of Robotics, Artificial Intelligence (AI), and how that will impact the future Education. The time of robotics/AI are upon us. Within the next 10 to 20 years, many jobs will be replaced by robots/AI. We will cover hot topics in Robotics, AI, how we prepare students for the rise of Robotics/AI, how we Re-design and Re-invent our education to adapt to the new era.

**ME 26N. Think Like a Designer. 3 Units.**

Introduces students to techniques designers use to create highly innovative solutions across domains. The project-based class will emphasize approaches to problem identification and problem solving. Topics include need-finding, structured brainstorming, synthesis, rapid prototyping, and visual communication; field trips to a local design firm, a robotics lab, and a machining lab. A secondary goal of the seminar is to introduce students to the pleasures of creative design and hands-on development of tangible solutions.

**ME 271E. Aerial Robot Design. 4 Units.**

(Graduate students only enroll in ME 271e or AA 248e) A result-focused introduction to the design of winged aerial robots capable of vertical takeoff and landing for a wide range of applications. Students will learn how to ideate specific aerial robot applications and make an appropriate design from scratch that meets mission requirements. Design skill outcomes include: robot need identification based on mission requirements; system ideation and sizing; making design performance tradeoffs; aerodynamic wing design; CAD assembly; communicating the design and its application. The hands-on lab experience includes prototyping the aerial robot mission, to inform system design, by building and flying quadcopters. Prerequisites: intro level undergraduate fluid mechanics or aerodynamics (e.g. ME 70 or AA 100) or equivalent; Intro level undergraduate electronics or Arduino experience; MATLAB experience.

Same as: AA 248E, ME 171E

**ME 277. Graduate Design Research Techniques. 3-4 Units.**

Students from different backgrounds work on real-world design challenges. The Design Thinking process with emphasis on: ethnographic techniques, need finding, framing and concept generation. The Design Thinking process as a lens to explore ways to better understand people and their culture. Cultural differences as a source of design inspiration, with the understanding that design itself is a culturally embedded practice.

**ME 27SI. Needfinding for Underserved Populations. 2 Units.**

The heart of any design process resides in empathy with users and their needs. Working in the realm of public service may engage a population to which the designer might not have been exposed. How different needfinding techniques can help designers to understand users from underserved populations and inspire them to create products and services that serve user needs.

**ME 281. Biomechanics of Movement. 3 Units.**

Experimental techniques to study human and animal movement including motion capture systems, EMG, force plates, medical imaging, and animation. The mechanical properties of muscle and tendon, and quantitative analysis of musculoskeletal geometry. Projects and demonstrations emphasize applications of mechanics in sports, orthopedics, and rehabilitation.

Same as: BIOE 281

**ME 283. Introduction to Biomechanics and Mechanobiology. 3 Units.**

Introduction to the application of mechanical engineering analysis to understand human physiology and disease. Topics include basics of musculoskeletal force analysis, cell mechanics, blood flow, and mechanical behaviors of tissues. Undergraduates should have taken ME 70 and ME 80 or equivalents.

**ME 284B. Cardiovascular Bioengineering. 3 Units.**

Continuation of ME/BIOE 284A. Integrative cardiovascular physiology, blood fluid mechanics, and transport in the microcirculation. Sensing, feedback, and control of the circulation. Overview of congenital and adult cardiovascular disease, diagnostic methods, and treatment strategies. Engineering principles to evaluate the performance of cardiovascular devices and the efficacy of treatment strategies.

Same as: BIOE 284B

**ME 285. Computational Modeling in the Cardiovascular System. 3 Units.**

This course introduces computational modeling methods for cardiovascular blood flow and physiology. Topics in this course include analytical and computational methods for solutions of flow in deformable vessels, one-dimensional equations of blood flow, cardiovascular anatomy, lumped parameter models, vascular trees, scaling laws, biomechanics of the circulatory system, and 3D patient specific modeling with finite elements; course will provide an overview of the diagnosis and treatment of adult and congenital cardiovascular diseases and review recent research in the literature in a journal club format. Students will use SimVascular software to do clinically-oriented projects in patient specific blood flow simulations.

Same as: BIOE 285, CME 285

**ME 287. Mechanics of Biological Tissues. 4 Units.**

Introduction to the mechanical behaviors of biological tissues in health and disease. Overview of experimental approaches to evaluating tissue properties and mathematical constitutive models. Elastic behaviors of hard tissues, nonlinear elastic and viscoelastic models for soft tissues.

**ME 289A. Interactive Art / Performance Design. 2 Units.**

This class is for those who want the experience of designing and creating interactive art and performance pieces for public audiences, using design thinking as the method, and supported by guest speakers, artist studio visits and needfinding trips to music festivals, museums and performances. Drawing on the fields of design, art, performance, and engineering, each student will ideate, design, plan and lead a team to build an interactive art and/or performance piece to be showcased to audience of 5000 at the Frost Music and Art Festival held on the Stanford campus on May 17th 2014. Projects can range from interactive art to unconventional set design, and from site-specific sculpture to immersive performance. This is a two-quarter long commitment during which students will first learn the design, planning, story boarding, budgeting, engineering, proposal creation and concept pitching of projects for applying for grants and presenting to funders. The second quarter will concentrate on prototyping, maquette making, testing, team forming, project management, creative leadership, construction, site installation and documentation. Part one of a two course series: ME 289A&B. Same as: TAPS 289A

**ME 289B. Interactive Art / Performance Creation. 3-4 Units.**

This class is the continuation of ME289A where students experience the designing and creating of interactive art and performance pieces for public audiences, using design thinking as the method, and supported by guest speakers, artist studio visits and needfinding trips to music festivals, museums and performances. Drawing on the fields of design, art, performance, and engineering, each student will ideate, design, plan and lead a team to build an interactive art and/or performance piece to be showcased to audience of 5000 at the Frost Music and Art Festival held on the Stanford campus on May 17th 2014. Projects can range from interactive art to unconventional set design, and from site-specific sculpture to immersive performance. During this second quarter students will concentrate on prototyping, maquette making, testing, team forming, project management, creative leadership, construction, site installation and documentation. Part two of a two course series : ME 289A&B.

Same as: TAPS 289B

**ME 28SI. Professional Design Practices. 1 Unit.**

Lab. Professional skills are developed through web-based portfolio and resume building. Additionally, visits to local design consulting firms and in house design groups will help solidify students understanding of the designer in the professional workplace. May be repeated for credit.

**ME 290. GIVE BIG OR GO HOME. 3-4 Units.**

When individuals or organizations attempt to solve social problems by giving money, they often overlook the people at the center of the situation. The bigger the problem, the more removed the donors or funding institutions become from the human experience. You will learn how to use human centered design to shape your giving, while also considering the roles of larger systems. Students will learn design thinking methods, how to conceptualize a system in which you want to make a difference, and creative ways to think about financing change.

**ME 292. Humanize My Ride: Investigations in User-Centric Vehicle Design. 3 Units.**

Humanize My Ride is vehicle design for the extreme user. We will explore the relationship between specialized vehicles and their user's needs to inform a deep dive into designing and prototyping a unique purpose modified ride for a new type of user. Utilizing the designing thinking approach and emerging technology such as Google GLASS, student teams will interview drivers and users of specific purpose cars and trucks and then choose a new user to design and build for. Teams will work collectively on different elements of one vehicle to test with their user's needs. This project-based course is accessible to students of all backgrounds interested in exploring and transforming the intersection of user-centric design, automotive technology, creative customization and hands-on building.

**ME 297. Forecasting for Innovators: Technology, Tools & Social Change. 3 Units.**

Technologies from the steam engine to the microprocessor have been mixed gifts, at once benefitting humankind and creating many of the problems facing humanity today. This class will explore how innovators can use forecasting methods to identify new challenges, develop responsive innovations and anticipate unintended consequences. Students will produce a long-range forecast project, applying a variety of methodologies including research, expert interviews and graphical exploration.

**ME 298. Silversmithing and Design. 3-4 Units.**

Skills involved in working with precious metals at a small scale. The course gives equal attention to design and the techniques involved in investment casting.

**ME 299A. Practical Training. 1 Unit.**

For master's students. Educational opportunities in high technology research and development labs in industry. Students engage in internship work and integrate that work into their academic program. Following internship work, students complete a research report outlining work activity, problems investigated, key results, and follow-up projects they expect to perform. Meets the requirements for curricular practical training for students on F-1 visas. Student is responsible for arranging own internship/employment and faculty sponsorship. Register under faculty sponsor's section number. All paperwork must be completed by student and faculty sponsor, as the Student Services Office does not sponsor CPT. Students are allowed only two quarters of CPT per degree program. Course may be repeated twice.

**ME 299B. Practical Training. 1 Unit.**

For Ph.D. students. Educational opportunities in high technology research and development labs in industry. Students engage in internship work and integrate that work into their academic program. Following internship work, students complete a research report outlining work activity, problems investigated, key results, and follow-up projects they expect to perform. Meets the requirements for curricular practical training for students on F-1 visas. Student is responsible for arranging own internship/employment and faculty sponsorship. Register under faculty sponsor's section number. All paperwork must be completed by student and faculty sponsor, as the student services office does not sponsor CPT. Students are allowed only two quarters of CPT per degree program. Course may be repeated twice.

**ME 29SI. Cars: A Crash Course. 1 Unit.**

Focus is on the basic mechanics and significance of cars. Topics include a basic, real-world understanding of automobile workings, histories, industries, cultural impact, and related media. Field trips to Tesla Motors and Go-Kart Racer will be organized, and there will be guest appearances by local automotive historians and enthusiasts. Students will get hands on experience with maintaining real cars, see high performance engines run, and have the opportunity to learn how to drive a manual transmission.

**ME 30. Engineering Thermodynamics. 3 Units.**

The basic principles of thermodynamics are introduced in this course. Concepts of energy and entropy from elementary considerations of the microscopic nature of matter are discussed. The principles are applied in thermodynamic analyses directed towards understanding the performances of engineering systems. Methods and problems cover socially responsible economic generation and utilization of energy in central power generation plants, solar systems, refrigeration devices, and automobile, jet and gas-turbine engines.

**ME 300A. Linear Algebra with Application to Engineering Computations. 3 Units.**

Computer based solution of systems of algebraic equations obtained from engineering problems and eigen-system analysis, Gaussian elimination, effect of round-off error, operation counts, banded matrices arising from discretization of differential equations, ill-conditioned matrices, matrix theory, least square solution of unsolvable systems, solution of non-linear algebraic equations, eigenvalues and eigenvectors, similar matrices, unitary and Hermitian matrices, positive definiteness, Cayley-Hamilton theory and function of a matrix and iterative methods. Prerequisite: familiarity with computer programming, and MATH51. Same as: CME 200

**ME 300B. Partial Differential Equations in Engineering. 3 Units.**

Geometric interpretation of partial differential equation (PDE) characteristics; solution of first order PDEs and classification of second-order PDEs; self-similarity; separation of variables as applied to parabolic, hyperbolic, and elliptic PDEs; special functions; eigenfunction expansions; the method of characteristics. If time permits, Fourier integrals and transforms, Laplace transforms. Prerequisite: CME 200/ME 300A, equivalent, or consent of instructor. Same as: CME 204

**ME 300C. Introduction to Numerical Methods for Engineering. 3 Units.**

Numerical methods from a user's point of view. Lagrange interpolation, splines. Integration: trapezoid, Romberg, Gauss, adaptive quadrature; numerical solution of ordinary differential equations: explicit and implicit methods, multistep methods, Runge-Kutta and predictor-corrector methods, boundary value problems, eigenvalue problems; systems of differential equations, stiffness. Emphasis is on analysis of numerical methods for accuracy, stability, and convergence. Introduction to numerical solutions of partial differential equations; Von Neumann stability analysis; alternating direction implicit methods and nonlinear equations. Prerequisites: CME 200/ME 300A, CME 204/ME 300B. Same as: CME 206

**ME 301. LaunchPad: Design and Launch your Product or Service. 4 Units.**

This is an intense course in product design and development offered to graduate students only (no exceptions). In just ten weeks, we will apply principles of design thinking to the real-life challenge of imagining, prototyping, testing and iterating, building, pricing, marketing, distributing and selling your product or service. You will work hard on both sides of your brain. You will experience the joy of success and the (passing) pain of failure along the way. This course is an excellent chance to practice design thinking in a demanding, fast-paced, results-oriented group with support from faculty and industry leaders. This course may change your life. We will treat each team and idea as a real start-up, so the work will be intense. If you do not have a passionate and overwhelming urge to start a business or launch a product or service, this class will not be a fit. Teams must visit office hours in winter quarter (Tuesdays 2:30p-4:00p) in order to be considered for the course.

**ME 302. The Future of the Automobile. 1 Unit.**

This quarter, the seminar will take a specific focus on "Advanced Driver Assistance Systems", which help drivers to maneuver their vehicles through traffic. Those systems range from navigation systems, adaptive cruise control, night vision, lane departure warning over automated parking, traffic jam assistance, to self-driving cars. With this breadth of applications, advanced driver assistance systems play an important role in making traffic safer, more efficient, and more enjoyable. This course, lectured by an industry expert, will introduce students to technology behind the systems, the benefits, challenges, and future perspectives of this exciting field. At the end of the quarter, students will have developed a technical understanding as well as an understanding for the interactions of the technology, business, and society with a specific automotive focus.

**ME 302A. Introduction to Automotive and Transportation Innovation at Stanford. 1 Unit.**

The objective of this course is to survey the innovative automotive and transportation community within Stanford. Stanford University has become one of the best universities on earth to to change the future of transportation and this course is a 'who's who' of that world. This is the first part of a 3-quarter seminar series, which build on one another but can be taken independently. This quarter, the seminar will feature talks from Stanford experts in focus areas as varied as autonomous vehicles, entrepreneurship, design, ethics, aerodynamics, neuroscience, communications and security. At the end of the quarter, students will have developed an understanding of Stanford's portfolio of transportation work and know the specific individuals who are key to its future. To obtain credit, students must attend the first class (no exceptions) plus 7 additional classes for a total of 8 classes.

**ME 302B. The Future of the Automobile- Driver Assistance and Automated Driving. 1 Unit.**

Automated vehicles are on the verge to productization and have been subject to a lot of news recently: GM bought a self-driving tech startup for presumably more than \$1 billion. BMW, Intel and MobilEye teamed up to "bring fully autonomous driving to streets by 2021". Uber acquired Otto (another startup) for reportedly \$680 million to lead Uber's self-driving car effort. MobilEye and Delphi announced "a partnership for Level 4/5 automated Driving solution for 2019". Ford announced to put a fleet of Level 4 autonomous vehicles on the road in 2021. Tesla is continuing to working on its Autopilot. Intel bought MobilEye. Sounds exciting if you have an idea what the terms and levels mean, and what the technology actually is, which is driving the vehicle automation. This class will provide a holistic introduction to the field of vehicle automation: The first three lectures will provide an overview, clarify terminology and categories, and dive into the legal and policy aspects of automated driving. The next three lectures discuss the technologies enabling vehicle automation and outline applications. Students are asked to work on a class assignment in groups discussing current topics of vehicle automation. The results of the group work will be presented in the final 2 lectures of the class. This is the second course of a 3-quarter seminar series, which build on one another but can be taken independently. This course, lectured by an industry expert, will introduce students to the technology behind the systems, the benefits, challenges, and future perspectives of this exciting field. Students will develop an understanding for the interactions of the technology, business, and public policies with a specific automotive focus.



**ME 302C. The Future of the Automobile- Mobility Entrepreneurship. 1 Unit.**

The objective of this course is to develop an understanding for the requirements that go into the design of a highly complex yet easy-to-use product, i.e. the automobile. Students will learn about very different interdisciplinary aspects that characterize the automobile and personal mobility. This is part of a multi-quarter seminar series, which build on one another but can be taken independently. This quarter, students will learn from 10 different founders / C-level executives about how they built their mobility startup to change the world of transportation. Previous classes included speakers from Tesla, Lyft, Pearl Auto, Turo, Nauto. In hearing these founder stories, students will get an insight not only into the world of entrepreneurship but also the multidisciplinary nature of the transportation industry. The course consists of 50-minute discussions with founders, with students encouraged to participate and ask questions of the founders. To obtain credit, students must attend 8 out of 10 classes including the first class.

**ME 303. Biomechanics of Flight. 3 Units.**

Study of biological flight as an inspiration for designing robots. The goal is to give students a broad understanding of the biomechanics of natural flight, and an in-depth understanding of bird flight. This course elucidates how students can pick and choose exciting biological questions, use biological and engineering techniques to answer them, and use the results to identify bio-inspired design applications. Prerequisites: Fluid mechanics OR Aerodynamics AND Fluent Matlab skills. Course website URL: [http://lentinklab.stanford.edu/impact/stanford\\_teaching](http://lentinklab.stanford.edu/impact/stanford_teaching).

**ME 304. The Designer's Voice. 1 Unit.**

This course for Masters students in the Stanford Design Program helps students develop a point of view about their design career that will enable them to articulate their design vision, inspire a design studio, or infect a business with a culture of design-thinking. This class focuses on the integration of work and worldview, professional values, design language, and the development of the designer's voice. Includes seminar-style discussions, role-playing, short writing assignments, guest speakers, and individual mentoring and coaching.

**ME 306. Engineering Design Theory in Practice. 3 Units.**

What is high performance in design? How could you improve your performance as a designer? Theories and frameworks from research into engineering design and design thinking are translated into action for developing insights into your design behavior and to develop strategies to improve design performance. Focus on performance in four aspects of design thinking: design as social activity, cognitive activity, physical activity and learning activity. Practice of effective team behaviors for concept generation, decision-making, and conflict-handling. Cognitive strategies from design as problem-solving, design as reflection-in-action, and C-K Theory. Prototyping performance improvements through media cascade and boundary object frameworks. Application of Perception-Action framework for improving self-learning in design. Students engage in multiple projects and a lab component.

**ME 308. Spatial Motion. 3 Units.**

The geometry of motion in Euclidean space. Fundamentals of theory of screws with applications to robotic mechanisms, constraint analysis, and vehicle dynamics. Methods for representing the positions of spatial systems of rigid bodies with their inter-relationships; the formulation of Newton-Euler kinetics applied to serial chain systems such as industrial robotics.

**ME 309. Finite Element Analysis in Mechanical Design. 3 Units.**

Basic concepts of finite elements, with applications to problems confronted by mechanical designers. Linear static, modal, and thermal formulations emphasized; nonlinear and dynamic formulations introduced. Application of a commercial finite element code in analyzing design problems. Issues: solution methods, modeling techniques, features of various commercial codes, basic problem definition. Individual projects focus on the interplay of analysis and testing in product design/development. Prerequisites: Math 51, or equivalent. Recommended: ME80 or CEE101A, or equivalent in structural and/or solid mechanics; some exposure to principles of heat transfer.

**ME 310A. Engineering Design Entrepreneurship and Innovation: exploring the problem space. 4 Units.**

Reality is the best teacher. The best teachers are coaches. The best learners are in teams of 3-4 persons. We offer an extraordinary Coaching Team to help guide you towards rewarding your time at Stanford. Your mission is to create the personal self-efficacy that you need to engage wicked design problems of your own invention. In October you will Kick-Off your connection to an international team of (3-4) multi-disciplinary graduate students at distinguished universities across the world. They come to Stanford to meet you. You will also meet the team of company liaisons who are funding you to re-invent-X, to be a start-up in Silicon Valley. Expect 10 different industry funded design challenges at the human interface to Robots, AI, Internet of Things, Autonomous vehicles and Smart Cities. ME310A is dedicated to exploring the problem space (your best creative opportunity) using strategic-foresight, design thinking, team-dynamics-management, rapid prototyping, and human-centric problem RE-framing. Take ME310ABC.

**ME 310B. Engineering Design Entrepreneurship and Innovation: exploring the solution space. 4 Units.**

Your team has RE-framed a solid human-centric need/problem. You have your X. Now explore the solution space. Search for the dark-horse (the impossible solution that actually works). ME310B and ME310C are a single course with one grade in June. Your interdisciplinary team-of-teams is challenged by your industry partners to achieve breakthrough-innovation. In late March, Stanford students typically visit their international partners to converge on one solution path to be made REAL by June.

**ME 310C. Engineering Design Entrepreneurship and Innovation: making it REAL. 4 Units.**

Building X is the mission for Spring Quarter. Make it REAL. Enable user testing, technical and business evaluation. Create functional hardware, software, and human-ware. Use strategic-foresight, design thinking, team-dynamics management, rapid prototyping, and problem framing. Present your pre-production prototype to the world at the Stanford Design EXPERIENCE in June (760 attended in 2017). Tell the world what you did, why you did it, and what you learned from the doing.

**ME 310I. The Essential Elements of New Product Development: Business and Industry Perspectives. 1 Unit.**

Restricted to graduate students. Topics include new product development agenda, new product management skills, leadership and team management, ncultural awareness, organizational culture, industrial challenges and opportunities. Seminar will include in-class discussions, design thinking sessions and guest speakers from industry.

**ME 311. Leading Design Teams. 3 Units.**

The objective of this course is to help students forge a new identity as a design leader. Most people find the transition from individual contributor to team leader challenging because it's the first time that work needs to get done through others rather than doing things yourself. In a team leader role, you need to focus on getting things done and motivating, developing, and communicating with people. There is a balancing act between tasks and people and yet there is no simple rule to follow. Letting go of your identity as an individual contributor and helping you embrace a new one as a team leader is the first step into a design leadership role. This course will give you the language and concepts that will allow you to reflect on your own design leadership experience and growth while practicing it.

**ME 312. Communication in Design. 3 Units.**

Communication of design information, ideas, and concepts is central to successful design projects. In this course you will learn about various forms of communication and when/how to apply them in the design process. Topics covered include: structuring communication, selecting key points to communicate, communicating technical information to a non-technical audience. Approaches include: videography, presentations, public speaking. Visual approaches: sketching, storyboarding, journey maps, figures and charts. This course does not cover within-team communication.

**ME 313. Human Values and Innovation in Design. 3 Units.**

Introduction to the philosophy, spirit, and tradition of the product design program. Hands-on design projects used as vehicles for design thinking, visualization, and methodology. The relationships among technical, human, aesthetic, and business concerns. Drawing, prototyping, and design skills. Focus is on tenets of design philosophy: point of view, user-centered design, design methodology, and iterative design.

**ME 315. The Designer in Society. 3 Units.**

This class focuses on individuals and their psychological well being. The class delves into how students perceive themselves and their work, and how they might use design thinking to lead a more creative and committed life. As a participant you read parts of a different book each week and then engage in exercises designed to unlock learnings. In addition, there are two self-selected term project dealing with either eliminating a problem from your life or doing something you have never done before. Apply the first day during class. Attendance at first session is mandatory; otherwise, at most one absence is acceptable.

**ME 316A. Product Design Master's Project. 2-6 Units.**

For graduate Product Design or Design (Art) majors only. Student teams, under the supervision of the design faculty, spend the quarter researching master's project topics. Students are expected to demonstrate mastery of design thinking methods including; needfinding, brainstorming, field interviews and synthesis during this investigation. Masters projects are selected that involve the synthesis of aesthetics and technological concerns in the service of human need. Design Institute class; see <http://dschool.stanford.edu>. Prereq: ME277, ME312, ME313.

**ME 316B. Product Design Master's Project. 2-6 Units.**

Design Garage is a Winter/Spring class (a two quarter commitment is required). The class is a deep dive in design thinking that uses student-led projects to teach design process and methods. The projects come from investigations conducted during the Fall quarter where the preliminary need finding, customer research, and product or service ideas have been developed to provide the seed projects for the student design teams. Students will learn the methodologies of design thinking by bringing a product, service, or experience to market. Students apply to Design Garage in the Fall, and teams are formed after interviews and applications are reviewed. Prerequisite: graduate student standing.

**ME 316C. Product Design Master's Project. 2-6 Units.**

This is the second half of the two quarter Design Garage sequence. Students will complete projects begun in ME316B the prior quarter. Prerequisite: ME316B and graduate student standing. Design Institute class; see <http://dschool.stanford.edu>.

**ME 318. Computer-Aided Product Creation. 4 Units.**

Design course focusing on an integrated suite of computer tools: rapid prototyping, solid modeling, computer-aided machining, and computer numerical control manufacturing. Students choose, design, and manufacture individual products, emphasizing individual design process and computer design tools. Structured lab experiences build a basic CAD/CAM/CNC proficiency. Limited enrollment. Prerequisite: consent of instructor.

**ME 319. Fundamentals of Design for Design Thinkers. 2-4 Units.**

This course is an introduction to the fundamental principles of Design, geared toward graduate students involved and invested in innovation and design thinking. Core concepts include Contrast, Color, Materiality, Form, Proportion, Transitions, and more. Students will be introduced to the major philosophical concepts of design in readings and in class, and will practice techniques in class and via weekly hands-on projects out of class, culminating in a final personal project. Students will also be introduced to many hands-on prototyping and making skills via access to the Product Realization Lab and Room 36 ([webshop.stanford.edu](http://webshop.stanford.edu)).

**ME 320. Introduction to Robotics. 3 Units.**

Robotics foundations in modeling, design, planning, and control. Class covers relevant results from geometry, kinematics, statics, dynamics, motion planning, and control, providing the basic methodologies and tools in robotics research and applications. Concepts and models are illustrated through physical robot platforms, interactive robot simulations, and video segments relevant to historical research developments or to emerging application areas in the field. Recommended: matrix algebra. Same as: CS 223A

**ME 321. Optofluidics: Interplay of Light and Fluids at the Micro and Nanoscale. 3 Units.**

Many optical systems in biology have sophisticated designs with functions that conventional optics cannot achieve: no synthetic materials, for example, can provide the camouflage capability exhibited by some animals. This course overviews recent efforts—some inspired by examples in biology—in using fluids, soft materials and nanostructures to create new functions in optics. Topics include electrowetting lenses, electronic inks, colloidal photonic crystals, bioinspired optical nanostructures, nanophotonic biosensors, lens-less optofluidic microscopes. The use of optics to control fluids is also discussed: optoelectronic tweezers, particle trapping and transport, microrheology, optofluidic sorters, fabrication and self-assembly of novel micro and nanostructures.

**ME 322. Kinematic Synthesis of Mechanisms. 3 Units.**

The rational design of linkages. Techniques to determine linkage proportions to fulfill design requirements using analytical, graphical, and computer based methods.

**ME 323. Modeling and Identification of Mechanical Systems for Control. 3 Units.**

Lecture/Lab. The art and science behind developing mathematical models for control system design. Theoretical and practical system modeling and parameter identification. Frequency domain identification, parametric modeling, and black-box identification. Analytical work and laboratory experience with identification, controller implementation, and the implications of unmodeled dynamics and non-linearities. Prerequisites: linear algebra and system simulation with MATLAB/SIMULINK; ENGR 105.

**ME 324. Precision Engineering. 4 Units.**

Advances in engineering are often enabled by more accurate control of manufacturing and measuring tolerances. Concepts and technology enable precision such that the ratio of overall dimensions to uncertainty of measurement is large relative to normal engineering practice. Typical application areas: non-spherical optics, computer information storage devices, and manufacturing metrology systems. Application experience through design and manufacture of a precision engineering project, emphasizing the principles of precision engineering. Structured labs; field trips. Prerequisite: consent of instructors.

**ME 325. Making Multiples: Injection Molding. 3 Units.**

Design course focusing on the process of injection molding as a prototyping and manufacturing tool. Coursework will include creating and evaluating initial design concepts, detailed part design, mold design, mold manufacturing, molding parts, and testing and evaluating the results. Students will work primarily on individually selected projects, using each project as a tool to continue developing and exercising individual design process. Lectures and field trips will provide students with context for their work in the Stanford Product Realization Lab. Prerequisite: ME318 or consent of instructors.

**ME 327. Design and Control of Haptic Systems. 4 Units.**

Study of the design and control of haptic systems, which provide touch feedback to human users interacting with virtual environments and teleoperated robots. Focus is on device modeling (kinematics and dynamics), synthesis and analysis of control systems, design and implementation, and human interaction with haptic systems. Coursework includes homework/laboratory assignments and a research-oriented project. Directed toward graduate students and advanced undergraduates in engineering and computer science. Prerequisites: dynamic systems and MATLAB programming. Suggested experience with programming, feedback control design, and hardware prototyping.

**ME 328. Medical Robotics. 3 Units.**

Study of the design and control of robots for medical applications. Focus is on robotics in surgery and interventional radiology, with introduction to other healthcare robots. Delivery is through instructor lectures and weekly guest speakers. Coursework includes homework and laboratory assignments, an exam, and a research-oriented project. Directed toward graduate students and advanced undergraduates in engineering and computer science; no medical background required. Prerequisites: dynamic systems and MATLAB programming. Suggested experience with C/C++ programming, feedback control design, and linear systems. Cannot be taken concurrently with CS 571.

**ME 329. Mechanical Analysis in Design. 3 Units.**

This project based course will cover the application of engineering analysis methods learned in the Mechanics and Finite Element series to real world problems involving the mechanical analysis of a proposed device or process. Students work in teams, and each team has the goal of solving a problem defined jointly with a sponsoring company or research group. Each team will be mentored by a faculty mentor and a mentor from the sponsoring organization. The students will gain experience in the formation of project teams; interdisciplinary communication skills; intellectual property; and project management. Course has limited enrollment.

**ME 330. Advanced Kinematics. 3 Units.**

Kinematics from mathematical viewpoints. Introduction to algebraic geometry of point, line, and plane elements. Emphasis is on basic theories which have potential application to mechanical linkages, computational geometry, and robotics.

**ME 331A. Advanced Dynamics & Computation. 3 Units.**

Newton, Euler, momentum, and road-map methods and computational tools for 3-D force and motion analysis of multibody systems. Power, work, and energy. Numerical solutions (e.g., MATLAB, etc.) of nonlinear algebraic and differential equations governing the static and dynamic behavior of multiple degree of freedom systems.

**ME 331B. Advanced Dynamics, Simulation & Control. 3 Units.**

Advanced methods and computational tools for the efficient formulation of equations of motion for multibody systems. D'Alembert principle. Power, work, and energy. Kane's and Lagrange's method. Computed torque control. Systems with constraints. Quaternions. Numerical solutions (e.g., MATLAB, etc.) of nonlinear algebraic and differential equations governing the behavior of multiple degree of freedom systems. Team-based computational multi-body lab project (inclusion of feed-forward control optional).

**ME 332. Introduction to Computational Mechanics. 3 Units.**

Provides an introductory overview of modern computational methods for problems arising primarily in mechanics of solids and is intended for students from various engineering disciplines. The course reviews the basic theory of linear solid mechanics and introduces students to the important concept of variational forms, including the principle of minimum potential energy and the principles of virtual work. Specific model problems that will be considered include deformation of bars, beams and membranes, plates, and problems in plane elasticity (plane stress, plane strain, axisymmetric elasticity). The variational forms of these problems are used as the starting point for developing the finite element method (FEM) and boundary element method (BEM) approaches providing an important connection between mechanics and computational methods.

Same as: CME 232

**ME 333. Mechanics - Fundamentals and Lagrangian Mechanics. 3 Units.**

Goal is a common basis for advanced mechanics courses. Introduction to variation calculus. Formulation of the governing equations from a Lagrangian perspective for finite and infinite dimensional mechanical systems. Examples include systems of particles and linear elastic solids. Introduction to tensors. Definition and interpretation of Cauchy stress tensor.

**ME 335A. Finite Element Analysis. 3 Units.**

Fundamental concepts and techniques of primal finite element methods. Method of weighted residuals, Galerkin's method and variational equations. Linear elliptic boundary value problems in one, two and three space dimensions; applications in structural, solid and fluid mechanics and heat transfer. Properties of standard element families and numerically integrated elements. Implementation of the finite element method using Matlab, assembly of equations, and element routines. Lagrange multiplier and penalty methods for treatment of constraints. The mathematical theory of finite elements.

**ME 335B. Finite Element Analysis. 3 Units.**

Finite element methods for linear dynamic analysis. Eigenvalue, parabolic, and hyperbolic problems. Mathematical properties of semi-discrete (t-continuous) Galerkin approximations. Modal decomposition and direct spectral truncation techniques. Stability, consistency, convergence, and accuracy of ordinary differential equation solvers. Asymptotic stability, over-shoot, and conservation laws for discrete algorithms. Mass reduction. Applications in heat conduction, structural vibrations, and elastic wave propagation. Computer implementation of finite element methods in linear dynamics. Implicit, explicit, and implicit-explicit algorithms and code architectures.

**ME 335C. Finite Element Analysis. 3 Units.**

Newton's method for nonlinear problems; convergence, limit points and bifurcation; consistent linearization of nonlinear variational forms by directional derivative; tangent operator and residual vector; variational formulation and finite element discretization of nonlinear boundary value problems (e.g. nonlinear heat equation, nonlinear elasticity); enhancements of Newton's method: line-search techniques, quasi-Newton and arc-length methods.

**ME 337. Mechanics of Growth. 3 Units.**

Introduction to continuum theory and computational simulation of living matter. Kinematics of finite growth. Balance equations in open system thermodynamics. Constitutive equations for living systems. Custom-designed finite element solution strategies. Analytical solutions for simple model problems. Numerical solutions for clinically relevant problems such as: bone remodeling; wound healing; tumor growth; atherosclerosis; heart failure; tissue expansion; and high performance training.

**ME 338. Continuum Mechanics. 3 Units.**

Introduction to vectors and tensors: kinematics, deformation, forces, and stress concept of continua; balance principles; aspects of objectivity; hyperelastic materials; thermodynamics of materials; variational principles. Prerequisite: CEE 291 or equivalent.

Same as: CEE 292

**ME 338B. Continuum Mechanics. 3 Units.**

Constitutive theory; equilibrium constitutive relations; material frame indifference and material symmetry; finite elasticity; formulation of the boundary value problem; linearization and well-posedness; symmetries and configurational forces; numerical considerations.

**ME 339. Introduction to parallel computing using MPI, openMP, and CUDA. 3 Units.**

This class will give hands on experience with programming multicore processors, graphics processing units (GPU), and parallel computers. Focus will be on the message passing interface (MPI, parallel clusters) and the compute unified device architecture (CUDA, GPU). Topics will include: network topologies, modeling communication times, collective communication operations, parallel efficiency, MPI, dense linear algebra using MPI. Symmetric multiprocessing (SMP), pthreads, openMP. CUDA, combining MPI and CUDA, dense linear algebra using CUDA, sort, reduce and scan using CUDA. Pre-requisites include: C programming language and numerical algorithms (solution of differential equations, linear algebra, Fourier transforms).

Same as: CME 213

**ME 340. Mechanics - Elasticity and Inelasticity. 3 Units.**

Introduction to the theories of elasticity, plasticity and fracture and their applications. Elasticity: Definition of stress, strain, and elastic energy; equilibrium and compatibility conditions; and formulation of boundary value problems. Stress function approach to solve 2D elasticity problems and Green's function approach in 3D. Applications to contact and crack. Plasticity: Yield surface, associative flow rule, strain hardening models, crystal plasticity models. Applications to plastic bending, torsion and pressure vessels. Fracture: Linear elastic fracture mechanics, J-integral, Dugdale-Barrenblatt crack model. Applications to brittle fracture and fatigue crack growth. Computer programming in Matlab is used to aid analytic derivation and numerical solutions.

**ME 341. Design Experiments. 3 Units.**

Design experiments to learn about the relationship between users and products, with an emphasis on quantitative output that is tested with statistics. Students will be exposed to all components of the experimental design process: research proposition, literature review, detailed hypotheses, method selection, experimental instruments, subject selection, pilot studies, analysis approaches, reporting results, and discussing conclusions. Students will receive human subjects training and complete the IRB certificate. Possible experiment design tools include in-person observation and interviews, web surveys, and eye-tracking.

**ME 341X. Statistics for Design Experiments. 1 Unit.**

Feedback from users is fundamental to good design. Often this feedback is collected in the form of a survey, resulting in data requiring both analysis and synthesis. Course content will be delivered via live and on-line video lectures, with group classroom time dedicated to completing the lab assignments. You will learn the specific skills necessary to design, launch and collect data using an online survey tool (Qualtrics), how to analyze the results using R for Statistical Computing, and to create simple graphical representations of statistical data. This course is designed to complement ME341 Design Experiments although enrollment in ME341 is not a prerequisite for this course. One-unit credit requires completion of an analysis project using data collected as part of this class. Auditors welcome.

**ME 342. Theory and Application of Inelasticity. 3 Units.**

Theories of plasticity and fracture phenomena from both phenomenological and micromechanical viewpoints. Yield surface, flow rules, strain hardening models, and applications to creep. Plastic zone near crack tip. Linear fracture mechanics and other criteria for crack initiation and growth. Application to fatigue. Classical analytic solutions will be discussed together with numerical solutions of plane elastoplastic problems by Matlab.

**ME 342A. Mechanobiology and Biofabrication Methods. 3 Units.**

Cell mechanobiology topics including cell structure, mechanical models, and chemo-mechanical signaling. Review and apply methods for controlling and analyzing the biomechanics of cells using traction force microscopy, AFM, micropatterning and cell stimulation. Practice and theory for the design and application of methods for quantitative cell mechanobiology.

Same as: BIOE 342A, BIOPHYS 342A

**ME 342D. MEMS Fabrication/Projects. 1-3 Unit.**

Emphasis is on process planning, in process testing, nanofabrication training, exposure to MEMS industry applications. Prerequisite: ENGR 341.

**ME 344. Introduction to High Performance Computing. 3 Units.**

ME 344 is an introductory course on High Performance Computing (HPC), providing a solid foundation in parallel computer architectures, programming models, and essential optimization strategies. This course will discuss fundamentals of what an HPC cluster consists of, and how we can take advantage of such systems to solve large scale problems in wide ranging applications like computational fluid dynamics, image processing, machine learning and analytics. The course will consist of lectures, and practical hands-on homework assignments conducted on an Intel® Xeon Phi Processor based HPC Cluster using various software tools that are part of Parallel Studio XE. In addition to classroom instruction, experience with the latest cutting-edge hardware and interaction with industry experts, the course features hands on projects that emphasize on the application of High Performance Computing and enable students to build upon their knowledge. These include fundamental exercises wherein the students build an HPC cluster from the ground up and applied projects where the students utilize HPC paradigms to build a Deep Learning application. This course is open to both computer scientists and computational scientists who are interested in learning about data parallelism, scaling to large number of nodes, and performance tuning methodologies and tools on standards driven languages and parallel models (C/C++/Fortran/MPI/OpenMP/Threading Building Blocks/Python). As it's desirable to have such a mix of students, the course will not assume much background, though good programming skills will be needed to get the most of the course.

**ME 345. Fatigue Design and Analysis. 3 Units.**

The mechanism and occurrences of fatigue of materials. Methods for predicting fatigue life and for protecting against premature fatigue failure. Use of elastic stress and elastic-plastic strain analyses to predict crack initiation life. Use of linear elastic fracture mechanics to predict crack propagation life. Effects of stress concentrations, manufacturing processes, load sequence, irregular loading, multi-axial loading. Subject is treated from the viewpoints of the engineer seeking up-to-date methods of life prediction and the researcher interested in improving understanding of fatigue behavior. Prerequisite: undergraduate mechanics of materials.

**ME 346A. Introduction to Statistical Mechanics. 3 Units.**

The main purpose of this course is to provide students with enough statistical mechanics background to the Molecular Simulations classes (ME 346B,C), including the fundamental concepts such as ensemble, entropy, and free energy, etc. The main theme of this course is how the laws at the macroscale (thermodynamics) can be obtained by analyzing the spontaneous fluctuations at the microscale (dynamics of molecules). Topics include thermodynamics, probability theory, information entropy, statistical ensembles, phase transition and phase equilibrium. Recommended: PHYSICS 110 or equivalent.

**ME 346B. Introduction to Molecular Simulations. 3 Units.**

Algorithms of molecular simulations and underlying theories. Molecular dynamics, time integrators, modeling thermodynamic ensembles (NPT, NVT), free energy, constraints. Monte Carlo simulations, parallel tempering. Stochastic equations, Langevin and Brownian dynamics. Applications in solids, liquids, and biomolecules (proteins). Programming in Matlab.

**ME 346C. Advanced Techniques for Molecular Simulations. 3 Units.**

Advanced methods for computer simulations of solids and molecules. Methods for long-range force calculation, including Ewald methods and fast multipole method. Methods for free energy calculation, such as thermodynamic integration. Methods for predicting rates of rare events (e.g. nucleation), including nudged elastic band method and umbrella sampling method. Students will work on projects in teams.

**ME 347. Mathematical Theory of Dislocations. 3 Units.**

The mathematical theory of straight and curvilinear dislocations in linear elastic solids. Stress fields, energies, and Peach-Koehler forces associated with these line imperfections. Anisotropic effects, Green's function methods, and the geometrical techniques of Brown and Indenborn-Orlov for computing dislocation fields and for studying dislocation interactions. Continuously distributed dislocations and cracks and inclusions.

**ME 348. Experimental Stress Analysis. 3 Units.**

Theory and applications of photoelasticity, strain sensors, and holographic interferometry. Comparison of test results with theoretical predictions of stress and strain. Discussion of other methods (optical fiber strain sensors, digital image correlation, thermoelasticity, brittle coating, Moire interferometry, residual stress determination). Six labs plus mini-project. Limited enrollment. Lab fee.

**ME 349. Variational Methods in Elasticity and Plate Theory. 3 Units.**

An introduction to variational calculus methods and their applications to the theories of elasticity and plates.

**ME 350A. Design @ the Intersection of Science, Technology, and Entrepreneurship. 1 Unit.**

This 1 credit class is for graduate students who are passionate about turning their research into a product or service. This is a chance to explore the potential impact of your work beyond your lab or research group. We are looking for students from the sciences, engineering, or mathematics, or students who have business acumen or start-up experience focused on technology driven companies. If you want to get out of your lab, away from your machine, and start to design your future come join us. The class will begin your journey from research to product conceptualization and user centered design through exercises and group activities. We'll meet once a week over the quarter in 10 self-contained 2 hour workshops where students will focus on their own work as well as explore the practical applications of fellow students' ideas, experience team formation and collaboration, and begin to explore product and service design. Aside from class time you will need to commit up to one hour per week outside the class on customer and market exploration. Advisors from industry and academia will mentor student teams. The class will be structured for individuals with team formation optional.

**ME 351A. Fluid Mechanics. 3 Units.**

Exact and approximate analysis of fluid flow covering kinematics, global and differential equations of mass, momentum, and energy conservation. Forces and stresses in fluids. Euler's equations and the Bernoulli theorem applied to inviscid flows. Vorticity dynamics. Topics in irrotational flow: stream function and velocity potential for exact and approximate solutions; superposition of solutions; complex potential function; circulation and lift. Some boundary layer concepts.

**ME 351B. Fluid Mechanics. 3 Units.**

Laminar viscous fluid flow. Governing equations, boundary conditions, and constitutive laws. Exact solutions for parallel flows. Creeping flow limit, lubrication theory, and boundary layer theory including free-shear layers and approximate methods of solution; boundary layer separation. Introduction to stability theory and transition to turbulence, and turbulent boundary layers. Prerequisite: 351A.

**ME 352A. Radiative Heat Transfer. 3 Units.**

The fundamentals of thermal radiation heat transfer; blackbody radiation laws; radiative properties of non-black surfaces; analysis of radiative exchange between surfaces and in enclosures; combined radiation, conduction, and convection; radiative transfer in absorbing, emitting, and scattering media. Advanced material for students with interests in heat transfer, as applied in high-temperature energy conversion systems. Take 352B,C for depth in heat transfer. Prerequisites: graduate standing and undergraduate course in heat transfer. Recommended: computer skills.

**ME 352B. Fundamentals of Heat Conduction. 3 Units.**

Physical description of heat conduction in solids, liquids, and gases. The heat diffusion equation and its solution using analytical and numerical techniques. Data and microscopic models for the thermal conductivity of solids, liquids, and gases, and for the thermal resistance at solid-solid and solid-liquid boundaries. Introduction to the kinetic theory of heat transport, focusing on applications for composite materials, semiconductor devices, micromachined sensors and actuators, and rarefied gases. Prerequisite: consent of instructor.

**ME 352C. Convective Heat Transfer. 3 Units.**

Prediction of heat and mass transfer rates based on analytical and numerical solutions of the governing partial differential equations. Heat transfer in fully developed pipe and channel flow, pipe entrance flow, laminar boundary layers, and turbulent boundary layers. Superposition methods for handling non-uniform wall boundary conditions. Approximate models for turbulent flows. Comparison of exact and approximate analyses to modern experimental results. General introduction to heat transfer in complex flows. Prerequisite: 351B or equivalent.

**ME 353. Design for Additive Manufacturing. 4 Units.**

Additive manufacturing and the associated emergence of algorithmic CAD software are changing the landscape for design engineers. The next generation of software is not solely based on geometry, but asks engineers to specify the desired performance parameters of their solution and leaves it up to the computer to create a geometry that optimizes that solution. Usually such geometries would be impossibly expensive or impossible to produce, but as additive manufacturing technologies and tools advance, we are approaching a world in which there will be virtually no geometric barriers associated with manufacturing cost.

**ME 354. Experimental Methods in Fluid Mechanics. 4-5 Units.**

Experimental methods associated with the interfacing of laboratory instruments, experimental control, sampling strategies, data analysis, and introductory image processing. Instrumentation including point-wise anemometers and particle image tracking systems. Lab. Prerequisites: previous experience with computer programming and consent of instructor. Limited enrollment.

**ME 355. Compressible Flow. 3 Units.**

Topics include quasi-one-dimensional isentropic flow in variable area ducts, normal shock waves, oblique shock and expansion waves, flow in ducts with friction and heat transfer, unsteady one-dimensional flow, and steady two-dimensional supersonic flow.

**ME 356. Hypersonic Aerothermodynamics. 3 Units.**

History of hypersonic flight technology. Inviscid hypersonic flows. Rankine-Hugoniot shock-jump relations at high Mach numbers. Newtonian approximation. Small-disturbance equations for hypersonic aerodynamics. Mach-number independence. Hypersonic similarity. Hypersonic boundary layers and viscous interactions. Aerodynamic heating. Self-similar solutions and analogies. Shock-shock interactions and shock-interference heating. Reentry aerothermodynamics. Effects of the entropy layer. Ablation shields. Thermodynamic and chemical nonequilibrium effects in hypersonics. Transition in hypersonic boundary layers. Effects of incident shock waves. Modern computational developments in hypersonics. Engineering applications of hypersonics in aeronautics and astronautics.

**ME 357. Gas-Turbine Design Analysis. 3 Units.**

This course is concerned with the design analysis of gas-turbine engines. After reviewing essential concepts of thermo- and aerodynamics, we consider a turbofan gas-turbine engine that is representative of a business aircraft. We will first conduct a performance analysis to match the engine design with aircraft performance requirements. This is followed by examining individual engine components, including compressor, combustor, turbines, and nozzles, thereby increase the level of physical description. Aspects of modern engine concepts, environmental impacts, and advanced engine-analysis methods will be discussed. Students will have the opportunity to develop a simulation code to perform a basic design analysis of a turbofan engine. Course Prerequisites: ENGR 30, ME 70, ME 131B, CME 100. Same as: ME 257

**ME 358. Heat Transfer in Microdevices. 3 Units.**

Application-driven introduction to the thermal design of electronic circuits, sensors, and actuators that have dimensions comparable to or smaller than one micrometer. The impact of thin-layer boundaries on thermal conduction and radiation. Convection in microchannels and microscopic heat pipes. Thermal property measurements for microdevices. Emphasis is on Si and GaAs semiconductor devices and layers of unusual, technically-promising materials such as chemical-vapor-deposited (CVD) diamond. Final project based on student research interests. Prerequisite: consent of instructor.

**ME 359. Designing for Safety in Labor and Delivery. 3 Units.**

Designing For Safety In Labor & Delivery will inform students about challenges in the L&D environment through direct observation in a simulated environment and the hospital. Simultaneously, we will be studying the users: their environment, standard protocols, communication and behavior. Our goal is to identify need spaces that will lead to product, system or service innovation and improve safety and quality of care. Student groups will have structured access to OB/GYN, pediatric and neonatology clinicians at Lucile Packard Children's Hospital, as well as parents for conducting ethnography. Field trips to Lucile Packard Children's Hospital and The Kaiser Garfield Healthcare Innovation Center are planned as well. Physical prototypes and/or scenarios can be tested and presented at CAPE's simulation lab in order to give students a realistic environment in which to evaluate and present their ideas. Prior design process experience is helpful but not a prerequisite. Collaboration with teammates is required and critical for student success. To be considered for admission, you must complete the application by 12/15/16 AND attend the first class. Admission by application. See [dschool.stanford.edu/classes](http://dschool.stanford.edu/classes) for more information.

**ME 359A. Advanced Design and Engineering of Space Systems I. 4 Units.**

The application of advanced theory and concepts to the development of spacecraft and missile subsystems; taught by experts in their fields. Practical aspects of design and integration. Mission analysis, systems design and verification, radiation and space environments, orbital mechanics, space propulsion, electrical power and avionics subsystems, payload communications, and attitude control. Subsystem-oriented design problems focused around a mission to be completed in groups. Tours of Lockheed Martin facilities. Limited enrollment. Prerequisites: undergraduate degree in related engineering field or consent of instructor.

**ME 359B. Advanced Design and Engineering of Space Systems II. 4 Units.**

Continuation of 359A. Topics include aerospace materials, mechanical environments, structural analysis and design, finite element analysis, mechanisms, thermal control, probability and statistics. Tours of Lockheed Martin facilities. Limited enrollment. Prerequisites: undergraduate degree in related field, or consent of instructor.

**ME 360. Physics of Microfluidics. 3 Units.**

Survey of the physics underlying a wide range of microfluidic devices. Course will review basic, simple principles around fluid flow; convective heat and mass transfer; flows of bubbles, drops, and particles; Brownian particles; Taylor dispersion; capillarity; electrokinetics; mixing; jetting; and chemical reactions. Applications of these systems include molecular diagnostics, genetic and proteomic analysis, single-cell analysis, chemical detection, microelectronics cooling, and studies of basic physics and chemistry. We will review recent scientific literature with a goal of deducing simplified explanations, scaling arguments, and back-of-the-envelope approximations of the relevant physics and device performance.

**ME 361. Turbulence. 3 Units.**

The nature of turbulent flows, statistical and spectral description of turbulence, coherent structures, spatial and temporal scales of turbulent flows. Averaging, two-point correlations and governing equations. Reynolds averaged equations and stresses. Free shear flows, turbulent jet, turbulent kinetic energy and kinetic energy dissipation, and kinetic energy budget. Kolmogorov's hypothesis and energy spectrum. Wall bounded flows, viscous scales, and law of the wall. Turbulence closure modeling for Reynolds averaged Navier Stokes equations. Direct and large eddy simulation of turbulent flows. Subgrid scale modeling.

**ME 362A. Physical Gas Dynamics. 3 Units.**

Concepts and techniques for description of high-temperature and chemically reacting gases from a molecular point of view. Introductory kinetic theory, chemical thermodynamics, and statistical mechanics as applied to properties of gases and gas mixtures. Transport and thermodynamic properties, law of mass action, and equilibrium chemical composition. Maxwellian and Boltzmann distributions of velocity and molecular energy. Examples and applications from areas of current interest such as combustion and materials processing.

**ME 362B. Nonequilibrium Processes in High-Temperature Gases. 3 Units.**

Chemical kinetics and energy transfer in high-temperature gases. Collision theory, transition state theory, and unimolecular reaction theory. Prerequisite: 362A or consent of instructor.

**ME 363. Partially Ionized Plasmas and Gas Discharges. 3 Units.**

Introduction to partially ionized gases and the nature of gas discharges. Topics: the fundamentals of plasma physics emphasizing collisional and radiative processes, electron and ion transport, ohmic dissipation, oscillations and waves, interaction of electromagnetic waves with plasmas. Applications: plasma diagnostics, plasma propulsion and materials processing. Prerequisite: 362A or consent of instructor.

**ME 364. Optical Diagnostics and Spectroscopy. 3 Units.**

The spectroscopy of gases and laser-based diagnostic techniques for measurements of species concentrations, temperature, density, and other flow field properties. Topics: electronic, vibrational, and rotational transitions; spectral lineshapes and broadening mechanisms; absorption, fluorescence, Rayleigh and Raman scattering methods; collisional quenching. Prerequisite: 362A or equivalent.

**ME 365. Making Multiples: Sand Casting. 4 Units.**

ME 365 is a product realization based course integrating designing and making with a focus on a scaled manufacturing process, sand casting. It's graduates will develop technical knowledge regarding design principles, tooling design and creation, mold making, and process parameters. This goal will be achieved by a sequence of three hands-on design and manufacturing projects, supported by lectures, curricular materials, and structured laboratories, and portfolio generation. Prerequisites: ME203, ME318, OR consent of instructor.

**ME 367. Optical Diagnostics and Spectroscopy Laboratory. 4 Units.**

Principles, procedures, and instrumentation associated with optical measurements in gases and plasmas. Absorption, fluorescence and emission, and light-scattering methods. Measurements of temperature, species concentration, and molecular properties. Lab. Enrollment limited to 16. Prerequisite: 362A or 364.

**ME 368. d.Leadership: Design Leadership in Context. 4 Units.**

d.Leadership is a course that teaches the coaching and leadership skills needed to drive good design process in groups. d.leaders will work on real projects driving design projects within organizations and gain real world skills as they experiment with their leadership style. Take this course if you are inspired by past design classes and want skills to lead design projects beyond Stanford. Preference given to students who have taken other Design Group or d.school classes. Admission by application. See dschool.stanford.edu/classes for more information. Same as: MS&E 489

**ME 368A. Biodesign Innovation: Needs Finding and Concept Creation. 4 Units.**

In this two-quarter course series ( BIOE 374A/B, MED 272A/B, ME 368A/B, OIT 384/5), multidisciplinary student teams identify real-world unmet healthcare needs, invent new health technologies to address them, and plan for their implementation into patient care. During the first quarter (winter 2018), students select and characterize an important unmet healthcare problem, validate it through primary interviews and secondary research, and then brainstorm and screen initial technology-based solutions. In the second quarter (spring 2018), teams select a lead solution and move it toward the market through prototyping, technical re-risking, strategies to address healthcare-specific requirements (regulation, reimbursement), and business planning. Final presentations in winter and spring are made to a panel of prominent health technology experts and/or investors. Class sessions include faculty-led instruction and case studies, coaching sessions by industry specialists, expert guest lecturers, and interactive team meetings. Enrollment is by application only, and students are expected to participate in both quarters of the course. Visit <http://biodesign.stanford.edu/programs/stanford-courses/biodesign-innovation.html> to access the application, examples of past projects, and student testimonials. More information about Stanford Biodesign, which has led to the creation of more than 40 venture-backed healthcare companies and has helped hundreds of student launch health technology careers, can be found at <http://biodesign.stanford.edu/>. Same as: BIOE 374A, MED 272A

**ME 368B. Biodesign Innovation: Concept Development and Implementation. 4 Units.**

In this two-quarter course series ( BIOE 374A/B, MED 272A/B, ME 368A/B, OIT 384/5), multidisciplinary student teams identify real-world unmet healthcare needs, invent new health technologies to address them, and plan for their implementation into patient care. During the first quarter (winter 2018), students select and characterize an important unmet healthcare problem, validate it through primary interviews and secondary research, and then brainstorm and screen initial technology-based solutions. In the second quarter (spring 2018), teams select a lead solution and move it toward the market through prototyping, technical re-risking, strategies to address healthcare-specific requirements (regulation, reimbursement), and business planning. Final presentations in winter and spring are made to a panel of prominent health technology experts and/or investors. Class sessions include faculty-led instruction and case studies, coaching sessions by industry specialists, expert guest lecturers, and interactive team meetings. Enrollment is by application only, and students are expected to participate in both quarters of the course. Visit <http://biodesign.stanford.edu/programs/stanford-courses/biodesign-innovation.html> to access the application, examples of past projects, and student testimonials. More information about Stanford Biodesign, which has led to the creation of more than 40 venture-backed healthcare companies and has helped hundreds of student launch health technology careers, can be found at <http://biodesign.stanford.edu/>. Same as: BIOE 374B, MED 272B

**ME 369. Cracks, Dislocations, and Waves. 3 Units.**

The 6-dimensional formalism of A. N. Stroh will be developed to treat two-dimensional problems in elastically anisotropic media. Stress fields of straight dislocations will be developed, from which the elastic fields of line cracks (treated as continuous distributions of straight dislocations) will be obtained along with stress intensity factors and energy release rates. Steady waves including plane waves, Rayleigh waves, and Stoneley waves will be treated along with problems of reflection and refraction of incident plane waves in joined anisotropic half-spaces. Anisotropic boundary element methods will be discussed. Assignments will include both analytical and semi-analytical work as well as simple numerical methods to implement Stroh's formalism. Class notes and readings will be provided.

**ME 370A. Energy Systems I: Thermodynamics. 3 Units.**

Thermodynamic analysis of energy systems emphasizing systematic methodology for and application of basic principles to generate quantitative understanding. Exergy, mixtures, reacting systems, phase equilibrium, chemical exergy, and modern computational methods for analysis. Prerequisites: undergraduate engineering thermodynamics and computer skills such as Matlab.

**ME 370B. Energy Systems II: Modeling and Advanced Concepts. 4 Units.**

Development of quantitative device models for complex energy systems, including fuel cells, reformers, combustion engines, and electrolyzers, using thermodynamic and transport analysis. Student groups work on energy systems to develop conceptual understanding, and high-level, quantitative and refined models. Advanced topics in thermodynamics and special topics associated with devices under study. Prerequisite: 370A.

**ME 370C. Energy Systems III: Projects. 3-5 Units.**

Refinement and calibration of energy system models generated in ME 370B carrying the models to maturity and completion. Integration of device models into a larger model of energy systems. Prerequisites: 370A,B, consent of instructor.

**ME 371. Combustion Fundamentals. 3 Units.**

Heat of reaction, adiabatic flame temperature, and chemical composition of products of combustion; kinetics of combustion and pollutant formation reactions; conservation equations for multi-component reacting flows; propagation of laminar premixed flames and detonations. Prerequisite: 362A or 370A, or consent of instructor.

**ME 372. Combustion Applications. 3 Units.**

The role of chemical and physical processes in combustion; ignition, flammability, and quenching of combustible gas mixtures; premixed turbulent flames; laminar and turbulent diffusion flames; combustion of fuel droplets and sprays. Prerequisite: 371.

**ME 373. Nanomaterials Synthesis and Applications for Mechanical Engineers. 3 Units.**

This course provides an introduction to both combustion synthesis of functional nanomaterials and nanotechnology. The first part of the course will introduce basic principles, synthesis/fabrication techniques and application of nanoscience and nanotechnology. The second part of the course will discuss combustion synthesis of nanostructures in zero-, one- two- and three- dimensions, their characterization methods, physical and chemical properties, and applications in energy conversion systems.

**ME 374. Dynamics and Kinetics of Nanoparticles. 3 Units.**

Part 1: Thermodynamics, transport theories and properties, aerosol dynamics and reaction kinetics of nanoparticles in fluids. Nucleation, gas kinetic theory of nanoparticles, the Smoluchowski equation, gas-surface reactions, diffusion, thermophoresis, conservation equations and useful solutions. Part 2: Introduction to soot formation, nanoparticles in reacting flows, particle transport and kinetics in flames, atmospheric heterogeneous reactions, and nanocatalysis.

**ME 375A. StoryViz: COMMUNICATION REDESIGNED. 2-3 Units.**

StoryViz is about creating authentic & compelling communication in many media: this year's topics include sketching, video, visual design & performance. Fantastic guests and a bevy of assignments will prepare students to communicate their work and ideas genuinely, concisely, and with a keen sense of wit. Limited enrollment; application required; see <http://dschool.stanford.edu/classes>. Please see notes.

**ME 376A. Imagining the Future of Learning: SparkTruck - Designing Mobile Interventions for Education. 4 Units.**

Created at the d.school last year, SparkTruck has traveled over 15,000 miles across the USA, teaching thousands of kids how to build stuff and unleash their creativity. In this class, students will explore the potential of a mobile platform for affecting change in the educational ecosystem. Topics will include introductions to the design process, modern prototyping tools, and the complex education ecosystem. Students will work in teams in this project-based class, and an emphasis will be placed on real-world prototyping through hands-on field work in local schools. Interested and qualified students will have the opportunity to embark on a cross-country road trip in the SparkTruck this summer. Open to all graduate students and well-qualified undergrads of any major. Enrollment is limited. Apply at [www.sparktruck.org/apply](http://www.sparktruck.org/apply). Same as: EDUC 333B

**ME 377. Design Thinking Studio. 4 Units.**

Design Thinking Studio is an immersive introduction to design thinking. You will engage in the real world with your heart, hands and mind to learn and apply the tools and attitudes of design. The class is project-based and emphasizes adopting new behaviors of work. Fieldwork and collaboration with teammates are required and are a critical component of the class. Application required, see [dschool.stanford.edu/classes](http://dschool.stanford.edu/classes) for more information.

**ME 378. Tell, Make, Engage: Action Stories for Entrepreneurship. 1-3 Unit.**

Individual storytelling action and reflective observations gives the course an evolving framework of evaluative methods, from engineering design; socio cognitive psychology; and art that are formed and reformed by collaborative development within the class. Stories attached to an idea, a discovery or starting up something new, are considered through iterative narrative work, and small group challenges. This course will use qualitative and quantitative methods for story engagement, assessment, and class determined research projects with practice exercises, artifacts, short papers and presentations. Graduate and Co-Term students from all programs welcome.

**ME 379. Fail Faster. 1 Unit.**

Fail Faster will dive deeply into one of design thinking's key tenets: Fail early, fail often. Students will explore ways to: [1] become comfortable with uncertainty, [2] develop tools to navigate situations of failure, and [3] learn to turn failures into opportunities. This exercised-based workshop will examine the physiological impact of failure and practice the psychological traits and the power of resilience through hands-on activities. Participants will acquire techniques to help them navigate, bounce back, grow and even flourish in the face of their failures.

**ME 381. Orthopaedic Bioengineering. 3 Units.**

Engineering approaches applied to the musculoskeletal system in the context of surgical and medical care. Fundamental anatomy and physiology. Material and structural characteristics of hard and soft connective tissues and organ systems, and the role of mechanics in normal development and pathogenesis. Engineering methods used in the evaluation and planning of orthopaedic procedures, surgery, and devices. Same as: BIOE 381

**ME 387. Soft Tissue Mechanics. 3 Units.**

Structure/function relationships and mechanical properties of soft tissues, including nonlinear elasticity, viscoelasticity, and poroelasticity.

**ME 389. Biomechanical Research Symposium. 1 Unit.**

Guest speakers present contemporary research on experimental and theoretical aspects of biomechanical engineering and bioengineering. May be repeated for credit.

**ME 390. Thermosciences Research Project Seminar. 1 Unit.**

Review of work in a particular research program and presentations of other related work.

**ME 390A. High Temperature Gasdynamics Laboratory Research Project Seminar. 1 Unit.**

Review of work in a particular research program and presentations of other related work.

**ME 391. Engineering Problems. 1-10 Unit.**

Directed study for graduate engineering students on subjects of mutual interest to student and staff member. May be used to prepare for experimental research during a later quarter under 392. Faculty sponsor required.

**ME 392. Experimental Investigation of Engineering Problems. 1-10 Unit.**

Graduate engineering students undertake experimental investigation under guidance of staff member. Previous work under 391 may be required to provide background for experimental program. Faculty sponsor required.

**ME 393. Topics in Biologically Inspired or Human Interactive Robotics. 1 Unit.**

Application of observations from human and animal physiology to robotic systems. Force control of motion including manipulation, haptics, and locomotion. Weekly literature review forum led by student. May be repeated for credit. (Cutkosky, Waldron, Niemeyer).

**ME 395. Seminar in Solid Mechanics. 1 Unit.**

Required of Ph.D. candidates in solid mechanics. Guest speakers present research topics related to mechanics theory, computational methods, and applications in science and engineering. May be repeated for credit.

**ME 397. Design Theory and Methodology Seminar. 1-3 Unit.**

What do designers do when they do design? How can their performance be improved? Topics change each quarter. May be repeated for credit.

**ME 399. Fuel Cell Seminar. 1 Unit.**

Interdisciplinary research in engineering, chemistry, and physics. Talks on fundamentals of fuel cells by speakers from Stanford, other academic and research institutions, and industry. The potential to provide high efficiency and zero emissions energy conversion for transportation and electrical power generation.



**ME 400. Thesis. 2-15 Units.**

Investigation of some engineering problems. Required of Engineer degree candidates.

Same as: Engineer Degree

**ME 405. Physics-Based Computational Modeling. 3 Units.**

This course is not a standard teaching of asymptotic methods as thought in the applied math programs. Nor does it involve such elaborate algebra and analytical derivations. Instead, the class relies on students' numerical programming skills and introduces improvements on numerical methods using standard asymptotic and scaling ideas. The main objective of the course is to bring physical insight into numerical programming. Majority of the problems to be explored involve one- and two-dimensional transient partial differential equations. Topics include: 1- Review of numerical discretization and numerical stability, 2- Implicit versus explicit methods, 3- Introduction to regular and singular perturbation problems, 4- Method of matched asymptotic expansions, 5- Stationary thin interfaces: boundary layers, Debye layers, 6- Moving thin interfaces: shocks, phase interfaces, 7- Reaction-diffusion problems, 8- Directional equilibrium and lubrication theory.

**ME 406. Turbulence Physics and Modeling Using Numerical Simulation Data. 2 Units.**

Prerequisite: consent of instructor.

**ME 408. Spectral Methods in Computational Physics. 3 Units.**

Data analysis, spectra and correlations, sampling theorem, nonperiodic data, and windowing; spectral methods for numerical solution of partial differential equations; accuracy and computational cost; fast Fourier transform, Galerkin, collocation, and Tau methods; spectral and pseudospectral methods based on Fourier series and eigenfunctions of singular Sturm-Liouville problems; Chebyshev, Legendre, and Laguerre representations; convergence of eigenfunction expansions; discontinuities and Gibbs phenomenon; aliasing errors and control; efficient implementation of spectral methods; spectral methods for complicated domains; time differencing and numerical stability. Same as: CME 322

**ME 410A. Introductory Foresight and Technological Innovation. 3 Units.**

Learn to develop long-range, technology-based innovations (5+ years based on industry). This course offers an intensive, hands-on approach using multiple engineering foresight strategies and tools. Model disruptive opportunities and create far-to-near development plans. Three quarter sequence.

**ME 410B. Advanced Foresight and Technological Innovation. 1 Unit.**

Continuation of ME410A. Students will continue developing their invention, integrate additional engineering foresight, and develop an intrinsic innovation mindset. Ongoing discussion of industry examples and contemporary events demonstrate foresight principals and engineering leadership in action.

**ME 410C. Advanced Foresight and Technological Innovation. 1 Unit.**

Continuation of ME410B. Students will continue developing their invention, integrate additional engineering foresight, and develop an intrinsic innovation mindset. Ongoing discussion of industry examples and contemporary events demonstrate foresight principals and engineering leadership in action.

**ME 412. Engineering Functional Analysis and Finite Elements. 3 Units.**

Concepts in functional analysis to understand models and methods used in simulation and design. Topology, measure, and integration theory to introduce Sobolev spaces. Convergence analysis of finite elements for the generalized Poisson problem. Extensions to convection-diffusion-reaction equations and elasticity. Upwinding. Mixed methods and LBB conditions. Analysis of nonlinear and evolution problems. Prerequisites: 335A,B, CME 200, CME 204, or consent of instructor. Recommended: 333, MATH 171.

Same as: CME 356

**ME 413. Quantum Confinement Structures: Physics and Fabrication. 3 Units.**

Quantum mechanics principles and the thermodynamics of confinement structures. Focus is on potential applications such as solar cells and catalysis. Student presentations. Lab demonstrations. Prerequisite: background in quantum mechanics and statistical thermodynamics.

**ME 414. Solid State Physics for Mechanical Engineering Experiments. 3 Units.**

Introductory overview of principles of statistical mechanics, quantum mechanics and solid-state physics. Provides graduate Mechanical Engineering students with the understanding needed to work on devices or technologies which rely on solid-state physics. (Alternate years, not offered summer 2012).

**ME 420. Applied Electrochemistry at Micro- and Nanoscale. 3 Units.**

Applied electrochemistry with a focus on energy conversion and storage. Basic concepts of thermodynamics, electrochemistry, and first principal calculations are presented, of which today's fundamentals of electrochemical energy conversion/storage are built. Conventional as well as advanced Li battery concepts/systems and their applications will be a main subject area. intercalation and conversion cathode and anode material families will be introduced and electrochemical function/challenges for energy storage of these materials will be highlighted. Conventional electrolyte materials such as carbonate based liquid electrolyte system and advanced solid-state material will be a topic in class.

**ME 421. European Entrepreneurship and Innovation Thought Leaders Seminar. 1 Unit.**

Lessons from real-world experiences and challenges in European startups, corporations, universities, non-profit research institutes and venture finance organizations. Speakers include entrepreneurs, leaders from global technology companies, university researchers, venture capitalists, legal experts, senior policy makers and other guests from selected European countries and regions. Geographic scope encompasses Ireland to Russia, and Scandinavia to the Mediterranean region. Enrollment open to undergraduates and graduates in any school or department at Stanford.

**ME 429. COMMERCIAL MEMS DEVICE DESIGN. 3 Units.**

This course will provide insight into designing MEMS based devices for use in commercial/consumer and automotive sensor applications. Topics to be covered in this MEMS sensor design course will include electromechanical modeling/simulation, compensation for cross-wafer and wafer-to-wafer fabrication variations in a high volume semiconductor manufacturing facility, design for extreme environments (drop shock, temperature, etc.), and some discussion of the unique challenges with respect to consumer and automotive sensor markets. Student teams will develop a MEMS sensor/transducer design (capacitive 3-axis accelerometer), electro-mechanical system model (Matlab based), fabrication process flow with manufacturing analysis (Excel based) in response to a provided design specification sheet.

**ME 440. Electronic States and Transitions In Quantum Confined Structures. 3 Units.**

Summary of selected quantum mechanical concepts with focus on phenomena related to charge separation and transfer. The physics and thermodynamics of excitons described and related to experimental observations. The energy state of electrons as function of confinement size and strength. Presentations include on electron tunneling, measuring the density of electronic states, dielectric behavior of materials, Bose Einstein condensation of quasi particles, and excitons in quantum wells and dots.

**ME 451A. Advanced Fluid Mechanics Multiphase Flows. 3 Units.**

Single particle and multi-particle fluid flow phenomena, mass, momentum and heat transfer, characteristic time and length scales, non-dimensional groups; collection of dispersed-phase elements: instantaneous and averaged descriptions for multiphase flow, Eulerian-Eulerian and Lagrangian-Eulerian statistical representations, mixture theories; models for drag, heat and mass transfer; dilute to dense two-phase flow, granular flows; computer simulation approaches for multiphase flows, emerging research topics. Prerequisites: graduate level fluid mechanics and engineering mathematics, and undergraduate engineering mechanics and thermodynamics.

**ME 451B. Advanced Fluid Mechanics Flow Instability. 3 Units.**

Waves in fluids: surface waves, internal waves, inertial and acoustic waves, dispersion and group velocity, wave trains, transport due to waves, propagation in slowly varying medium, wave steepening, solitons and solitary waves, shock waves. Instability of fluid motion: dynamical systems, bifurcations, Kelvin-Helmholtz instability, Rayleigh-Benard convection, energy method, global stability, linear stability of parallel flows, necessary and sufficient conditions for stability, viscosity as a destabilizing factor, convective and absolute instability. Focus is on flow instabilities. Prerequisites: graduate courses in compressible and viscous flow.

**ME 451C. Advanced Fluid Mechanics - Compressible Turbulence. 3 Units.**

Conservation equations. Thermodynamics of ideal gases. Isentropic flows. Crocco-Vazsonyi's equation, creation and destruction of vorticity by compressibility effects. Acoustics and generation of sound by turbulence. Shock waves. Kovasznay's modal decomposition of compressible flow, linear and nonlinear modal interactions, interaction of turbulence with shock waves. Turbulent Mach number. Shocklets. Energetics of compressible turbulence, effects of compressibility on homogeneous turbulence, free-shear flows and turbulent boundary layers. Van Driest transformation, recovery temperature, and shock/boundary layer interaction. Strong Reynolds analogy. Subgrid-scale modeling for compressible turbulence. Hypervelocity flows. Prerequisites: Familiarity with compressible laminar flows (ME 355) and incompressible turbulence (ME 361), or consent of the instructor.

**ME 451D. Microhydrodynamics. 3 Units.**

Transport phenomena on small-length scales appropriate to applications in microfluidics, complex fluids, and biology. The basic equations of mass, momentum, and energy, derived for incompressible fluids and simplified to the slow-flow limit. Topics: solution techniques utilizing expansions of harmonic and Green's functions; singularity solutions; flows involving rigid particles and fluid droplets; applications to suspensions; lubrication theory for flows in confined geometries; slender body theory; and capillarity and wetting. Prerequisites: 120A,B, 300, or equivalents.

Same as: CHEMENG 310

**ME 453A. Finite Element-Based Modeling and Simulation of Linear Fluid/Structure Interaction Problems. 3 Units.**

Basic physics behind many fluid/structure interaction phenomena. Finite element-based computational approaches for linear modeling and simulation in the frequency domain. Vibrations of elastic structures. Linearized equations of small movements of inviscid fluids. Sloshing modes. Hydroelastic vibrations. Acoustic cavity modes. Structural-acoustic vibrations. Applications to liquid containers and underwater signatures. Prerequisite: graduate course in the finite element method or consent of instructor.

**ME 455. Complex Fluids and Non-Newtonian Flows. 3 Units.**

Definition of a complex liquid and microrheology. Division of complex fluids into suspensions, solutions, and melts. Suspensions as colloidal and non-colloidal. Extra stress and relation to the stresslet. Suspension rheology including Brownian and non-Brownian fibers. Microhydrodynamics and the Fokker-Planck equation. Linear viscoelasticity and the weak flow limit. Polymer solutions including single mode (dumbbell) and multimode models. Nonlinear viscoelasticity. Intermolecular effects in nondilute solutions and melts and the concept of reptation. Prerequisites: low Reynolds number hydrodynamics or consent of instructor.

Same as: CHEMENG 462

**ME 457. Fluid Flow in Microdevices. 3 Units.**

Physico-chemical hydrodynamics. Creeping flow, electric double layers, and electrochemical transport such as Nernst-Planck equation; hydrodynamics of solutions of charged and uncharged particles. Device applications include microsystems that perform capillary electrophoresis, drug dispersion, and hybridization assays. Emphasis is on bioanalytical applications where electrophoresis, electro-osmosis, and diffusion are important. Prerequisite: consent of instructor.

**ME 458. Advanced Topics in Electrokinetics. 3-5 Units.**

Electrokinetic theory and electrokinetic separation assays. Electroneutrality approximation and weak electrolyte electrophoresis theory. Capillary zone electrophoresis, field amplified sample stacking, isoelectric focusing, and isotachopheresis. Introduction to general electrohydrodynamics (EHD) theory including the leaky dielectric concept, the Ohmic model formulation, and electrokinetic flow instabilities. Prerequisite: ME 457.

**ME 461. Advanced Topics in Turbulence. 3 Units.**

Turbulence phenomenology; statistical description and the equations governing the mean flow; fluctuations and their energetics; turbulence closure problem, two-equation turbulence models, and second moment closures; non-local effect of pressure; rapid distortion analysis and effect of shear and compression on turbulence; effect of body forces on turbulent flows; buoyancy-generated turbulence; suppression of turbulence by stratification; turbulent flows of variable density; effect of rotation on homogeneous turbulence; turbulent flows with strong vortices. Prerequisites: 351B and 361A, or consent of instructor.

**ME 463. Advanced Topics in Plasma Science and Engineering. 3 Units.**

Research areas such as plasma diagnostics, plasma transport, waves and instabilities, and engineering applications.

**ME 469. Computational Methods in Fluid Mechanics. 3 Units.**

The last two decades have seen the widespread use of Computational Fluid Dynamics (CFD) for analysis and design of thermal-fluids systems in a wide variety of engineering fields. Numerical methods used in CFD have reached a high degree of sophistication and accuracy. The objective of this course is to introduce classical approaches and algorithms used for the numerical simulations of incompressible flows. In addition, some of the more recent developments are described, in particular as they pertain to unstructured meshes and parallel computers. An in-depth analysis of the procedures required to certify numerical codes and results will conclude the course.

**ME 469B. Computational Methods in Fluid Mechanics. 3 Units.**

Advanced CFD codes. Geometry modeling, CAD-CFD conversion. Structured and unstructured mesh generation. Solution methods for steady and unsteady incompressible Navier-Stokes equations. Turbulence modeling. Conjugate (solid/fluid) heat transfer problems. Development of customized physical models. Batch execution for parametric studies. Final project involving solution of a problem of student's choosing. Prerequisite: ME 300C/CME 206.

**ME 47. Press Play: Interactive Device Design. 4-5 Units.**

This course provides an introduction to the human-centered and technical workings behind interactive devices ranging from cell phones and video controllers to household appliances and smart cars. This is a hands-on, lab-based course; there will be no midterm or final. Course topics include electronics prototyping, interface prototyping, sensors and actuators, microcontroller development, physical prototyping and user testing. For the final project, students will build a working MP3 player prototype of their own design, using embedded microcontrollers, digital audio decoders, component sensors and other electronic hardware. Prior experience in programming, such as CS106A (or equivalent) or electronics, such as ENG40A (or equivalent) preferred. Students should attend the first class.

**ME 470. Uncertainty Quantification. 3 Units.**

Uncertainty analysis in computational science. Probabilistic data representation, propagation techniques and validation under uncertainty. Mathematical and statistical foundations of random variables and processes for uncertainty modeling. Focus is on state-of-the-art propagation schemes, sampling techniques, and stochastic Galerkin methods. The concept of model validation under uncertainty and the determination of confidence bounds estimates. Prerequisite: basic probability and statistics at the level of CME 106 or equivalent. Same as: CEE 362A

**ME 471. Turbulent Combustion. 3 Units.**

Basis of turbulent combustion models. Assumption of scale separation between turbulence and combustion, resulting in Reynolds number independence of combustion models. Level-set approach for premixed combustion. Different regimes of premixed turbulent combustion with either kinematic or diffusive flow/chemistry interaction leading to different scaling laws and unified expression for turbulent velocity in both regimes. Models for non-premixed turbulent combustion based on mixture fraction concept. Analytical predictions for flame length of turbulent jets and NO<sub>x</sub> formation. Partially premixed combustion. Analytical scaling for lift-off heights of lifted diffusion.

**ME 472. Computational Modeling of Radiative Transfer. 3 Units.**

Overview of physical modeling and computational methods for radiation heat transfer in participating media. Review of surface transfer. Radiation hydrodynamics and the radiative transfer equation. Constitutive relations for transport coefficients of participating media. Formal solution and one-dimensional transfer. Moment methods: diffusion and spherical harmonics. The discrete ordinates method: spatial and angular discretization, false scattering and ray effects, the finite volume method, parallelization. Monte Carlo ray tracing: ray tracing, Monte Carlo simulations, surface transfer, transfer in participating media, variance reduction techniques, parallelization. Additional topics covered time permitting: spectral modeling, collimated sources, transient radiative transfer, reverse ray-tracing. Pre-requisites: ME 300C or equivalent; STATS 116 or equivalent; undergraduate heat transfer; ME 352A strongly recommended but not required.

**ME 484. Computational Methods in Cardiovascular Bioengineering. 3 Units.**

Lumped parameter, one-dimensional nonlinear and linear wave propagation, and three-dimensional modeling techniques applied to simulate blood flow in the cardiovascular system and evaluate the performance of cardiovascular devices. Construction of anatomic models and extraction of physiologic quantities from medical imaging data. Problems in blood flow within the context of disease research, device design, and surgical planning. Same as: BIOE 484

**ME 485. Modeling and Simulation of Human Movement. 3 Units.**

Direct experience with the computational tools used to create simulations of human movement. Lecture/labs on animation of movement; kinematic models of joints; forward dynamic simulation; computational models of muscles, tendons, and ligaments; creation of models from medical images; control of dynamic simulations; collision detection and contact models. Prerequisite: 281, 331A,B, or equivalent. Same as: BIOE 485

**ME 491. Ph.D. Teaching Experience. 3 Units.**

Required of Ph.D. students. May be repeated for credit.

**ME 492. Mechanical Engineering Teaching Assistance Training. 1 Unit.****ME 495A. ME Seminar Series: Product Design. 1 Unit.**

Seminars will feature accomplished product designers and product design researchers. Guest speakers will come from the U.S. and internationally, and will present on topics of current interest to the Product Design Community.

**ME 495B. ME Seminar Series: At the Interface between Mechanical Engineering and Biology. 1 Unit.**

Seminars will feature early career mechanical engineers working on leading edge problems in biomechanical engineering. Topics include mechanobiology, cell mechanics, transport phenomena in biological systems, bio-inspired design, design and analysis of biodevices or bioinstrumentation, biomaterials, and modeling of physiological systems. Guest speakers will come from top universities within the U.S. and internationally, and will discuss both their past research and plans for building a research program in the future.

**ME 500. Thesis. 1-15 Unit.**

Same as: Ph.D.

**ME 52SI. Scan, Model, Print! Designing with 3D Technology. 2 Units.**

Think 3D scanning, modeling, and printing technology is just about plastic widgets? Think again! Immerse yourself in a world of custom prosthetics, manufacturing in space, autonomous cars, and much more. This hands-on engineering design course teaches advanced 3D imaging and computational modeling skills in order to leverage the unique benefits of additive manufacturing to solve complex problems. Students will connect the theory behind these tools to direct experience with the equipment and software. Short assignments at the start of the quarter will build students' core competencies and prepare them for a team-based, open-ended project. Class time will be a mixture of lecture, lab, guest speakers, and field trips. Recommended: basic CAD, fabrication, and programming experience (e.g. ME103D, 203, CS106A or equivalents).

**ME 571. Surgical Robotics Seminar. 1 Unit.**

Surgical robots developed and implemented clinically on varying scales. Seminar goal is to expose students from engineering, medicine, and business to guest lecturers from academia and industry. Engineering and clinical aspects connected to design and use of surgical robots, varying in degree of complexity and procedural role. May be repeated for credit. Same as: CS 571

**ME 66SI. Machine Dissection. 2 Units.**

This course is designed to help engineering students build their physical intuition through a series of mini-lectures, mechanical dissection activities, student presentations, and a final project. Some of the mechanisms students will dissect include a wind-up toy, fishing reel, and car transmission. Through these activities, students learn the process and value of reverse engineering, develop a better understanding of the design choices made by engineers, become familiar with historically significant mechanisms, and develop both oral and graphical communication skills necessary for working in a technical team. This course is intended for freshman/sophomore engineering students with some knowledge of physics, but little hands on experience.

**ME 70. Introductory Fluids Engineering. 4 Units.**

Elements of fluid mechanics as applied to engineering problems. Equations of motion for incompressible ideal flow. Hydrostatics. Control volume laws for mass, momentum, and energy. Bernoulli equation. Dimensional analysis and similarity. Flow in ducts. Boundary layer flows. Lift and drag. Lab experiment demonstrations. Prerequisites: ENGR 14 and 30.

**ME 80. Mechanics of Materials. 4 Units.**

Mechanics of materials and deformation of structural members. Topics include stress and deformation analysis under axial loading, torsion and bending, column buckling and pressure vessels. Introduction to stress transformation and multiaxial loading. Prerequisite: ENGR 14.

**ME 801. TGR Project. 0 Units.****ME 802. TGR Dissertation. 0 Units.**

## Mgmt Science & Engineering (MS&E) Music (MUSIC)

**MUSIC 1. Musical Genius: Exemplars in the History of Organized Sound. 3 Units.**

How does music work? A broad exploration of music as defined by three major components (i) Theories of Music (elements and parameters), (ii) Histories of Music (cultures and people), and (iii) Practitioners of Music (musicians and scholars). Lecture, discussion, guided critical listening and viewing of audio, video, and live performance, and creation of self-curated mini-projects.

**MUSIC 101. Introduction to Creating Electronic Sounds. 3-4 Units.**

Students to explore their creative voices by learning the practical nuts and bolts of making sounds with computers and professional audio equipment. Basic concepts include mixing and production techniques used in podcasts, documentaries, live performance, electronic music, and sound art. Students will create a midterm soundscape project as well as a final class project that is focused on their particular creative interests.

**MUSIC 102. Picturing Performance, Re-Envisioning the Arts. 2-4 Units.**

Critical and creative exploration of the performing body as captured on film. Viewing/listening includes musicals, dance and opera on film, music video, experimental film and video, and moments of heightened musicality in feature film. We'll focus on examples of moving media that possess a kinship with music through gesture, rhythm or affect and through visual parameters like décor, lighting, texture, camera movement and editing. Requirements include choosing and documenting a live performance, producing a short audiovisual work involving post-production, and weekly reading and viewing/listening assignments. No previous videomaking experience required.

Same as: MUSIC 202

**MUSIC 112. Creative Expression: Musical Theater. 4 Units.**

Students begin to create pieces that are fresh and innovative forms of musical theater that do not necessarily appeal to specifically popular audiences but perhaps to audiences more associated with high art, opera, or even contemporary independent music. Musical theater is an untapped resource of potential artistic innovation and has unfortunately become stuck in an ideal of universal accessibility. In present popular culture and the culture of contemporary art forms, musical theater almost exclusively refers to popular productions such as Phantom of the Opera, Rent, Wicked, Jesus Christ Superstar. Although excellent pieces of art in their own way, both dramaturgically and in their ability to evoke emotion through catchy melodies, for the most part each of them have their basis in popular and traditional musical idioms and theatrical forms, seldom exploring more advanced or avant-garde and experimental compositional and theatrical techniques.

**MUSIC 113. Introduction to Instrumental Composition. 2 Units.**

Students compose weekly exercises to improve creative fluency and develop basic control of instruments. Audio examples of diverse compositional techniques are introduced, analyzed and emulated.

**MUSIC 114. Sound Tracks: Music, Memory, and Migration in the Twentieth Century. 3-4 Units.**

This course comprises a thematic exploration of forces, experiences, and after-effects of diasporas of communities in the Americas and Europe throughout the 20th century. Through close listening accompanied by historical and theoretical readings, students will gain deeper insights into the making of meaning in music and the role of music as a creative response to the challenges of migration and minority-status in the modern nation-state. Historical examples will draw from the Romani diaspora, Eastern-European Jewish liturgical sounds, the Mexican-US border, and from Jazz and the Blues. We explore issues of race, ethnicity, identity, nationalism, minoritization as they intersect in the sound tracks of diaspora.

Same as: CSRE 114

**MUSIC 11A. Orchestral Repertoire and Technique for Violin. 1 Unit.**

Open to major and non-majors who would like to learn orchestral pieces and performance technique, including the works from the Stanford Symphony Orchestra's concert program. Priority is given to students who sign up for SSO and SPO. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 11AZ. Orchestral Repertoire and Technique for Violin. 0 Units.**

Open to major and non-majors who would like to learn orchestral pieces and performance technique, including the works from the Stanford Symphony Orchestra's concert program. Priority is given to students who sign up for SSO and SPO. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 11N. A View from the Podium: The Art of Conducting. 3 Units.**

How a conductor interprets music, realizes a personal vision through the rehearsal process, and communicates with orchestra and audience. Conducting as based on human communication skills. How to apply these lessons to other fields of endeavor.

**MUSIC 122A. Counterpoint. 4 Units.**

Analysis and composition of contrapuntal styles from the Renaissance and Baroque periods. Use of keyboard, ear training, and sight singing underlies all written work. Prerequisites: MUSIC 23 and MUSIC 24C; passing piano-proficiency examination; or, consent of instructor.

**MUSIC 122B. Analysis of Tonal Music. 4 Units.**

Complete movements, or entire shorter works of the 18th and 19th centuries, are analyzed in a variety of theoretical approaches. Prerequisites: MUSIC 23 and MUSIC 24C; passing piano-proficiency examination; or, consent of instructor.

**MUSIC 122C. Introduction to 20th-Century Composition. 4 Units.**

Contemporary works, with emphasis on music since 1945. Projects in free composition based on 20th-century models. Prerequisites: MUSIC 23 and MUSIC 24C; passing piano-proficiency examination; or, consent of instructor.

**MUSIC 123. Undergraduate Seminar in Composition. 3 Units.**

Current trends in composition. May be repeated for credit a total of 7 times. Prerequisites: Music major; 23 or consent of instructor.

**MUSIC 123A. Undergraduate Seminar in Composition: Rhythmic Design. 1 Unit.**

Students compose weekly exercises to develop creative fluency and personal style. The course focuses on listening to examples, analysis and emulation of diverse compositional techniques involving rhythm.

**MUSIC 123B. Undergraduate Seminar in Composition: Pitch Design. 1 Unit.**

Students compose weekly exercises to develop creative fluency and personal style. The course focuses on listening to examples, analysis and emulation of diverse compositional techniques involving pitch.

**MUSIC 124A. Songwriters Workshop. 1-2 Unit.**

Laboratory for composers of any kind of vernacular music: singer-songwriters; folk singers; laptop dance music composers; rock and pop bands; rappers; writers of instrumentals or music with lyrics; solo artists and collaborators; etc. Compositional strategies for songwriting, overview of exemplars, discussion of aesthetic issues, and development of artistic personae. Weekly critique session for students and faculty to share work and offer feedback. Music theory and literacy not required. Aimed, however, at those with at least some experience as writers, whether casual or extensive. For bands at least half of members must be enrolled.

**MUSIC 124B. Songwriters Workshop. 3 Units.**

Laboratory for composers of any kind of vernacular music: singer-songwriters; folk singers; laptop dance music composers; rock and pop bands; rappers; writers of instrumentals or music with lyrics; solo artists and collaborators; etc. Compositional strategies for songwriting, overview of exemplars, discussion of aesthetic issues, and development of artistic personae. Weekly critique session for students and faculty to share work and offer feedback. Music theory and literacy not required. Aimed, however, at those with at least some experience as writers, whether casual or extensive. For bands at least half of members must be enrolled. Enrollment in 3-unit course is by permission of, and invites lessons with instructor.

**MUSIC 125. Individual Undergraduate Projects in Composition. 1-3 Unit.**

May be repeated for credit a total of 14 times. Prerequisites: music major, and one quarter of 123.

**MUSIC 126. Introduction to Thoroughbass. 1-3 Unit.**

The development of continuo techniques and skills for figured-bass realization. Performance and analysis of selected repertoire, using thoroughbass principles and exercises based on historical theoretical treatises. Prerequisite: 21.

**MUSIC 127. Instrumentation and Orchestration. 3 Units.**

Individual instruments, instrumental groups within the orchestra, and combinations of groups. Arrangements from piano to orchestral music. Score analysis with respect to orchestration. Practical exercises using chamber ensembles and school orchestra. Prerequisite: 23.

**MUSIC 128. Stanford Laptop Orchestra: Composition, Coding, and Performance. 1-5 Unit.**

Classroom instantiation of the Stanford Laptop Orchestra (SLOrk) which includes public performances. An ensemble of more than 20 humans, laptops, controllers, and special speaker arrays designed to provide each computer-mediated instrument with its sonic identity and presence. Topics and activities include issues of composing for laptop orchestras, instrument design, sound synthesis, programming, and live performance. May be repeated four times for credit. Space is limited; see <https://ccrma.stanford.edu/courses/128> for information about the application and enrollment process. May be repeat for credit. Same as: CS 170

**MUSIC 129. Advanced Ear-Training/Musicianship. 1-2 Unit.**

A course in advanced aural analysis and musicianship skills for students who have completed the Music 24 series. Topics of study include analysis by ear of large scale forms, chromatic or extended-tertiary harmony, modulations to distantly related keys, chromatic or atonal melodies, modal harmony and melody, as well as alternative forms of aural analysis.

**MUSIC 12A. Introductory Piano Class. 1 Unit.**

(A=level 1; B=level 2; C=level 3) There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Preference to department majors. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 12AS. Introductory Piano Class, Level 1. 1 Unit.**

Piano: Introductory Level 1 (Group; 10 students to a section) (A=Level 1; B=Level 2; C=Level 3). Class is closed by design. Please register on the wait-list and show up on the first day of class to receive a permission number for enrollment. Complete registration form available for download at: <http://tinyurl.com/q43c48g>. May be repeated for credit 5 times. Zero unit enrollment option available with instructor permission. See website: (<http://tinyurl.com/posmuhn>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

Same as: Group

**MUSIC 12AZ. Introductory Piano Class. 0 Units.**

(A=level 1; B=level 2; C=level 3) There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Preference to department majors. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeat for credit for 0 unit and total completion allowed 99.

**MUSIC 12B. Introductory Piano Class. 1 Unit.**

This class is closed by design. To enroll, please sign up on the Axxess waitlist and show up on the first day to receive a permission number for re-enrollment. Your place on the waitlist will be considered a reservation. If the waitlist is closed, there are no more spaces in the class. (A=level 1; B=level 2; C=level 3) There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 12BS. Introductory Piano Class, Level 2. 1 Unit.**

Piano: Introductory Level 2 (Group; 10 students to a section) (A=Level 1; B=Level 2; C=Level 3). Class is closed by design. Please register on the wait-list and show up on the first day of class to receive a permission number for enrollment. Complete registration form available for download at: <http://tinyurl.com/q43c48g>. May be repeated for credit 5 times. Zero unit enrollment option available with instructor permission. See website: (<http://tinyurl.com/posmuhn>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

Same as: Group

**MUSIC 12BZ. Introductory Piano Class. 0 Units.**

This class is closed by design. To enroll, please sign up on the Axxess waitlist and show up on the first day to receive a permission number for re-enrollment. Your place on the waitlist will be considered a reservation. If the waitlist is closed, there are no more spaces in the class. (A=level 1; B=level 2; C=level 3) There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 12C. Introductory Piano Class. 1 Unit.**

This class is closed by design. To enroll, please sign up on the Axxess waitlist and show up on the first day to receive a permission number for re-enrollment. Your place on the waitlist will be considered a reservation. If the waitlist is closed, there are no more spaces in the class. (A=level 1; B=level 2; C=level 3.) May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 12CS. Introductory Piano Class, Level 3. 1 Unit.**

Piano: Introductory Level 3 (Group; 10 students to a section) (A=Level 1; B=Level 2; C=Level 3). Class is closed by design. Please register on the wait-list and show up on the first day of class to receive a permission number for enrollment. Complete registration form available for download at: <http://tinyurl.com/q43c48g>. May be repeated for credit 5 times. Zero unit enrollment option available with instructor permission. See website: (<http://tinyurl.com/posmuhn>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.  
Same as: Group

**MUSIC 12CZ. Introductory Piano Class. 0 Units.**

This class is closed by design. To enroll, please sign up on the Axxess waitlist and show up on the first day to receive a permission number for re-enrollment. Your place on the waitlist will be considered a reservation. If the waitlist is closed, there are no more spaces in the class. (A=level 1; B=level 2; C=level 3.). There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 12SC. Musical Collisions and Radical Creativity. 2 Units.**

The margins of musical culture; nonconformist, maverick, and eccentric creative impulses that expand the definition of art. Laboratory atmosphere and daily rehearsals in which students create collaborative works with a final public concert involving collaborations with local musicians and presentations of student-composed works created during the course.

**MUSIC 12SZ. Introductory Piano. 0 Units.**

Introductory Piano (zero-unit option). Complete registration form available for download at: <http://tinyurl.com/q43c48g>. Zero unit enrollment option available with instructor permission. See website: (<http://tinyurl.com/posmuhn>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 130A. Introduction to Conducting. 3 Units.**

Baton techniques and rehearsal procedures. The development of coordination of the members of the body involved in conducting; fluency in beat patterns and meters; dynamics, tempi, cueing, and use of the left hand in conducting. Prerequisites: 122B and diagnostic musicianship exam given first day of class.

**MUSIC 130B. Elementary Orchestral Conducting. 3 Units.**

Prerequisites: 127 or previous orchestral performance experience, 130A.

**MUSIC 130C. Elementary Choral Conducting. 3 Units.**

Techniques specific to the conducting of choral ensembles: warm-ups, breathing, balance, blend, choral tone, isolation principles, recitative conducting, preparation, and conducting of choral/orchestral works. Prerequisite: 130A.

**MUSIC 133. Food, Text, Music: A Multidisciplinary Lab on the Art of Feasting. 3-5 Units.**

Students cook a collection of unfamiliar recipes each week while learning about the cultural milieus in which they originated. The course focuses on the fourteenth and fifteenth centuries, a time of great banquets that brought together chefs, visual artists, poets, musicians, and dancers. Students read late-medieval cookbooks under the guidance of professional chefs, learn songs and poetry with the help of visiting performers, and delve into a burgeoning scholarly literature on food history and sensory experience. We will also study trade routes and food networks, the environmental impact of large-scale banquets, the science of food, and the politics of plenty. This course may count towards the Medieval component of the French major, and corresponds to DLCL 121, a course requirement for the Medieval Studies Minor. Students interested in applying for course need to email Professors Galvez and Rodin (<mailto:mgalvez@stanford.edu> and <mailto:jrodin@stanford.edu>) with a statement of intent and dietary restrictions/preferences. Same as: FRENCH 166, FRENCH 366, MUSIC 333

**MUSIC 135. Harmonic Convergence: Music's Intersections with Science, Mathematics, History, and Literature. 3 Units.**

Topics include music and the brain; tuning and temperament; musical form; connections between music and mathematics; and readings in history and literature with strong musical elements. Readings include "The Power of Music" (Mannes), "Musicophilia" (Sacks), "From Music to Mathematics" (Roberts), "The Kreutzer Sonata" (Tolstoy), "A Clockwork Orange" and "Honey for the Bears" (Burgess). Compositions by Bach, Mozart, Beethoven, Debussy, Schoenberg, Stravinsky, Shostakovich, and others will be studied. Goals: increased understanding of music's relationship to other fields; improved writing skills. While ability to read music is not required, students with musical ability will be encouraged to perform relevant works in class.

**MUSIC 13N. Bollywood and Beyond: South Asian Popular and Folk Music. 3 Units.**

This seminar is an introduction to regional and popular music of South Asia; India, Pakistan, Sri Lanka, Bangladesh, and Nepal. An immense variety of South Asian music; everything from drumming to wedding songs to movie scores; is woven into the social lives of both audiences and performers. Through their music, people across South Asia express social criticism, bring about political change, engage in worship, mark rites of passage, and cope with rapid and unsettling socio-economic changes. For example, Marathi kirtan, a form of devotional song/storytelling from Western India, has been used to teach spiritual lessons and oppose colonial occupation; musicians from South Indian oppressed castes enlist drums to protest their low social status; and the ever-popular Bollywood dance music creates a sense of home for Indians living abroad. In this seminar you will have the opportunity to acquire listening skills that will enhance your appreciation of the variety and depth of South Asian folk and popular music. We will draw on areas such as folklore and ethnomusicology to gain an understanding about what makes these musical practices thrive. And we will go on three field trips, which will give you an opportunity to engage first-hand with South Asian music and musicians in our local community. No musical experience is required.

**MUSIC 13Q. Classical Music and Politics: Western Music in Modern China. 3 Units.**

Preference to sophomores. Social history, cultural studies, China studies, international relations, and music. From the Italian Jesuit, Matteo Ricci who presented a clavichord to the Chinese emperor to the emergence of a modern generation of Chinese musicians.

**MUSIC 13SC. Performing America: The Broadway Musical. 2 Units.**

This seminar explores how the themes, characters, stories, and, above all, the songs of the Broadway musical have played a key role in forming ideas of American identity from the early 20th century to the present. Musical theater is a perennial site for negotiating social themes of race, class, gender roles, and sexual identity. The American musical has been in constant dialogue with vernacular song and dance idioms, from ragtime and early jazz to rock, pop, disco, hip-hop, and electronic dance music. Jazz musicians have regularly looked to musical theater for their standards, as have talent shows from the vaudeville era to American Idol. Disney musicals, the television series *Glee* and *Smash*, and the High School Musical franchise all illustrate how musicals serve as a medium for negotiating personal identity from childhood through early adulthood, staging the conflicts and attachments that define our everyday lives while connecting these with the culture we live in through the collective medium of song. We will look at a variety of influential historical musicals (*Oklahoma*, *Guys and Dolls*, *Gypsy*, *The Music Man*, *West Side Story*) and a few recent shows such as *Wicked*, *Hairspray*, *Bloody Bloody Andrew Jackson*, *American Idiot*, and *The Book of Mormon*, asking what the relation is between individual numbers and the overall themes and structures of the shows. How do lyrics and music combine in a successful song, and how does a song contribute to shape of the show? How do the dynamics of live theater relate to the presentation of musicals in the mediums of film and television? In addition to working on selected songs and scenes with the help of Stanford voice and drama faculty, students will attend, discuss, and review Bay area productions (San Jose, San Francisco), including the Broadway by the Bay (Redwood City) production of *Cabaret* opening on September 13, 2013. Grading will be based on class discussion, production analysis and reviews, and a choice between a final creative project and a short research paper.

**MUSIC 142J. Studies in Music of the Baroque: Monteverdi's Theater Music. 3-4 Units.**

Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.).  
Same as: MUSIC 242J

**MUSIC 142K. Studies in Music of the Baroque: Handel the Cosmopolitan. 4-5 Units.**

Music history seminar on the operatic, sacred, and instrumental works of G.F. Handel as examples of the diversity, cosmopolitanism, expression, formal and technical features, and social uses of music in the first half of eighteenth century. Traces Handel's career from his native Germany to an elite Roman circle of musical connoisseurs, and to the Italian opera company he founded in London and his transformation of Italian opera into a new genre of English oratorio. By analyzing Handel's works in context, we examine the aesthetic, harmonic, and dramatic principles of the major European Baroque art-music genres. Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.).  
Same as: MUSIC 242K

**MUSIC 143J. Studies in Music of the Classical Period: Franz Joseph Haydn. 3-4 Units.**

Music and Musicians in the Age of Enlightenment Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.).  
Same as: MUSIC 243J

**MUSIC 143K. Studies in Music of the Classical Period: Mozart's Operas. 3-4 Units.**

Aesthetic, musical, and dramatic principles of 18th-century comic opera explored through W.A. Mozart's *Abduction from the Seraglio*, *Marriage of Figaro*, *Don Giovanni*, *Così fan tutte*, and *Magic Flute*. Comic strategies of exaggeration, farce, stock characters, ethnic caricature, and topsy-turvy social inversion; national traditions of Italian opera buffa and German Singspiel; musical forms and elements including recitative, aria, and ensemble. How Mozart's operas reflect 18th-century ideas about music, social organization, political authority, gender, sexuality, and rhetoric. Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.).  
Same as: MUSIC 243K

**MUSIC 144J. Studies in Music of the Romantic Period: Faust in 19th-century Music. 3-4 Units.**

Prerequisites: MUSIC 23, MUSIC 42 (WIM at 4-unit level only.).  
Same as: MUSIC 244J

**MUSIC 144L. Studies in Music of the Romantic Period: Wagner: The Ring of the Nibelung. 3-4 Units.**

Richard Wagner's cycle of four operas, "Der Ring des Nibelungen" (1848-74), is one of the key documents of the mid nineteenth-century revolutionary fervor in Europe and a monument of radical artistic modernism of the period. The course will examine the artistic features of this unique work and place it in the complex ideological context of its time. Prerequisites: MUSIC 23, MUSIC 42 (WIM at 4-unit level only.).  
Same as: MUSIC 244L

**MUSIC 145J. Studies in Western Art Music Since 1900: The Music & Ideas of Charles Ives. 4 Units.**

Prerequisites: MUSIC 23, MUSIC 42. (WIM at 4-unit level only.).  
Same as: MUSIC 245J

**MUSIC 145K. Studies in Western Art Music Since 1900: Concepts of New Music. 4 Units.**

A survey of the history of Western classical music in the twentieth century, concentrating on shifts in the concept of New Music in the first half of the century. The aim is twofold: to study in depth a representative selection of works and to develop a historiographical framework for that study. Relevant concepts to be examined include Expressionism, Neo-Classicism, New Objectivity, Serialism, Aleatoricism, and Minimalism -- all of them key terms used by music historians and critics to describe and delineate the multifaceted phenomenon of "New Music." Composers to be studied include Schoenberg, Stravinsky, Berg, Weill, Shostakovich, Reich and Glass, and others. Prerequisites: MUSIC 23, MUSIC 42. (WIM course for Music majors.).  
Same as: MUSIC 245K

**MUSIC 146J. Studies in Ethnomusicology: Listening to the Local: Music Ethnography of the Bay Area. 3-5 Units.**

An introduction to music ethnography through student research on musical life in the Bay Area. Focus is on the intersections of music, social life, and cultural practice by engaging with people as they perform music and culture in situ. Techniques taught include participant-observation, interviewing and oral history, writing field-notes, recording, transcription, analysis, and ethnographic writing. Pre-/co-requisite (for music majors): MUSIC 22. (WIM at 4 units only.).  
Same as: CSRE 146J, MUSIC 246J

**MUSIC 146K. Studies in Ethnomusicology: Music of South Asia. 3-5 Units.**

Focuses on the history, theory, and practice of South Asian music with particular emphasis on the classical traditions of North and South India. Also addresses regional folk, popular, and devotional musical styles of India, Pakistan, and Bangladesh. Topics include: raga, tala, vocal and instrumental genres, improvisation, aesthetics, music transmission, musical nationalism, social organization of musicians, music and ritual, music and gender, and technology. Lecture with discussion, some singing (no experience necessary), guest performances, reading, listening, and analysis. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 or 5 units only.).  
Same as: MUSIC 246K

**MUSIC 146L. Studies in Ethnomusicology: Musics of Africa and the African Diaspora. 3-5 Units.**

An introduction to musics of Africa and the African Diaspora. Topics include: music and nationalism, religion, embodiment, diaspora, migration, resistance, gender, globalization, and race. Musical regions and nations may include: Zimbabwe, South Africa, West Africa, Central Africa, Somalia, Ethiopia, the Caribbean, and the United States. This is a seminar-based course in which students will write short reflective papers and a final, research-based paper. Pre- or co-requisite for WIM credit: Music 22. WIM at 4 or 5 letter-graded units only.

Same as: AFRICAAM 146L, AFRICAST 246L, MUSIC 246L

**MUSIC 147J. Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music. 3-4 Units.**

The African American tradition of soul music from its origins in blues, gospel, and jazz to its influence on today's r&b, hip hop, and dance music. Style such as rhythm and blues, Motown, Southern soul, funk, Philadelphia soul, disco, Chicago house, Detroit techno, trip hop, and neo-soul. Soul's cultural influence and global reach; its interaction with politics, gender, place, technology, and the economy. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.).

Same as: AFRICAAM 19, AMSTUD 147J, CSRE 147J, MUSIC 247J

**MUSIC 147K. Studies in Music, Media, and Popular Culture: Music and Urban Film. 3-4 Units.**

How music and sound work in urban cinema. What happens when music's capacity to transform everyday reality combines with the realism of urban films? Provides an introduction to traditional theories of film music and film sound; considers how new technologies and practices have changed the roles of music in film. Readings discuss film music, realistic cinema, urban musical practices and urban culture. Viewing includes action/adventure, Hindi film, documentary, film noir, hip hop film, the musical, and borderline cases by Jean-Luc Godard, Spike Lee, Wong Kar-Wai and Tsai Ming-Liang. Pre- or corequisite (for music majors): MUSIC 22. (WIM at 4 unit level only.).

Same as: MUSIC 247K

**MUSIC 147L. Studies in Music, Media, and Popular Culture: Latin American Music and Globalization. 3-4 Units.**

Focuses on vernacular music of Latin America and the Caribbean, including Mexico, Cuba, Dominican Republic, Peru, Brazil, Colombia, and Argentina. Musical examples discussed in relation to: globalization, migration, colonialism, nationalism, diaspora, indigeneity, politics, religion, dance, ethnicity, and gender. How music reflects and shapes cultures, identities, and social structures. Genres addressed: bachata, bossa nova, cumbia, forro, ranchero, reggaeton, rock, salsa, tango, and others. Seminar, guest performances, reading, listening, and analysis. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.).

Same as: CHILATST 147L, CSRE 147L, MUSIC 247L

**MUSIC 148J. Studies in Perf Practice: Reactions to the Record: Early Recordings, Lost Styles, and Music's Future. 3-4 Units.**

This is a seminar on the transformation of musical style in the era of recordings in light of their roots in cultural trends, including shifting hierarchies between composer and performer, work and notation, text and act. Early recordings will be studied as documents of musical values and conceptions different from those around us today. Methodologies of performance analysis will be explored and used to contextualize sources, which include historic recordings from Stanford's Archive of Recorded Sound, performance documents, and field research with performers, composers, critics, and listeners. Repertoire includes works for orchestra, piano, strings, chamber ensemble and voice. Outstanding contributions from seminar members may be featured in the Music Department's May 2014 Reactions to the Record symposium. May be repeated for credit. Pre- or corequisite (for music majors): MUSIC 22. (WIM at 4-unit level only.).

Same as: MUSIC 248J

**MUSIC 14N. Women Making Music. 3 Units.**

Preference to freshmen. Women's musical activities across times and cultures; how ideas about gender influence the creation, performance, and perception of music.

Same as: FEMGEN 13N

**MUSIC 150. Musical Acoustics. 3 Units.**

The physics of vibrating systems, waves, and wave motion. Time- and frequency-domain analysis of sound. Room acoustics, reverberation, and spatialization. The acoustics of musical instruments: voice, strings, and winds. Emphasis is on the practical aspects of acoustics in making music. Hands-on and computer-based lab. See <http://ccrma.stanford.edu/courses/150/>.

**MUSIC 150P. The Changing World of Popular Music. 2 Units.**

This course will cover changes in the business, economics, and practices of the popular music industry. It will provide a brief historical overview of the industry and its business models. The majority of the course will focus on the industry as it works today and on forces that are causing it to change rapidly. The course will feature guest artists and executives with current experience in the field, as well as project-based assignments designed to give students hands-on experience. Topics will include: Economics and business models of commercial music business, Technology and music production, Technology and music distribution, Technology and marketing, Leadership in the music industry: case studies, Managing creative projects, Copyright and legal issues. Attendance at first class required. Enrollment will be determined on the first day through a simple application process.

Same as: ARTSINST 150

**MUSIC 150R. Robert Schumann and the Idea of Musical Romanticism. 3-5 Units.**

The creative personality and musical compositions of Robert Schumann (1810-1856) as exemplars of the idea of Romanticism in European culture of the early nineteenth century. Survey of major genres (solo piano, Lieder, symphonies, chamber music, choral music) in dialogue with Romantic literary and visual cultures. Students prepare at least one or two works by Schumann or contemporary figures (Mendelssohn, Chopin, Brahms, Clara Schumann) for presentation in lecture-recital format. Prerequisites: Music 22 or equivalent (intermediate music theory), intermediate or higher performance ability in piano, strings, or voice.

**MUSIC 152A. Careers in Media Technology. 2 Units.**

Careers in Media Technology explores how leading audio, music, and video technology companies, such as Pandora, Adobe, Sonos, Dolby, Gracenote, iZotope, and Avid bring products from idea to market. We examine best practices, roles, day-to-day responsibilities, desired skillsets, and department/team function. This seminar is intended for all students considering full-time positions or internships in media technology industry. No prior engineering background required. Topics include: product management, project management (agile), software development in large organizations, UX/UI design, marketing, hardware development, R&D, sales, operations (HR, IP/patents), and the hiring process. Online lectures available. Class time includes discussion and meetings with industry professionals.

**MUSIC 153. Online Jamming and Concert Technology. 2-4 Units.**

Today's vast amount of streaming and video conferencing on the Internet lacks one aspect of musical fun and that's what this course is about: high-quality, near-synchronous musical collaboration. Under the right conditions, the Internet can be used for ultra-low-latency, uncompressed sound transmission. The course teaches open-source (free) techniques for setting up city-to-city studio-to-studio audio links. Distributed rehearsing, production and split ensemble concerts are the goal. Setting up such links and debugging them requires knowledge of network protocols, network audio issues and some ear training.



**MUSIC 154. History of Electronic Music. 1-5 Unit.**

What is electronic music? Acousmatic, computer music, algorithmic composition, tape music, glitch, electronic, musique concrète, noise, laptop music, DJ'ing, organized sound...what do these labels mean? This course will provide a brief historical survey of electroacoustic music and discuss some of the most salient questions associated with it, from both a compositional and musicological point of view. Topics to be covered include: definitions of musical sounds; Schaefferian theory and musique concrète; serialism and elektronische Musik; tape music and computer music in the USA; analysis of electroacoustic music; sampling and intellectual property; algorithmic and computer-assisted composition; live-electronics and improvisation. The course does not require previous experience in the field. Classes will be based on discussion of selected listening and reading materials, as well as hands-on digital experimentation with sounds.

**MUSIC 154A. Sound Art I. 4 Units.**

Acoustic, digital and analog approaches to sound art. Familiarization with techniques of listening, recording, digital processing and production. Required listening and readings in the history and contemporary practice of sound art. (lower level).

Same as: ARTSTUDI 131

**MUSIC 154B. Aesthetics of Experimental Electronic Music, 1980 to Today. 3-5 Units.**

In this course, students will listen to, analyze, and interpret experimental electronic music since 1980. We will explore how technologies influence music making, audiences, experiences, distribution outlets and performance contexts for electronic music. How do artists generate meaning and expressivity when using experimental tools and styles? Emphasis on developing vocabulary and frameworks for informed discourse surrounding electronic music, drawing from both academic and journalistic traditions. Topics include electronic dance music, dubstep, hip hop, internet music culture, drone, noise, microsound, electroacoustic, and sound art. Highly recommended for music majors taking the MST specialization. For upper-level undergraduates and graduate students.

**MUSIC 154D. Symposium on Manufacturing Techniques for Music and Art. 1-3 Unit.**

A guided symposium on the many techniques for making music and art objects. The course will be tailored to student interest and needs as it covers computer controlled machining, traditional techniques, and innovative methods of creating physical objects for music and art.

**MUSIC 154F. Electroacoustic Music Analysis. 3-4 Units.**

This course will explore the most important methodologies for analysis of electroacoustic music that have been proposed in the literature. Class meetings include lectures, student discussions of relevant literature and listening sessions. Assignments include weekly readings, homework, and a final project. Basic musical proficiency is required. Experience with programming, music analysis, or music perception/cognition is desirable.

**MUSIC 155. Intermedia Workshop. 3-4 Units.**

Students develop and produce intermedia works. Musical and visual approaches to the conceptualisation and shaping of time-based art. Exploration of sound and image relationship. Study of a wide spectrum of audiovisual practices including experimental animation, video art, dance, performance, non-narrative forms, interactive art and installation art. Focus on works that use music/sound and image as equal partners. Limited enrollment. Prerequisites: consent of instructors, and one of FILMPROD 114, ARTSTUDI 131, 138, 167, 177, 179, or MUSIC 123, or equivalent. May be repeated for credit.

Same as: ARTSTUDI 239, MUSIC 255

**MUSIC 156. "sic": Improvisation Collective. 1 Unit.**

Small ensemble devoted to learning trans-idiomatic improvisation techniques and composing indeterminate pieces in a workshop setting. One major concert. Prerequisite: access to an instrument. Improvisational experience and conventional instrumental virtuosity not required. May be repeated for credit for a total of 3 times.

**MUSIC 156Z. "sic": Improvisation Collective. 0 Units.**

Small ensemble devoted to learning trans-idiomatic improvisation techniques and composing indeterminate pieces in a workshop setting. One major concert. Prerequisite: access to an instrument. Improvisational experience and conventional instrumental virtuosity not required. May be repeated for credit for a total of 3 times.

**MUSIC 158. Stanford Community Chorus. 1 Unit.**

Chorus members explore many different types of music and singing in a fun and supportive environment, including folk, spirituals, popular songs, and traditional choral music. The course culminates in an informal performance. No audition is required to join; experienced music readers and non-readers alike are welcome. The ensemble is open to both Stanford students and community members. There is a \$25 fee for music. Offered in collaboration with Stanford Continuing Studies. Enrollment limited to 15 students and 30 community members. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 159. Early Music Singers. 1 Unit.**

Small choir specializing in Medieval, Renaissance, and early Baroque vocal music. One major concert per quarter. May be repeated for credit for a total of 15 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 159J. Performance as Analysis: Late-Medieval Music in Action. 1-3 Unit.**

This experimental course channels embodied musical knowledge into text-based analysis and reflection. Part I features an intensive period of seven workshops and rehearsals: working closely with members of Cut Circle (<http://cutcircle.org>) as well as specialists in computer science and art history, students prepare a concert to be held during Week 2 of the quarter. Part II (Weeks 3-5) comprises a more typical twice-a-week schedule in which we reflect on, contextualize, and analyze the music and our experience performing it. A final paper is due in about Week 7; regular meetings conclude after Week 5. Prerequisites: good sight-singing skills; at least one quarter's experience in MUSIC 165 (Chamber Chorale) or an ensemble of a similar caliber. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University. Week 1: Mon 4 January: 4:30 - 7:00, MemChu; Wed 6 January: 4:30 - 7:00, MemChu; Fri 8 January: 4:30 - 7:00, DinkReh; Sat 9, and Sun 10 January: 2:30 - 6pm, BRH moving to MemChu; Week 2: Tues 12 January: 4:30 - 7:00, MemChu; Wed 13 January: 6pm call for 7:30p concert, MemChu;; Weeks 3-5: Tues/Thurs, 4:30 - 5:50 Braun 105; Weeks 6-10: No class meeting. Final paper due in week 7.

**MUSIC 159K. Stanford Facsimile Singers. 1 Unit.**

Small vocal ensemble performing late-medieval and Renaissance music from original sources. Exposes students to unfamiliar notational systems through often lavish music manuscripts and prints; builds sight-singing skills. May be repeated for credit for a total of three times. Zero-unit enrollment option available with instructor permission. Prerequisites: basic sight-singing. Prior training in voice not required.

**MUSIC 159KZ. Stanford Facsimile Singers. 0 Units.**

Small vocal ensemble performing late-medieval and Renaissance music from original sources. Exposes students to unfamiliar notational systems through often lavish music manuscripts and prints; builds sight-singing skills. May be repeated for credit for a total of three times. Zero-unit enrollment option available with instructor permission. Prerequisites: basic sight-singing. Prior training in voice not required.

**MUSIC 159Z. Early Music Singers. 0 Units.**

Small choir specializing in Medieval, Renaissance, and early Baroque vocal music. One major concert per quarter. May be repeated for credit for a total of 15 times for 0 unit. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 15N. The Aesthetics of Data. 3 Units.**

Focus on visual and auditory display of data, specifically, the importance of aesthetic principles in effective data display, and the creative potential of scientific, biological, environmental and other data as inspiration for artistic expression.

**MUSIC 160. Stanford Symphony Orchestra. 1 Unit.**

70- to 100-member ensemble performing major orchestral works; minimum one concert per quarter. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://sso.stanford.edu>). All participants must enroll. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 160A. Stanford Philharmonia. 1 Unit.**

Prerequisite: audition, one year of 160, or consent of instructor. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://sso.stanford.edu>). All participants must register. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 160AZ. Stanford Philharmonia. 0 Units.**

Prerequisite: audition, one year of 160, or consent of instructor. May be repeated for credit. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://www.stanford.edu/group/sso/cgi-bin/wordpress/member-login/>). All participants must register. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 160B. Stanford New Ensemble. 1 Unit.**

Performing compositions of the 20th century, recent works of this century, and new works by Stanford faculty and student composers. Musicians collaborate with composers and artists visiting and performing at Stanford. One concert per quarter. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://www.stanford.edu/group/sso/cgi-bin/wordpress/member-login/>). All participants must register. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 160BZ. Stanford New Ensemble. 0 Units.**

Performing compositions of the 20th century, recent works of this century, and new works by Stanford faculty and student composers. Musicians collaborate with composers and artists visiting and performing at Stanford. One concert per quarter. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://www.stanford.edu/group/sso/cgi-bin/wordpress/member-login/>). All participants must register. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 160C. Stanford Baroque Soloists. 1 Unit.**

Elite string group focusing on concerti by Corelli, Vivaldi and other Italians, Bach, Handel and other Germans, as well as theater music by Purcell and Lully. Each member expected to solo as well as play backup. Performances each quarter, played standing, student-led without conductor. Coaching will emphasize leadership and ensemble techniques, intonation and blend, particulars of eighteenth century notation and performance practice. Modern instruments, modern pitch, baroque bows as available. Limited to six violins, three violas, three cellos, bass, admission by audition. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. Contact instructor for audition and enrollment information: [apmartin@stanford.edu](mailto:apmartin@stanford.edu). May be repeated for credit for total completion of 15 and total 15 units. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 160CZ. Stanford Baroque Soloists. 0 Units.**

Elite string group focusing on concerti by Corelli, Vivaldi and other Italians, Bach, Handel and other Germans, as well as theater music by Purcell and Lully. Each member expected to solo as well as play backup. Performances each quarter, played standing, student-led without conductor. Coaching will emphasize leadership and ensemble techniques, intonation and blend, particulars of eighteenth century notation and performance practice. Modern instruments, modern pitch, baroque bows as available. Limited to six violins, three violas, three cellos, bass, admission by audition. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. Contact instructor for audition and enrollment information: [apmartin@stanford.edu](mailto:apmartin@stanford.edu). May be repeated for credit for 0 units. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 160S. Summer Orchestra. 1 Unit.**

See website for details: <https://music.stanford.edu/academic-programs/summer-studies-stanford-music/summer-session-ensembles-chorus-and-symphony>. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 160SZ. Summer Orchestra. 0 Units.**

See website for details: <https://music.stanford.edu/academic-programs/summer-studies-stanford-music/summer-session-ensembles-chorus-and-symphony>. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 160Z. Stanford Symphony Orchestra. 0 Units.**

70- to 100-member ensemble performing major orchestral works; minimum one concert per quarter. Admission and enrollment based on audition. For audition and contact information, please refer to the SSO/SPO/SNE website at (<http://www.stanford.edu/group/sso/cgi-bin/wordpress/member-login/>). All participants must enroll. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 161A. Stanford Wind Symphony. 1 Unit.**

40- to 50-member ensemble performing transcriptions of symphonic music, brass band music, and repertoire composed specifically for symphonic band. One concert per quarter. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 161AZ. Stanford Wind Symphony. 0 Units.**

40- to 50-member ensemble performing transcriptions of symphonic music, brass band music, and repertoire composed specifically for symphonic band. One concert per quarter. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 161B. Jazz Orchestra. 1 Unit.**

Jazz Orchestra is an undergraduate large ensemble performance class. Admission is by audition and/or permission of instructor. The class meets three times per week and presents a minimum of one formal concert per quarter with a major jazz artist. The class endeavors to provide students with the opportunity to perform, at the highest level, jazz compositions and arrangements of a serious nature, and provide opportunities for challenging and creative improvisational situations. Emphasis is placed on the understanding of the structural, psychological, and emotional components of the materials studied and performed. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for total of 15 times. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 161BZ. Jazz Orchestra. 0 Units.**

Jazz Orchestra is an undergraduate large ensemble performance class. Admission is by audition and/or permission of instructor. The class meets three times per week and presents a minimum of one formal concert per quarter with a major jazz artist. The class endeavors to provide students with the opportunity to perform, at the highest level, jazz compositions and arrangements of a serious nature, and provide opportunities for challenging and creative improvisational situations. Emphasis is placed on the understanding of the structural, psychological, and emotional components of the materials studied and performed. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for total completion of 15 and 0 (zero) unit. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 161D. Stanford Brass Ensemble. 1 Unit.**

Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. Performance of works for full brass choir and for smaller ensembles of brass instruments. Once weekly rehearsals. May be repeated for credit. Prerequisite: audition and consent of instructor. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 161DZ. Stanford Brass Ensemble. 0 Units.**

Performance of works for full brass choir and for smaller ensembles of brass instruments. Once weekly rehearsals. May be repeated for credit. Prerequisite: audition and consent of instructor. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 161E. Stanford Afro-Latin Jazz Orchestra. 1 Unit.**

Ensemble dedicated to the performance, interpretation and study of Afro-Latin music and its fusion with North American jazz. Repertoire includes the music of Brazil, Cuba, Dominican Republic, Puerto Rico, Peru and Argentina, as well as the United States. Idioms studied include Latin Jazz, Danzon, Son Montuno, Samba, Bossa, Traditional and Modern Salsa, Timba, Lando, and Candombe. African roots of the music are also presented including songs and rhythms from the Lucumi and Arara traditions. Focus is placed on learning rhythms, associated syncopations and also clave phrasing. One weekly rehearsal and a concert are required per quarter. Other playing opportunities available at the discretion of the group. Regular openings for brass/wind players, drummers, percussionists, pianists, bassists, and vocalists. Guest openings on violin, guitar and vibraphone. Inclusion of other instruments at the discretion of the director. Members should have basic reading ability and some related ensemble experience (e.g. jazz band). Ability to read and play complex syncopations are mandatory. Percussionists with experience in bongo, congas, timbales and pandeiro desired. Vocalists with fluency or exposure to Spanish and/or Portuguese also preferred. May be repeat for credit. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 161EZ. Stanford Afro-Latin Jazz Orchestra. 0 Units.**

Ensemble dedicated to the performance, interpretation and study of Afro-Latin music and its fusion with North American jazz. Repertoire includes the music of Brazil, Cuba, Dominican Republic, Puerto Rico, Peru and Argentina, as well as the United States. Idioms studied include Latin Jazz, Danzon, Son Montuno, Samba, Bossa, Traditional and Modern Salsa, Timba, Lando, and Candombe. African roots of the music are also presented including songs and rhythms from the Lucumi and Arara traditions. Focus is placed on learning rhythms, associated syncopations and also clave phrasing. One weekly rehearsal and a concert are required per quarter. Other playing opportunities available at the discretion of the group. Regular openings for brass/wind players, drummers, percussionists, pianists, bassists, and vocalists. Guest openings on violin, guitar and vibraphone. Inclusion of other instruments at the discretion of the director. Members should have basic reading ability and some related ensemble experience (e.g. jazz band). Ability to read and play complex syncopations are mandatory. Percussionists with experience in bongo, congas, timbales and pandeiro desired. Vocalists with fluency or exposure to Spanish and/or Portuguese also preferred. May be repeat for credit for total of 0 (zero) unit. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 162. Symphonic Chorus. 1 Unit.**

180- to 200-voice choral ensemble, performing major choral masterworks with orchestra. One concert per quarter. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 162Z. Symphonic Chorus. 0 Units.**

180- to 200-voice choral ensemble, performing major choral masterworks with orchestra. One concert per quarter. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 163. Memorial Church Choir. 1 Unit.**

Official choir of Memorial Church, furnishing music for Sunday services and special occasions in the church calendar. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 163Z. Memorial Church Choir. 0 Units.**

Official choir of Memorial Church, furnishing music for Sunday services and special occasions in the church calendar. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 165. Chamber Chorale. 1 Unit.**

Select 24-voice choral ensemble, specializing in virtuoso choral repertoire from all periods of Western art music. Annual touring commitment required. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 165Z. Chamber Chorale. 0 Units.**

Select 24-voice choral ensemble, specializing in virtuoso choral repertoire from all periods of Western art music. Annual touring commitment required. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 167. University Singers. 1 Unit.**

Select, 50-voice choral ensemble, performing choral repertoire from all periods of Western art music. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 167S. Summer Chorus. 1 Unit.**

80- to 100-voice non-auditioned ensemble, performing major choral masterworks and choral repertoire from all periods of Western art music. For details see: <https://music.stanford.edu/academic-programs/summer-studies-stanford-music/summer-session-ensembles>. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit for a total of 0 (zero) unit. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 167SZ. Summer Chorus. 0 Units.**

80- to 100-voice non-auditioned ensemble, performing major choral masterworks and choral repertoire from all periods of Western art music. For details see: <https://music.stanford.edu/academic-programs/summer-studies-stanford-music/summer-session-ensembles>. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit for a total of 0 (zero) unit. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 167Z. University Singers. 0 Units.**

Select, 50-voice choral ensemble, performing choral repertoire from all periods of Western art music. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 169. Stanford Taiko. 1 Unit.**

Select 15- to 18-member North American taiko ensemble, performing all-original repertoire for Japanese drums. Multiple performances in Winter and Spring quarters, also touring; instrument construction and maintenance. Admission by audition in Autumn Quarter only. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 169Z. Stanford Taiko. 0 Units.**

Select 15- to 18-member North American taiko ensemble, performing all-original repertoire for Japanese drums. Multiple performances in Winter and Spring quarters, also touring; instrument construction and maintenance. Admission by audition in Autumn Quarter only. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 170. Collaborative Piano. 1 Unit.**

Performance class in a workshop setting. Techniques of collaboration with vocalists and instrumentalists in repertoire ranging from songs and arias to sonatas and concertos. Prerequisite: private-lesson proficiency level in piano, or consent of instructor.

**MUSIC 171. Chamber Music. 1 Unit.**

Admission based on audition. Weekly one-hour coachings from Music department faculty. Search for instructor section in Axxess. Classical string quartets and piano/string groups are supervised by the St. Lawrence String Quartet. Two masterclasses and one performance per quarter are required. May be repeated for credit. All participants must enroll. Zero unit enrollment option available with instructor permission. See website for policy, procedure, and audition sign up: <http://music.stanford.edu/> By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 171Z. Chamber Music. 0 Units.**

Admission based on audition. Weekly one-hour coachings from Music department faculty. Search for instructor section in Axess. Classical string quartets and piano/string groups are supervised by the St. Lawrence String Quartet. Two masterclasses and one performance per quarter are required. May be repeated for credit. All participants must enroll. Zero unit enrollment option available with instructor permission. See website for policy, procedure, and audition sign up: <http://music.stanford.edu/> By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 172A. Piano. 1-3 Unit.**

Private lessons and group master class weekly. May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 172B. Organ. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 172C. Harpsichord. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 172D. Jazz Piano. 1-3 Unit.**

By invitation only; priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 172E. Fortepiano. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 172F. Carillon. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 172G. Gu-Zheng. 1-3 Unit.**

Private lessons weekly. May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 173. Voice. 1-3 Unit.**

Private lessons and group master classes weekly. May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 174A. Violin. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 174B. Viola. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 174C. Violoncello. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 174D. Contrabass. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 174E. Viola Da Gamba. 1-3 Unit.**

Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 174F. Classical Guitar. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 174G. Harp. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 174H. Baroque Violin. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.



**MUSIC 177A. Drum Set Lessons. 1-3 Unit.**

These lessons will be geared toward the individual student's desires and needs. All levels are welcome, but students should contact instructor to set up initial meeting, prior to enrolling in the course. Students will explore drumset technique, coordination, reading and a study various styles including, Jazz, Rock, R&B, Blues, Latin and Brazilian music. Students will use different texts as needed. These texts may include: Syncopation by Ted Reed, Modern Reading Text in 4/4 by Louis Bellson, A Funky Primer by Charles Dowd, Advanced Techniques for the Modern Drummer by Jim Chapin, and others. Students will also use material created by David for his classes "Around the World on a Drumset" and "Chart Reading Demystified." These lessons are designed to be both fun and challenging. Students will play along with recordings and are encouraged to bring in recordings of music that they enjoy. May be repeated for credit a total of 15 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 179Z. Applied Music Private Lessons. 0 Units.**

Students enroll in appropriate instructor section for private instrumental/vocal lessons using this zero unit enrollment option. Available only with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information.

**MUSIC 17N. The Operas of Mozart. 3 Units.**

Preference to freshmen. Four of Mozart's mature operas, the earliest works in the operatic repertoire never to go out of fashion. What accounts for this extraordinary staying power? Focus on the history of their composition, performance, and reception, and their changing significance from Mozart's time to the present.

**MUSIC 182. Diction for Singers. 1 Unit.**

The international phonetic alphabet and its application to German, French, and Italian vocal literature. Open also to pianists interested in vocal coaching and choral conducting.

**MUSIC 183A. German Art Song Interpretation. 1 Unit.**

By audition only. For advanced singers and pianists as partners. Performance class in a workshop setting. Composers include Beethoven, Schubert, Wolf and Strauss. May be repeated for credit a total of 2 times. Enrollment limit: 20 (ten singers maximum). Prerequisite: consent of instructor. Recommended prerequisite: 170 (pianists) or 182 (singers).

**MUSIC 183B. French Art Song Interpretation. 1 Unit.**

By audition only. For advanced singers and pianists as partners. Performance class in a workshop setting. Composers include Fauré, Debussy, Ravel and Poulenc. May be repeated for credit a total of 2 times. Enrollment limit: 20 (ten singers maximum). Prerequisite: consent of instructor. Recommended prerequisite: 170 (pianists) or 182 (singers).

**MUSIC 183C. Interpretation of Musical Theater Repertoire. 1-2 Unit.**

By audition only: Contact instructor prior to enrolling (bnies1@gmail.com). Ability to read music expected, but students with experience singing in musical theater can be accepted. For singers and pianists as partners. Performance class in a workshop setting along with lecture/discussion of important eras of musical theater history. Composers include Kern, Porter, Gershwin, Rodgers, Sondheim, Lloyd Weber, Jason Robert Brown and others. May be repeated for credit a total of 2 times. Enrollment limit: 20 (ten singers maximum). Prerequisite: consent of instructor. Recommended prerequisite: 170 (pianists). Same as: TAPS 183C

**MUSIC 183CZ. Interpretation of Musical Theater Repertoire. 0 Units.**

By audition only: Contact instructor prior to enrolling (bnies1@gmail.com). Ability to read music expected, but students with experience singing in musical theater can be accepted. For singers and pianists as partners. Performance class in a workshop setting along with lecture/discussion of important eras of musical theater history. Composers include Kern, Porter, Gershwin, Rodgers, Sondheim, Lloyd Weber, Jason Robert Brown and others. May be repeated for credit a total of 2 times. Enrollment limit: 20 (ten singers maximum). Prerequisite: consent of instructor. Recommended prerequisite: 170 (pianists).

**MUSIC 183D. Musical Theater. 1-3 Unit.**

In this workshop we will traverse the landscape of world of Musical Theater. It will serve as an introduction for the beginning actor and singer, and expand the more experienced performer's range in this genre. The world of Musical Theater is filled with stories of love, passion, joy, violence, heartbreak and rage. The class will include an introduction to vocal and movement skills for musical theater, beginning with exercises to build an ensemble and encourage a sense of play and relaxation in supportive environment. Our class must be a place where everyone feels safe. As ensemble members, we will be responsible for each other in this environment. Students will choose one solo song, and perform in a group number from this exciting discipline. The instructor will work with the actors on technique, utilization of action, specificity of language, personalization, and emotional truth. A professional coach from the theater community will conduct vocal coaching. Physical warm-ups and choreography will be suited for both the dancer and non-dancer. The class will culminate in the last week with live performance for friends and family. STUDENTS ARE ENCOURAGED TO BRING THEIR OWN SUGGESTIONS. (Isn't there a role you've always wanted to sing?) Required text: Broadway Musicals Show by Show: Sixth Edition - Stanley Green; Paperback. Same as: TAPS 115

**MUSIC 183E. Singing for Musicals. 2 Units.**

This course provides training in vocal technique, stylistic musical phrasing, and acting for students interested in performing musical theater. Students will learn about the physical process of singing, including posture, breath support, and vocal exercises. They will incorporate vocal technique with the study of phrasing in different styles of Broadway repertoire, and apply both to the art of acting the song. Each student will work on solo selections and ensembles, and sing in most classes. Through understanding vocal technique, students will become more confident and joyful performers. The course will culminate in a final public workshop performance. Same as: TAPS 183E

**MUSIC 184A. Editing and Performing Early Music. 1-3 Unit.**

This course is a practical workshop in early music vocal repertoire. The main focus of this course is to use original source material to explore editorial practice. Having prepared the score, students learn to perform the piece from an historically informed performance practice point of view. In addition to broadening the student's knowledge of vocal repertoire, the following skills are developed: text preparation, foreign language translation and diction; rehearsal for performance and/or recording. Prerequisite: vocal or instrumental instruction, as the class is open to singers or collaborative artists. May be repeated for credit a total of 4 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 184AZ. Editing and Performing Early Music. 0 Units.**

This course is a practical workshop in early music vocal repertoire. The main focus of this course is to use original source material to explore editorial practice. Having prepared the score, students learn to perform the piece from an historically informed performance practice point of view. In addition to broadening the student's knowledge of vocal repertoire, the following skills are developed: text preparation, foreign language translation and diction; rehearsal for performance and/or recording. Prerequisite: vocal or instrumental instruction, as the class is open to singers or collaborative artists. All participants must enroll. May be repeated for a total of 4 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 184B. Topics in Opera Stagecraft. 1-3 Unit.**

This course is a practical workshop in vocal repertoire for the stage. Each quarter's offering emphasizes a specific genre or period, therefore the course can be repeated with permission of the instructor. In addition to broadening the student's knowledge of vocal repertoire, the following skills are developed: text preparation, foreign language translation and diction; rehearsal etiquette for performance and/or recording. Prerequisite: vocal or instrumental instruction, as the class is open to singers or collaborative artists. May be repeated for credit a total of 4 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 184BZ. Topics in Opera Stagecraft. 0 Units.**

This course is a practical workshop in vocal repertoire for the stage. Each quarter's offering emphasizes a specific genre or period, therefore the course can be repeated with permission of the instructor. In addition to broadening the student's knowledge of vocal repertoire, the following skills are developed: text preparation, foreign language translation and diction; rehearsal etiquette for performance and/or recording. Prerequisite: vocal or instrumental instruction, as the class is open to singers or collaborative artists. May be repeated for credit a total of 4 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 184C. Dramatic Vocal Arts: Songs and Scenes Onstage. 1-2 Unit.**

Studies in stagecraft, acting and performance for singers, culminating in a public performance. Repertoire to be drawn from the art song, opera, American Songbook and musical theater genres. Audition or consent of instructor required. May be repeated for credit a total of 4 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

Same as: TAPS 184C

**MUSIC 184CZ. Dramatic Vocal Arts: Songs and Scenes Onstage. 0 Units.**

Studies in stagecraft, acting and performance for singers, culminating in a public performance. Repertoire to be drawn from the art song, opera, American Songbook and musical theater genres. Audition or consent of instructor required. May be repeated for credit a total of 4 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 184D. Creating a Musical. 4 Units.**

This practical, hands on class in the making of musicals explores all aspects of creating musical theater, including writing, composing, producing, directing, designing, and casting this most American of theater genres. The class will include direct engagement and discussion with the producers and artists of TheatreWorks Silicon Valley's production of *The Bridges of Madison County*, book by Marsha Norman and music by Jason Robert Brown, including off-campus field trip to rehearsal of the show. The class will explore the creation of several renowned musicals including Stephen Sondheim's *Merrily We Roll Along*, and will include live Skype interviews with Broadway composers Andrew Lippa (*The Wild Party*), Paul Gordon (*Jane Eyre*), and David Hein and Irene Sankoff (*Come from Away*, winner of the 2017 Drama Desk Award for Best Musical). The quarter will culminate in the creation, production, and performance of several mini-musicals created by members of the class. Instructor Robert Kelley is the Founding Artistic Director of TheatreWorks Silicon Valley, where he has directed 170 productions, including many world and regional premieres.

Same as: TAPS 177C

**MUSIC 184E. Musical Theater Dance Styles. 1 Unit.**

Students will be able to demonstrate period specificity, character of style through learning different musical theater dances from the early 20th C. to the present. ALL students will participate in an end of quarter showing of the choreography developed and composed in class. nClass will be supplemented with the occasional guest, DJ accompaniment and video viewing.

Same as: DANCE 102

**MUSIC 185. Technologies of Musical Expression. 3 Units.**

Music is made and experienced through technology created for it. These technologies allow for expression but influence the result.

This course will utilize special collections, acoustical tools, music-making apps, live musicians, and media both historical and modern to reflect on the ways people make music expressive. The course is designed around creative projects and hands on experiences with digital and analogue media, player pianos, archival manuscripts, and sound sculptures to stimulate discussion about the role of technology in our musical experiences. Projects can include performances using digital and analogue media, performance art, creating player piano rolls, or performance ethnographies, etc. WAYS credit for 3 units and grade only.

**MUSIC 186. Religion and Music in South Asia. 4-5 Units.**

How music and other arts in South Asia are intertwined with religion. Classical, devotional, folk, and popular examples introduce Gods as musicians, sound as God, music as yoga, singing as devotion, music as *ecstasy*-inducing, music as site for doctrinal argument, music and religion as vehicles for nationalism. Co-taught by professors of Music and Religious Studies, focusing Hinduism and Islam in India, Pakistan, and the diaspora. Music practice along with academic study; guest artists and films; no background required.

Same as: MUSIC 286, RELIGST 259

**MUSIC 186B. American Song in the 20th Century and after. 3-4 Units.**

Critical and creative exploration of song in the Americas. About twenty-five key examples will guide discussion of the interactions between words, music, performance and culture. Weekly listening, reading and assignments will be organized around central themes: love, sex and romance; war and politics; labor and money; place; identity; society and everyday life. Genres include art song; blues, gospel, jazz and country; pop, soul, rock and hip-hop; bossa nova, nueva canción and salsa; electronic and experimental. Takehome and in-class assignments will include critical and creative writing, and music composition, production and performance; final projects may emphasize any of the above.

Same as: AMSTUD 186B, MUSIC 286B



**MUSIC 187. Music and Culture from the Land of Fire: Introduction to Azerbaijani Mugham. 1-5 Unit.**

Nestled in the Caucasus, Azerbaijan is a crossroads between East and West; its rich musical heritage contains threads of Turkish, Central Asian, Persian, Caucasian, Russian, and Arabic traditions. In this course, master-musician Imamyar Hasanov teaches students to perform and appreciate Azeri music. Content includes classical mugham, Eastern theory, improvisation and microtonality. We'll discuss Azeri music culture, supplemented by guest lecturers and Skype interviews with musicians in Azerbaijan. Open to students with any experience playing a musical instrument (including voice). No previous experience with Azeri music necessary. Supported by the SF World Music Festival. Questions? Email [schultzta@stanford.edu](mailto:schultzta@stanford.edu).

**MUSIC 18A. Jazz History: Ragtime to Bebop, 1900-1940. 3 Units.**

From the beginning of jazz to the war years.

Same as: AFRICAAM 18A

**MUSIC 18B. Jazz History: Bebop to Present, 1940-Present. 3 Units.**

Modern jazz styles from Bebop to the current scene. Emphasis is on the significant artists of each style.

Same as: AFRICAAM 18B

**MUSIC 192A. Foundations of Sound-Recording Technology. 3 Units.**

For upper division undergraduates and graduate students; preference given to Music majors with MST specialization. Topics: elementary electronics; the physics of sound transduction and microphone operation, selection, and placement; mixing consoles; connectors and device interconnection; grounding and shielding; principles of analog magnetic recording; operation maintenance of recording equipment; and principles of recording engineering. Enrollment limited. Prerequisites: MUSIC 150, algebra, physics basics, and consent of instructor.

**MUSIC 192B. Advanced Sound Recording Technology. 3 Units.**

Topics: noise reduction techniques; dynamics and time-delay audio effects; the principles of digital audio; disk- and tape-based digital recorders; digital audio workstations and editing; advanced multitrack techniques; SMPTE and MIDI time code and device synchronization; MIDI sequencing and synchronization. See <http://ccrma.stanford.edu/courses/>. Prerequisite: 192A.

**MUSIC 192C. Session Recording. 1-2 Unit.**

Independent engineering of recording sessions. May be repeated for credit a total of 14 times. Prerequisites: 192A,B.

**MUSIC 197. Undergraduate Teaching Apprenticeship. 1-2 Unit.**

Work in an apprentice-like relationship with faculty teaching a student-initiated course. Prerequisite: consent of instructor. (Staff).

**MUSIC 198. Concentrations Project. 4 Units.**

For concentration program participants only. Must be taken in senior year. Multiple concentrators may enroll in one section of 198 per concentration.

**MUSIC 199. Independent Study. 1-5 Unit.**

For advanced undergraduates and graduate students who wish to do work outside the regular curriculum. Before registering, student must present specific project and enlist a faculty sponsor. May be repeated for credit a total of 14 times.

**MUSIC 19A. Introduction to Music Theory. 3 Units.**

For non-music majors and Music majors or minors unable to pass the proficiency test for entry to MUSIC 21. The fundamentals of music theory and notation, basic sight reading, sight singing, ear training, keyboard harmony; melodic, rhythmic, and harmonic dictation. Skill oriented, using piano and voice as basic tools to develop listening and reading skills.

**MUSIC 19B. Intermediate Music Theory. 3 Units.**

This course is an introduction to music theory geared toward students who have basic literacy skills (i.e. fundamental notation, identifying major and minor scales, keys, etc). Using musical materials from repertoire selected from campus and area concerts, and incorporating the opportunity to attend these concerts, the course will introduce elements of harmony, melody, form, orchestration and arrangement. The course is an appropriate successor to Music 19A. Students who successfully complete Music 19B can go on directly to Music 21.

**MUSIC 1A. Music, Mind, and Human Behavior. 3 Units.**

An introductory exploration of the question of why music is a pervasive and fundamental aspect of human existence. The class will introduce aspects of music perception and cognition as well as anthropological and cultural considerations.

**MUSIC 1SI. Introduction to Indian Classical Music. 1 Unit.**

This is an introductory course in the classical music of India, with emphasis on learning to listen to and appreciate Indian classical music concerts. It will cover a broad overview of the two main genres of Indian classical music - Carnatic and Hindustani. We will have several in-class demonstrations of instruments unique to the Indian classical music tradition. Class meetings will include discussions of landmark performances and artists as well as fundamentals of this music style, such as Raaga (melody), Taala (rhythm), song structure, and improvisation.

**MUSIC 200A. Proseminar in Musicology and Music Bibliography. 3-4 Units.**

Introduction to research in music, bibliographical materials, major issues in the field, philosophy, and methods in music history. Guest lecturers and individual research topics.

**MUSIC 200B. Proseminar in Ethnomusicology. 3-5 Units.**

A graduate-level introduction to the field of ethnomusicology. Issues and debates are traced through the history of the discipline, with emphasis on influences from anthropology, performance studies, linguistics, and cultural studies. Topics include music and: social organization, "culture," structure, practice, comparison, representation, globalization, identity, transcription, and embodiment.

**MUSIC 201. CCRMA Colloquium. 1 Unit.**

Weekly review of work being done in the field, research taking place at CCRMA, and tools to make the most of the CCRMA technical facilities.

**MUSIC 202. Picturing Performance, Re-Envisioning the Arts. 2-4 Units.**

Critical and creative exploration of the performing body as captured on film. Viewing/listening includes musicals, dance and opera on film, music video, experimental film and video, and moments of heightened musicality in feature film. We'll focus on examples of moving media that possess a kinship with music through gesture, rhythm or affect and through visual parameters like décor, lighting, texture, camera movement and editing. Requirements include choosing and documenting a live performance, producing a short audiovisual work involving post-production, and weekly reading and viewing/listening assignments. No previous videomaking experience required.

Same as: MUSIC 102

**MUSIC 208C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.**

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 408C, REES 208C, REES 408C, RELIGST 208C, RELIGST 308C

**MUSIC 20A. Jazz Theory. 3 Units.**

Introduces the language and sounds of jazz through listening, analysis, and compositional exercises. Students apply the fundamentals of music theory to the study of jazz. Prerequisite: 19 or consent of instructor. Same as: AFRICAAM 20A

**MUSIC 20B. Advanced Jazz Theory. 3 Units.**

Approaches to improvisation through listening and transcribing, and developing familiarity with important contributors to this music. Topics: scale theory, altered dominants, and substitute harmony. Prerequisite: 20A or consent of instructor.

**MUSIC 20C. Jazz Arranging and Composition. 3 Units.**

Jazz arranging and composition for small ensembles. Foundation for writing for big band. Prerequisite: 20A or consent of instructor.

**MUSIC 21. Elements of Music I. 3 Units.**

Preference to majors. Introduction to tonal theory. Practice and analysis. Diatonic harmony focusing on melodic and harmonic organization, functional relationships, voice-leading, and tonal structures. Students must concurrently enroll in an Ear-training and musicianship lab (MUSIC 24a, 24b, or 24c as appropriate). Music majors must take 4 courses in ear training, and pass an ear training exit exam in their Junior year. Enrollment limited to 40. Prerequisites: (1) Piano Proficiency Exam (must be passed within the first two weeks of the term) or MUSIC 12A (may be taken concurrently); (2) Passing grade on a basic musical skills proficiency examination on the first day of class or MUSIC 19.

**MUSIC 22. Elements of Music II. 3 Units.**

Preference to majors. Introduction to chromatic harmony focusing on secondary functions, modulations, harmonic sequences, mode mixture, and the Neapolitan, and augmented sixth chords. Analysis of musical forms and harmonizations complemented by harmonic and melodic dictation, sight singing, and other practical skills. Students must concurrently enroll in an Ear-training and musicianship lab (MUSIC 24a, 24b, or 24c as appropriate). Music majors must take 4 courses in ear training, and pass an ear training exit exam in their Junior year. Prerequisites: (1) MUSIC 21; (2) Piano Proficiency Exam or MUSIC 12B (may be taken concurrently).

**MUSIC 220A. Fundamentals of Computer-Generated Sound. 2-4 Units.**

What are the basic tools that computer music researchers and artists use to create sound? This course will include a summary of digital synthesis techniques (additive, subtractive, wavetable, frequency modulation and physical-modeling), signal processing techniques for digital effects, (reverberation, panning, filters), and basic psychoacoustics. Programming experience is recommended, but not required. Course will use the ChuckK computer music language. Majors (undergraduate or graduate) must take for 4 units. See <http://ccrma.stanford.edu/>.

**MUSIC 220B. Compositional Algorithms, Psychoacoustics, and Computational Music. 2-4 Units.**

The use of high-level programming language as a compositional aid in creating musical structures. Advanced study of sound synthesis techniques. Simulation of a reverberant space and control of the position of sound within the space. This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit. See <http://ccrma.stanford.edu/>. Prerequisite: 220A.

**MUSIC 220C. Research Seminar in Computer-Generated Music. 2-4 Units.**

Individual projects in composition, psychoacoustics, or signal processing. See <http://ccrma.stanford.edu/>. May be repeated for credit. Prerequisite: 220B.

**MUSIC 220D. Research in Computer-Generated Music. 1-10 Unit.**

Independent research projects in composition, psychoacoustics, or signal processing. See <http://ccrma.stanford.edu/>. May be repeated for credit. Prerequisite: 220C.

**MUSIC 221. Topics in the History of Theory. 3-5 Units.**

The intersection of music theory and compositional practice in different eras of Western music history. Primary sources in music theory and issues such as notation, rhythm, mode, dissonance treatment, counterpoint, tonality, form, rhetoric, affect and imitation, expression, linear analysis, 12-tone and set theory, in light of relevant repertoire and modern scholarship. May be repeated for credit a total of 5 times.

**MUSIC 222. Sound in Space. 1-4 Unit.**

Historical background, techniques and theory on the use of space in music composition and diffusion. Listening and analysis of relevant pieces. Experimental work in spatialization techniques leading to short studies to be diffused in concert at the end of the quarter.

**MUSIC 223. Composition for Electronic Musicians. 1-4 Unit.**

Composition for any combination of acoustic and electroacoustic instrumentation, computer-generated sound, invented instruments, sound-sculptures, and multi-disciplinary elements including theater and visual media. Project-based laboratory to advance original student works, supported by lectures on the fundamentals of composition. Concert performance of final works. Taught at CCRMA with a focus on engendering deliberate conversation on the enrichment of a cultural context for new media. Open to undergraduates and graduates.

**MUSIC 23. Elements of Music III. 3 Units.**

Preference to majors. Continuation of chromatic harmony and complex forms of late Romantic period. Students must concurrently enroll in an Ear-training and musicianship lab (MUSIC 24a, 24b, or 24c as appropriate). Music majors must take 4 courses in ear training, and pass an ear training exit exam in their Junior year. Prerequisites: (1) MUSIC 22; (2) Piano Proficiency Exam or MUSIC 12C (may be taken concurrently).

**MUSIC 230. Advanced Orchestral Conducting. 2-4 Units.**

May be repeated for credit a total of 8 times. Prerequisite: 130B.

**MUSIC 231. Advanced Choral Conducting. 2-4 Units.**

Individual instruction continuing trajectory of Music 130C. Focus on gestural technique and analysis of works by genre and historical period. May be repeated for credit a total of 8 times. Prerequisite: 130C.

**MUSIC 236. Future Media, Media Archaeologies. 3-4 Units.**

Hand-on. Media technologies from origins to the recent past. Students create artworks based on Victorian era discoveries and inventions, early developments in electronic media, and orphaned technologies. Research, rediscover, invent, and create devices of wonder and impossible objects. Readings in history and theory. How and what media technologies mediate.

Same as: ARTSTUDI 236

**MUSIC 242J. Studies in Music of the Baroque: Monteverdi's Theater Music. 3-4 Units.**

Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.).

Same as: MUSIC 142J

**MUSIC 242K. Studies in Music of the Baroque: Handel the Cosmopolitan. 4-5 Units.**

Music history seminar on the operatic, sacred, and instrumental works of G.F. Handel as examples of the diversity, cosmopolitanism, expression, formal and technical features, and social uses of music in the first half of eighteenth century. Traces Handel's career from his native Germany to an elite Roman circle of musical connoisseurs, and to the Italian opera company he founded in London and his transformation of Italian opera into a new genre of English oratorio. By analyzing Handel's works in context, we examine the aesthetic, harmonic, and dramatic principles of the major European Baroque art-music genres. Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.).

Same as: MUSIC 142K

**MUSIC 243J. Studies in Music of the Classical Period: Franz Joseph Haydn. 3-4 Units.**

Music and Musicians in the Age of Enlightenment Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.).

Same as: MUSIC 143J

**MUSIC 243K. Studies in Music of the Classical Period: Mozart's Operas. 3-4 Units.**

Aesthetic, musical, and dramatic principles of 18th-century comic opera explored through W.A. Mozart's *Abduction from the Seraglio*, *Marriage of Figaro*, *Don Giovanni*, *Così fan tutte*, and *Magic Flute*. Comic strategies of exaggeration, farce, stock characters, ethnic caricature, and topsy-turvy social inversion; national traditions of Italian opera buffa and German Singspiel; musical forms and elements including recitative, aria, and ensemble. How Mozart's operas reflect 18th-century ideas about music, social organization, political authority, gender, sexuality, and rhetoric. Prerequisites: MUSIC 22, MUSIC 41. (WIM at 4-unit level only.). Same as: MUSIC 143K

**MUSIC 244J. Studies in Music of the Romantic Period: Faust in 19th-century Music. 3-4 Units.**

Prerequisites: MUSIC 23, MUSIC 42 (WIM at 4-unit level only.). Same as: MUSIC 144J

**MUSIC 244L. Studies in Music of the Romantic Period: Wagner: The Ring of the Nibelung. 3-4 Units.**

Richard Wagner's cycle of four operas, "Der Ring des Nibelungen" (1848-74), is one of the key documents of the mid nineteenth-century revolutionary fervor in Europe and a monument of radical artistic modernism of the period. The course will examine the artistic features of this unique work and place it in the complex ideological context of its time. Prerequisites: MUSIC 23, MUSIC 42 (WIM at 4-unit level only.). Same as: MUSIC 144L

**MUSIC 245J. Studies in Western Art Music Since 1900: The Music & Ideas of Charles Ives. 4 Units.**

Prerequisites: MUSIC 23, MUSIC 42. (WIM at 4-unit level only.). Same as: MUSIC 145J

**MUSIC 245K. Studies in Western Art Music Since 1900: Concepts of New Music. 4 Units.**

A survey of the history of Western classical music in the twentieth century, concentrating on shifts in the concept of New Music in the first half of the century. The aim is twofold: to study in depth a representative selection of works and to develop a historiographical framework for that study. Relevant concepts to be examined include Expressionism, Neo-Classicism, New Objectivity, Serialism, Aleatoricism, and Minimalism – all of them key terms used by music historians and critics to describe and delineate the multifaceted phenomenon of "New Music." Composers to be studied include Schoenberg, Stravinsky, Berg, Weill, Shostakovich, Reich and Glass, and others. Prerequisites: MUSIC 23, MUSIC 42. (WIM course for Music majors.). Same as: MUSIC 145K

**MUSIC 246J. Studies in Ethnomusicology: Listening to the Local: Music Ethnography of the Bay Area. 3-5 Units.**

An introduction to music ethnography through student research on musical life in the Bay Area. Focus is on the intersections of music, social life, and cultural practice by engaging with people as they perform music and culture in situ. Techniques taught include participant-observation, interviewing and oral history, writing field-notes, recording, transcription, analysis, and ethnographic writing. Pre-/co-requisite (for music majors): MUSIC 22. (WIM at 4 units only.). Same as: CSRE 146J, MUSIC 146J

**MUSIC 246K. Studies in Ethnomusicology: Music of South Asia. 3-5 Units.**

Focuses on the history, theory, and practice of South Asian music with particular emphasis on the classical traditions of North and South India. Also addresses regional folk, popular, and devotional musical styles of India, Pakistan, and Bangladesh. Topics include: raga, tala, vocal and instrumental genres, improvisation, aesthetics, music transmission, musical nationalism, social organization of musicians, music and ritual, music and gender, and technology. Lecture with discussion, some singing (no experience necessary), guest performances, reading, listening, and analysis. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 or 5 units only.). Same as: MUSIC 146K

**MUSIC 246L. Studies in Ethnomusicology: Musics of Africa and the African Diaspora. 3-5 Units.**

An introduction to musics of Africa and the African Diaspora. Topics include: music and nationalism, religion, embodiment, diaspora, migration, resistance, gender, globalization, and race. Musical regions and nations may include: Zimbabwe, South Africa, West Africa, Central Africa, Somalia, Ethiopia, the Caribbean, and the United States. This is a seminar-based course in which students will write short reflective papers and a final, research-based paper. Pre- or co-requisite for WIM credit: Music 22. WIM at 4 or 5 letter-graded units only. Same as: AFRICAAM 146L, AFRICAST 246L, MUSIC 146L

**MUSIC 247J. Studies in Music, Media, and Popular Culture: The Soul Tradition in African American Music. 3-4 Units.**

The African American tradition of soul music from its origins in blues, gospel, and jazz to its influence on today's r&b, hip hop, and dance music. Style such as rhythm and blues, Motown, Southern soul, funk, Philadelphia soul, disco, Chicago house, Detroit techno, trip hop, and neo-soul. Soul's cultural influence and global reach; its interaction with politics, gender, place, technology, and the economy. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.). Same as: AFRICAAM 19, AMSTUD 147J, CSRE 147J, MUSIC 147J

**MUSIC 247K. Studies in Music, Media, and Popular Culture: Music and Urban Film. 3-4 Units.**

How music and sound work in urban cinema. What happens when music's capacity to transform everyday reality combines with the realism of urban films? Provides an introduction to traditional theories of film music and film sound; considers how new technologies and practices have changed the roles of music in film. Readings discuss film music, realistic cinema, urban musical practices and urban culture. Viewing includes action/adventure, Hindi film, documentary, film noir, hip hop film, the musical, and borderline cases by Jean-Luc Godard, Spike Lee, Wong Kar-Wai and Tsai Ming-Liang. Pre- or corequisite (for music majors): MUSIC 22. (WIM at 4 unit level only.). Same as: MUSIC 147K

**MUSIC 247L. Studies in Music, Media, and Popular Culture: Latin American Music and Globalization. 3-4 Units.**

Focuses on vernacular music of Latin America and the Caribbean, including Mexico, Cuba, Dominican Republic, Peru, Brazil, Colombia, and Argentina. Musical examples discussed in relation to: globalization, migration, colonialism, nationalism, diaspora, indigeneity, politics, religion, dance, ethnicity, and gender. How music reflects and shapes cultures, identities, and social structures. Genres addressed: bachata, bossa nova, cumbia, forro, ranchero, reggaeton, rock, salsa, tango, and others. Seminar, guest performances, reading, listening, and analysis. Pre-/corequisite (for music majors): MUSIC 22. (WIM at 4 units only.). Same as: CHILATST 147L, CSRE 147L, MUSIC 147L

**MUSIC 248J. Studies in Perf Practice: Reactions to the Record: Early Recordings, Lost Styles, and Music's Future. 3-4 Units.**

This is a seminar on the transformation of musical style in the era of recordings in light of their roots in cultural trends, including shifting hierarchies between composer and performer, work and notation, text and act. Early recordings will be studied as documents of musical values and conceptions different from those around us today. Methodologies of performance analysis will be explored and used to contextualize sources, which include historic recordings from Stanford's Archive of Recorded Sound, performance documents, and field research with performers, composers, critics, and listeners. Repertoire includes works for orchestra, piano, strings, chamber ensemble and voice. Outstanding contributions from seminar members may be featured in the Music Department's May 2014 Reactions to the Record symposium. May be repeated for credit. Pre- or corequisite (for music majors): MUSIC 22. (WIM at 4-unit level only.)

Same as: MUSIC 148J

**MUSIC 24A. Ear Training I. 1-2 Unit.**

Class is closed by design. Please contact instructor Erika Arul (mailto:earul@stanford.edu) for permission to enroll.

**MUSIC 24B. Ear Training II. 1-2 Unit.**

Class is closed by design. Please contact instructor Erika Arul (mailto:earul@stanford.edu) for permission to enroll.

**MUSIC 24C. Ear Training III. 1-2 Unit.**

Class is closed by design. Please contact instructor Erika Arul (mailto:earul@stanford.edu) for permission to enroll.

**MUSIC 24K. Keyboard Harmony. 1 Unit.**

In this practical introduction to keyboard harmony, students learn to play, analyze and improvise chord progressions at the keyboard. The course covers reading figured bass, playing chord progressions in all major and minor keys, and score reading. Students also analyze and perform solo repertoire that progresses through the semester from simple pieces to the level of a Bach invention and chorale. Preference given to majors. Keyboard harmony supports material learned in MUSIC 24B and 24C and counts as an ear training course. Prerequisites: (1) Piano Proficiency Exam, (2) MUSIC 24A.

**MUSIC 25. Decoding Anime. 3 Units.**

Anime as an artistic form often boasts highly imaginative graphics, striking music, vibrant characters, and fantastical stories. The course aims at decoding the expressive power of anime by applying a method of multimedia analysis that focuses on the interaction between its component elements: story, image, sound and music. Through close reading of works by five leading and innovative directors the students will develop tools to analyze anime and interpret it in a larger cultural context.

**MUSIC 250A. Physical Interaction Design for Music. 3-4 Units.**

This lab and project-based course explores how we can physically interact with real-time electronic sound. Students learn to use and design sensors, circuits, embedded computers, communication protocols and sound synthesis. Advanced topics include real-time media, haptics, sound synthesis using physical model analogs, and human-computer interaction theory and practice. Course culminates in musical performance with or exhibition of completed design projects. A \$50 lab fee will be added to your bill upon enrollment in this course. See <http://ccrma.stanford.edu/>.

**MUSIC 250B. Interactive Sound Art. 1-4 Unit.**

A project based course where students will create Interactive Sound Art Installations focusing on the acoustical properties of reverberation. See <http://ccrma.stanford.edu/courses/250b/>.

**MUSIC 251. Psychophysics and Music Cognition. 1-5 Unit.**

Lecture, lab and experiment-based course in perception, psychoacoustics, cognition, and neuroscience of music. (WIM at 4 or 5 units only.)

**MUSIC 252. Introduction to Music Notation Software. 1-2 Unit.**

Learn to use music notation programs Finale®, Sibelius® and open-source alternatives.

**MUSIC 253. Symbolic Musical Information. 2-4 Units.**

Focus on symbolic data for music applications including advanced notation systems, optical music recognition, musical data conversion, and internal structure of MIDI files.

Same as: CS 275A

**MUSIC 254. Music Query, Analysis, and Style Simulation. 2-4 Units.**

Leveraging off three synchronized sets of symbolic data resources for notation and analysis, the lab portion introduces students to the open-source Humdrum Toolkit for music representation and analysis. Issues of data content and quality as well as methods of information retrieval, visualization, and summarization are considered in class. Grading based primarily on student projects. Prerequisite: 253 or consent of instructor. Same as: CS 275B

**MUSIC 255. Intermedia Workshop. 3-4 Units.**

Students develop and produce intermedia works. Musical and visual approaches to the conceptualisation and shaping of time-based art. Exploration of sound and image relationship. Study of a wide spectrum of audiovisual practices including experimental animation, video art, dance, performance, non-narrative forms, interactive art and installation art. Focus on works that use music/sound and image as equal partners. Limited enrollment. Prerequisites: consent of instructors, and one of FILMPROD 114, ARTSTUDI 131, 138, 167, 177, 179, or MUSIC 123, or equivalent. May be repeated for credit.

Same as: ARTSTUDI 239, MUSIC 155

**MUSIC 256A. Music, Computing, Design I: Art of Design for Computer Music. 3-4 Units.**

Creative design for computer music software. Programming, audiovisual design, as well as software design for musical tools, instruments, toys, and games. Provides paradigms and strategies for designing and building music software, with emphases on interactive systems, aesthetics, and artful product design. Course work includes several programming assignments and a "design+implement" final project. Prerequisite: experience in C/C++ and/or Java. See <https://ccrma.stanford.edu/courses/256a/>.

Same as: CS 476A

**MUSIC 256B. Music, Computing, Design II: Virtual and Augmented Reality for Music. 3-4 Units.**

Aesthetics, design, and exploration of creative musical applications of virtual reality (VR) and augmented reality (AR), centered around VR and mobile technologies. Comparison between AR, VR, and traditional software design paradigms for music. Topics include embodiment, interaction design, novel instruments, social experience, software design + prototyping. Prerequisite: MUSIC 256A / CS 476A.

Same as: CS 476B

**MUSIC 257. Neuroplasticity and Musical Gaming. 3-5 Units.**

What changes in a musician's brain after hours and years of daily practice? How do skills that make a great violinist transfer to other abilities? Can directed neuroplasticity be used to target skill learning? This course will include fundamentals of psychoacoustics and auditory neuroscience. Focus will be development of video games that use perceptually motivated tasks to drive neural change. Emphasis will be on music, linguistic, and acoustic based skills. Programming experience is highly recommended, but not required.

**MUSIC 264. Musical Engagement: Use correlation analysis and big data to identify and predict musical behaviors. 1-3 Unit.**

The course will use data analysis to explore why people engage in music. The course will be one part lab, one part seminar, meeting once a week for two hours. Students will learn to apply correlation analysis to a vast corpus of actual performance data using the latest analytics and query tools, developing insights into what motivates the musical preferences and behaviors of both performers and listeners. A basic proficiency in Java, MatLab, and SQL query language will be developed along the way.

**MUSIC 269. Research in Performance Practices. 1-5 Unit.**

Directed reading and research. May be repeated for credit a total of 5 times.

**MUSIC 26N. Japanese Arts: a Creative Exploration. 4 Units.**

The striking originality of Japanese contemporary culture seems to defy unifying pressures of globalization. What are the sources of this originality? Can it be traced to the unique and sophisticated art forms like rock gardens, haiku, tea ceremony, martial arts, ikebana and Noh Theater or to the illusive aesthetic notions of wabi, sabi, yūgen, ma or jo-ha-kyū? Exploration of Japanese arts through comparative examination and direct engagement. Creative projects and workshops in traditional Japanese arts.

**MUSIC 272A. Advanced Piano. 1-3 Unit.**

Private lessons and group masterclass weekly. May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 272B. Advanced Organ. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 272C. Advanced Harpsichord. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 272D. Advanced Jazz Piano. 1-3 Unit.**

By invitation only; priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 272E. Advanced Fortepiano. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 272F. Advanced Carillon. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 272G. Advanced Gu-Zheng. 1-3 Unit.**

Private lesson weekly. May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 273. Advanced Voice. 1-3 Unit.**

Private lessons and group master class weekly. May be repeated for credit. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 274A. Advanced Violin. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 274B. Advanced Viola. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 274C. Advanced Violoncello. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 274D. Advanced Contrabass. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 274E. Advanced Viola da Gamba. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 274F. Advanced Classical Guitar. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 274G. Advanced Harp. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 274H. Advanced Baroque Violin. 1-3 Unit.**

May be repeated for credit a total of 14 times. Admission is by audition only. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.



**MUSIC 27N. The British Invasion. 3 Units.**

Examination of three generations of British popular music in the '60s and '70s: the Beatles (and the Rolling Stones, the Kinks, the Who); progressive rock (art rock) as embodied in Pink Floyd, Yes, King Crimson, Genesis, and Emerson, Lake, and Palmer; the emergence of punk in its revolutionary (the Clash) and nihilistic (the Sex Pistols) forms. Among other issues, the manner in which marginal American culture (particularly African-American blues) is neglected by Americans and venerated by foreigners and the subsequent mainstream consumption of a transformed and repackaged American minority culture is discussed.

**MUSIC 280. TA Training Course. 1 Unit.**

Required for doctoral students serving as teaching assistants. Orientation to resources at Stanford, guest presentations on the principles of common teaching activities, supervised teaching experience. Students who entered in the Autumn should take 280 in the Spring prior to the Autumn they begin teaching.

**MUSIC 286. Religion and Music in South Asia. 4-5 Units.**

How music and other arts in South Asia are intertwined with religion. Classical, devotional, folk, and popular examples introduce Gods as musicians, sound as God, music as yoga, singing as devotion, music as  $\zeta$ ecstasy $\zeta$ -inducing, music as site for doctrinal argument, music and religion as vehicles for nationalism. Co-taught by professors of Music and Religious Studies, focusing Hinduism and Islam in India, Pakistan, and the diaspora. Music practice along with academic study; guest artists and films; no background required.

Same as: MUSIC 186, RELIGST 259

**MUSIC 286B. American Song in the 20th Century and after. 3-4 Units.**

Critical and creative exploration of song in the Americas. About twenty-five key examples will guide discussion of the interactions between words, music, performance and culture. Weekly listening, reading and assignments will be organized around central themes: love, sex and romance; war and politics; labor and money; place; identity; society and everyday life. Genres include art song; blues, gospel, jazz and country; pop, soul, rock and hip-hop; bossa nova, nueva canción and salsa; electronic and experimental. Takehome and in-class assignments will include critical and creative writing, and music composition, production and performance; final projects may emphasize any of the above.

Same as: AMSTUD 186B, MUSIC 186B

**MUSIC 28N. Queer Lives in Music. 3 Units.**

Queer Lives in Music examines music by queer musicians in genres including punk, opera, rock, symphony, musical theater, folk, and jazz. We will study lesbian, gay, bisexual, transgender, and queer composers, performers, and listeners, to learn how queer people have expressed individual identity and built communities through music. We will learn how sexual stigma, taboo, oppression, and resistance have impacted musical creativity and music history. Class is designed for students interested in music, social history, cultural studies, and gender/sexuality studies.

Same as: FEMGEN 28N

**MUSIC 2A. The Symphony. 3 Units.**

Symphonic literature 1750 to the present, with emphasis on developing listening skills and preparation for attending a live performance. Ability to read music not required.

**MUSIC 2C. An Introduction to Opera. 3 Units.**

The lasting appeal of opera as a lavishly hybrid genre from the 1600s to the present. How and why does opera set its stories to music? What is operatic singing? Who is the audience? How do words, music, voices, movement, and staging collaborate in different operatic eras and cultures? Principal works by Monteverdi, Handel, Mozart, Verdi, Wagner, Strauss, Britten, and Adams. Class studies and attends two works performed by the San Francisco Opera.

**MUSIC 300A. Medieval Notation. 3-4 Units.**

Western notation of the Middle Ages and Renaissance: principles, purposes, and transcription.

**MUSIC 300B. Renaissance Notation. 3-4 Units.**

Western notation of the Middle Ages and Renaissance: principles, purposes, and transcription.

**MUSIC 300C. Medieval Methodologies. 1-3 Unit.**

An introduction to the essential tool-kit for medievalists, this course will give all medievalists a great head start in knowing how to access and interpret major works and topics in the field. Stanford's medieval faculty will explain the key sources and methods in the major disciplines from History to Religion, French to Arabic, English to Chinese, and Art History to German and Music. In so doing, students will be introduced to the breadth and interdisciplinary potential of Medieval Studies. A workshop devoted to Digital Technologies and Codicology/Palaography will offer elementary training in these fundamental skills.

Same as: DLCL 300, ENGLISH 300

**MUSIC 302. Research in Musicology. 1-5 Unit.**

Directed reading and research. May be repeated for credit a total of 14 times.

**MUSIC 305A. Analysis and Repertoire: Medieval and Renaissance. 4 Units.**

Analytical approaches to genres, styles, forms, and techniques of Western music from [chant and early polyphony through the sixteenth century]. Issues of aesthetics, history, and interpretation viewed through representative repertoire, readings, and analytical methods.

**MUSIC 305B. Analysis and Repertoire: Baroque to Early Romantic. 4 Units.**

Analytical approaches to genres, styles, forms, and techniques of Western music from the seventeenth through the mid-nineteenth centuries. Issues of aesthetics, history, and interpretation viewed through representative repertoire, readings, and analytical methods.

**MUSIC 305C. Analysis and Repertoire: Late-Romantic to Contemporary. 3-4 Units.**

Analytical approaches to genres, styles, materials and techniques of Western music from the mid-nineteenth century through the present. Questions of aesthetics, history and performance explored through musical analysis. Representative repertoire and readings, and a range of analytical methods.

**MUSIC 305D. Analysis from a Compositional Perspective. 4 Units.**

Introduction to analysis, examining diverse examples in part chosen from, otherwise supplementing and illuminating, the graduate composers' qualifying exam list; consideration of aesthetic premises and motivations, and of implications for contemporary compositional practice.

**MUSIC 30N. A Stranger in a Strange Land: Jewish Musics in Translation. 3 Units.**

What does it mean to be a stranger in a strange land? For centuries Jewish people have struggled to shape their identities in unfamiliar surroundings, using music to remember the past and generate new, hybrid identities. In this class we adopt the metaphor of translation to think about how minority Jewish communities bridge distinct languages, musical idioms, and cultural practices. Our theme will take us on a journey across time and space; from Italy to India, New York, Syria, Russia, and Israel. We consider the case of Salamone Rossi, a 17th-century Italian Jewish composer who moved uneasily between dual careers in the synagogue and a secular/Christian court. We also explore a group of Indian Jews (Bene Israel) who combine idioms learned from Jewish and Christian missionaries with local Hindu musical traditions. In all our examples musicians translate languages, musical styles, and cultures to unite memories of a Jewish past with the realities of minority status in the present. The class format includes listening, discussion, some singing, student presentations, and guest lectures.

**MUSIC 310. Research Seminar in Musicology. 3-5 Units.**

For graduate students. Topics vary each quarter. May be repeated for credit a total of 8 times.

**MUSIC 312A. Aesthetics and Criticism of Music, Ancients and Moderns: Plato to Nietzsche. 3-4 Units.**

For graduate students. Primary texts focusing on the nature, purposes, and uses of music and other arts.

**MUSIC 312B. Aesthetics and Criticism of Music, Contemporaries: Heidegger to Today. 3-4 Units.**

For graduate students. Primary texts focusing on the nature, purposes, and uses of music and other arts.

**MUSIC 318. Advanced Acoustics. 1-5 Unit.**

Current topics. May be repeated for credit.

**MUSIC 319. Research Seminar on Computational Models of Sound Perception. 1-3 Unit.**

All aspects of auditory perception, often with emphasis on computational models. Topics: music perception, signal processing, auditory models, pitch perception, speech, binaural hearing, auditory scene analysis, basic psychoacoustics, and neurophysiology. See <http://ccrma.stanford.edu/courses/>. May be repeated for credit a total of 14 times.

**MUSIC 31N. Perspectives in North American Taiko. 3 Units.**

Preference to Freshman. Taiko, or Japanese drum, is a newcomer to the American music scene. Emergence of the first N. American taiko groups coincided with increased Japanese American activism, and to some it is symbolic of Japanese American identity. N. American taiko is associated with Japanese American Buddhism. Musical, cultural, historical, and political perspectives of taiko. Hands-on drumming. Japanese music and Japanese American history, and relations among performance, cultural expression, community, and identity.

Same as: ASNAMST 31N

**MUSIC 320A. Introduction to Audio Signal Processing Part I: Spectrum Analysis. 3-4 Units.**

Digital signal representations and transforms for music and audio research. Topics: complex numbers, sinusoids, spectrum representation, sampling and aliasing, the Discrete Fourier Transform (DFT), Fourier theorems, z transform, Laplace transform, and associated Matlab software. See <http://ccrma.stanford.edu/courses/320/>.

**MUSIC 320B. Introduction to Audio Signal Processing Part II: Digital Filters. 3-4 Units.**

Digital filters for music and audio research. Topics: digital filter structures, frequency response, z transforms, transfer-function analysis, and associated Matlab software. See <http://ccrma.stanford.edu/courses/320/>.

**MUSIC 321. Readings in Music Theory. 1-5 Unit.**

Directed reading and research. May be repeated for credit a total of 15 times.

**MUSIC 323. Doctoral Seminar in Composition. 3-4 Units.**

Illustrated discussions of compositional issues and techniques. Presentation of relevant topics, including students' own compositional practice. May be repeated for credit a total of 14 times.

**MUSIC 324. Graduate Composition Forum. 1 Unit.**

Community forum for all graduate student composers. Discussion of completed and in-progress work by students, faculty, and visiting composers. Repertoire listening sessions. Planning of upcoming Department events. Special area exam topic presentations, final doctoral project presentations, and review of portfolios. Many sessions are open to the public. May be repeated for credit.

**MUSIC 325. Individual Graduate Projects in Composition. 1-5 Unit.**

May be repeated for credit.

**MUSIC 32N. Sculpting with Sounds, Images, and Words. 3 Units.**

Throughout history and from East to West, cultures abound in multimedia forms. Whether in Coldplay's Music Video or Fantasia, Pepsi TV ads or Wagner's opera, Miyazaki anime or traditional Noh Theater of Japan, the three modes of expression (sounds, images, and word) are interwoven in distinctive ways. What are their individual and combined powers? How can one harness them in an online context? Can Web be a stage for multimedia theater? What is unique about the poetry of intermodal metaphor? The course will be an opportunity to face these questions in creative web-based projects as well as through in-class viewing of multimedia works, analysis and debates, readings, and student presentations. The seminar will be taught at the Center for Computer Research in Music and Acoustics where students will have access to new media technologies. Prior experience in music, literature, art practice or computer programming is welcome but not required.

**MUSIC 330. Musicology Dissertation Colloquium. 1-4 Unit.**

Weekly meetings for all musicology students 4th year and beyond to discuss research and writing strategies, share and critique work in progress, and discuss issues in professional development (preparing abstracts, conference papers, C.V. and job interviews, book reviews, submitting articles for publication). Open to 3rd-year students.

**MUSIC 333. Food, Text, Music: A Multidisciplinary Lab on the Art of Feasting. 3-5 Units.**

Students cook a collection of unfamiliar recipes each week while learning about the cultural milieus in which they originated. The course focuses on the fourteenth and fifteenth centuries, a time of great banquets that brought together chefs, visual artists, poets, musicians, and dancers. Students read late-medieval cookbooks under the guidance of professional chefs, learn songs and poetry with the help of visiting performers, and delve into a burgeoning scholarly literature on food history and sensory experience. We will also study trade routes and food networks, the environmental impact of large-scale banquets, the science of food, and the politics of plenty. This course may count towards the Medieval component of the French major, and corresponds to DLCL 121, a course requirement for the Medieval Studies Minor. Students interested in applying for course need to email Professors Galvez and Rodin (<mailto:mgalvez@stanford.edu> and <mailto:jrodin@stanford.edu>) with a statement of intent and dietary restrictions/preferences. Same as: FRENCH 166, FRENCH 366, MUSIC 133

**MUSIC 33N. Beethoven. 3 Units.**

This seminar is designed as an in-depth introduction to the music of Ludwig van Beethoven. In addition to exploring the composer's principal works in a variety of genres (symphonies, piano sonatas, string quartets, opera, etc.), we will consider broader questions of biography and reception history. How have images of the composer and the fortunes of his music changed over time? How did his compositions come to define the paradigm of Western classical music? What impact has he had on popular culture? The class is open to all levels of musical expertise; the ability to read music is not a requirement. Come prepared to discover – or rediscover – some great music!.

**MUSIC 341. Ph.D Dissertation. 1-10 Unit.**

May be repeated for credit a total of 5 times.

**MUSIC 34N. Performing America: The Broadway Musical. 3 Units.**

Musical theater as a site for the construction of American identity in the twentieth century to the present. Issues of class, race, gender, and sexuality; intersections with jazz, rock, and pop; roles of lyricist, composer, director, choreographer, producer, performers. Individual shows (Showboat, Oklahoma, South Pacific, Guys and Dolls, West Side Story, Wicked, Book of Mormon, Hamilton, Dear Evan Hansen), show tunes in jazz performance, film musicals, and television. Opportunities for performance and attendance at local productions.

**MUSIC 351A. Seminar in Music Perception and Cognition I. 1-3 Unit.**

A seminar on topics in music perception and cognition. Students will study and discuss recent research as well as design and implement experiments.



**MUSIC 351B. Seminar in Music Perception and Cognition II: Musical Gesture. 1-3 Unit.**

Exploring how musical activities are related to gestural communication by surveying recent human behavioural literature and forming own interest-driven research questions. Reviewed research topics include different techniques in music gesture recording and analysis, auditory perception related to gesture, and issues related to educational and therapeutic applications. The class activities involve discussions on articles and on experimental designs for possible research proposals.

**MUSIC 364. Data-Driven Research in Music Cognition. 2-4 Units.**

Project-based course exploring the impact of music on human behavior using evidence of user engagement with music in large-scale datasets including publicly available industrial and social-media data and corpuses published for research purposes. Data-driven research complements laboratory-based behavioral and imaging research by focusing on framing and addressing music-related questions using pre-existing datasets. Class meetings include lectures, guest speakers, and student discussions of background literature and projects. Assignments include weekly readings, labs, and a final project. Basic musical proficiency is required. Experience with programming, data visualization, statistics, or music cognition is desirable.

**MUSIC 36H. Dangerous Ideas. 1 Unit.**

Ideas matter. Concepts such as race, progress, and evil have inspired social movements, shaped political systems, and dramatically influenced the lives of individuals. Others, like religious tolerance, voting rights, and wilderness preservation play an important role in contemporary debates in the United States. All of these ideas are contested, and they have a real power to change lives, for better and for worse. In this one-unit class we will examine these dangerous ideas. Each week, a faculty member from a different department in the humanities and arts will explore a concept that has shaped human experience across time and space. Some weeks will have short reading assignments, but you are not required to purchase any materials.

Same as: ARTHIST 36, COMPLIT 36A, EALC 36, ENGLISH 71, FRENCH 36, HISTORY 3D, PHIL 36, POLISCI 70, RELIGST 21X, SLAVIC 36

**MUSIC 36N. Humor in Music. 3 Units.**

Through theoretical readings the course will touch on psychological and neurological bases of humor, explore contingent, tactical, modal, and ontological difficulties in the apprehension of humor, and address ethical issues surrounding humor in music. In addition to in-class listening and screening sessions, analytic discussions will be led by students who will find and present examples of humor in music. Students will also be invited to compose original humorous song lyrics and to create collaborative works of musical humor.

**MUSIC 37N. Ki ho'alu: The New Renaissance of a Hawaiian Musical Tradition. 3 Units.**

Preference to freshman. Developed in the Hawaiian Islands during the 1830s, *ki ho'alu*, or Hawaiian slack key guitar, is an art form experiencing newfound popularity coinciding with the growth of political activism in Hawaiian culture. The musical, cultural, historical, and political perspectives of Hawaiian music and *ki ho'alu*, through hands-on experience, readings, discussion, and workshops. Hawaiian music and history and relationships among performance, cultural expression, community, and identity.

**MUSIC 38N. Singing Early Music. 3 Units.**

Preference to freshmen. 15th- and 16th-century musical repertoires and their contexts; performance practice.

**MUSIC 390. Practicum Internship. 1 Unit.**

On-the-job training under the guidance of experienced, on-site supervisors. Meets the requirements for curricular practical training for students on F-1 visas. Students submit a concise report detailing work activities, problems worked on, and key results. May be repeated for credit. Prerequisite: qualified offer of employment and consent of adviser.

**MUSIC 399. D.M.A. Final Project. 1-10 Unit.**

May be repeated for credit a total of 5 times.

**MUSIC 39A. Music, Health, and Medicine. 3 Units.**

Explore how music relates to health and medicine surveying recent medical literature. Review different techniques in music therapy, music-related health problems, and issues related to educational and medical applications. Course materials are chosen to clearly identify music as a component of health related activity or occupation, to describe responses to music in our mind and body, and to think about the roles of music in our health. The seminars also discuss related basics in psychology and neurology. Students learn how to do literature search and write essays about relevant topics.

**MUSIC 39N. The Classical String Quartet: Haydn, Mozart, Beethoven & Schubert. 3 Units.**

This seminar, an in-depth historical survey of canonic works from the string quartet repertory, is intended for performers and non-performers alike. Topics to be explored include the origins of the genre in the pre-classical period; the establishment of enduring conventions in the early quartets of Haydn; aesthetic criteria that distinguish the approaches of Haydn and Mozart; the epoch-defining shifts in musical composition that are reflected in Beethoven's works for the medium; the tension between classicism and romanticism in the chamber music of Schubert; and issues of historical performance practice. Field trips will include a visit to the Beethoven Center in San Jose and attending chamber music concerts on campus. The St. Lawrence String Quartet (Stanford's ensemble-in-residence) will be joining the seminar on a regular basis to provide live demonstrations and coaching. Students who are string players are strongly encouraged to bring their instruments to class. Class activities will cover history, criticism, analysis, and performance (usually in combination). Informed listening is a primary goal of the seminar. Assignments will be tailored to student interests and abilities.

**MUSIC 40. Music History to 1600. 4 Units.**

Pre- or corequisite: 21.

**MUSIC 408C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.**

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 208C, REES 208C, REES 408C, RELIGST 208C, RELIGST 308C

**MUSIC 41. Music History 1600-1830. 4 Units.**

Pre- or corequisite: 22.

**MUSIC 42. Music History Since 1830. 4 Units.**

Pre- or corequisite: 23.

**MUSIC 420A. Signal Processing Models in Musical Acoustics. 3-4 Units.**

Computational methods in musical sound synthesis and digital audio effects based on acoustic physical models. Topics: mass-spring-dashpot systems; electric circuit analogies; finite difference schemes; state-space models and the modal representation; impedance; ports; acoustic simulation using delay lines, digital filters, and nonlinear elements; interpolation and sampling-rate conversion; delay effects; wave digital filters; real-time computational models for musical instruments and effects, both acoustic and electronic. See <http://ccrma.stanford.edu/courses/420/>. Prerequisites: MUSIC 320A and MUSIC 320B or equivalent; PHYSICS 21 or equivalent course applying Newton's laws of motion; and CS 106B or equivalent programming in C and C++.

**MUSIC 421A. Audio Applications of the Fast Fourier Transform. 3-4 Units.**

Spectrum analysis and signal processing using Fast Fourier Transforms (FFTs) with emphasis on audio applications. Topics: Fourier theorems; FFT windows; spectrum analysis; spectrograms; sinusoidal modeling; spectral modeling synthesis; FFT convolution; FIR filter design and system identification; overlap-add and filter-bank-summation methods for short-time Fourier analysis, modification, and resynthesis. See <http://ccrma.stanford.edu/courses/421/>. Prerequisites: Music 320A and Music 320B or equivalent background in spectrum analysis and linear systems. Same as: FFT

**MUSIC 421N. Deep Learning for Music and Audio. 1 Unit.**

Seminar reviewing the development of deep-learning methods in music and audio fields. See the course website for latest information: <http://ccrma.stanford.edu/courses/mus421n/>.

**MUSIC 422. Perceptual Audio Coding. 3 Units.**

History and basic principles: development of psychoacoustics-based data-compression techniques; perceptual-audio-coder applications (radio, television, film, multimedia/internet audio, DVD, EMD). In-class demonstrations: state-of-the-art audio coder implementations (such as AC-3, MPEG) at varying data rates; programming simple coders. Topics: audio signals representation; quantization; time to frequency mapping; introduction to psychoacoustics; bit allocation and basic building blocks of an audio codec; perceptual audio codecs evaluation; overview of MPEG-1, 2, 4 audio coding and other coding standards (such as AC-3). Prerequisites: knowledge of digital audio principles, familiarity with C programming. Recommended: 320, EE 261. See <http://ccrma.stanford.edu/>.

**MUSIC 423. Graduate Research in Music Technology. 1-10 Unit.**

Research discussion, development, and presentation by graduate students, visiting scholars, and CCRMA faculty in the areas of music and/or audio technology. Permission of instructor required. See <http://ccrma.stanford.edu/courses/423/> for latest information. May be repeated for credit.

**MUSIC 424. Signal Processing Techniques for Digital Audio Effects. 3-4 Units.**

Techniques for dynamic range compression, reverberation, equalization and filtering, panning and spatialization, digital emulation of analog processors, and implementation of time-varying effects. Single-band and multiband compressors, limiters, noise gates, de-essers, convolutional reverberators, parametric and linear-phase equalizers, wah-wah and envelope-following filters, and the Leslie. Students develop effects algorithms of their own design in labs. Prerequisites: digital signal processing, sampling theorem, digital filtering, and the Fourier transform at the level of 320 or EE 261; Matlab and modest C programming experience. Recommended: 420 or EE 264; audio effects in mixing and mastering at the level of 192.

**MUSIC 434. Gender and Performance. 5 Units.**

This seminar seeks to investigate relationships between performance, gender, and the body politic through a discussion of embodiment, body cultures, queerness, desire, representation. Through a weekly engagement with film texts from across the world as well as theoretical perspectives on gender and performance in various geo-political contexts, we will explore the intersections of gender with race, class, national discourse, and performance traditions. The seminar is conceived to be interdisciplinary and participants are encouraged to introduce and work with texts from other disciplines, including visual arts, theatre, dance, literature etc. No prior engagement with film studies is required. Screening times may range from 90 to 180 minutes. Same as: FEMGEN 434, FILMSTUD 434, TAPS 344A

**MUSIC 451A. Basics in Auditory and Music Neuroscience. 2-5 Units.**

Understanding basic concepts and techniques in cognitive neuroscience using electroencephalography (EEG) specific to auditory perception and music cognition via seminar and laboratory exercise work. Acquiring and practicing skills in experimental design, data analysis, and interpretation, writing for scientific reports and research proposals, and giving a critical review of others' scientific work. Seminar discusses related literature in neuroanatomy, neurophysiology, psychology, and neuroimaging. Laboratory focuses on electroencephalography (EEG) techniques, classic paradigms for recording evoked response, and associated data analysis methods.

**MUSIC 451B. Advanced Research in Auditory and Music Neuroscience. 2-5 Units.**

Advancing research skills in cognitive neuroscience specific to auditory perception and music cognition by doing individual research project. Activities include surveying literature, designing own study, discussing other's research and giving constructive criticisms, writing research proposals, reports and critical reviews. Laboratory works covers advanced electroencephalography (EEG) recording and analysis techniques. Seminar discusses related literature in basic and clinical research in neurophysiology and neuropsychology. Final project is aimed at producing presentable data based on hypothesis-driven experiment. Prerequisite: Music 451A.

**MUSIC 451C. Auditory EEG Research III: Coordinated Actions and Hyperscanning. 2-5 Units.**

Advancing EEG research skills in cognitive neuroscience specific to music cognition by conducting a group research project. In particular, this course focuses on basics for 2-person EEG (hyperscanning) paradigms and explores how coordinated actions and social interactions during musical ensemble are processed in the two brains. Laboratory works covers advanced electroencephalography (EEG) recording and analysis techniques specifically for oscillation and phase coherence across brain areas and between subjects. Seminar activities include surveying literature, discussing research articles and giving criticisms, and writing research reports. Lab scheduled separately Prerequisite: Music 451A.

**MUSIC 45I. Interactive Introduction to North American Taiko. 1 Unit.**

Taught by Stanford Taiko members. Techniques and history. No experience necessary. May be repeated for credit. This course was initiated by Mitchell Fukumoto and Stanford Taiko.

**MUSIC 50. Arts in Context: The Process of Cultural Production. 1-2 Unit.**

A combination of practical skill-building and discussions with practicing arts professionals, this course will provide students with the foundational skills necessary to produce programs on campus and/or work in the arts. The talks and workshops will cover topics including curatorial practice and programming (for both visual and performing arts); grant writing and other fundraising methodology; budgeting and financial management; contracts and other legal considerations; and public relations and marketing. Every session is open for drop-in attendance, or students may take the entire series for credit. May be repeat for credit. Same as: ARTSINST 50, TAPS 50

**MUSIC 55I. Insiders Guide to Music Production: The Modern Applications of Digital Audio. 2 Units.**

Learn how to produce music on computer. Class focus on achieving fluence in a digital audio workstation and fostering creativity within the music-making process. Practical mixing techniques, fundamental audio editing practices, and ow to create sounds from scratch. Final project (song) that utilizes techniques taught in class. No prior music production experience is required.

**MUSIC 60. Singing: How it's done, how to learn to do it, and how to work with people who do it.. 1 Unit.**

A weekly lecture course for singers, pianists, directors, conductors, and anyone who is interested in the art and craft of the voice. Students will learn about the vocal instrument, how to use it efficiently and keep it healthy, how to lead and participate in vocal productions and ensembles of all periods and styles. Ability to sing and/or read music is not required; this is not a voice class. Required readings. Taught by Music Department Faculty; coordinated by Wendy Hillhouse.

Same as: TAPS 60

**MUSIC 62. CLUB - Band. 1 Unit.**

This course is offered to club members who participate on credit approved Club Sports teams. All members must complete 30 hours of participation during the quarter. To be eligible for credit, the club must practice 2x a week for a maximum total of 4 hours and participate in 1-3 events in the quarter. Prerequisite: Permission of club sport administrator. May repeat for credit. A maximum of 8 activity units may be applied towards graduation.

Same as: ATHLETIC 62

**MUSIC 65A. Voice Class I. 1 Unit.**

Group (7 students to a section) beginning voice (A = level 1; B = level 2). May be repeated for credit. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 65AS. Voice Class 1: Beginning Voice, Level 1. 1 Unit.**

Group (6 students to a section) beginning voice (A = level 1; B = level 2). Complete registration form available for download at: <http://tinyurl.com/q43c48g>. May be repeated for credit 5 times. Zero unit enrollment option available with instructor permission. See website: (<http://tinyurl.com/posmuhn>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

Same as: Group

**MUSIC 65AZ. Voice Class I. 0 Units.**

Group (7 students to a section) beginning voice (A = level 1; B = level 2). There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit for 0 unit and total completion allowed 99.

**MUSIC 65B. Voice Class II. 1 Unit.**

Group (7 students to a section) beginning voice for the non-major (A = level 1; B = level 2). May be repeated for credit. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 65BS. Voice Class 2: Beginning Voice, Level 2. 1 Unit.**

Group (6 students to a section) beginning voice (A = level 1; B = level 2). Complete registration form available for download at: <http://tinyurl.com/q43c48g>. May be repeated for credit 5 times. Zero unit enrollment option available with instructor permission. See website: (<http://tinyurl.com/posmuhn>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

Same as: Group

**MUSIC 65BZ. Voice Class II. 0 Units.**

Group (7 students to a section) beginning voice for the non-major (A = level 1; B = level 2). There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeat for credit for 0 units and total completion of 99.

**MUSIC 65SZ. Beginning Voice. 0 Units.**

Beginning Voice (zero-unit option). Complete registration form available for download at: <http://tinyurl.com/q43c48g>. May be repeated 5 times. Zero unit enrollment option available with instructor permission. See website: (<http://tinyurl.com/posmuhn>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 6A. From Gamelan to Kabuki: Musical Traditions of Far East Asia. 3 Units.**

Introduction to the musical traditions of Far East Asia. Study of prominent examples from diverse regions with an emphasis on Indonesia, China and Japan. Exploration of ethnic, social, cultural, and global perspectives. Survey of instruments and ensembles in a wide range of performance contexts, from sacred rituals to secular dance and theater. Traditional genres and their impact on contemporary composers. No musical background required. Lectures, listening to live and recorded music, attendance of a concert, video screenings.

**MUSIC 6F. Art is My Occupation: Professional Development in Music. 1 Unit.**

Open to majors and non-majors. This course is designed for students who are considering careers in performance or the music industry to explore their personal and artistic identity. Weekly guest speakers provide real world insight on topics related to professional advancement.

**MUSIC 72A. Intermediate Piano Class. 1 Unit.**

For intermediate students. May be repeated for credit a total of 14 times. Prerequisites: 12C or equivalent, audition. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 72AS. Intermediate Piano Class. 1 Unit.**

Piano: Intermediate Level (Group; 10 students to a section) Class is closed by design. Please register on the wait-list and show up on the first day of class to receive a permission number for enrollment. Complete registration form available for download at: <http://tinyurl.com/q43c48g>. May be repeated for credit 5 times. Zero unit enrollment option available with instructor permission. See website: (<http://tinyurl.com/posmuhn>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

Same as: Group

**MUSIC 72AZ. Intermediate Piano Class. 0 Units.**

For intermediate students. Prerequisites: 12C or equivalent, audition. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee and signup information. This class is closed by design. Please register on the waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 72C. Harpsichord Class. 1 Unit.**

For beginning harpsichord students who have keyboard skills. May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Admission based on instructor consent. Contact instructor prior to enrolling to discuss availability. Class meets in Braun 201. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 72CZ. Harpsichord Class. 0 Units.**

For beginning harpsichord students who have keyboard skills. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Admission based on instructor consent. Contact instructor prior to enrolling to discuss availability. Class meets in Braun 201. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 72D. Jazz Piano Class. 1 Unit.**

Priority to majors and jazz-ensemble participants. May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 72DZ. Jazz Piano Class. 0 Units.**

Priority to majors and jazz-ensemble participants. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 72G. Gu-Zheng Class. 1 Unit.**

Introduction to Chinese music through learning how to play Gu-Zheng, a 21-stringed traditional Chinese instrument. The cultural, social, and historical significance of Gu-Zheng. 15 Gu-Zheng techniques, how to read Chinese music and Gu-Zheng notation, and two simple classic Gu-Zheng pieces. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee information. All participants must enroll. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 72GZ. Gu-Zheng Class. 0 Units.**

Introduction to Chinese music through learning how to play Gu-Zheng, a 21-stringed traditional Chinese instrument. The cultural, social, and historical significance of Gu-Zheng. 15 Gu-Zheng techniques, how to read Chinese music and Gu-Zheng notation, and two simple classic Gu-Zheng pieces. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fee information. All participants must enroll. May be repeated for credit a total of 14 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 72SZ. Intermediate Piano. 0 Units.**

Intermediate Piano (zero-unit option). Zero unit enrollment option available with instructor permission. See website: (<http://tinyurl.com/posmuhn>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

**MUSIC 73. Intermediate Voice Class. 1 Unit.**

For intermediate students. Admission by audition. May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the Axxess waitlist and show up on the first day of class to receive a permission number for enrollment. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 73Z. Intermediate Voice Class. 0 Units.**

For intermediate students. Admission by audition. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. This class is closed by design. Please register on the Axxess waitlist and show up on the first day of class to receive a permission number for enrollment.

**MUSIC 74AA. Introductory Violin Class Level 1: Beginner. 1 Unit.**

Open to majors and non-majors. Focus is on beginning violin skills. Topics include brief history and physics of the instrument, and survey of repertoire. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 74AB. Introductory Violin Class Level 2: Intermediate. 1 Unit.**

Open to majors and non-majors. Focus is on beginning violin skills. Topics include brief history and physics of the instrument, and survey of repertoire. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 74AC. Introductory Violin Class Level 3: Advanced Intermediate. 1 Unit.**

Open to majors and non-majors. Focus is on beginning violin skills. Topics include brief history and physics of the instrument, and survey of repertoire. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 74AZ. Introductory Violin Class. 0 Units.**

(74A.1=Level 1 beginners; 74A.2=Level 2 continuing) Open to majors and non-majors. Focus is on beginning violin skills. Topics include brief history and physics of the instrument, and survey of repertoire. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 74C. Classical Guitar Class. 1 Unit.**

May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <https://music.stanford.edu/ensembles-lessons/applied-music-policies/applied-music-fees-and-policies> for class fee information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 74CZ. Classical Guitar Class. 0 Units.**

There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 74D. Harp Class. 1 Unit.**

May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 74DZ. Harp Class. 0 Units.**

There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 75B. Renaissance Wind Instruments Class. 1 Unit.**

May be repeated for credit. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 75BZ. Renaissance Wind Instruments Class. 0 Units.**

May be repeated for credit. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 76. Brass Instruments Class. 1 Unit.**

May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 76A. Tuba Class. 1 Unit.**

Basic brass techniques as they apply to the tuba including warmups, breathing, and developing a daily routine. For beginning through intermediate players. There is a fee for this class. Please visit <http://music.stanford.edu/Academics/LessonSignups.html> for class fees and audition information. All participants must enroll. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit.

**MUSIC 76AZ. Tuba Class. 0 Units.**

Basic brass techniques as they apply to the tuba including warmups, breathing, and developing a daily routine. For beginning through intermediate players. This course includes a fee of \$175 for Music majors and minors, and \$200 for non Music majors. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. May be repeated for credit for 0 unit.

**MUSIC 76Z. Brass Instruments Class. 0 Units.**

May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 77. Percussion Class. 1 Unit.**

May be repeated for credit a total of 14 times. There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 77Z. Percussion Class. 0 Units.**

There is a fee for this class. Please visit <http://music.stanford.edu> for class fees and signup information. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure.

**MUSIC 7B. Musical Cultures of the World. 3 Units.**

An overview of selected musical cultures from Africa, Asia, Europe, and the Americas. Course objectives: cultivate an appreciation for the diversity of human musical expression; discover how music is used to shape social interactions and systems of meaning; develop active listening skills that can be used when encountering any music; gain a preliminary understanding of ethnomusicological concepts and vocabulary. No musical experience is necessary. Class format: Lecture, discussion, listening, guest performances, musical participation, and a concert analysis.

**MUSIC 801. TGR Project. 0 Units.****MUSIC 802. TGR Dissertation. 0 Units.****MUSIC 80T. Jewish Music in the Lands of Islam. 4 Units.**

An Interdisciplinary study of Music, Society, and Culture in communities of the Jewish Diaspora in Islamic countries. The course examines the diverse and rich musical traditions of the Jews in North Africa and the Middle East. Based on the "Maqamat" system, the Arabic musical modes, Jewish music flourished under Islamic rule, encompassing the fields of sacred music, popular songs, and art music. Using musicological, historical, and anthropological tools, the course compares and contrasts these traditions from their original roots through their adaptation, appropriation, and re-synthesis in contemporary art music and popular songs.

Same as: JEWISHST 80T

**MUSIC 8A. Rock, Sex, and Rebellion. 3 Units.**

Development of critical listening skills and musical parameters through genres in the history of rock music. Focus is on competing aesthetic tendencies and subcultural forces that shaped the music. Rock's significance in American culture, and the minority communities that have enriched rock's legacy as an expressively diverse form. Lectures, readings, listening, and video screenings. Attendance at all lectures is required.

**MUSIC 9. Music + Mentorship. 1-2 Unit.**

Music + Mentorship (M+M) is a coalition of Stanford University musicians who seek to empower kids in the surrounding community through music. Through M+M, volunteers commit to weekly music lessons in local schools and participate in class readings and discussions about the principles of music education. Guest lecturers include local music educators.

## Neurobiology (NBIO)

**NBIO 101. Social and Ethical Issues in the Neurosciences. 2-4 Units.**

Foundational scientific issues and philosophical perspectives related to advances in the study of brain and behavior. Implications of new insights from the neurosciences for medical therapy, social policy, and broader conceptions of human nature including consciousness, free will, personal identity, and moral responsibility. Topics include ethical issues related to genetic screening and editing, desire and addiction, criminal behavior, the biology of sexuality, fetal pain, aging and neurodegenerative disease, brain-computer interfaces, and neural enhancement and the human future. May be taken for 2 units without a research paper.

Same as: NBIO 201

**NBIO 198. Directed Reading in Neurobiology. 1-18 Unit.**

Prerequisite: consent of instructor. (Staff).

**NBIO 199. Undergraduate Research. 1-18 Unit.**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

**NBIO 201. Social and Ethical Issues in the Neurosciences. 2-4 Units.**

Foundational scientific issues and philosophical perspectives related to advances in the study of brain and behavior. Implications of new insights from the neurosciences for medical therapy, social policy, and broader conceptions of human nature including consciousness, free will, personal identity, and moral responsibility. Topics include ethical issues related to genetic screening and editing, desire and addiction, criminal behavior, the biology of sexuality, fetal pain, aging and neurodegenerative disease, brain-computer interfaces, and neural enhancement and the human future. May be taken for 2 units without a research paper.

Same as: NBIO 101

**NBIO 206. The Nervous System. 6 Units.**

Structure and function of the nervous system, including neuroanatomy, neurophysiology, and systems neurobiology. Topics include the properties of neurons and the mechanisms and organization underlying higher functions. Framework for general work in neurology, neuropathology, clinical medicine, and for more advanced work in neurobiology. Lecture and lab components must be taken together.

**NBIO 218. Neural Basis of Behavior. 5 Units.**

Advanced seminar. The principles of information processing in the nervous system and the relationship of functional properties of neural systems with perception, behavior, and learning. Original papers; student presentations. Prerequisite: NBIO 206 or consent of instructor.

**NBIO 220. Central Mechanisms in Vision-based Cognition. 2-4 Units.**

Contemporary cognitive neuroscience, emphasizing the use of the primate visual and oculomotor systems to explore neural mechanisms underlying perception, attention, learning, and decision-making. Eight foundational topics in cognitive neuroscience; intensive study and critical discussion of selected papers from the contemporary literature. Student presentations, seminar-style discussions. Class enrollment is limited to 12 students. First priority will be given to students from the neurosciences graduate program.

**NBIO 224. Glia and Neuroimmunology. 2 Units.**

The role of glia in the brain, including development, normal functioning, and disease. Topics include astrocytes, microglia, oligodendrocyte lineage, the blood brain barrier, and neuroimmunology with special emphasis on tools for studying glia. Preference to graduate students.

**NBIO 227. Understanding Techniques in Neuroscience. 2 Units.**

Topics include molecular, genetic, behavioral, electrophysiological, imaging, and computational approaches used in the field of neuroscience. Presentations and discussions led by senior graduate students, assigned readings from the primary neuroscience literature, and optional laboratory demonstrations. Intended for graduate students from any discipline and for advanced undergraduates in the biosciences, engineering, or medicine.

**NBIO 228. Mathematical Tools for Neuroscience. 2 Units.**

Student-instructed. For students with no math background beyond basic calculus, or as a review for more advanced students. Techniques useful for analysis of neural data including linear algebra, Fourier transforms, probability and statistics, signal detection, Bayesian inference, and information theory.

**NBIO 254. Molecular and Cellular Neurobiology. 3-5 Units.**

For graduate students. Includes lectures for BIO 154. Cellular and molecular mechanisms in the organization and functions of the nervous system. Topics: wiring of the neuronal circuit, synapse structure and synaptic transmission, signal transduction in the nervous system, sensory systems, molecular basis of behavior including learning and memory, molecular pathogenesis of neurological diseases. Same as: BIO 254

**NBIO 258. Information and Signaling Mechanisms in Neurons and Circuits. 4 Units.**

How synapses, cells, and neural circuits process information relevant to a behaving organism. How phenomena of information processing emerge at several levels of complexity in the nervous system, including sensory transduction in molecular cascades, information transmission through axons and synapses, plasticity and feedback in recurrent circuits, and encoding of sensory stimuli in neural circuits.

**NBIO 299. Directed Reading in Neurobiology. 1-18 Unit.**

Prerequisite: consent of instructor.

**NBIO 370. Medical Scholars Research. 4-18 Units.**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

**NBIO 399. Graduate Research. 1-18 Unit.**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

## Physics (PHYSICS)

**PHYSICS 100. Introduction to Observational Astrophysics. 4 Units.**

Designed for undergraduate physics majors but open to all students with a calculus-based physics background and some laboratory and coding experience. Students make and analyze observations using the telescopes at the Stanford Student Observatory. Topics covered include navigating the night sky, the physics of stars and galaxies, telescope instrumentation and operation, imaging and spectroscopic techniques, quantitative error analysis, and effective scientific communication. The course concludes with an independent project where student teams propose and execute an observational astronomy project of their choosing, using techniques learned in class to gather and analyze their data, and presenting their findings in the forms of professional-style oral presentations and research papers. Enrollment by permission. To get a permission number please complete form: <http://web.stanford.edu/~elva/physics100prelim.fb> If you have not heard from us by the beginning of class, please come to the first class session.

**PHYSICS 105. Intermediate Physics Laboratory I: Analog Electronics. 4 Units.**

Analog electronics including Ohm's law, passive circuits and transistor and op amp circuits, emphasizing practical circuit design skills to prepare undergraduates for laboratory research. Short design project. Minimal use of math and physics, no electronics experience assumed beyond introductory physics. Prerequisite: PHYSICS 43 or PHYSICS 63.

**PHYSICS 107. Intermediate Physics Laboratory II: Experimental Techniques and Data Analysis. 4 Units.**

Experiments on lasers, Gaussian optics, and atom-light interaction, with emphasis on data and error analysis techniques. Students describe a subset of experiments in scientific paper format. Prerequisites: completion of PHYSICS 40 or PHYSICS 60 series, and PHYSICS 70 and PHYSICS 105. Recommended pre- or corequisites: PHYSICS 120 and 130. WIM.

**PHYSICS 108. Advanced Physics Laboratory: Project. 4 Units.**

Small student groups plan, design, build, and carry out a single experimental project in low-temperature physics. Prerequisites PHYSICS 105, PHYSICS 107.

**PHYSICS 110. Advanced Mechanics. 3-4 Units.**

Lagrangian and Hamiltonian mechanics. Principle of least action, Euler-Lagrange equations. Small oscillations and beyond. Symmetries, canonical transformations, Hamilton-Jacobi theory, action-angle variables. Introduction to classical field theory. Selected other topics, including nonlinear dynamical systems, attractors, chaotic motion. Undergraduates register for Physics 110 (4 units). Graduates register for Physics 210 (3 units). Prerequisites: MATH 131P or PHYSICS 111, and PHYSICS 112 or MATH elective 104 or higher. Recommended prerequisite: PHYSICS 130. Same as: PHYSICS 210

**PHYSICS 111. Partial Differential Equations of Mathematical Physics. 4 Units.**

This course is intended to introduce students to the basic techniques for solving partial differential equations that commonly occur in classical mechanics, electromagnetism, and quantum mechanics. Tools that will be developed include separation of variables, Fourier series and transforms, and Sturm-Liouville theory. Examples (including the heat equation, Laplace equation, and wave equation) will be drawn from different areas of physics. Through examples, students will gain a familiarity with some of the famous special functions arising in mathematical physics. Prerequisite: MATH 53 or 63. Completing PHYSICS 40 or 60 sequences helpful.

**PHYSICS 112. Mathematical Methods for Physics. 4 Units.**

This course will cover methods of mathematical physics that are pertinent to physics. Topics include: Complex analysis, group theory, calculus of variations. Emphasis will be on in-depth coverage of selected topics. Prerequisites: MATH 50 or 60 series.

**PHYSICS 113. Computational Physics. 4 Units.**

Numerical methods for solving problems in mechanics, astrophysics, electromagnetism, quantum mechanics, and statistical mechanics. Methods include numerical integration; solutions of ordinary and partial differential equations; solutions of the diffusion equation, Laplace's equation and Poisson's equation with various methods; statistical methods including Monte Carlo techniques; matrix methods and eigenvalue problems. Short introduction to Python, used for class examples; class projects may be programmed in any language such as C, python or julia. No Prerequisites. Previous programming experience not required.

**PHYSICS 120. Intermediate Electricity and Magnetism I. 4 Units.**

Vector analysis. Electrostatic fields, including boundary-value problems and multipole expansion. Dielectrics, static and variable magnetic fields, magnetic materials. Maxwell's equations. Prerequisites: PHYSICS 43 or PHYS 63; MATH 52 and MATH 53. Pre- or corequisite: PHYS 111, MATH 131P or MATH 173. Recommended corequisite: PHYS 112.

**PHYSICS 121. Intermediate Electricity and Magnetism II. 4 Units.**

Conservation laws and electromagnetic waves, Poynting's theorem, tensor formulation, potentials and fields. Plane wave problems (free space, conductors and dielectric materials, boundaries). Dipole and quadrupole radiation. Special relativity and transformation between electric and magnetic fields. Prerequisites: PHYS 120 and PHYS 111 or MATH 131P or MATH 173; Recommended: PHYS 112.

**PHYSICS 12N. Black Holes: Fact and Fancy. 3 Units.**

Black Holes have been observed throughout the universe using radio waves, light, X- and gamma-rays and now with gravitational radiation. They are well-described using Einstein's theory of relativity and provide dramatic demonstrations of how physicists think about matter, energy, space, and time. They have also stimulated much science fiction. This seminar is intended primarily for non-science freshmen who should learn how some really big ideas were developed, debated, and then demonstrated to be correct. Movies and popular books will be critiqued and used to illustrate basic properties of black holes. Special attention will be paid to understanding what it takes for an interesting idea to become accepted or rejected as scientific fact. There will be visits to Stanford labs where instruments used to observe black holes were conceived, constructed and combined.

**PHYSICS 130. Quantum Mechanics I. 4 Units.**

The origins of quantum mechanics and wave mechanics. Schrödinger equation and solutions for one-dimensional systems. Commutation relations. Generalized uncertainty principle. Time-energy uncertainty principle. Separation of variables and solutions for three-dimensional systems; application to hydrogen atom. Spherically symmetric potentials and angular momentum eigenstates. Spin angular momentum. Addition of angular momentum. Prerequisites: PHYSICS 65 or PHYSICS 70 and PHYSICS 111 or MATH 131P or MATH 173. MATH 173 can be taken concurrently. Pre- or corequisites: PHYSICS 120.

**PHYSICS 131. Quantum Mechanics II. 4 Units.**

Identical particles; Fermi and Bose statistics. Time-independent perturbation theory. Fine structure, the Zeeman effect and hyperfine splitting in the hydrogen atom. Time-dependent perturbation theory. Variational principle and WKB approximation. Prerequisite: PHYSICS 120, PHYSICS 130, PHYSICS 111 or MATH 131P, or MATH 173. Pre- or corequisite: PHYSICS 121.

**PHYSICS 134. Advanced Topics in Quantum Mechanics. 3-4 Units.**

Scattering theory, partial wave expansion, Born approximation. Additional topics may include nature of quantum measurement, EPR paradox, Bell's inequality, and topics in quantum information science; path integrals and applications; Berry's phase; structure of multi-electron atoms (Hartree-Fock); relativistic quantum mechanics (Dirac equation). Undergraduates register for PHYSICS 134 (4 units). Graduate students register for PHYSICS 234 (3 units). Prerequisite: PHYSICS 131.

Same as: PHYSICS 234

**PHYSICS 14N. Quantum Information: Visions and Emerging Technologies. 3 Units.**

What sets quantum information apart from its classical counterpart is that it can be encoded non-locally, woven into correlations among multiple qubits in a phenomenon known as entanglement. We will discuss paradigms for harnessing entanglement to solve hitherto intractable computational problems or to push the precision of sensors to their fundamental quantum mechanical limits. We will also examine challenges that physicists and engineers are tackling in the laboratory today to enable the quantum technologies of the future.

**PHYSICS 15. Stars and Planets in a Habitable Universe. 3 Units.**

Is the Earth unique in our galaxy? Students learn how stars and our galaxy have evolved and how this produces planets and the conditions suitable for life. Discussion of the motion of the night sky and how telescopes collect and analyze light. The life-cycle of stars from birth to death, and the end products of that life cycle -- from dense stellar corpses to supernova explosions. Course covers recent discoveries of extrasolar planets -- those orbiting stars beyond our sun -- and the ultimate quest for other Earths. Intended to be accessible to non-science majors, material is explored quantitatively with problem sets using basic algebra and numerical estimates. Sky observing exercise and observatory field trips supplement the classroom work.

**PHYSICS 152. Introduction to Particle Physics I. 3 Units.**

Elementary particles and the fundamental forces. Quarks and leptons. The mediators of the electromagnetic, weak and strong interactions. Interaction of particles with matter; particle acceleration, and detection techniques. Symmetries and conservation laws. Bound states. Decay rates. Cross sections. Feynman diagrams. Introduction to Feynman integrals. The Dirac equation. Feynman rules for quantum electrodynamics and for chromodynamics. Undergraduates register for PHYSICS 152. Graduate students register for PHYSICS 252. (Graduate students will be required to complete additional assignments in a format determined by the instructor.) Prerequisite: PHYSICS 130. Pre- or corequisite: PHYSICS 131.

Same as: PHYSICS 252

**PHYSICS 16. The Origin and Development of the Cosmos. 3 Units.**

How did the present Universe come to be? The last few decades have seen remarkable progress in understanding this age-old question. Course will cover the history of the Universe from its earliest moments to the present day, and the physical laws that govern its evolution. The early Universe including inflation and the creation of matter and the elements. Recent discoveries in our understanding of the makeup of the cosmos, including dark matter and dark energy. Evolution of galaxies, clusters, and quasars, and the Universe as a whole. Implications of dark matter and dark energy for the future evolution of the cosmos. Intended to be accessible to non-science majors, material is explored quantitatively with problem sets using basic algebra and numerical estimates.

**PHYSICS 160. Introduction to Stellar and Galactic Astrophysics. 3 Units.**

Observed characteristics of stars and the Milky Way galaxy. Physical processes in stars and matter under extreme conditions. Structure and evolution of stars from birth to death. White dwarfs, planetary nebulae, supernovae, neutron stars, pulsars, binary stars, x-ray stars, and black holes. Galactic structure, interstellar medium, molecular clouds, HI and HII regions, star formation, and element abundances. Undergraduates register for PHYSICS 160. Graduate students register for PHYSICS 260. (Graduate students will be required to complete additional assignments in a format determined by the instructor.) Prerequisite: PHYSICS 121. Same as: PHYSICS 260

**PHYSICS 161. Introduction to Cosmology and Extragalactic Astrophysics. 3 Units.**

What do we know about the physical origins, content, and evolution of the Universe – and how do we know it? Students learn how cosmological distances and times, and the geometry and expansion of space, are described and measured. Composition of the Universe. Origin of matter and the elements. Observational evidence for dark matter and dark energy. Thermal history of the Universe, from inflation to the present. Emergence of large-scale structure from quantum perturbations in the early Universe. Astrophysical tools used to learn about the Universe. Big open questions in cosmology. Undergraduates register for Physics 161. Graduates register for Physics 261. (Graduate students will be required to complete additional assignments in a format determined by the instructor.) Prerequisite: PHYSICS 121 or equivalent. Same as: PHYSICS 261

**PHYSICS 17. Black Holes and Extreme Astrophysics. 3 Units.**

Black holes represent an extreme frontier of astrophysics. Course will explore the most fundamental and universal force – gravity – and how it controls the fate of astrophysical objects, leading in some cases to black holes. How we discover and determine the properties of black holes and their environment. How black holes and their event horizons are used to guide thinking about mysterious phenomena such as Hawking radiation, wormholes, and quantum entanglement. How black holes generate gravitational waves and powerful jets of particles and radiation. Other extreme objects such as pulsars. Relevant physics, including relativity, is introduced and treated at the algebraic level. No prior physics or calculus is required, although some deep thinking about space, time, and matter is important in working through assigned problems.

**PHYSICS 170. Thermodynamics, Kinetic Theory, and Statistical Mechanics I. 4 Units.**

Basic probability and statistics for random processes such as random walks. The derivation of laws of thermodynamics from basic postulates; the determination of the relationship between atomic substructure and macroscopic behavior of matter. Temperature; equations of state, heat, internal energy, equipartition; entropy, Gibbs paradox; equilibrium and reversibility; heat engines; applications to various properties of matter; absolute zero and low-temperature phenomena. Distribution functions, fluctuations, the partition function for classical and quantum systems, irreversible processes. Pre- or corequisite: PHYSICS 130.

**PHYSICS 171. Thermodynamics, Kinetic Theory, and Statistical Mechanics II. 4 Units.**

Mean-field theory of phase transitions; critical exponents. Ferromagnetism, the Ising model. The renormalization group. Dynamics near equilibrium: Brownian motion, diffusion, Boltzmann equations. Other topics at discretion of instructor. Prerequisite: PHYSICS 170. Recommended pre- or corequisite: PHYSICS 130.

**PHYSICS 172. Solid State Physics. 3 Units.**

Introduction to the properties of solids. Crystal structures and bonding in materials. Momentum-space analysis and diffraction probes. Lattice dynamics, phonon theory and measurements, thermal properties. Electronic structure theory, classical and quantum; free, nearly-free, and tight-binding limits. Electron dynamics and basic transport properties; quantum oscillations. Properties and applications of semiconductors. Reduced-dimensional systems. Undergraduates should register for PHYSICS 172 and graduate students for APPPHYS 272. Prerequisites: PHYSICS 170 and PHYSICS 171, or equivalents. Same as: APPPHYS 272

**PHYSICS 182. Introduction to Modern Atomic Physics and Quantum Optics. 3 Units.**

Introduction to modern atomic physics, including laser cooling and trapping, collisions, ultracold and quantum gases, optical lattices, entanglement, and ion trap quantum gates. Introduction to quantum optical theory of light and atom-photon interactions, including cavity QED, quantum trajectory theory, nonlinear optics, and fundamentals of laser spectroscopy including frequency combs. Prerequisites: PHYSICS 131 or 134 and 171. Same as: PHYSICS 282

**PHYSICS 18N. Frontiers in Theoretical Physics and Cosmology. 3 Units.**

Preference to freshmen. The course will begin with a description of the current standard models of gravitation, cosmology, and elementary particle physics. We will then focus on frontiers of current understanding including investigations of very early universe cosmology, string theory, and the physics of black holes.

**PHYSICS 19. How Things Work: An Introduction to Physics. 3 Units.**

Introduction to the principles of physics through familiar objects and phenomena, including airplanes, cameras, computers, engines, refrigerators, lightning, radio, microwave ovens, and fluorescent lights. Estimates of real quantities from simple calculations. Prerequisite: high school algebra and trigonometry.

**PHYSICS 190. Independent Research and Study. 1-9 Unit.**

Undergraduate research in experimental or theoretical physics under the supervision of a faculty member. Prerequisites: superior work as an undergraduate Physics major and consent of instructor.

**PHYSICS 199. The Physics of Energy and Climate Change. 3 Units.**

Topics include measurements of temperature and sea level changes in the climate record of the Earth, satellite atmospheric spectroscopy, satellite gravity geodesy measurements of changes in water aquifers and glaciers, and ocean changes. The difference between weather fluctuations changes and climate change, climate models and their uncertainties in the context of physical, chemical and biological feedback mechanisms to changes in greenhouse gases and solar insolation will be discussed. Energy efficiency, transmission and distribution of electricity, energy storage, and the physics of harnessing fossil, wind, solar, geothermal, fission and fusion will be covered, along with prospects of future technological developments in energy use and production. Prerequisite: Physics 40 or Physics 60 series.

**PHYSICS 205. Senior Thesis Research. 1-12 Unit.**

Long-term experimental or theoretical project and thesis in Physics under supervision of a faculty member. Planning of the thesis project is recommended to begin as early as middle of the junior year. Successful completion of a senior thesis requires a minimum of 3 units for a letter grade completed during the senior year, along with the other formal thesis and physics major requirements. Students doing research for credit prior to senior year should sign up for Physics 190. Prerequisites: superior work as an undergraduate Physics major and approval of the thesis application.



**PHYSICS 21. Mechanics, Fluids, and Heat. 4 Units.**

How are the motions of objects and the behavior of fluids and gases determined by the laws of physics? Students learn to describe the motion of objects (kinematics) and understand why objects move as they do (dynamics). Emphasis on how Newton's three laws of motion are applied to solids, liquids, and gases to describe phenomena as diverse as spinning gymnasts, blood flow, and sound waves. Understanding many-particle systems requires connecting macroscopic properties (e.g., temperature and pressure) to microscopic dynamics (collisions of particles). Laws of thermodynamics provide understanding of real-world phenomena such as energy conversion and performance limits of heat engines. Everyday examples are analyzed using tools of algebra and trigonometry. Problem-solving skills are developed, including verifying that derived results satisfy criteria for correctness, such as dimensional consistency and expected behavior in limiting cases. Physical understanding fostered by peer interaction and demonstrations in lecture, and interactive group problem solving in discussion sections. Prerequisite: high school algebra and trigonometry; calculus not required.

**PHYSICS 210. Advanced Mechanics. 3-4 Units.**

Lagrangian and Hamiltonian mechanics. Principle of least action, Euler-Lagrange equations. Small oscillations and beyond. Symmetries, canonical transformations, Hamilton-Jacobi theory, action-angle variables. Introduction to classical field theory. Selected other topics, including nonlinear dynamical systems, attractors, chaotic motion. Undergraduates register for Physics 110 (4 units). Graduates register for Physics 210 (3 units). Prerequisites: MATH 131P or PHYSICS 111, and PHYSICS 112 or MATH elective 104 or higher. Recommended prerequisite: PHYSICS 130.

Same as: PHYSICS 110

**PHYSICS 211. Continuum Mechanics. 3 Units.**

Elasticity, fluids, turbulence, waves, gas dynamics, shocks, and MHD plasmas. Examples from everyday phenomena, geophysics, and astrophysics.

**PHYSICS 212. Statistical Mechanics. 3 Units.**

Principles, ensembles, statistical equilibrium. Thermodynamic functions, ideal and near-ideal gases. Fluctuations. Mean-field description of phase-transitions and associated critical exponents. One-dimensional Ising model and other exact solutions. Renormalization and scaling relations. Prerequisites: PHYSICS 131, 171, or equivalents.

**PHYSICS 216. Back of the Envelope Physics. 3 Units.**

Techniques such as scaling and dimensional analysis, useful to make order-of-magnitude estimates of physical effects in different settings. Goals are to promote a synthesis of physics through solving problems, including problems that are not usually thought of as physics. Applications include properties of materials, fluid mechanics, geophysics, astrophysics, and cosmology. Prerequisites: undergraduate mechanics, statistical mechanics, electricity and magnetism, and quantum mechanics.

**PHYSICS 21S. Mechanics and Heat with Laboratory. 5 Units.**

How are the motions of objects and the behavior of fluids and gases determined by the laws of physics? Students learn to describe the motion of objects (kinematics) and understand why objects move as they do (dynamics). Emphasis on how Newton's three laws of motion are applied to solids, liquids, and gases to describe phenomena as diverse as spinning gymnasts, blood flow, and sound waves. Understanding many-particle systems requires connecting macroscopic properties (e.g., temperature and pressure) to microscopic dynamics (collisions of particles). Laws of thermodynamics provide understanding of real-world phenomena such as energy conversion and performance limits of heat engines. Everyday examples are analyzed using tools of algebra and trigonometry. Problem-solving skills are developed, including verifying that derived results satisfy criteria for correctness, such as dimensional consistency and expected behavior in limiting cases. Physical understanding fostered by peer interaction and demonstrations in lecture, and interactive group problem solving in discussion sections. Labs are an integrated part of the summer course. Prerequisite: high school algebra and trigonometry; calculus not required.

**PHYSICS 22. Mechanics, Fluids, and Heat Laboratory. 1 Unit.**

Guided hands-on exploration of concepts in classical mechanics, fluids, and thermodynamics with an emphasis on student predictions, observations and explanations. Pre- or corequisite: PHYSICS 21.

**PHYSICS 220. Classical Electrodynamics. 3 Units.**

Special relativity: The principles of relativity, Lorentz transformations, four vectors and tensors, relativistic mechanics and the principle of least action. Lagrangian formulation, charges in electromagnetic fields, gauge invariance, the electromagnetic field tensor, covariant equations of electrodynamics and mechanics, four-current and continuity equation. Noether's theorem and conservation laws, Poynting's theorem, stress-energy tensor. Constant electromagnetic fields: conductors and dielectrics, magnetic media, electric and magnetic forces, and energy. Electromagnetic waves: Plane and monochromatic waves, spectral resolution, polarization, electromagnetic properties of matter, dispersion relations, wave guides and cavities. Prerequisites: PHYSICS 121 and PHYSICS 210, or equivalent; MATH 106 or MATH 116, and MATH 132 or equivalent.

**PHYSICS 23. Electricity, Magnetism, and Optics. 4 Units.**

How are electric and magnetic fields generated by static and moving charges, and what are their applications? How is light related to electromagnetic waves? Students learn to represent and analyze electric and magnetic fields to understand electric circuits, motors, and generators. The wave nature of light is used to explain interference, diffraction, and polarization phenomena. Geometric optics is employed to understand how lenses and mirrors form images. These descriptions are combined to understand the workings and limitations of optical systems such as the eye, corrective vision, cameras, telescopes, and microscopes. Discussions based on the language of algebra and trigonometry. Physical understanding fostered by peer interaction and demonstrations in lecture, and interactive group problem solving in discussion sections. Prerequisite: PHYSICS 21 or PHYSICS 21S.

**PHYSICS 230. Graduate Quantum Mechanics I. 3 Units.**

Fundamental concepts. Introduction to Hilbert spaces and Dirac's notation. Postulates applied to simple systems, including those with periodic structure. Symmetry operations and gauge transformation. The path integral formulation of quantum statistical mechanics. Problems related to measurement theory. The quantum theory of angular momenta and central potential problems. Prerequisite: PHYSICS 131 or equivalent.

**PHYSICS 231. Graduate Quantum Mechanics II. 3 Units.**

Basis for higher level courses on atomic solid state and particle physics. Problems related to measurement theory and introduction to quantum computing. Approximation methods for time-independent and time-dependent perturbations. Semiclassical and quantum theory of radiation, second quantization of radiation and matter fields. Systems of identical particles and many electron atoms and molecules. Prerequisite: PHYSICS 230.

**PHYSICS 234. Advanced Topics in Quantum Mechanics. 3-4 Units.**

Scattering theory, partial wave expansion, Born approximation. Additional topics may include nature of quantum measurement, EPR paradox, Bell's inequality, and topics in quantum information science; path integrals and applications; Berry's phase; structure of multi-electron atoms (Hartree-Fock); relativistic quantum mechanics (Dirac equation). Undergraduates register for PHYSICS 134 (4 units). Graduate students register for PHYSICS 234 (3 units). Prerequisite: PHYSICS 131.

Same as: PHYSICS 134

**PHYSICS 235. Electricity and Optics with Laboratory. 5 Units.**

How are electric and magnetic fields generated by static and moving charges, and what are their applications? How is light related to electromagnetic waves? Students learn to represent and analyze electric and magnetic fields to understand electric circuits, motors, and generators. The wave nature of light is used to explain interference, diffraction, and polarization phenomena. Geometric optics is employed to understand how lenses and mirrors form images. These descriptions are combined to understand the workings and limitations of optical systems such as the eye, corrective vision, cameras, telescopes, and microscopes. Discussions based on the language of algebra and trigonometry. Physical understanding fostered by peer interaction and demonstrations in lecture, and interactive group problem solving in discussion sections. Labs are an integrated part of the summer courses. Prerequisite: PHYSICS 21 or PHYSICS 21S.

**PHYSICS 24. Electricity, Magnetism, and Optics Laboratory. 1 Unit.**

Guided hands-on exploration of concepts in electricity and magnetism, circuits and optics with an emphasis on student predictions, observations and explanations. Introduction to multimeters and oscilloscopes. Pre- or corequisite: PHYS 23.

**PHYSICS 240. Introduction to the Physics of Energy. 3 Units.**

Energy as a consumable. Forms and interconvertibility. World Joule budget. Equivalents in rivers, oil pipelines and nuclear weapons. Quantum mechanics of fire, batteries and fuel cells. Hydrocarbon and hydrogen synthesis. Fundamental limits to mechanical, electrical and magnetic strengths of materials. Flywheels, capacitors and high pressure tanks. Principles of AC and DC power transmission. Impossibility of pure electricity storage. Surge and peaking. Solar constant. Photovoltaic and thermal solar conversion. Physical limits on agriculture.

**PHYSICS 241. Introduction to Nuclear Energy. 3 Units.**

Radioactivity. Elementary nuclear processes. Energetics of fission and fusion. Cross-sections and resonances. Fissionable and fertile isotopes. Neutron budgets. Light water, heavy water and graphite reactors. World nuclear energy production. World reserves of uranium and thorium. Plutonium, reprocessing and proliferation. Half lives of fission decay products and actinides made by neutron capture. Nuclear waste. Three Mile Island and Chernobyl. Molten sodium breeders. Generation-IV reactors. Inertial confinement and magnetic fusion. Laser compression. Fast neutron production and fission-fusion hybrids. Prerequisites: Strong undergraduate background in elementary chemistry and physics. PHYSICS 240 and PHYSICS 252 recommended but not required. Interested undergraduates encouraged to enroll, with permission of instructor.

**PHYSICS 25. Modern Physics. 4 Units.**

How do the discoveries since the dawn of the 20th century impact our understanding of 21st-century physics? This course introduces the foundations of modern physics: Einstein's theory of special relativity and quantum mechanics. Combining the language of physics with tools from algebra and trigonometry, students gain insights into how the universe works on both the smallest and largest scales. Topics may include atomic, molecular, and laser physics; semiconductors; elementary particles and the fundamental forces; nuclear physics (fission, fusion, and radioactivity); astrophysics and cosmology (the contents and evolution of the universe). Emphasis on applications of modern physics in everyday life, progress made in our understanding of the universe, and open questions that are the subject of active research. Physical understanding fostered by peer interaction and demonstrations in lecture, and interactive group problem solving in discussion sections. Prerequisite: PHYSICS 23 or PHYSICS 23S.

**PHYSICS 252. Introduction to Particle Physics I. 3 Units.**

Elementary particles and the fundamental forces. Quarks and leptons. The mediators of the electromagnetic, weak and strong interactions. Interaction of particles with matter; particle acceleration, and detection techniques. Symmetries and conservation laws. Bound states. Decay rates. Cross sections. Feynman diagrams. Introduction to Feynman integrals. The Dirac equation. Feynman rules for quantum electrodynamics and for chromodynamics. Undergraduates register for PHYSICS 152. Graduate students register for PHYSICS 252. (Graduate students will be required to complete additional assignments in a format determined by the instructor.) Prerequisite: PHYSICS 130. Pre- or corequisite: PHYSICS 131. Same as: PHYSICS 152

**PHYSICS 26. Modern Physics Laboratory. 1 Unit.**

Guided hands-on and simulation-based exploration of concepts in modern physics, including special relativity, quantum mechanics and nuclear physics with an emphasis on student predictions, observations and explanations. Pre- or corequisite: PHYSICS 25.

**PHYSICS 260. Introduction to Stellar and Galactic Astrophysics. 3 Units.**

Observed characteristics of stars and the Milky Way galaxy. Physical processes in stars and matter under extreme conditions. Structure and evolution of stars from birth to death. White dwarfs, planetary nebulae, supernovae, neutron stars, pulsars, binary stars, x-ray stars, and black holes. Galactic structure, interstellar medium, molecular clouds, HI and HII regions, star formation, and element abundances. Undergraduates register for PHYSICS 160. Graduate students register for PHYSICS 260. (Graduate students will be required to complete additional assignments in a format determined by the instructor.) Prerequisite: PHYSICS 121. Same as: PHYSICS 160

**PHYSICS 261. Introduction to Cosmology and Extragalactic Astrophysics. 3 Units.**

What do we know about the physical origins, content, and evolution of the Universe – and how do we know it? Students learn how cosmological distances and times, and the geometry and expansion of space, are described and measured. Composition of the Universe. Origin of matter and the elements. Observational evidence for dark matter and dark energy. Thermal history of the Universe, from inflation to the present. Emergence of large-scale structure from quantum perturbations in the early Universe. Astrophysical tools used to learn about the Universe. Big open questions in cosmology. Undergraduates register for Physics 161. Graduates register for Physics 261. (Graduate students will be required to complete additional assignments in a format determined by the instructor.) Prerequisite: PHYSICS 121 or equivalent. Same as: PHYSICS 161

**PHYSICS 262. General Relativity. 3 Units.**

Einstein's General Theory of Relativity is a basis for modern ideas of fundamental physics, including string theory, as well as for studies of cosmology and astrophysics. The course begins with an overview of special relativity, and the description of gravity as arising from curved space. From Riemannian geometry and the geodesic equations, to curvature, the energy-momentum tensor, and the Einstein field equations. Applications of General Relativity: topics may include experimental tests of General Relativity and the weak-field limit, black holes (Schwarzschild, charged Reissner-Nordstrom, and rotating Kerr black holes), gravitational waves (including detection methods), and an introduction to cosmology (including cosmic microwave background radiation, dark energy, and experimental probes). Prerequisite: PHYSICS 121 or equivalent including special relativity.

**PHYSICS 268. Physics with Neutrinos. 3 Units.**

Relativistic fermions, Weyl and Dirac equations, Majorana masses. Electroweak theory, neutrino cross sections, neutrino refraction in matter, MSW effect. Three-flavor oscillations, charge-parity violation, searches for sterile neutrinos, modern long- and short-baseline oscillation experiments. Seesaw mechanism, models of neutrino masses, lepton flavor violation. Neutrinoless double beta decay. Cosmological constraints on neutrino properties. Advanced topics, such as collective oscillations in supernovae or ultrahigh energy neutrinos, offered as optional projects. The material in this course is largely complementary to PHYS 269, focusing on particle physics aspects of neutrinos. Prerequisites: PHYSICS 121, 131 and 171 or equivalent. PHYS 230-231, 269, 152 and 161 or equivalent are helpful, but not required.

**PHYSICS 269. Neutrinos in Astrophysics and Cosmology. 3 Units.**

Basic neutrino properties. Flavor evolution in vacuum and in matter. Oscillations of atmospheric, reactor and beam neutrinos. Measurements of solar neutrinos; physics of level-crossing and the resolution of the solar neutrino problem. Roles of neutrinos in stellar evolution; bounds from stellar cooling. Neutrinos and stellar collapse; energy transport, collective flavor oscillations, neutrino flavor in turbulent medium. Ultra-high-energy neutrinos. The cosmic neutrino background, its impact on the cosmic microwave background and structure formation; cosmological bounds on the neutrino sector. Prerequisites/corequisites: PHYSICS 121, 131 and 171 or equivalent. PHYS 230-231, 152 and 161 or equivalent are helpful, but not required. May be repeat for credit.

**PHYSICS 282. Introduction to Modern Atomic Physics and Quantum Optics. 3 Units.**

Introduction to modern atomic physics, including laser cooling and trapping, collisions, ultracold and quantum gases, optical lattices, entanglement, and ion trap quantum gates. Introduction to quantum optical theory of light and atom-photon interactions, including cavity QED, quantum trajectory theory, nonlinear optics, and fundamentals of laser spectroscopy including frequency combs. Prerequisites: PHYSICS 131 or 134 and 171. Same as: PHYSICS 182

**PHYSICS 290. Research Activities at Stanford. 1 Unit.**

Required of first-year Physics graduate students; suggested for junior or senior Physics majors for 1 unit. Review of research activities in the department and elsewhere at Stanford at a level suitable for entering graduate students.

**PHYSICS 291. Practical Training. 1-3 Unit.**

Opportunity for practical training in industrial labs. Arranged by student with the research adviser's approval. A brief summary of activities is required, approved by the research adviser.

**PHYSICS 293. Literature of Physics. 1-15 Unit.**

Study of the literature of any special topic. Preparation, presentation of reports. If taken under the supervision of a faculty member outside the department, approval of the Physics chair required. Prerequisites: 25 units of college physics, consent of instructor.

**PHYSICS 294. Teaching of Physics Seminar. 1 Unit.**

Weekly seminar/discussions on interactive techniques for teaching physics. Practicum which includes class observations, grading and student teaching in current courses. Required of all Teaching Assistants prior to first teaching assignment. Mandatory attendance at weekly in-class sessions during first 5 weeks of the quarter; mandatory successful completion of all practicum activities. Enrollment by permission. To get a permission number please complete form: <http://web.stanford.edu/dept/physics/academics/TA/PH294app.fb> If you have not heard from us by the beginning of class, please come to the first class session.

**PHYSICS 295. Learning & Teaching of Science. 3 Units.**

This course will provide students with a basic knowledge of the relevant research in cognitive psychology and science education and the ability to apply that knowledge to enhance their ability to learn and teach science, particularly at the undergraduate level. Course will involve readings, discussion, and application of the ideas through creation of learning activities. It is suitable for advanced undergraduates and graduate students with some science background. Same as: EDUC 280, ENGR 295

**PHYSICS 301. Astrophysics Laboratory. 3 Units.**

Designed for physics graduate students but open to all graduate students with a calculus-based physics background and some laboratory and coding experience. Students make and analyze observations using the telescopes at the Stanford Student Observatory. Topics covered include navigating the night sky, the physics of stars and galaxies, telescope instrumentation and operation, imaging and spectroscopic techniques, quantitative error analysis, and effective scientific communication. The course concludes with an independent project where student teams propose and execute an observational astronomy project of their choosing, using techniques learned in class to gather and analyze their data, and presenting their findings in the forms of professional-style oral presentations and research papers. Enrollment by permission. To get a permission number please complete form: <http://web.stanford.edu/~elva/physics301prelim.fbn> If you have not heard from us by the beginning of class, please come to the first class session.

**PHYSICS 312. Basic Plasma Physics. 3 Units.**

For the nonspecialist who needs a working knowledge of plasma physics for space science, astrophysics, fusion, or laser applications. Topics: orbit theory, the Boltzmann equation, fluid equations, magneto hydrodynamics (MHD) waves and instabilities, electromagnetic (EM) waves, the Vlasov theory of electrostatic (ES) waves and instabilities including Landau damping and quasilinear theory, the Fokker-Planck equation, and relaxation processes. Advanced topics in resistive instabilities and particle acceleration. Prerequisite: PHYSICS 220, or consent of instructor.

**PHYSICS 321. Laser Spectroscopy. 3 Units.**

Theoretical concepts and experimental techniques. Absorption, dispersion, Kramers-Kronig relations, line-shapes. Classical and laser linear spectroscopy. Semiclassical theory of laser atom interaction: time-dependent perturbation theory, density matrix, optical Bloch equations, coherent pulse propagation, multiphoton transitions. High-resolution nonlinear laser spectroscopy: saturation spectroscopy, polarization spectroscopy, two-photon and multiphoton spectroscopy, optical Ramsey spectroscopy. Phase conjugation. Four-wave mixing, harmonic generation. Coherent Raman spectroscopy, quantum beats, ultra-sensitive detection. Prerequisite: PHYSICS 230. Recommended: PHYSICS 231.

**PHYSICS 330. Quantum Field Theory I. 3 Units.**

Lorentz Invariance. S-Matrix. Quantization of scalar and Dirac fields. Feynman diagrams. Quantum electrodynamics. Elementary electrodynamic processes: Compton scattering; e+e- annihilation. Loop diagrams. Prerequisites: PHYSICS 130, PHYSICS 131, or equivalents AND a basic knowledge of Group Theory.

**PHYSICS 331. Quantum Field Theory II. 3 Units.**

Functional integral methods. Local gauge invariance and Yang-Mills fields. Asymptotic freedom. Spontaneous symmetry breaking and the Higgs mechanism. Unified models of weak and electromagnetic interactions. Prerequisite: PHYSICS 330.

**PHYSICS 332. Quantum Field Theory III. 3 Units.**

Theory of renormalization. The renormalization group and applications to the theory of phase transitions. Renormalization of Yang-Mills theories. Applications of the renormalization group of quantum chromodynamics. Perturbation theory anomalies. Applications to particle phenomenology. Prerequisite: PHYSICS 331.

**PHYSICS 351. Standard Model of Particle Physics. 3 Units.**

Symmetries, group theory, gauge invariance, Lagrangian of the Standard Model, flavor group, flavor-changing neutral currents, CKM quark mixing matrix, GIM mechanism, rare processes, neutrino masses, seesaw mechanism, QCD confinement and chiral symmetry breaking, instantons, strong CP problem, QCD axion. Prerequisite: PHYSICS 330.

**PHYSICS 360. Modern Astrophysics. 3 Units.**

Basic theory of production of radiation in stars, galaxies and diffuse interstellar and intergalactic media and transfer of radiation throughout the universe. Magnetic fields, turbulence shocks and particle acceleration and transport around magnetospheres of planets to clusters of galaxies. Application to compact objects, pulsars and accretion in binary stars and super-massive black holes, supernova remnants, cosmic rays and active galactic nuclei. Prerequisite: PHYSICS 260 or equivalent.

**PHYSICS 361. Cosmology. 3 Units.**

A comprehensive exposition of the standard model of cosmology, connecting a fundamental physics description to contemporary and proposed observations. Geometry, kinematics, dynamics, and current contents of the Universe at large. History of the universe as it expanded in size by a factor of a trillion, including nucleosynthesis, recombination, and reionization. Evolution of perturbations that eventually grow to form large scale structure, and the influence of this structure on observations of the microwave background and galaxies. Introduction to modern cosmological probes including techniques to measure the expansion history and the growth of structure. The course will conclude with a focused discussion of cosmic inflation, the nature and origin of matter, and the cosmological constant. Recommended prerequisites: PHYSICS 261 or equivalent.

**PHYSICS 362. Advanced Extragalactic Astrophysics and Cosmology. 3 Units.**

Observational data on the content and activities of galaxies, the content of the Universe, cosmic microwave background radiation, gravitational lensing, and dark matter. Models of the origin, structure, and evolution of the Universe based on the theory of general relativity. Test of the models and the nature of dark matter and dark energy. Physics of the early Universe, inflation, baryosynthesis, nucleosynthesis, and galaxy formation. Prerequisites: PHYSICS 210, PHYSICS 211, and PHYSICS 260 or PHYSICS 360.

**PHYSICS 364. Advanced Gravitation. 3 Units.**

Classical and quantum gravity in Anti-de Sitter spacetime (AdS). History and uses of AdS. Basic classical physics of AdS: metric, conformal structure, common coordinate systems. Black holes in AdS: thermodynamics, Hawking-Page transition. Classical fields in AdS: action of conformal group, singletons. Stability of AdS and positive energy theorems. Towards the holographic correspondence: geodesics and the UV-IR relation. AdS from supergravity. Recommended: PHYSICS 330, some familiarity with general relativity.

**PHYSICS 366. Special Topics in Astrophysics: Statistical Methods. 2 Units.**

Existing and emerging statistical techniques and their application to astronomical surveys and cosmological data analysis. Topics covered will include statistical frameworks (Bayesian inference and frequentist statistics), numerical methods including Markov Chain Monte Carlo, and machine learning applied to classification and regression. Hands on activities based on open-source software in python.

**PHYSICS 367. Special Topics in Astrophysics: Experimental Methods in Particle Astrophysics and Cosmology. 2 Units.**

Experimental methods in particle physics, particle astrophysics and cosmology. The course will cover detector fundamentals including the passage of radiation through matter, signal production and collection in detector media, and front-end electronics, with a focus on the fundamental limits of technology. The course will include case studies of specific experiments chosen to illustrate a range of experimental techniques, what the underlying physics questions are and how they are probed with the instrumentation. A typical case study will include instrumentation papers that describe the detector design and a physics results paper that elucidates how the measurement follows from the detector capabilities. Students will make an oral presentation on an experiment, covering both the design of the experiment, and a science result that exploits the apparatus.

**PHYSICS 368. Computational Cosmology and Astrophysics. 2 Units.**

Create virtual Universes and understand our own using your computer. Techniques for studying the dynamics of dark matter and gas as it assembles over cosmic time to form the structure in the Universe. The use of modern computer codes on supercomputers to combine modeling of gravitation, gas dynamics, radiation processes, magnetohydrodynamics, and other relevant physical processes to make detailed predictions about the evolution of the Universe. Practical exercises to explore how cosmic microwave background observations are sensitive to cosmological parameters, how key numerical algorithms work, how different cosmological observations can be combined to constrain what the Universe is made of and how it changed over time. Additional current topics in computational cosmology depending on student interest. Hands-on activities based on open-source software in C++ and Python. Pre- or corequisites: PHYSICS 361. Recommended prerequisite: PHYSICS 366.

**PHYSICS 372. Condensed Matter Theory I. 3 Units.**

Fermi liquid theory, many-body perturbation theory, response function, functional integrals, interaction of electrons with impurities. Prerequisite: APPPHYS 273 or equivalent.

**PHYSICS 373. Condensed Matter Theory II. 3 Units.**

Superfluidity and superconductivity. Quantum magnetism. Prerequisite: PHYSICS 372.

**PHYSICS 41. Mechanics. 4 Units.**

How are motions of objects in the physical world determined by laws of physics? Students learn to describe the motion of objects (kinematics) and then understand why motions have the form they do (dynamics). Emphasis on how the important physical principles in mechanics, such as conservation of momentum and energy for translational and rotational motion, follow from just three laws of nature: Newton's laws of motion. Distinction made between fundamental laws of nature and empirical rules that are useful approximations for more complex physics. Problems drawn from examples of mechanics in everyday life. Skills developed in verifying that derived results satisfy criteria for correctness, such as dimensional consistency and expected behavior in limiting cases. Discussions based on language of mathematics, particularly vector representations and operations, and calculus. Physical understanding fostered by peer interaction and demonstrations in lecture, and discussion sections based on interactive group problem solving. Prerequisite: High school physics or concurrent enrollment in PHYSICS 41A. MATH 20 or MATH 51 or CME 100 or equivalent. Minimum corequisite: MATH 21 or equivalent.

**PHYSICS 41A. Mechanics Concepts, Calculations, and Context. 5 Units.**

Students attend Physics 41 lectures with different recitation sessions: two sections per week instead of one. Since PH41 sections fill up, you should sign up for your desired section in PH41 now in case you do not get permission for PH41A and you have to take PH41 instead. Prerequisite: application; see [https://stanforduniversity.qualtrics.com/jfe/form/SV\\_4OrBvKcJ5o1Baw5](https://stanforduniversity.qualtrics.com/jfe/form/SV_4OrBvKcJ5o1Baw5). nCourse content is identical to Physics 41: How are motions of objects in the physical world determined by laws of physics? Students learn to describe the motion of objects (kinematics) and then understand why motions have the form they do (dynamics). Emphasis on how the important physical principles in mechanics, such as conservation of momentum and energy for translational and rotational motion, follow from just three laws of nature: Newton's laws of motion. Distinction made between fundamental laws of nature and empirical rules that are useful approximations for more complex physics. Problems drawn from examples of mechanics in everyday life. Skills developed in verifying that derived results satisfy criteria for correctness, such as dimensional consistency and expected behavior in limiting cases. Discussions based on language of mathematics, particularly vector representations and operations, and calculus. Physical understanding fostered by peer interaction and demonstrations in lecture, and discussion sections based on interactive group problem solving.

**PHYSICS 42. Classical Mechanics Laboratory. 1 Unit.**

Hands-on exploration of concepts in classical mechanics: Newton's laws, conservation laws, rotational motion. Introduction to laboratory techniques, experimental equipment and data analysis. Pre- or corequisite: PHYSICS 41.

**PHYSICS 43. Electricity and Magnetism. 4 Units.**

What is electricity? What is magnetism? How are they related? How do these phenomena manifest themselves in the physical world? The theory of electricity and magnetism, as codified by Maxwell's equations, underlies much of the observable universe. Students develop both conceptual and quantitative knowledge of this theory. Topics include: electrostatics; magnetostatics; simple AC and DC circuits involving capacitors, inductors, and resistors; integral form of Maxwell's equations; electromagnetic waves. Principles illustrated in the context of modern technologies. Broader scientific questions addressed include: How do physical theories evolve? What is the interplay between basic physical theories and associated technologies? Discussions based on the language of mathematics, particularly differential and integral calculus, and vectors. Physical understanding fostered by peer interaction and demonstrations in lecture, and discussion sections based on interactive group problem solving. Prerequisite: PHYSICS 41 or equivalent. MATH 21 or MATH 51 or CME 100 or equivalent. Recommended corequisite: MATH 52 or CME 102.

**PHYSICS 43A. Electricity and Magnetism: Concepts, Calculations and Context. 1 Unit.**

Additional assistance and applications for Physics 43. In-class problems in physics and engineering. Exercises in calculations of electric and magnetic forces and field to reinforce concepts and techniques; Calculations involving inductors, transformers, AC circuits, motors and generators. Highly recommended for students with limited or no high school physics or calculus. Corequisite: PHYSICS 43-34 or PHYSICS 43-35; Prerequisite: application at [https://stanforduniversity.qualtrics.com/jfe/form/SV\\_eIGPlvxyNxdziXX](https://stanforduniversity.qualtrics.com/jfe/form/SV_eIGPlvxyNxdziXX).

**PHYSICS 43N. Understanding Electromagnetic Phenomena. 1 Unit.**

Preference to freshmen. Expands on the material presented in PHYSICS 43; applications of concepts in electricity and magnetism to everyday phenomena and to topics in current physics research. Corequisite: PHYSICS 43 or advanced placement.

**PHYSICS 44. Electricity and Magnetism Lab. 1 Unit.**

Hands-on exploration of concepts in electricity, magnetism, and circuits. Introduction to multimeters, function generators, oscilloscopes, and graphing techniques. Pre- or corequisite: PHYSICS 43.

**PHYSICS 45. Light and Heat. 4 Units.**

What is temperature? How do the elementary processes of mechanics, which are intrinsically reversible, result in phenomena that are clearly irreversible when applied to a very large number of particles, the ultimate example being life? In thermodynamics, students discover that the approach of classical mechanics is not sufficient to deal with the extremely large number of particles present in a macroscopic amount of gas. The paradigm of thermodynamics leads to a deeper understanding of real-world phenomena such as energy conversion and the performance limits of thermal engines. In optics, students see how a geometrical approach allows the design of optical systems based on reflection and refraction, while the wave nature of light leads to interference phenomena. The two approaches come together in understanding the diffraction limit of microscopes and telescopes. Discussions based on the language of mathematics, particularly calculus. Physical understanding fostered by peer interaction and demonstrations in lecture, and discussion sections based on interactive group problem solving. Prerequisite: PHYSICS 41 or equivalent. MATH 21 or MATH 51 or CME 100 or equivalent.

**PHYSICS 450. Advanced Theoretical Physics I: String Theory with Applications to Cosmology and Black Hole Physics. 3 Units.**

String theory provides a strong candidate for quantum gravity as well as contributing insights into many areas of physics. The class will start by evaluating the need for an extension of general relativity and quantum field theory, and assess the circumstances under which it becomes relevant (or 'dangerously irrelevant' in the renormalization group sense). We will develop the basic tools for perturbative calculations and study their implications at short and long distances and in nontrivial spacetime geometries and topologies. The course will survey non-perturbative objects, dualities, compactification, and the structure of cosmological backgrounds of string theory, discussing their implications for early universe models and for the problem of upgrading holographic duality to cosmology.

**PHYSICS 451. Advanced Theoretical Physics II: Quantum Information Theory, Complexity, Gravity and Black Holes. 3 Units.**

This course will cover the developing intersection between quantum information theory and the quantum theory of gravity. We will focus on the central roles of entanglement and computational complexity in black hole physics. Prerequisites: Basic knowledge of quantum mechanics, quantum field theory, and general relativity.

**PHYSICS 45N. Topics in Light and Heat. 1 Unit.**

Preference to freshmen. Explores the quantum and classical properties of light from stars, lasers and other sources. Includes modern applications ranging from gravity wave interferometers to x-ray lasers.

**PHYSICS 46. Light and Heat Laboratory. 1 Unit.**

Hands-on exploration of concepts in geometrical optics, wave optics and thermodynamics. Pre- or corequisite: PHYSICS 45.

**PHYSICS 470. Topics in Modern Condensed Matter Theory I: Topological States of Matter. 3 Units.**

A brief introduction to integer quantum Hall effect. Su-Schrieffer-Heeger model and one-dimensional topological insulators. Topological band theory of time-reversal invariant topological insulators. Various approaches of determining the topological invariant from the bulk and the boundary. An overview of key experiments. Topological superconductivity. Topological response theory. A brief summary of more recent developments on interacting topological insulators/symmetry protected topological states. Prerequisite: PHYSICS 172/APPPHYS 272 or equivalent; knowledge on second quantization; knowledge on path integral. May be repeat for credit.

**PHYSICS 471. Topics in Modern Condensed Matter Theory II: Physics of the Quantum Hall Regime. 3 Units.**

Integer quantum Hall effect, Fractional quantum Hall effect, Laughlin's theory, Hierarchy states, Effective theories, topological order in the fractional quantum Hall effect, physics of the half-filled Landau level, quantum Hall plateau transitions. May be repeat for credit.

**PHYSICS 490. Research. 1-18 Unit.**

Open only to Physics graduate students, with consent of instructor. Work is in experimental or theoretical problems in research, as distinguished from independent study of a non-research character in 190 and 293.

**PHYSICS 491. Symmetry and Quantum Information. 2 Units.**

This course gives an introduction to quantum information theory through the study of symmetries. We start with Bell's and Tsirelson's inequalities, which bound the strength of classical and quantum correlations, and discuss their relation to algebraic symmetries. Next, we exploit permutation symmetry to quantify the monogamy of entanglement and explain how to securely distribute a secret key. Lastly, we study quantum information in the limit of many copies and discuss a powerful technique for constructing universal quantum protocols, based on the Schur-Weyl duality between the unitary and symmetric groups. Applications include quantum data compression, state estimation, and entanglement distillation. Prerequisite: PHYSICS 230 or equivalent. All required group and representation theory will be introduced. This course runs for the first five weeks of the quarter.

**PHYSICS 492. Topological Quantum Computation. 2 Units.**

This course will be an introduction to topological quantum computation (TQC), which has recently emerged as an exciting approach to constructing fault-tolerant quantum computers. We start with a review of some basics of quantum computing, 2D topological phases of matter, Abelian/non-Abelian anyons, etc. Then we introduce the concept of TQC and study some examples such as the toric/surface code and Levin-Wen string-net model. We continue to talk about the mathematical theory of anyons including modular tensor categories, braid groups, 6j-symbols, Pentagon Equations. We study the issue of universality for different systems. Lastly, we show the equivalence of TQC with standard circuit model. Additional topics include complexity classes, Jones polynomials, topological field theories, etc. Prerequisite: Basic knowledge of quantum mechanics and condensed matter physics. Some knowledge of category theory and representation theory is useful but is not required. The course will run the first five weeks.

**PHYSICS 50. Astronomy Laboratory and Observational Astronomy. 3 Units.**

Introduction to observational astronomy emphasizing the use of optical telescopes. Observations of stars, nebulae, and galaxies in laboratory sessions with telescopes at the Stanford Student Observatory. Meets at the observatory one evening per week from dusk until well after dark, in addition to day-time lectures each week. No previous physics required. Limited enrollment.

**PHYSICS 59. Frontiers of Physics Research. 1 Unit.**

Recommended for prospective Physics or Engineering Physics majors or anyone with an interest in learning about the big questions and unknowns that physicists tackle in their research at Stanford. Weekly faculty presentations, in some cases followed by tours of experimental laboratories where the research is conducted.

**PHYSICS 61. Mechanics and Special Relativity. 4 Units.**

(First in a three-part advanced freshman physics series: PHYSICS 61, PHYSICS 63, PHYSICS 65.) This course covers Einstein's special theory of relativity and Newtonian mechanics at a level appropriate for students with a strong high school mathematics and physics background, who are contemplating a major in Physics or Engineering Physics, or are interested in a rigorous treatment of physics. Postulates of special relativity, simultaneity, time dilation, length contraction, the Lorentz transformation, causality, and relativistic mechanics. Central forces, contact forces, linear restoring forces. Momentum transport, work, energy, collisions. Angular momentum, torque, moment of inertia in three dimensions. Damped and forced harmonic oscillators. Uses the language of vectors and multivariable calculus. Recommended prerequisites: Mastery of mechanics at the level of AP Physics C and AP Calculus BC or equivalent. Corequisite: MATH 51 or MATH 61CM or MATH 61DM.

**PHYSICS 62. Mechanics Laboratory. 1 Unit.**

Introduction to laboratory techniques, experiment design, data collection and analysis simulations, and correlating observations with theory. Labs emphasize discovery with open-ended questions and hands-on exploration of concepts developed in PHYSICS 61 including Newton's laws, conservation laws, rotational motion. Pre- or corequisite PHYSICS 61.

**PHYSICS 63. Electricity, Magnetism, and Waves. 4 Units.**

(Second in a three-part advanced freshman physics series: PHYSICS 61, PHYSICS 63, PHYSICS 65.) This course covers the foundations of electricity and magnetism for students with a strong high school mathematics and physics background, who are contemplating a major in Physics or Engineering Physics, or are interested in a rigorous treatment of physics. Electricity, magnetism, and waves with some description of optics. Electrostatics and Gauss' law. Electric potential, electric field, conductors, image charges. Electric currents, DC circuits. Moving charges, magnetic field, Ampere's law. Solenoids, transformers, induction, AC circuits, resonance. Relativistic point of view for moving charges. Displacement current, Maxwell's equations. Electromagnetic waves, dielectrics. Diffraction, interference, refraction, reflection, polarization. Prerequisite: PHYSICS 61 and MATH 51 or MATH 61CM or MATH 61DM. Pre- or corequisite: MATH 52 or MATH 62CM or MATH 62DM.

**PHYSICS 64. Electricity, Magnetism and Waves Laboratory. 1 Unit.**

Introduction to multimeters, breadboards, function generators and oscilloscopes. Emphasis on student-developed design of experimental procedure and data analysis for topics covered in PHYSICS 63: electricity, magnetism, circuits, and optics. Pre- or corequisite: PHYSICS 63.

**PHYSICS 65. Quantum and Thermal Physics. 4 Units.**

(Third in a three-part advanced freshman physics series: PHYSICS 61, PHYSICS 63, PHYSICS 65.) This course introduces the foundations of quantum and statistical mechanics for students with a strong high school mathematics and physics background, who are contemplating a major in Physics or Engineering Physics, or are interested in a rigorous treatment of physics. Quantum mechanics: atoms, electrons, nuclei. Quantization of light, Planck's constant. Photoelectric effect, Compton and Bragg scattering. Bohr model, atomic spectra. Matter waves, wave packets, interference. Fourier analysis and transforms, Heisenberg uncertainty relationships. Schrödinger equation, eigenfunctions and eigenvalues. Particle-in-a-box, simple harmonic oscillator, barrier penetration, tunneling, WKB and approximate solutions. Time-dependent and multi-dimensional solution concepts. Coulomb potential and hydrogen atom structure. Thermodynamics and statistical mechanics: ideal gas, equipartition, heat capacity. Probability, counting states, entropy, equilibrium, chemical potential. Laws of thermodynamics. Cycles, heat engines, free energy. Partition function, Boltzmann statistics, Maxwell speed distribution, ideal gas in a box, Einstein model. Quantum statistical mechanics: classical vs. quantum distribution functions, fermions vs. bosons. Prerequisites: PHYSICS 61 & PHYSICS 63. Pre- or corequisite: MATH 53 or MATH 63CM or MATH 63DM.

**PHYSICS 67. Introduction to Laboratory Physics. 2 Units.**

Methods of experimental design, data collection and analysis, statistics, and curve fitting in a laboratory setting. Experiments drawn from electronics, optics, heat, and modern physics. Lecture plus laboratory format. Required for PHYSICS 60 series Physics and Engineering Physics majors; recommended, in place of PHYSICS 44, for PHYSICS 40 series students who intend to major in Physics or Engineering Physics. Pre- or corequisite: PHYSICS 65 or PHYSICS 43.

**PHYSICS 70. Foundations of Modern Physics. 4 Units.**

Required for Physics or Engineering Physics majors who completed the PHYSICS 40 series. Introduction to special relativity: reference frames, Michelson-Morley experiment. Postulates of relativity, simultaneity, time dilation. Length contraction, the Lorentz transformation, causality. Doppler effect. Relativistic mechanics and mass, energy, momentum relations. Introduction to quantum physics: atoms, electrons, nuclei. Quantization of light, Planck constant. Photoelectric effect, Compton and Bragg scattering. Bohr model, atomic spectra. Matter waves, wave packets, interference. Fourier analysis and transforms, Heisenberg uncertainty relationships. Schrödinger equation, eigenfunctions and eigenvalues. Particle-in-a-box, simple harmonic oscillator, barrier penetration, tunneling, WKB and approximate solutions. Time-dependent and multi-dimensional solution concepts. Coulomb potential and hydrogen atom structure. Prerequisites: PHYSICS 41, PHYSICS 43. Pre or corequisite: PHYSICS 45. Recommended: prior or concurrent registration in MATH 53.

**PHYSICS 801. TGR Project. 0 Units.****PHYSICS 802. TGR Dissertation. 0 Units.****PHYSICS 81N. Science on the Back of the Envelope. 3 Units.**

Understanding the complex world around us quantitatively, using order of magnitude estimates and dimensional analysis. Starting from a handful of fundamental constants of Nature, one can estimate complex quantities such as cosmological length and time scales, size of the atom, height of Mount Everest, speed of tsunami, energy density of fuels and climate effects. Through these examples students learn the art of deductive thinking, fundamental principles of science and the beautiful unity of nature.

**PHYSICS 83N. Physics in the 21st Century. 3 Units.**

Preference to freshmen. Current topics at the frontier of modern physics. This course provides an in-depth examination of two of the biggest physics discoveries of the 21st century: that of the Higgs boson and Dark Energy. Through studying these discoveries we will explore the big questions driving modern particle physics, the study of nature's most fundamental pieces, and cosmology, the study of the evolution and nature of the universe. Questions such as: What is the universe made of? What are the most fundamental particles and how do they interact with each other? What can we learn about the history of the universe and what does it tell us about its future? We will learn about the tools scientists use to study these questions such as the Large Hadron Collider and the Hubble Space Telescope. We will also learn to convey these complex topics in engaging and diverse terms to the general public through writing and reading assignments, oral presentations, and multimedia projects. The syllabus includes a tour of SLAC, the site of many major 20th century particle discoveries, and a virtual visit of the control room of the ATLAS experiment at CERN amongst other activities. No prior knowledge of physics is necessary; all voices are welcome to contribute to the discussion about these big ideas. Learning Goals: By the end of the quarter you will be able to explain the major questions that drive particle physics and cosmology to your friends and peers. You will understand how scientists study the impossibly small and impossibly large and be able to convey this knowledge in clear and concise terms.

**PHYSICS 91SI. Practical Computing for Scientists. 2 Units.**

Essential computing skills for researchers in the natural sciences. Helping students transition their computing skills from a classroom to a research environment. Topics include the Unix operating system, the Python programming language, and essential tools for data analysis, simulation, and optimization. More advanced topics as time allows. Prerequisite: CS106A or equivalent.

**PHYSICS 95Q. The Philosophies of Three Great Physicists. 3 Units.**

Richard Feynman has famously said, Philosophy of science is about as useful to scientists as ornithology is to birds. A closer look at key moments in the history of physics, however, reveals a different picture. Contrary to the misconception that philosophy has nothing to offer to science in general, and physics in particular, watershed moments in the development of physics were inspired and motivated by deeply held philosophical principles. Similarly, important developments in physics have generated important and difficult philosophical questions. In this sophomore seminar we will explore three significant moments in the development of physics surrounding the works of Newton, Einstein, and Bohr. We will analyze the relationship between the prevailing philosophical views they espoused and the physics they produced. How did Newton come to the view of absolute and fixed space and time? What led Einstein to reject the notion of a fixed space and time and propose a relativistic, and even dynamic space-time? What is Bohr's influential doctrine of complementarity, and why did several generations of physicists believe it to be an adequate philosophical response to quantum mechanics? We will see that the relationship between philosophy and physics is more similar to the relationship between mathematics and physics where progress in one area is often preceded and followed by progress in the second.

## Political Science (POLISCI)

**POLISCI 1. The Science of Politics. 5 Units.**

Why do countries go to war? How can we explain problems such as poverty, inequality, and pollution? What can be done to improve political representation in the United States and other countries? We will use scientific methods to answer these and other fundamental questions about politics.

**POLISCI 101. Introduction to International Relations. 5 Units.**

Approaches to the study of conflict and cooperation in world affairs. Applications to First and Second World Wars, the Cold War, terrorism, economic policy, and development.

**POLISCI 101Z. Introduction to International Relations. 4 Units.**

Approaches to the study of conflict and cooperation in world affairs. Applications to war, terrorism, trade policy, the environment, and world poverty. Debates about the ethics of war and the global distribution of wealth.

Same as: INTNLREL 101Z

**POLISCI 102. Politics and Public Policy. 4-5 Units.**

American political institutions (the Presidency, Congress, and the Court) and political processes (the formation of political attitudes and voting) have for some time now been criticized as inadequate to the task of making modern public policy. Against the backdrop of American culture and political history we examine how public policy has been and is being made. We use theories from Political Science and Economics to assess the state of the American system and the policy making process. We use case studies and lectures to analyze contemporary issues including environmental policy, taxes and spending, gun control, economic growth and inequality and mobility. In some of these issue areas we use comparative data from other countries to see how the U.S. is doing relative to other countries. In addition to class room lecture and discussion, student groups are formed to analyze policy issues of relevance to them. Undergraduate Public Policy students are required to enroll in this class for five units.

Same as: AMSTUD 123X, PUBLPOL 101, PUBLPOL 201

**POLISCI 103. Justice. 4-5 Units.**

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors. Same as: ETHICSOC 171, PHIL 171, POLISCI 336S, PUBLPOL 103C, PUBLPOL 307

**POLISCI 104. Introduction to Comparative Politics. 5 Units.**

(Formerly POLISCI 4) Why are some countries prone to civil war and violence, while others remain peaceful? Why do some countries maintain democratic systems, while others do not? Why are some countries more prosperous than others? This course will provide an overview of the most basic questions in the comparative study of political systems, and will introduce the analytical tools that can help us answer them.

**POLISCI 10N. International Organizations and the World Order. 3 Units.**

Since the end of World War II, there has been an explosion in the number, scope, and complexity of international organizations. International organizations such as the United Nations, North Atlantic Treaty Organization, and World Bank now play critical roles across a wide range of policy issues. Why have international organizations proliferated and expanded since the mid-20th century? How do these organizations shape the international system? Why do states sometimes conduct foreign policy through international organizations, while other times preferring traditional means? Why do some international organizations evolve over time, while others resist change? What are some of the pathologies and problems of contemporary international organizations? We will explore these questions by carefully examining the functions and operations of major international organizations. You will also complete a research project examining an international organization of your choice and present your findings in class.

**POLISCI 110C. America and the World Economy. 5 Units.**

Examination of contemporary US foreign economic policy. Areas studied: the changing role of the dollar; mechanism of international monetary management; recent crises in world markets including those in Europe and Asia; role of IMF, World Bank and WTO in stabilizing world economy; trade politics and policies; the effects of the globalization of business on future US prosperity. Enroll in PoliSci 110C for WIM credit.

Same as: INTNLREL 110C, POLISCI 110X

**POLISCI 110D. War and Peace in American Foreign Policy. 5 Units.**

(Students not taking this course for WIM, register for 110Y.) The causes of war in American foreign policy. Issues: international and domestic sources of war and peace; war and the American political system; war, intervention, and peace making in the post-Cold War period.

Same as: AMSTUD 110D, INTNLREL 110D, POLISCI 110Y

**POLISCI 110G. Governing the Global Economy. 5 Units.**

Who governs the world economy? Why do countries succeed or fail to cooperate in setting their economic policies? When and how do international institutions help countries cooperate? When and why do countries adopt good and bad economic policies? How does the international economy affect domestic politics? This course examines how domestic and international politics determine how the global economy is governed. We will study the politics of monetary, trade, international investment, energy, environmental, and foreign aid policies to answer these questions. The course will approach each topic by examining alternative theoretical approaches and evaluate these theories using historical and contemporary evidence. There will be an emphasis on applying concepts through the analysis of case studies.

**POLISCI 110X. America and the World Economy. 5 Units.**

Examination of contemporary US foreign economic policy. Areas studied: the changing role of the dollar; mechanism of international monetary management; recent crises in world markets including those in Europe and Asia; role of IMF, World Bank and WTO in stabilizing world economy; trade politics and policies; the effects of the globalization of business on future US prosperity. Enroll in PoliSci 110C for WIM credit.

Same as: INTNLREL 110C, POLISCI 110C

**POLISCI 110Y. War and Peace in American Foreign Policy. 5 Units.**

(Students not taking this course for WIM, register for 110Y.) The causes of war in American foreign policy. Issues: international and domestic sources of war and peace; war and the American political system; war, intervention, and peace making in the post-Cold War period.

Same as: AMSTUD 110D, INTNLREL 110D, POLISCI 110D

**POLISCI 114D. Democracy, Development, and the Rule of Law. 5 Units.**

Links among the establishment of democracy, economic growth, and the rule of law. How democratic, economically developed states arise. How the rule of law can be established where it has been historically absent. Variations in how such systems function and the consequences of institutional forms and choices. How democratic systems have arisen in different parts of the world. Available policy instruments used in international democracy, rule of law, and development promotion efforts. Same as: INTNLREL 114D, IPS 230, POLISCI 314D

**POLISCI 114S. International Security in a Changing World. 5 Units.**

This class examines the most pressing international security problems facing the world today: nuclear crises, nuclear non-proliferation, terrorism, and climate change. Alternative perspectives—from political science, history, and STS (Science, Technology, and Society) studies—are used to analyze these problems. The class includes an award-winning two-day international negotiation simulation.

Same as: HISTORY 104D, IPS 241

**POLISCI 115A. The Rise of Asia. 3-5 Units.**

We will examine the sources and implications of the rise of Asia in the international system. Topics will include military competition, international cooperation, regional integration, domestic politics, business and investment, legalization, environmental issues, demographics, social issues, and the role of technology.

Same as: POLISCI 315A

**POLISCI 115E. Japan & the World: Innovation, Economic Growth, Globalization, and Int'l Security Challenges. 3-5 Units.**

This course introduces students to the economy, politics, and international relations of contemporary Japan. The course puts a particular emphasis on several emerging issues in Japan including innovation and economic dynamism, Japan's contributions to international peace and cooperation, and Japan's response to international economic and geopolitical challenges. The course will invite several guest instructors, each of whom is an expert on at least one of the issues that Japan faces today, to give lectures in addition to the main instructors. The guest lecturers will also be available outside of the classroom for further discussion during their stays at Stanford.

Same as: EASTASN 153, EASTASN 253, ECON 120

**POLISCI 116. The International History of Nuclear Weapons. 5 Units.**

An introduction to the history of nuclear weapons from World War II to the present. The focus is on politics, but the role of technology transfer, whether legal or illicit, in the development of nuclear weapons will be examined; so too will the theories about the military and political utility of nuclear weapons. We will look at the efforts to control and abolish nuclear weapons and at the international institutions created to reduce the danger of nuclear war.

Same as: HISTORY 103E

**POLISCI 116A. European Security Since World War Two. 4-5 Units.**

This course looks at European security during the Cold War and up to the present. There are many historical controversies to be examined, e.g. the enlargement of NATO, as well as theoretical and doctrinal debates, e.g. about extended deterrence and detente.

Same as: HISTORY 232C, HISTORY 332C, IPS 235

**POLISCI 118P. U.S. Relations in Iran. 5 Units.**

The evolution of relations between the U.S. and Iran. The years after WW II when the U.S. became more involved in Iran. Relations after the victory of the Islamic republic. The current state of affairs and the prospects for the future. Emphasis is on original documents of U.S. diplomacy (White House, State Department, and the U.S. Embassy in Iran). Research paper.



**POLISCI 11N. The Rwandan Genocide. 3 Units.**

Preference to freshmen. In 1994, more than 800,000 Tutsi and moderate Hutu Rwandans were killed in the most rapid genocide in history. What could bring humans to carry out such violence? Could it have been prevented? Why did no major power intervene to stop the killing? Should the U.N. be held accountable? What were the consequences for Central Africa? How have international actors respond to the challenges of reconstructing Rwanda? What happened to the perpetrators? Sources include scholarly and journalistic accounts.

**POLISCI 120B. Campaigns, Voting, Media, and Elections. 4-5 Units.**

This course examines the theory and practice of American campaigns and elections. First, we will attempt to explain the behavior of the key players – candidates, parties, journalists, and voters – in terms of the institutional arrangements and political incentives that confront them. Second, we will use current and recent election campaigns as "laboratories" for testing generalizations about campaign strategy and voter behavior. Third, we examine selections from the academic literature dealing with the origins of partisan identity, electoral design, and the immediate effects of campaigns on public opinion, voter turnout, and voter choice. As well, we'll explore issues of electoral reform and their more long-term consequences for governance and the political process. Same as: COMM 162, COMM 262

**POLISCI 120C. American Political Institutions in Uncertain Times. 5 Units.**

This course examines how the rules that govern elections and the policy process determine political outcomes. It explores the historical forces that have shaped American political institutions, contemporary challenges to governing, and prospects for change. Topics covered include partisan polarization and legislative gridlock, the politicization of the courts, electoral institutions and voting rights, the expansion of presidential power, campaign finance and lobbying, representational biases among elected officials, and the role of political institutions in maintaining the rule of law. Throughout, emphasis will be placed on the strategic interactions between Congress, the presidency, and the courts and the importance of informal norms and political culture. Same as: PUBLPOL 124

**POLISCI 120Z. What's Wrong with American Government? An Institutional Approach. 4 Units.**

How politicians, once elected, work together to govern America. The roles of the President, Congress, and Courts in making and enforcing laws. Focus is on the impact of constitutional rules on the incentives of each branch, and on how they influence law. Fulfills the Writing in the Major Requirement for Political Science majors.

**POLISCI 121. Political Power in American Cities. 5 Units.**

The major actors, institutions, processes, and policies of sub-state government in the U.S., emphasizing city general-purpose governments through a comparative examination of historical and contemporary politics. Issues related to federalism, representation, voting, race, poverty, housing, and finances.

Same as: AMSTUD 121Z, PUBLPOL 133, URBANST 111

**POLISCI 121L. Racial-Ethnic Politics in US. 5 Units.**

This course examines various issues surrounding the role of race and ethnicity in the American political system. Specifically, this course will evaluate the development of racial group solidarity and the influence of race on public opinion, political behavior, the media, and in the criminal justice system. We will also examine the politics surrounding the Multiracial Movement and the development of racial identity and political attitudes in the 21st century. PoliSci 150A, Stats 60 or Econ 1 is strongly recommended.

Same as: CSRE 121L, PUBLPOL 121L

**POLISCI 121Z. Political Power in American Cities. 4 Units.**

The major actors, institutions, processes, and policies of sub-state government in the U.S., emphasizing city general-purpose governments through a comparative examination of historical and contemporary politics. Issues related to federalism, representation, voting, race, poverty, housing, and finances.

**POLISCI 122. Introduction to American Law. 3-5 Units.**

For undergraduates. The structure of the American legal system including the courts; American legal culture; the legal profession and its social role; the scope and reach of the legal system; the background and impact of legal regulation; criminal justice; civil rights and civil liberties; and the relationship between the American legal system and American society in general.

Same as: AMSTUD 179, PUBLPOL 302A

**POLISCI 123A. Presidential Politics: Race, Gender, and Inequality in the 2016 Election. 3 Units.**

From the 2016 nomination process to the election. The complexities of identity and its role in uniting and dividing the electorate. Panels covering the media, political participation, and group affiliation.

Same as: AFRICAAM 109, CSRE 112

**POLISCI 124A. The American West. 5 Units.**

The American West is characterized by frontier mythology, vast distances, marked aridity, and unique political and economic characteristics. This course integrates several disciplinary perspectives into a comprehensive examination of Western North America: its history, physical geography, climate, literature, art, film, institutions, politics, demography, economy, and continuing policy challenges. Students examine themes fundamental to understanding the region: time, space, water, peoples, and boom and bust cycles.

Same as: AMSTUD 124A, ARTHIST 152, ENGLISH 124, HISTORY 151

**POLISCI 124L. The Psychology of Communication About Politics in America. 4-5 Units.**

Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can manipulate poll results; corruption in survey research.

Same as: COMM 164, COMM 264, PSYCH 170

**POLISCI 124R. The Federal System: Judicial Politics and Constitutional Law. 5 Units.**

Does the constitution matter? And if so, how exactly does it shape our daily lives? In this course, we will examine the impact of structural features, such as the separation of powers and federalism. While these features often seem boring and unimportant, they are not. As we will see, arguments over structure were at the heart of the debates over slavery, the incarceration of the Japanese during WWII, the drug war and gay marriage. Prerequisites: 2 or equivalent, and sophomore standing. Fulfills Writing in the Major requirement for PoliSci majors.

**POLISCI 124S. Civil Liberties: Judicial Politics and Constitutional Law. 5 Units.**

The role and participation of courts, primarily the U.S. Supreme Court, in public policy making and the political system. Judicial activity in civil liberty areas (religious liberty, free expression, race and sex discrimination, political participation, and rights of persons accused of crime). Prerequisites: 2 or equivalent, and sophomore standing.

**POLISCI 125M. Latino Social Movements. 5 Units.**

Social movements are cooperative attempts to change the world. This course reviews historically significant and contemporary political and social movements in Latino communities in the U.S., including the movements of the 1960s and events of the modern era such as the Spring 2006 marches and student walkouts, the 2010 resistance to Arizona's SB1070, and ongoing efforts in 2017 related to detention and deportation policies.

Same as: CHILATST 181

**POLISCI 125P. The First Amendment: Freedom of Speech and Press. 4-5 Units.**

Introduction to the constitutional protections for freedom of speech, press, and expressive association. All the major Supreme Court cases dealing with issues such as incitement, libel, hate speech, obscenity, commercial speech, and campaign finance. There are no prerequisites, but a basic understanding of American government would be useful. In addition to a final and midterm exam, students participate in a moot court on a hypothetical case. (Grad students register for COMM 251).

Same as: COMM 151, COMM 251

**POLISCI 125S. Chicano/Latino Politics. 5 Units.**

The political position of Latinos and Latinas in the U.S.. Focus is on Mexican Americans, with attention to Cuban Americans, Puerto Ricans, and other groups. The history of each group in the American polity; their political circumstances with respect to the electoral process, the policy process, and government; the extent to which the demographic category Latino is meaningful; and group identity and solidarity among Americans of Latin American ancestry. Topics include immigration, education, affirmative action, language policy, and environmental justice.

Same as: CHILATST 125S

**POLISCI 125V. The Voting Rights Act. 5 Units.**

Focus is on whether and how racial and ethnic minorities including African Americans, Asian Americans, and Latinos are able to organize and press their demands on the political system. Topics include the political behavior of minority citizens, the strength and effect of these groups at the polls, the theory and practice of group formation among minorities, the responsiveness of elected officials, and the constitutional obstacles and issues that shape these phenomena.

Same as: AFRICAAM 125V, CSRE 125V

**POLISCI 126P. Constitutional Law. 3 Units.**

This course covers Supreme Court case law concerning governmental powers, equal protection, and certain fundamental rights. The course investigates the constitutional foundation for democratic participation in the United States, covering topics such as the Fourteenth Amendment's protections against discrimination on grounds of race, gender, and other classifications, as well as the individual rights to voting and intimate association, and an introduction to First Amendment rights of free speech and press. Students will be evaluated on class participation, a midterm moot court with both a written and oral component, and a take-home final exam. Lectures will be twice per week and a discussion section once per week.

Same as: COMM 152, COMM 252

**POLISCI 127A. Finance and Society for non-MBAs. 4 Units.**

The financial system is meant to help people, businesses, and governments fund, invest, and manage risks, but it is rife with conflicts of interests and may allow people with more information and control to harm those with less of both. In this interdisciplinary course we explore the forces that shape the financial system and how individuals and society can benefit most from this system without being unnecessarily harmed and endangered. Topics include the basic principles of investment, the role and "dark side" of debt, corporations and their governance, banks and other financial institutions, why effective financial regulations are essential yet often fail, and political and ethical issues in finance. The approach will be rigorous and analytical but not overly technical mathematically. Prerequisite: Econ 1.

Same as: ECON 143, IPS 227, MS&E 147, PUBLPOL 143

**POLISCI 127P. Economic Inequality and Political Dysfunction. 5 Units.**

This course will examine how two of the defining features of contemporary U.S. politics, economic inequality and political polarization, relate to each other and to Congressional gridlock. The reading list will focus on several books recently authored by preeminent political scientists on this important topic. The course will cover a range of topics, including the disparity in political representation of the preferences of the affluent over those of the poor, the origins of Congressional polarization, the influence of money in politics, budgetary politics, immigration policy, and electoral and institutional barriers to reform.

**POLISCI 128S. The Constitution: A Brief History. 5 Units.**

A broad survey of the Constitution, from its Revolutionary origins to the contemporary disputes over interpretation. Topics include the invention of the written constitution and interpretative canons; the origins of judicial review; the Civil War and Reconstruction as constitutional crises; the era of substantive due process; the rights revolution; and the Constitution in wartime.

Same as: AMSTUD 157, HISTORY 157

**POLISCI 130. 20th Century Political Theory: Liberalism and its Critics. 5 Units.**

In this course, students will learn and engage with the debates that have animated political theory since the early 20th century. What is the proper relationship between the individual, the community, and the state? Are liberty and equality in conflict, and, if so, which should take priority? What does justice mean in a large and diverse modern society? The subtitle of the course, borrowed from a book by Michael Sandel, is "Liberalism and its Critics" because the questions we discuss in this class center on the meaning of, and alternatives to, the liberal idea that the basic goal of society should be the protection of individual rights. Readings will include selections from works by John Rawls, Hannah Arendt, Robert Nozick, Michael Sandel, Iris Marion Young, and Martha Nussbaum. No prior experience with political theory is necessary.

Same as: PHIL 171P

**POLISCI 131A. The Ethics and Politics of Collective Action. 3-4 Units.**

Collective action problems arise when actions that are individually rational give rise to results that are collectively irrational. Scholars have used such a framework to shed light on various political phenomena such as revolutions, civil disobedience, voting, climate change, and the funding of social services. We examine their findings and probe the theoretical foundations of their approach. What does this way of thinking about politics bring into focus, and what does it leave out? What role do institutions play in resolving collective action problems? And what if the required institutions are absent? Can we, as individuals, be required to cooperate even if we expect that others may not play their part? Readings drawn from philosophy, political science, economics, and sociology.

Same as: ETHICSOC 180M, PHIL 73, PUBLPOL 304A

**POLISCI 131L. Modern Political Thought: Machiavelli to Marx and Mill. 5 Units.**

This course offers an introduction to the history of Western political thought from the late fifteenth through the nineteenth centuries. We will consider the development of ideas like individual rights, government by consent, and the protection of private property. We will also explore the ways in which these ideas continue to animate contemporary political debates. Thinkers covered will include: Niccolò Machiavelli, Thomas Hobbes, John Locke, Jean-Jacques Rousseau, Edmund Burke, John Stuart Mill, and Karl Marx.

Same as: ETHICSOC 131S

**POLISCI 132A. The Ethics of Elections. 5 Units.**

Do you have a duty to vote? How should you choose whom to vote for? Should immigrants be allowed to vote? Should we make voting mandatory? How (if at all) should we regulate campaign finance? Should we even have elections at all? In this course, we will explore these and other ethical questions related to electoral participation and the design of electoral institutions. We will evaluate arguments from political philosophers, political scientists, and politicians to better understand how electoral systems promote important democratic values and how this affects citizens' and political leaders' ethical obligations. We will focus, in particular, on questions that are particularly relevant to the 2016 U.S. presidential election, though many of the ethical issues we will discuss in this course will be relevant in any electoral democracy. Same as: ETHICSOC 134R

**POLISCI 132C. Family, Friends, and Groups: The Ethics of Association. 4 Units.**

The practice of associating with others is a fundamental part of human existence. We cultivate friendships, we grow up in families, we work for nonprofit associations or businesses, we join social movements and sport clubs, and we participate in political associations with our fellow citizens. This seminar explores the ethical dimensions of association. What grounds a right to freedom of association? Do we have, beyond a right, also a duty to participate in associational life? Do we have special obligations towards our friends, family members, or fellow-citizens that we do not have toward strangers? To what extent should the internal life of private associations, such as families or churches, be regulated by the state? Should the state support, through tax-exemptions and subsidies, the nonprofit associations of civil society? Can a state exclude non-citizens, such as immigrants, in the same way in which a private club excludes non-members? These questions have wide-ranging implications for contemporary political and legal debates.

**POLISCI 133. Ethics and Politics of Public Service. 3-5 Units.**

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. Same as: CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL 175A, PHIL 275A, PUBLPOL 103D, URBANST 122

**POLISCI 133Z. Ethics and Politics in Public Service. 4 Units.**

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford. Same as: CSRE 133P, PUBLPOL 103Z, URBANST 122Z

**POLISCI 134L. Introduction to Environmental Ethics. 4-5 Units.**

How should human beings relate to the natural world? Do we have moral obligations toward non-human animals and other parts of nature? And what do we owe to other human beings, including future generations, with respect to the environment? The first part of this course will examine such questions in light of some of our current ethical theories: considering what those theories suggest regarding the extent and nature of our environmental obligations; and also whether reflection on such obligations can prove informative about the adequacy of our ethical theories. In the second part of the course, we will use the tools that we have acquired to tackle various ethical questions that confront us in our dealings with the natural world, looking at subjects such as: animal rights; conservation; economic approaches to the environment; access to and control over natural resources; environmental justice and pollution; climate change; technology and the environment; and environmental activism. Same as: ETHICSOC 178M, ETHICSOC 278M, PHIL 178M, PHIL 278M

**POLISCI 134P. Contemporary Moral Problems. 4-5 Units.**

Conflict is a natural part of human life. As human beings we represent a rich diversity of conflicting personalities, preferences, experiences, needs, and moral viewpoints. How are we to resolve or otherwise address these conflicts in a way fair to all parties? In this course, we will consider the question as it arises across various domains of human life, beginning with the classroom. What are we to do when a set of ideas expressed in the classroom offends, threatens, or silences certain of its members? What is it for a classroom to be safe? What is it for a classroom to be just? We will then move from the classroom to the family, considering a difficult set of questions about how we are to square the autonomy rights of children, elderly parents, and the mentally ill with our desire as family members to keep them safe. Finally, we will turn to the conflicts of citizenship in a liberal democratic society in which the burdens and benefits of citizenship have not always been fairly distributed. We will consider, among others, the question of whether or not civil disobedience is ever morally permissible, of whether there is a right to healthcare, and of whether or not some citizens are owed reparations for past injustices. Same as: ETHICSOC 185M, PHIL 72

**POLISCI 135D. The Ethics of Democratic Citizenship. 5 Units.**

We usually think about democratic citizenship in terms of rights and opportunities, but are these benefits of democracy accompanied by special obligations? Do citizens of a democracy have an obligation to take an interest in politics and to actively influence political decision making? How should citizens respond when a democracy's laws become especially burdensome? Do citizens of a democracy have a special obligation to obey the law? In this course, we will read classical and contemporary political philosophy including Plato's *Crito* and King's "Letter from a Birmingham Jail" to explore how political thinkers have understood and argued for the ethics of citizenship. Students in this course will draw on these materials to construct their own arguments, and to identify and assess implicit appeals to the ethics of citizenship in popular culture and contemporary public discourse, from The Simpsons to President Obama's speeches. Same as: ETHICSOC 135R

**POLISCI 135P. Moral Limits of the Market. 4 Units.**

Morally controversial uses of markets and market reasoning in areas such as organ sales, procreation, education, and child labor. Would a market for organ donation make saving lives more efficient; if it did, would it thereby be justified? Should a nation be permitted to buy the right to pollute? Readings include Walzer, Arrow, Rawls, Sen, Frey, Titmuss, and empirical cases. Same as: ETHICSOC 174A, PHIL 174A, PHIL 274A

**POLISCI 136R. Introduction to Global Justice. 4 Units.**

This course provides an overview of core ethical problems in international politics, with special emphasis on the question of what demands justice imposes on institutions and agents acting in a global context. The course is divided into three sections. The first investigates the content of global justice, and comprises of readings from contemporary political theorists and philosophers who write within the liberal contractualist, utilitarian, cosmopolitan, and nationalist traditions. The second part of the course looks at the obligations which global justice generates in relation to a series of real-world issues of international concern: global poverty, human rights, natural resources, climate change, migration, and the well-being of women. The final section of the course asks whether a democratic international order is necessary for global justice to be realized.

Same as: ETHICSOC 136R, INTNLREL 136R, PHIL 76, POLISCI 336

**POLISCI 137A. Political Philosophy: The Social Contract Tradition. 4 Units.**

(Graduate students register for 276.) Why and under what conditions do human beings need political institutions? What makes them legitimate or illegitimate? What is the nature, source, and extent of the obligation to obey the legitimate ones, and how should people alter or overthrow the others? Study of the answers given to such questions by major political theorists of the early modern period: Hobbes, Locke, Rousseau, and Kant. Same as: PHIL 176, PHIL 276, POLISCI 337A

**POLISCI 140L. China in World Politics. 5 Units.**

The implications of the rise of China in contemporary world politics and for American foreign policy, including issues such as arms and nuclear proliferation, regional security arrangements, international trade and investment, human rights, environmental problems, and the Taiwan and Tibet questions.

Same as: POLISCI 340L

**POLISCI 140P. Populism and the Erosion of Democracy. 5 Units.**

What is populism, and how much of a threat to democracy is it? How different is it from fascism or other anti-liberal movements? This course explores the conditions for the rise of populism, evaluates how much of a danger it poses, and examines the different forms it takes.

Same as: GLOBAL 106

**POLISCI 141A. Immigration and Multiculturalism. 5 Units.**

What are the economic effects of immigration? Do immigrants assimilate into local culture? What drives native attitudes towards immigrants? Is diversity bad for local economies and societies and which policies work for managing diversity and multiculturalism? We will address these and similar questions by synthesizing the conclusions of a number of empirical studies on immigration and multiculturalism. The emphasis of the course is on the use of research design and statistical techniques that allow us to move beyond correlations and towards causal assessments of the effects of immigration and immigration policy.

Same as: CSRE 141S

**POLISCI 141S. Politics of India. 5 Units.**

This course provides an overview of the political institutions, processes, and issues in post-independence India. The purpose is not merely to familiarize students to the politics of India, but also to facilitate a good understanding of, and stimulate keen interest in, the subject. The course hopes to build a strong foundation for acquiring a deeper understanding of Indian politics. The subject-matter will be approached from a comparative perspective, and students are encouraged to think about the topics covered with a view on cases beyond India.

**POLISCI 142B. British Politics. 5 Units.**

The impact on the world's oldest democracy of major changes in policies, politics, and the institution of government made over the last two decades by Margaret Thatcher and Tony Blair.

**POLISCI 143S. Comparative Corruption. 3 Units.**

Causes, effects, and solutions to various forms of corruption in business and politics in both developing regions (e.g. Asia, E. Europe) and developed ones (the US and the EU).

Same as: SOC 113

**POLISCI 144A. Revolution and Reconciliation Through Film. 5 Units.**

The course uses the Spanish political experience in the 20th Century, both in the Spanish civil war and in its transition to democracy in the late 1970s, as a starting point, to focus on the human and social effects of the numerous political upheavals in the transitions from democracy to authoritarianism and back again. Using films about revolutionary change in several different societies, we will treat these as the texts to motivate our thinking, and examine both the process of social breakdown during periods of civil strife and the role of reconciliation in the reconstruction of societies. We will focus on multiple elements of social consequences in political transitions, including gender, children, non-violent resistance, racism, social class, and the role of the United States. Course requirements will include weekly film screening, discussion, and two critical response papers written across the quarter.

**POLISCI 146A. African Politics. 4-5 Units.**

Africa has lagged the rest of the developing world in terms of economic development, the establishment of social order, and the consolidation of democracy. This course seeks to identify the historical and political sources accounting for this lag, and to provide extensive case study and statistical material to understand what sustains it, and how it might be overcome.

Same as: AFRICAAM 146A

**POLISCI 147. Comparative Democratic Development. 5 Units.**

Social, cultural, political, economic, and international factors affecting the development and consolidation of democracy in historical and comparative perspective. Individual country experiences with democracy, democratization, and regime performance. Emphasis is on global third wave of democratization beginning in the mid-1970s, the recent global recession of democracy (including the rise of illiberal populist parties and movements), and the contemporary challenges and prospects for democratic change.

Same as: SOC 112

**POLISCI 147P. The Politics of Inequality. 5 Units.**

This course is about the distribution of power in contemporary democratic societies, and especially in the US: who governs? Is there a "power elite," whose preferences dominate public policy making? Or, does policy reflect a wide range of interests? What is the relationship between income and power? What are the political consequences of increasing income inequality? How do income differences across racial and ethnic groups affect the quality of their representation? What are effective remedies for unequal influence? Finally, which institutions move democratic practice furthest towards full democratic equality? This course will address these questions, focusing first on local distributions of power, and then considering the implications of inequality in state and national politics. Students will have the opportunity to study income inequality using income and labor force surveys in a mid-term assignment. Then, in a final paper, students will conduct an empirical examination of the implications of income inequality for American democracy.

Same as: PUBLPOL 247, SOC 178

**POLISCI 148. Chinese Politics. 3-5 Units.**

China, one of the few remaining communist states in the world, has not only survived, but has become a global political actor of consequence with the fastest growing economy in the world. What explains China's authoritarian resilience? Why has the CCP thrived while other communist regimes have failed? How has the Chinese Communist Party managed to develop markets and yet keep itself in power? What avenues are there for political participation? How does censorship work in the information and 'connected' age of social media? What are the prospects for political change? How resilient is the part in the face of technological and economic change? Materials will include readings, lectures, and selected films. This course has no prerequisites. (Graduate students register for 348.)

Same as: POLISCI 348

**POLISCI 149S. Islam, Iran, and the West. 5 Units.**

Changes in relative power and vitality of each side. The relationship in the Middle Ages revolved around power and domination, and since the Renaissance around modernity. Focus is on Muslims of the Middle East.

**POLISCI 149T. Middle Eastern Politics. 5 Units.**

Topics in contemporary Middle Eastern politics including institutional sources of underdevelopment, political Islam, electoral authoritarianism, and the political economy of oil.

**POLISCI 150A. Data Science for Politics. 5 Units.**

Data science is quickly changing the way we understand and engage in the political process. In this course we will develop fundamental techniques of data science and apply them to large political datasets on elections, campaign finance, lobbying, and more. The objective is to give students the skills to carry out cutting edge quantitative political studies in both academia and the private sector. Students with technical backgrounds looking to study politics quantitatively are encouraged to enroll.

Same as: POLISCI 355A

**POLISCI 150B. Machine Learning for Social Scientists. 5 Units.**

Machine learning—the use of algorithms to classify, predict, sort, learn and discover from data—has exploded in use across academic fields, industry, government, and non-profit. This course provides an introduction to machine learning for social scientists. We will introduce state of the art machine learning tools, show how to use those tools in the programming language R, and demonstrate why a social science focus is essential to effectively apply machine learning techniques. Applications of the methods will include forecasting social phenomena, the analysis of social media data, and the automatic analysis of text data. Political Science 150A or an equivalent is required. (Prerequisite 150A/355A).

Same as: POLISCI 355B

**POLISCI 150C. Causal Inference for Social Science. 5 Units.**

Causal inference methods have revolutionized the way we use data, statistics, and research design to move from correlation to causation and rigorously learn about the impact of some potential cause (e.g., a new policy or intervention) on some outcome (e.g., election results, levels of violence, poverty). This course provides an introduction that teaches students the toolkit of modern causal inference methods as they are now widely used across academic fields, government, industry, and non-profits. Topics include experiments, matching, regression, sensitivity analysis, difference-in-differences, panel methods, instrumental variable estimation, and regression discontinuity designs. We will illustrate and apply the methods with examples drawn from various fields including policy evaluation, political science, public health, economics, business, and sociology. Political Science 150A and 150B or an equivalent is required.

Same as: POLISCI 355C

**POLISCI 152. Introduction to Game Theoretic Methods in Political Science. 3-5 Units.**

Concepts and tools of non-cooperative game theory developed using political science questions and applications. Formal treatment of Hobbes' theory of the state and major criticisms of it; examples from international politics. Primarily for graduate students; undergraduates admitted with consent of instructor.

Same as: POLISCI 352

**POLISCI 153. Thinking Strategically. 5 Units.**

This course provides an introduction to strategic reasoning. We discuss ideas such as the commitment problem, credibility in signaling, cheap talk, moral hazard and adverse selection. Concepts are developed through games played in class, and applied to politics, business and everyday life.

Same as: POLISCI 354

**POLISCI 153Z. Thinking Strategically. 4 Units.**

This course provides an introduction to strategic reasoning. We discuss ideas such as the commitment problem, credibility in signaling, cheap talk, moral hazard and adverse selection. Concepts are developed through games played in class, and applied to politics, business and everyday life.

**POLISCI 155. Political Data Science. 5 Units.**

Introduction to methods of research design and data analysis used in quantitative political research. Topics covered include hypothesis testing, linear regression, experimental and observational approaches to causal inference, effective data visualization, and working with big data. These topics will be introduced using data sets from American politics, international relations, and comparative politics. The course begins with an intensive introduction to the R programming language used throughout the course. Satisfies quantitative methods requirement for the Political Science Research Honors Track. Prerequisites: Stat 60 or instructor consent.

Same as: PUBLPOL 157

**POLISCI 18N. Civil War and International Politics: Syria in Context. 3 Units.**

How and why do civil wars start, drag on, and end? What does focus of post-Cold War U.S. foreign policy on countries torn apart by civil war tell us about contemporary international relations? We consider these and related questions, with the conflict in Syria as our main case study.

**POLISCI 18SC. The Federal Government and the West. 2 Units.**

Historical development and current status of the relationship between the U.S. federal government and the American West. Land ownership, natural resource management, agriculture, water, energy, and environmental quality.

**POLISCI 19N. Politics of Energy Efficiency. 5 Units.**

We will examine the political context of energy efficiency and climate change. Why are some countries, such as Japan and France, able to achieve high levels of energy efficiency, while others, such as the United States and Australia, struggle to do so? What political factors facilitate or impede energy efficiency policies? Why is international cooperation on climate change so difficult?

**POLISCI 2. Introduction to American National Government and Politics. 5 Units.**

American political institutions (the Presidency, Congress, and the Court) and political processes (the formation of political attitudes and voting) have for some time now been criticized as inadequate to the task of making modern public policy. Against the backdrop of American culture and political history we examine how public policy has been and is being made. We use theories from Political Science and Economics to assess the state of the American system and the policy making process. We use case studies and lectures to analyze contemporary issues including environmental policy, taxes and spending, gun control, economic growth and inequality and mobility. In some of these issue areas we use comparative data from other countries to see how the U.S. is doing relative to other countries. In addition to class room lecture and discussion, student groups are formed to analyze policy issues of relevance to them. (This course has merged with Political Science 123/PubPol 101).

Same as: AMSTUD 2

**POLISCI 209. Curricular Practical Training. 1 Unit.**

Qualified Political Science students obtain employment in a relevant research or industrial activity to enhance their professional experience consistent with their degree programs. The student is responsible for arranging their own internship/employment and gaining faculty sponsorship. Prior to enrolling students must complete a petition due no later than May 15th. An offer letter will need to be submitted along with the petition. At the completion of the summer quarter, a final report must be submitted to the faculty sponsor documenting work done and relevance to degree program. Meets the requirements for Curricular Practical Training for students on F-1 visas. May be repeated for credit but the course will not count toward the Political Science major requirements.

**POLISCI 20Q. Democracy in Crisis: Learning from the Past. 3 Units.**

This Sophomore Seminar will focus on U.S. democracy and will use a series of case studies of major events in our national history to explore what happened and why to American democracy at key pressure points. This historical exploration should shed light on how the current challenges facing American democracy might best be handled. (Cardinal Course certified by the Haas Center).

Same as: EDUC 122Q, HISTORY 52Q

**POLISCI 210A. Special Topics: Solving Global Challenges. 5 Units.**

Most of us study international relations to help improve the state of our world. Yet, political scientists and policy makers increasingly operate in two completely different spheres. The purpose of this seminar is to help bridge this gap: to develop a social science-based toolkit for solving complex global problems. By the end of the quarter, you will be deeply familiar with the most important explanations of international relations, be comfortable reading contemporary political-scientific literature, and instinctively assess world events and identify solutions by leveraging theory and evidence. Prerequisites: POLISCI 101.

**POLISCI 211A. Special Topics: Humanizing War. 5 Units.**

War exposes the most barbarous face of human nature, so the notion that societies can impose order and morality on warfare may seem paradoxical and even futile. Yet throughout history, people have sought to, and indeed succeeded in, humanize war. Who are the political actors that have attempted this Herculean task? What strategies have they taken to do so? What are the laws, norms, and organizations structure the ways in which wars are fought? This course will answer these questions, drawing primarily from political science theory and evidence.

Same as: HUMRTS 105

**POLISCI 211B. International Cooperation and Institutions. 4 Units.**

World politics is often described as a state of war. And yet, the historical record suggests that war is the exception, not the rule. In this course, we seek to understand why relations between most states, most of the time, are defined by peace and cooperation. We will explore the causes of international conflict and how international institutions – from formal international organizations to international law and norms – promote cooperation and help states resolve their conflicts peacefully. Students will engage classic texts and cutting-edge research and leverage evidence-based theory to develop policy solutions to important contemporary global challenges in policy-design labs.

**POLISCI 211M. Past, Present, and Future of War. 4 Units.**

This course offers a forward-looking introduction to international security. Students will learn how political science historically explains conflict and assess how well these explanations describe international security threats in 2018, including those surrounding China, North Korea, Syria, and ISIS.

**POLISCI 211N. Nuclear Politics. 3-5 Units.**

Why do states develop nuclear weapons and why do some states, that have the technological capacity to build nuclear weapons, refrain from doing so? What are the strategic consequences of new states deploying nuclear weapons? What is the relationship between the spread of nuclear energy and the spread of nuclear weapons? Have international and domestic views on nuclear weapons changed since 1945? In this course, we will first examine the political science literature on these key questions about nuclear politics. We will read and critique works using different approaches in political science including quantitative analysis, experiments, game theory, historical case studies, and mixed methods. Students will then design and execute small research projects to address questions that have been inadequately addressed in the existing literature.

Same as: POLISCI 311N

**POLISCI 211S. Special Topics: The United States and Europe: A Renewed Imperative?. 5 Units.**

New challenges in Asia, the Middle-East, Europe's Eastern and Southern periphery, and even within Europe itself, are making the Transatlantic relationship more central and more critical in world politics than is usually thought. Is there a new dawn in Transatlantic relations? How are the foundations, objectives and "rules of the game" of US-Europe relations being redefined in the context of an emerging new international dis(order)? What will it take for the US and Europe to successfully defend their joint interests and values in an increasingly unstable and dangerous world? The course will discuss the main political, strategic, economic and cultural dynamics and issues at the heart of this new US-Europe relationship.

**POLISCI 212A. Special Topics: EGYPT: Politics, Terror and Society: From Vision to Reality. 5 Units.**

Egypt has for centuries been one of the world's central civilization: a country characterized by social tolerance, at the avant-garde of Middle East culture, which also occupies a critically important geostrategic position in the region. This course will examine the political, social, and security challenges Egypt has had to deal with since becoming a modern state. The course will look at the decision-making process of its different rulers, focusing on the nuances between the theoretical and the practical. The course is designed around three central pillars: a look at the country's history, its ideological undercurrents, and expectations for the future. It will look at the causes of the country's social problems and look at the deterioration of the security situation that has led to an emergence of extremism. In addition, it will address what needs to be done to restore stability and efficient government. The lecturer will bring his own first-hand testimony, as an eyewitness to the Egyptian Revolution in 2011 that led to the downfall of The President. The purpose of the course is to provide students with the tools to be able to look at the current developments in the country, conduct a self-analysis and answer one seeming endless question: Whither Egypt?.

**POLISCI 212C. Civil War and International Politics: Syria in Context. 5 Units.**

The Syrian civil war is both a humanitarian disaster and a focal point for a set of interlocking regional and international political struggles. This course uses the Syrian case as an entry for exploring broader questions, such as why do civil wars begin, how do they end, and what are the international politics of civil war. Please enroll in 212C for WIM credit. Same as: POLISCI 212X

**POLISCI 212X. Civil War and International Politics: Syria in Context. 5 Units.**

The Syrian civil war is both a humanitarian disaster and a focal point for a set of interlocking regional and international political struggles. This course uses the Syrian case as an entry for exploring broader questions, such as why do civil wars begin, how do they end, and what are the international politics of civil war. Please enroll in 212C for WIM credit. Same as: POLISCI 212C

**POLISCI 213. US-Russia Relations After the Cold War. 2 Units.**

A quarter century ago, the Soviet Union collapsed and the Cold War ended. At the time, Russian leaders aspired to build democratic and market institutions at home. They also wanted to join the West. American presidents Democrat and Republican encouraged these domestic and international changes. Today, U.S.-Russia relations are once again confrontational, reminiscent of relations during the Cold War. This course seeks to analyze shifts in U.S.-Russia relations, with special attention given to the U.S.-Russia relationship during Obama's presidency. Readings will include academic articles and a book manuscript by Professor McFaul on Obama's reset policy. Open to students with previous coursework involving Russia. Same as: POLISCI 313, REES 213

**POLISCI 213A. Russia and the West. 5 Units.**

Today, American-Russian relations, and Russia's relations with West more generally, are tense and confrontational. One has to look deep into the Cold War to find a similar era of confrontation and competition. Yet, relations between Russia and the West were not always this way. The end of the Cold War, for instance, ushered in a period of cooperation. Back then, many believed that Russia was going to develop democratic and market institutions and integrate into Western international institutions. This seminar will examine various explanations for these variations in Russia's relations with the West, starting in the 19th century, and briefly examining the Cold War period, but a real focus on the last thirty years. In evaluating competing explanations, the course will focus on balance of power theories, culture, historical legacies, institutional design, and individual actors in both the United States (and sometimes Europe) and Russia. **NOTE:** The enrollment of the class is by application only. Please send a one page document to Anya Shkurko (ashkurko@stanford.edu) by March 23rd with the following information: full name, class year, major, contact email, which version of the course you want to enroll in (PoliSci/REES/IPS). In the document please also outline previous associated coursework and/or relevant experience and write why you want to enroll in the seminar. Application results will be announced on March 30th. Any questions related to this course can be directed to Anya Shkurko. Same as: IPS 231A, REES 213A

**POLISCI 213E. Introduction to European Studies. 5 Units.**

This course offers an introduction to major topics in the study of historical and contemporary Europe. We focus on European politics, economics and culture. First, we study what makes Europe special, and how its distinct identity has been influenced by its history. Next, we analyze Europe's politics. We study parliamentary government and proportional representation electoral systems, and how they affect policy. Subsequently, we examine the challenges the European economy faces. We further study the European Union and transatlantic relations. Same as: INTNLREL 122

**POLISCI 213R. Political Economy of Financial Crisis. 5 Units.**

Political responses to domestic and international financial crises. Monetary and fiscal policy. The role of interest groups. International cooperation and the role of the IMF. Same as: POLISCI 313R

**POLISCI 213S. A Post American Century? American Foreign Policy in a Uni-Multi-unipolar World. 5 Units.**

This seminar examines recent policy from Bush to Obama in the context of two classic traditions: Wilsonianism vs. Realism. What is the role of the international system, what is the weight of domestic forces like ideology, history and identity? Prerequisite: junior or senior standing.

**POLISCI 214R. Challenges and Dilemmas in American Foreign Policy. 5 Units.**

This seminar will examine the complexities and trade offs involved in foreign policy decision-making at the end of the twentieth century and the dawn of the post-9/11 era. Students will analyze dilemmas confronting policymakers through case studies including post-conflict reconstruction and state-building, nuclear proliferation, democratization and peace negotiation. The seminar will conclude with a 48-hour crisis simulation. For advanced undergraduates and graduate students. Application for enrollment required. Applications will be available for pick up in Political Science Department (Encina West 100) starting late-October. Same as: POLISCI 314R

**POLISCI 215. Explaining Ethnic Violence. 5 Units.**

What is ethnic violence and why does it occur? Should elite machinations, the psychology of crowds, or historical hatreds be blamed? Case studies and theoretical work on the sources and nature of ethnic violence. Counts as Writing in the Major for PoliSci majors.

**POLISCI 215A. Special Topics: State-Society Relations in the Contemporary Arab World-Key Concepts and Debates. 5 Units.**

This course looks at key concepts pertaining to state-society relations in the Arab world as they have evolved in regional intellectual and political debates since the 1990s. Citizenship, minority rights, freedom of expression, freedom of association, the rule of law, government accountability, independence of the judiciary, civil-military relations, and democratic transition will be among the concepts discussed. Same as: IPS 215

**POLISCI 215D. Special Topics: Dilemmas of Democracy and Security in Israel and the Middle East. 5 Units.**

The Middle East is known to be a volatile region, characterized by political violence, armed conflicts, and social instabilities. This volatility is of relevance for many countries including the US with its invested interests in the region and Israel that exists at the heart of the region, and along with its conflict with the Palestinians is considered to be one of the root causes of this volatility. Moreover, the volatility brings into encounter two kinds of collective goods: democracy and security. Their encounter in a conflictual and unstable environment raises a host of questions and dilemmas, both moral and practical: should we balance democracy and security and if so how? Can the two be accommodated at all? Does democracy is better or worse in addressing security problems? Does democracy and security constitute each other conceptually? Do democratic states tend to cooperate with each other when confronting security issues? And what about democratization: how good a cause is it as a foreign policy? How good a cause is it in justifying war and/or not ending one? From its establishment the State of Israel found itself torn by these and others related questions and the recent decades saw the US drawn by these dilemmas as well (think of the Bybee Memo and the Patriot acts). In the course we will introduce these dilemmas, analyze them and examine different normative and policy answers that were discussed in academia and in the policy world. Same as: JEWISHST 275D

**POLISCI 215F. Nuclear Weapons and International Politics. 5 Units.**

Why do states develop nuclear weapons and why do some states, that have the technological capacity to build nuclear weapons, refrain from doing so? What are the strategic consequences of new states deploying nuclear weapons? What is the relationship between the spread of nuclear energy and the spread of nuclear weapons? We will study the political science and history literature on these topics. Research paper required. Same as: POLISCI 315F

**POLISCI 216. State Building. 5 Units.**

How and when can external actors (others states, aid agencies, NGOs?) promote institutional change in weak and badly governed states?.

**POLISCI 216G. International Organizations and Institutions. 5 Units.**

What is the appropriate balance between government regulation and market freedom? Introduction to important theoretical and policy debates in international political economy. Topics include: political economy of trade; exchange rate policy; the liberalization of trade and finance; the global move to openness; development, debt and aid; and the role of international organizations. Discussion of application of academic insights to key policy debates, including whether governments should offset the welfare costs of globalization, whether the IMF and World Bank should be reformed to meet the needs of the 21st century, and how the international community should respond to financial crises. Students will research, write and orally present policy briefs on specific policy questions.

**POLISCI 217A. American Foreign Policy: Interests, Values, and Process. 5 Units.**

This seminar will examine the tension in American foreign policy between pursuing U.S. security and economic interests and promoting American values abroad. The course will retrace the theoretical and ideological debates about values versus interests, with a particular focus on realism versus liberalism. The course will examine the evolution of these debates over time, starting with the French revolution, but with special attention given to the Cold War, American foreign policy after September 11th, and the Obama administration. The course also will examine how these contending theories and ideologies are mediated through the U.S. bureaucracy that shapes the making of foreign policy. \*\* NOTE: The enrollment of the class is by application only. Please provide a one page double-spaced document outlining previous associated coursework and why you want to enroll in the seminar to Anna Coll (acoll@stanford.edu) by February 22nd. Any questions related to this course can be directed to Anna Coll.

Same as: GLOBAL 220, IPS 242

**POLISCI 217M. Special Topics: International Democratization. 5 Units.**

Analyzing the international aspects of democratization involves understanding at least the following: (1) what is democracy (2) what domestic-level processes increase or decrease the level of democracy (3) what kind of influences from the outside world work, and do not work, in furthering democracy, and in what ways. This course spans all subfields of political science, and spills over into law, economics, and sociology. A complicating factor is the geographical expanse of democratic institutions and efforts to promote them. Eastern Europe, Russia, the Middle East, Sub-Saharan Africa, post-civil war El Salvador and Cambodia, are only some of the regions and countries that have been impacted. Their vastly different backgrounds challenge anyone attempting the puzzle. A further complication is the variety of ways in which the outside world may affect the scope and quality of democracy. These ways include but are not limited to: pressures exercised by regional economic institutions and alliances, the power of ideas and socialization, transfers of wealth, demands for trade liberalization, the training of civic activists, reports issued by foreign election observers. Same as: POLISCI 317M

**POLISCI 218J. Japanese Politics and International Relations. 5 Units.**

The domestic politics, political economy, and international relations of contemporary Japan. The role of political parties, the bureaucracy, and private actors. Economic development and challenges. Relations with the United States and East Asia.

Same as: POLISCI 318J

**POLISCI 218S. Political Economy of International Trade and Investment. 5 Units.**

How domestic and international politics influence the economic relations between countries. Why do governments promote or oppose globalization? Why do countries cooperate economically in some situations but not others? Why do countries adopt bad economic policies? Focus on the politics of international trade and investment. Course approaches each topic by examining alternative theoretical approaches and evaluate these theories using historical and contemporary evidence from many geographical regions around the world. Prerequisites: ECON 1A, ECON 1B, and a statistics course.

Same as: INTNLREL 118S

**POLISCI 219. Directed Reading and Research in International Relations. 1-10 Unit.**

May be repeated for credit. Requires a petition that can be found on our Political Science website.

**POLISCI 220. Place-Making Policies. 5 Units.**

This reading and research seminar considers the numerous ways that governments conduct social policy by shaping and remaking geographic places. Representative topics include: housing aid programs, exclusionary zoning, controls on internal migration and place of residence, cars and their place in cities, and the politics of western water projects. Students will conduct original field research on the consequences of these policies for economic, social, and political outcomes. Prerequisites: None.

Same as: PUBLPOL 225, URBANST 170

**POLISCI 220R. The Presidency. 3-5 Units.**

This course provides students with a comprehensive perspective on the American presidency and covers a range of topics: elections, policy making, control of the bureaucracy, unilateral action, war-making, and much more. But throughout, the goal is to understand why presidents behave as they do, and why the presidency as an institution has developed as it has, with special attention to the dynamics of the American political system and how they condition incentives, opportunities, and power.

Same as: POLISCI 320R

**POLISCI 221A. American Political Development, 1865-present. 3-5 Units.**

In this reading-intensive course, we will conduct a wide-ranging survey of major transformations in the American political system in the post-Civil War period. Our inquiries about these transformations will focus on the origins of the modern administrative state, the interactive role of the state and social movements, and changes in the party system. We'll examine these developments not only to understand institutional change, but to learn how changing institutions have shaped the behavior of the American electorate.

Same as: POLISCI 421R

**POLISCI 222. The Political Psychology of Intolerance. 5 Units.**

This seminar explores the political psychology of intolerance. It focuses on two problems in particular: race in America and the challenge of Muslim inclusion in Western Europe. It concentrates on primary research. The readings consist of both classic and contemporary (including on-going) studies of prejudice and politics.

Same as: CSRE 222



**POLISCI 223. The Politics of Gender in the United States. 5 Units.**

Gender is one of the most recognizable and important identities in daily life. Yet it has been paid scant attention by political scientists in terms of its role on access to political power, opinion formation, group identity politics, election outcomes, and political representation. This class provides a survey of the literature on gender in American politics. We begin with the interdisciplinary research on the social construction of gender to understand what gender is and is not. Throughout the course we will use these theories to analyze and critique the approaches of quantitative research on gender politics.

Same as: FEMGEN 223X

**POLISCI 223A. Public Opinion and American Democracy. 5 Units.**

This course focuses on the public mood and politics in America today. It accordingly examines, among other things, the coherence (or lack of it) of public opinion; the partisan sorting of the electorate; and the ideological and affective polarization of mass politics. It also examines contemporary critiques of representation and citizenship in liberal democracies.

**POLISCI 223B. Money, Power, and Politics in the New Gilded Age. 5 Units.**

During the past two generations, democracy has coincided with massive increases in economic inequality in the U.S. and many other advanced democracies. The course will explore normative and practical issues concerning democracy and equality and examine why democratic institutions have failed to counteract rising inequality. Topics will include the influence of money in politics, disparity in political representation of the preferences of the affluent over those of the poor, the implications of political gridlock, and electoral and institutional barriers to reform.

**POLISCI 224A. Disasters, Decisions, Development in Sustainable Urban Systems. 3-5 Units.**

CEE 224X of the CEE 224XYZ SUS Project series is joining forces with D3: Disasters, Decisions, Development to offer D3+SUS, which will connect principles of sustainable urban systems with the challenge of increasing resilience in the San Francisco Bay Area. The project-based learning course is designed to align with the Resilient By Design | Bay Area Challenge (<http://www.resilientbayarea.org/>); students will learn the basic concepts of resilience and tools of risk analysis while applying those mindsets and toolsets to a collective research product delivered to the RBD community. Students who take D3+SUS are encouraged to continue on to CEE 224Y and CEE 224Z, in which teams will be paired with local partners and will develop interventions to improve the resilience of local communities. For more information, visit <http://sus.stanford.edu/courses>.

Same as: ESS 118, ESS 218, GEOPHYS 118X, GEOPHYS 218X, GS 118, GS 218, PUBLPOL 118

**POLISCI 225C. Fixing US Politics: Political Reform in Principle and Practice. 5 Units.**

Americans have been trying to perfect their system of government since its founding. Despite some notable achievements, there is a pervasive sense of frustration with political reform. This course will examine the goals and political consequences of American political regulation. Topics will vary by year to some degree but examples include campaign finance, lobbying, term limits, conflict of interest regulation, direct democracy, citizen commissions and assemblies, vote administration problems, transparency, and open meeting laws.

**POLISCI 226. Race and Racism in American Politics. 5 Units.**

Topics include the historical conceptualization of race; whether and how racial animus reveals itself and the forms it might take; its role in the creation and maintenance of economic stratification; its effect on contemporary U.S. partisan and electoral politics; and policy making consequences.

Same as: AMSTUD 226, CSRE 226, POLISCI 326

**POLISCI 226T. The Politics of Education. 3-5 Units.**

America's public schools are government agencies, and virtually everything about them is subject to political authority—and thus to decision through the political process. This seminar is an effort to understand the politics of education and its impacts on the nation's schools. Our focus is on the modern era of reform, with special attention to the most prominent efforts to bring about fundamental change through accountability (including No Child Left Behind), school choice (charter schools, vouchers), pay for performance, and more and more to the politics of blocking that has made genuine reform so difficult to achieve.

Same as: POLISCI 326T

**POLISCI 227. U.S. Immigration Politics. 5 Units.**

This course presents an overview of immigration in the United States. We will focus on current policies, U.S. immigration history, individual immigrant groups, economic causes and consequences of immigration, attitudes toward immigrants, U.S. national identity, immigrant political behavior, undocumented immigration, immigrants and public education, language barriers and policies, and immigration reform. Although the course is crafted with a focus on the U.S. as a whole, we will also spend a little time at the end of the quarter narrowing in on the California context, before taking a broader look at immigration in Western Europe to gain a comparative perspective on immigration. Finally, while we will discuss immigrant groups beyond Latinos, the course will disproportionately focus on Latino immigrants, as this is by far the largest immigrant group in the United States.

**POLISCI 229. Directed Reading and Research in American Politics. 1-10 Unit.**

May be repeated for credit. Requires a petition that can be found on our Political Science website.

**POLISCI 22SC. The Face of Battle. 2 Units.**

Our understanding of warfare often derives from the lofty perspective of political leaders and generals: what were their objectives and what strategies were developed to meet them? This top-down perspective slights the experience of the actual combatants and non-combatants caught in the crossfire. This course focuses on the complexity of the process by which strategy is translated into tactical decisions by the officers and foot soldiers on the field of battle. We will review theories about civil-military relations and the nature of modern warfare and then visit Washington DC to discuss strategy and politics with current and former policy makers. We will also study two important battles in American history: Gettysburg (July 1863) and the Battle of Little Bighorn (June 1876). We will travel to Gettysburg, Pennsylvania, and the Little Bighorn battlefield in Montana. The course's battlefield tours are based on the "staff rides" developed by the Prussian Army in the mid-1800s and employed by the U.S. Army since the early 1900s. While at Stanford, students will conduct extensive research on individual participants at Gettysburg and Little Bighorn. Then, as we walk through the battlefield sites, students will brief the group on their subjects' experience of battle and on why they made the decisions they did during the conflict. Why did Lt. General Longstreet oppose the Confederate attack on the Union Army at Gettysburg? What was the experience of a military surgeon on a Civil War battlefield? Why did Custer divide his 7th Cavalry troops as they approached the Little Bighorn River? What was the role of Lakota Sioux women after a battle? Travel will be provided and paid by Sophomore College (except incidentals) and is made possible by the support of the Center for International Security and Cooperation (CISAC). The course is open to students from a range of disciplines; an interest in the topic is the only prerequisite.

**POLISCI 230A. Classical Seminar: Origins of Political Thought. 3-5 Units.** (Formerly CLASSHIS 133/333.) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change. Same as: CLASSICS 181, CLASSICS 381, PHIL 176A, PHIL 276A, POLISCI 330A

**POLISCI 231. High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests. 3-5 Units.**

Normative political theory combined with positive political theory to better explain how major texts may have responded to and influenced changes in formal and informal institutions. Emphasis is on historical periods in which catastrophic institutional failure was a recent memory or a realistic possibility. Case studies include Greek city-states in the classical period and the northern Atlantic community of the 17th and 18th centuries including upheavals in England and the American Revolutionary era. Same as: CLASSICS 382, POLISCI 331

**POLISCI 231Z. Topics in Democratic Theory. 5 Units.**

Democratic rule is rule of the people. But what does that mean? This course explores democracy's roots in ancient Athens to its modern incarnation. The course aims to familiarize students with the various strands of democratic theory as well as the way democratic theory responds to hot political issues such as immigration and freedom of speech. The goal of the course is to equip students to think critically about democracy in the modern world and the different interpretation democratic rule can have. The questions we will investigate include: What does democracy require? What is the relationship between democracy and human rights or social justice? Can democracy justify border control? What restrictions, if any, does democracy place on hate speech? What is the role of courts in a democracy? The course provides tools to answer these questions by surveying different approaches to democracy in contemporary literature, as well surveying the history of democratic theory from ancient Athenian democracy to the modern age, with a look to the future of democracy in a globalized era.

**POLISCI 232T. The Dialogue of Democracy. 4-5 Units.**

All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized. Same as: AMSTUD 137, COMM 137W, COMM 237, POLISCI 332T

**POLISCI 233. Justice and Cities. 5 Units.**

Cities have most often been where struggles for social justice happen, where injustice is most glaring and where new visions of just communities are developed and tested. This class brings political theories of justice and democracy together with historical and contemporary empirical work on city design, planning, and policies to ask the following questions: What makes a city just or unjust? How have people tried to make cities more just? What has made these efforts succeed or fail? Each session will include a case study of a particular city, largely with a focus on the United States. Students will develop research projects examining a city of their choice through the lens of a particular aspect of justice and injustice. Same as: URBANST 134

**POLISCI 233F. Science, technology and society and the humanities in the face of the looming disaster. 3-5 Units.**

How STS and the Humanities can together help think out the looming catastrophes that put the future of humankind in jeopardy. Same as: FRENCH 228, ITALIAN 228

**POLISCI 234. Democratic Theory. 5 Units.**

Most people agree that democracy is a good thing, but do we agree on what democracy is? This course will examine the concept of democracy in political philosophy. We will address the following questions: What reason(s), if any, do we have for valuing democracy? What does it mean to treat people as political equals? When does a group of individuals constitute "a people," and how can a people make genuinely collective decisions? Can democracy really be compatible with social inequality? With an entrenched constitution? With representation?. Same as: PHIL 176P

**POLISCI 234P. Deliberative Democracy and its Critics. 3-5 Units.**

This course examines the theory and practice of deliberative democracy and engages both in a dialogue with critics. Can a democracy which emphasizes people thinking and talking together on the basis of good information be made practical in the modern age? What kinds of distortions arise when people try to discuss politics or policy together? The course draws on ideas of deliberation from Madison and Mill to Rawls and Habermas as well as criticisms from the jury literature, from the psychology of group processes and from the most recent normative and empirical literature on deliberative forums. Deliberative Polling, its applications, defenders and critics, both normative and empirical, will provide a key case for discussion. Same as: AMSTUD 135, COMM 135, COMM 235, COMM 335, POLISCI 334P

**POLISCI 235J. Creative Political Thinking: From Machiavelli to Madison. 4-5 Units.**

How can we account for creativity and innovation in political thinking? Are these qualities simply a product of political expediency and rhetorical urgency, or do they also depend on qualities of mind and historical contingencies that have to be studied individually? This class will explore these questions with three noteworthy cases: Niccolo Machiavelli, John Locke, and James Madison. Extensive reading in both primary writings and secondary sources. Same as: HISTORY 205G, HISTORY 305G, POLISCI 335J

Same as: HISTORY 205G, HISTORY 305G, POLISCI 335J

**POLISCI 236. Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector. 5 Units.**

What is the basis of private action for the public good? How are charitable dollars distributed and what role do nonprofit organizations and philanthropic dollars play in a modern democracy? In the *Philanthropy Lab* component of the course, students will award \$100,000 in grants to local nonprofits. Students will explore how nonprofit organizations operate domestically and globally as well as the historical development and modern structure of civil society and philanthropy. Readings in political philosophy, history, political sociology, and public policy. WIM for PoliSci students who enroll in PoliSci 236S. Same as: ETHICSOC 232T, POLISCI 236S

**POLISCI 236S. Theories and Practices of Civil Society, Philanthropy, and the Nonprofit Sector. 5 Units.**

What is the basis of private action for the public good? How are charitable dollars distributed and what role do nonprofit organizations and philanthropic dollars play in a modern democracy? In the *Philanthropy Lab* component of the course, students will award \$100,000 in grants to local nonprofits. Students will explore how nonprofit organizations operate domestically and globally as well as the historical development and modern structure of civil society and philanthropy. Readings in political philosophy, history, political sociology, and public policy. WIM for PoliSci students who enroll in PoliSci 236S. Same as: ETHICSOC 232T, POLISCI 236S

**POLISCI 237M. Politics and Evil. 5 Units.**

In the aftermath of the Second World War, the political theorist Hannah Arendt wrote that the problem of evil will be the fundamental question of postwar intellectual life in Europe. This question remains fundamental today. The acts to which the word "evil" might apply—genocide, terrorism, torture, human trafficking, etc.—persist. The rhetoric of evil also remains central to American political discourse, both as a means of condemning such acts and of justifying preventive and punitive measures intended to combat them. In this advanced undergraduate seminar, we will examine the intersection of politics and evil by considering works by philosophers and political theorists, with occasional forays into film and media. The thinkers covered will include: Hannah Arendt, Immanuel Kant, Niccolò Machiavelli, Friedrich Nietzsche, and Michael Walzer.  
Same as: ETHICSOC 237M

**POLISCI 237S. Civil Society and Democracy in Comparative Perspective. 5 Units.**

A cross-national approach to the study of civil societies and their role in democracy. The concept of civil society—historical, normative, and empirical. Is civil society a universal or culturally relative concept? Does civil society provide a supportive platform for democracy or defend a protected realm of private action against the state? How are the norms of individual rights, the common good, and tolerance balanced in diverse civil societies? Results of theoretical exploration applied to student-conducted empirical research projects on civil societies in eight countries. Summary comparative discussions. Prerequisite: a course on civil society or political theory. Students will conduct original research in teams of two on the selected nations. Enrollment limited to 18. Enrollment preference given to students who have taken PoliSci 236S/EthicSoc 232T.  
Same as: ETHICSOC 237

**POLISCI 238C. Governing the 21st Century World. 5 Units.**

How is our world governed, and by whom? How are decisions made on the most important issues of our time, including climate change, global inequality, and protection of human rights? A traditional answer to these questions is that only official governments have the power to govern—to set and enforce rules on these and other issues. In contrast, this class explores the emerging roles of non-state actors, including NGOs, for-profit corporations, informal social movements, and international institutions, in governing our world and making decisions on these and other key issues. We will also study the ways that the governance by non-state actors challenges our ideas of democracy, legitimacy, and justice. The class thus seeks to bring together perspectives and tools from both empirical social science and political theory in order to better understand this important phenomenon.

**POLISCI 239. Directed Reading and Research in Political Theory. 1-10 Unit.**

May be repeated for credit.

**POLISCI 23Q. Analyzing the 2016 Elections. 3 Units.**

The seminar will normally meet for two hours, but after three seminars there will be lab sessions to acquaint students with basic quantitative methods and major social science databases. After every election the commentariat promulgates a story line to explain the results. Typically later analysis shows the media story line to be wrong (eg. "values voters" in 2004). Participants in this seminar will analyze the results of the 2016 elections. The seminar is about ANALYSIS, not ideology. Some familiarity with quantitative methods is a prerequisite.

**POLISCI 240A. Democratic Politics. 5 Units.**

This course examines the relationship between democratic ideals and contemporary democratic politics.  
Same as: POLISCI 340A

**POLISCI 240C. The Comparative Political Economy of Post-Communist Transitions. 3-4 Units.**

Dominant theoretical perspectives of comparative democratization and marketization; focus is on the political economy of transition in Eastern Europe and Eurasia while comparing similar processes in Latin America and Asia. Topics include: meanings of democracy, synergy between democracies and markets, causes of the collapse of communism, paths to political liberalization and democracy, civil society, constitutions, parliaments, presidents, the rule of law, electoral systems, market requirements, strategies of reform, the Russian experience of market building, exporting democracy and the market, and foreign aid and assistance.

**POLISCI 240T. Democracy, Promotion, and American Foreign Policy. 5 Units.**

Theoretical and intellectual debates about democracy promotion with focus on realism versus liberalism. The evolution of these debates with attention to the Cold War, the 90s, and American foreign policy after 9/11. Tools for and bureaucratic struggles over how to promote democracy. Contemporary case studies.

**POLISCI 241A. An Introduction to Political Economy of Development. 5 Units.**

This course is an upper-level undergraduate seminar providing an introduction to the political economy of development. This course explores sources of economic growth, inequality, poverty, and other aspects of development with a particular focus on political institutions. We first explore the patterns of development in the world and then overview basic theories of development. Second, we review the key areas of debate within the study of development, including the role of the state, the consequences of corruption, the effects of natural resources, and gender. The course consists of lectures on theoretical and empirical approaches and the discussion on the literature and cases.

**POLISCI 241B. Special Topics: Comparative Political Economy. 5 Units.**

Why do countries present public policies that are stable and coherent overtime, whereas others policies tend to be more volatile and inconsistent? This course applies theoretical tools of comparative political economy to investigate the functioning of political institutions, political systems and the policymaking process, and their effect on public policies and on economic performance with special focus on Latin America. The goal of the course, therefore, is for students to become acquainted with the diversity of institutional combinations of Latin American countries and their effect on the profile of public policies.  
Same as: Latin America

**POLISCI 241C. Campaigns and Elections in Israel. 5 Units.**

Employing a theoretical and comparative framework, this seminar focuses on campaigns and elections in Israel. The seminar is divided into two interrelated sections. In the first section, we will cover voting behavior. Here we will look at Israel's election laws, its political culture, socialization and cleavages, turnout, political sophistication, ideology, partisanship and issue voting. In the second half of the semester we will examine elections from the perspective of candidates and campaign strategists. The topics we will focus on include election laws, public and private campaign finance, campaign strategy, media, polling, and advertising. In examining these topics, we will cover a variety of elections campaigns since Israel's birth, with an emphasis on the most recent ones.

Same as: JEWISHST 271C

**POLISCI 241S. Spatial Approaches to Social Science. 5 Units.**

This multidisciplinary course combines different approaches to how GIS and spatial tools can be applied in social science research. We take a collaborative, project oriented approach to bring together technical expertise and substantive applications from several social science disciplines. The course aims to integrate tools, methods, and current debates in social science research and will enable students to engage in critical spatial research and a multidisciplinary dialogue around geographic space.

Same as: ANTHRO 130D, ANTHRO 230D, URBANST 124

**POLISCI 241T. Political Economy of Gender. 5 Units.**

This course provides an introduction to the political economy of gender. The course first explores the key areas of debate on women's representation. Why are women underrepresented in formal political institutions? How do the political institutions affect women's representation? What's the effects of women's representation? Also, the course examines the quality of female politicians, women's voting behavior and political preferences, public opinion on gender issues, and women's representation in Law. No prior knowledge is required.

**POLISCI 242A. Why is Africa Poor?. 5 Units.**

Living standards around the world have increased, in many cases exponentially, throughout the previous century. Yet sub-Saharan Africa remains, by a considerable margin, the poorest region on Earth. This course asks three questions: Why is Africa poor? When did it become so? And will it remain so for the foreseeable future? The course draws on a range of social science disciplines, including anthropology, economics, history, political science, and sociology, to offer tentative answers.

**POLISCI 242C. Corruption, Conflict and Financial Crisis: Contemporary Global Politics and Journalism. 5 Units.**

This course offers students interested in contemporary global politics a unique introduction to the critical analysis of current events through the lens of award-winning non-fiction writing. Each week, we will explore a new political issue crucial to understanding today's world by reading some of the most gripping (and best written!) first- and second-hand narratives of these events, as recounted by journalists, academics and documentarians working in the field. Topics will include: global poverty, the overthrow of authoritarian regimes, terrorism, genocide and crimes against humanity, the Israel-Palestinian conflict, financial crises, and political corruption. In class, students will discuss the readings and learn to apply major social scientific theories to systematically analyze these complex political issues. Through this course, students will not only gain exposure to some exemplary writing on topics of current importance, but also acquire the skills and tools necessary to understand some of the most intractable and interesting problems in the world today.

**POLISCI 243C. The Political Economy of Development. 5 Units.**

Why are some countries rich and others poor? What explains the economic policies that governments adopt, and how do those policies affect economic performance? Why some policies persist over time while others don't? We will use tools from political science and economics to explore these important questions. The readings for this course will include conceptual and historical material from many geographic regions. As we explore the fascinating relationship between politics and economics, we will evaluate hypotheses according to robust and sound empirical evidence.

**POLISCI 243D. Special Topics: Taiwan's Democratic Evolution. 5 Units.**

This course is an introduction to the contemporary politics of Taiwan. Once a poor, insecure autocracy, today Taiwan has been transformed into a prosperous and stable liberal democracy, albeit one whose long-term security remains imperiled by the rising power of the People's Republic of China. We will draw on concepts and theories from political science to explore distinct aspects of this ongoing political evolution, including the transition to and consolidation of democracy, origins and trajectory of economic and social development, sources of Taiwanese nationalism, security of the Taiwanese state and its relationship to the PRC and the United States, parties and elections, and public policy processes and challenges.

**POLISCI 243L. Politics of Economic Reform. 5 Units.**

Description to come.

**POLISCI 244. An Introduction to Political Development. 5 Units.**

Political development concerns the evolution of three categories of institutions: (1) the state itself; (2) the rule of law; and (3) accountable government. Focus on many of the major theories of political development, beginning with some classic social theorists and continuing up through the present.

**POLISCI 244A. Authoritarian Politics. 3-5 Units.**

Examination of how authoritarian regimes govern. Topics include: historical determinants of authoritarian government, typologies of authoritarian rule and impact of authoritarian governance on economic growth.

Same as: POLISCI 344A

**POLISCI 244C. Political Change in Latin America: The contemporary challenge to democracy. 5 Units.**

The purpose is to present the contemporary tendencies that characterize the mutation of democracy in Latin America. Along with a general conceptualization, focus will be given to specific cases that illustrate concepts. Three axes constitute the frame of the course: the background, the new trends of democracy on the eve of the 21st century, and the emergence of "refoundational" government and movements.

**POLISCI 244P. Religion and Politics in Latin America. 5 Units.**

The purpose of this seminar is to introduce students to the complexities of Politics and Religion in Latin America from a historical and sociological perspective. The seminar will examine the evolution of Church-State-Society-Community-Individual relations in Latin America, from Independence to present day. Topics will include new definitions of religious freedom, debates concerning the so called "lay State" (Estado laico), secularization, and the role of the lay or secular state and religious groups in the development of democratic or authoritarian regimes, as well as civil and religious freedoms, particularly sexual and reproductive rights and bioethical issues (contraception, abortion, euthanasia, stem cell research, homosexual rights and homophobia). The course will combine a series of reading tests designed to introduce central questions of the texts with a critical discussion of the assigned source material, in order to develop a knowledgeable approach and research interest in the student.

**POLISCI 244U. Political Culture. 3-5 Units.**

The implications of social norms, preferences and beliefs for political and economic behavior and societal outcomes.

Same as: POLISCI 344U

**POLISCI 245A. Politics and Public Finance. 5 Units.**

The main related but different questions addressed by course are: how states have, through history, financed their expenditures, e.g. by taxing people or issuing public debt; how different political and fiscal institutions have been shaped by the varying need of the state to collect revenues (such as war, revolution threats, increasing demand of redistribution by the "median voter"). We will focus mainly, but not only, on the historical experience of the Western World (e.g. Europe and the US), and pay special attention to the nature of political institutions in place (e.g. absolutist regimes, constitutional monarchies, different forms of democracy), over a relatively long period of time (i.e. beginning with the). The exposition will not necessarily follow a chronological order, but rather a logical one (in some sense).

**POLISCI 245E. Middle East Politics. 5 Units.**

This course offers a thematic approach to the study of Middle Eastern politics. We will overview the major areas of political science research on the contemporary Middle East while simultaneously building empirical knowledge about the politics of individual countries in the region.

Topics to be covered include: state capacity and democracy; economic development and mineral resources; the politics of religion and gender; international relations and civil conflict; terrorism and revolution.

**POLISCI 245R. Politics in Modern Iran. 5 Units.**

Modern Iran has been a smithy for political movements, ideologies, and types of states. Movements include nationalism, constitutionalism, Marxism, Islamic fundamentalism, social democracy, Islamic liberalism, and fascism. Forms of government include Oriental despotism, authoritarianism, Islamic theocracy, and liberal democracy. These varieties have appeared in Iran in an iteration shaped by history, geography, proximity to oil and the Soviet Union, and the hegemony of Islamic culture.

**POLISCI 246A. Paths to the Modern World: Islam and the West. 5 Units.**  
How and why did Europe develop political institutions that encouraged economic growth and industrialization? And why has the Islamic world lagged in the creation of growth-promoting institutions? This course uses a comparative approach to understanding two routes to the modern world – the historical experiences of Christian Europe and the Islamic world. We will explore questions including, when do representative parliamentary assemblies emerge and how does urbanization affect economic development?.

**POLISCI 246P. The Dynamics of Change in Africa. 4-5 Units.**  
Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.  
Same as: AFRICAST 301A, HISTORY 246, HISTORY 346, POLISCI 346P

**POLISCI 247A. Games Developing Nations Play. 5 Units.**  
If, as economists argue, development can make everyone in a society better off, why do leaders fail to pursue policies that promote development? The course uses game theoretic approaches from both economics and political science to address this question. Incentive problems are at the heart of explanations for development failure. Specifically, the course focuses on a series of questions central to the development problem: Why do developing countries have weak and often counterproductive political institutions? Why is violence (civil wars, ethnic conflict, military coups) so prevalent in the developing world, and how does it interact with development? Why do developing economies fail to generate high levels of income and wealth? We study how various kinds of development traps arise, preventing development for most countries. We also explain how some countries have overcome such traps. This approach emphasizes the importance of simultaneous economic and political development as two different facets of the same developmental process. No background in game theory is required.  
Same as: ECON 162, POLISCI 347A

**POLISCI 247G. Governance and Poverty. 5 Units.**  
Poverty relief requires active government involvement in the provision of public services such as drinking water, healthcare, sanitation, education, roads, electricity and public safety. Failure to deliver public services is a major impediment to the alleviation of poverty in the developing world. This course will use an interdisciplinary approach to examining these issues, bringing together readings from across the disciplines of political science, economics, law, medicine and education to increase understanding of the complex causal linkages between political institutions, the quality of governance, and the capacity of developing societies to meet basic human needs. Conceived in a broadly comparative international perspective, the course will examine cross-national and field-based research projects, with a particular focus on Latin America and Mexico.

**POLISCI 248S. Latin American Politics. 3-5 Units.**  
Fundamental transformations in Latin America in the last two decades: why most governments are now democratic or semidemocratic; and economic transformation as countries abandoned import substitution industrialization policies led by state intervention for neoliberal economic policies. The nature of this dual transformation.  
Same as: POLISCI 348S

**POLISCI 249. Directed Reading and Research in Comparative Politics. 1-10 Unit.**  
May be repeated for credit. Requires a petition that can be found on our Political Science website.

**POLISCI 24Q. Law and Order. 3 Units.**  
Preference to sophomores. The role of law in promoting social order. What is the rule of law? How does it differ from the rule of men? What institutions best support the rule of law? Is a state needed to ensure that laws are enforced? Should victims be allowed to avenge wrongs? What is the relationship between justice and mercy?.

**POLISCI 24SC. Conservatism and Liberalism in American Politics and Policy. 2 Units.**  
What influence do political ideologies have in American politics and government? In this course, students will study liberal and conservative ideology in American politics and public policy from the mid-20th century onward. The course begins with an examination of ideology in the American public and then considers ideology among political activists and elected officials, focusing on members of Congress and the president. The course will also cover the ideological polarization of political elites and its impact on the policy-making process. In the final part of the course, through a series of policy case studies, students will also evaluate how well certain public policies have met the ideological goals of their liberal and conservative sponsors. The course will include several lunches and dinners with guest speakers.

**POLISCI 251A. Introduction to Machine Learning for Social Scientists. 4 Units.**  
This course introduces techniques to collect, analyze, and utilize large collections of data for social science inferences. The ultimate goal of the course is to introduce students to modern machine learning techniques and provide the skills necessary to apply these methods widely. Students will leave the course equipped with a broad understanding of machine learning and on how to continue building new skills.

**POLISCI 259. Directed Reading and Research in Political Methodology. 1-10 Unit.**  
May be repeated for credit.

**POLISCI 25N. The US Congress in Historical and Comparative Perspective. 3 Units.**  
This course traces the development of legislatures from their medieval European origins to the present, with primary emphasis on the case of the U.S. Congress. Students will learn about the early role played by assemblies in placing limits on royal power, especially via the power of the purse. About half the course will then turn to a more detailed consideration of the U.S. Congress's contemporary performance, analyzing how that performance is affected by procedural legacies from the past that affect most democratic legislatures worldwide.

**POLISCI 27N. Thinking Like a Social Scientist. 3 Units.**  
Preference to freshman. This seminar will consider how politics and government can be studied systematically: the compound term Political SCIENCE is not an oxymoron. The seminar will introduce core concepts and explore a variety of methodological approaches. Problems of inference from evidence will be a major concern. Classic and contemporary research studies will be the basis of discussion throughout.

**POLISCI 28N. The Changing Nature of Racial Identity in American Politics. 3 Units.**  
Almost one-third of Americans now identify with a racial/ethnic minority group. This seminar examines the relationship between racial identity, group consciousness, and public opinion. Topics include the role of government institutions in shaping identification, challenges in defining and measuring race, attitudes towards race-based policies, and the development of political solidarity within racial groups. Particular attention will be paid to the construction of political identities among the growing mixed-race population.

**POLISCI 291. Political Institutions. 5 Units.**

This course focuses on the role of political institutions in shaping policy outcomes around the world, with special attention to the United States. Students will become familiar with a wide range of theoretical approaches to the study of institutions, and they will learn the basics of applied quantitative empirical analysis. Enrollment is restricted to Political Science Research Honors Track students.

**POLISCI 292. Political Behavior. 5 Units.**

This research seminar will survey important topics in the study of mass political behavior including public opinion, political participation, partisanship and voting. Open only to students in the Political Science Research Honors Track.

**POLISCI 299A. Research Design. 5 Units.**

This course is designed to teach students how to design a research project. The course emphasizes the specification of testable hypotheses, the building of data sets, and the inferences from that may be drawn from that evidence.

**POLISCI 299B. Honors Thesis Seminar. 5 Units.**

Restricted to Research Honors students who have completed PoliSci 299A.

**POLISCI 299C. Honors Thesis. 1-5 Unit.**

(Previously 299B) Students conduct independent research work towards a senior honors thesis.

**POLISCI 299D. Honors Thesis. 1-5 Unit.**

(Previously 299C) Students conduct independent research work towards a senior honors thesis.

**POLISCI 29N. Mixed-Race Politics and Culture. 3 Units.**

Today, almost one-third of Americans identify with a racial/ethnic minority group, and more than 9 million Americans identify with multiple races. What are the implications of such diversity for American politics and culture? In this course, we approach issues of race from an interdisciplinary perspective, employing research in the social sciences and humanities to assess how race shapes perceptions of identity as well as political behavior in 21st century U.S. We will examine issues surrounding the role of multiculturalism, immigration, acculturation, racial representation and racial prejudice in American society. Topics we will explore include the political and social formation of "race"; racial representation in the media, arts, and popular culture; the rise and decline of the "one-drop rule" and its effect on political and cultural attachments; the politicization of Census categories and the rise of the Multiracial Movement.

Same as: AFRICAAM 52N, ENGLISH 52N

**POLISCI 30SI. Digital Security and Civil Society. 2 Units.**

This class will instruct students in the political economy of software and digital infrastructure as they relate to civil society in democracies. We will consider the role of privacy, anonymity, free expression and free association in democracies and examine the digital tools and practices that enable these freedoms. The class consists of three interwoven themes: n1) The role of civil society in democracies n2) The political economy of digital tools and their influence on society n3) Individual and collective digital security.

**POLISCI 311E. Political Economy I. 2-5 Units.**

Theoretical models of political economy. Potential topics include: basic social choice theory, democracy, electoral competition, political accountability, legislative bargaining, lobbying, corruption, autocratic politics, democratization, conflict and arms races, and institutional change. Attention to economics implications, including taxation, redistribution, and public goods. Prerequisite: Econ 203 or permission of instructors.

Same as: ECON 220

**POLISCI 311N. Nuclear Politics. 3-5 Units.**

Why do states develop nuclear weapons and why do some states, that have the technological capacity to build nuclear weapons, refrain from doing so? What are the strategic consequences of new states deploying nuclear weapons? What is the relationship between the spread of nuclear energy and the spread of nuclear weapons? Have international and domestic views on nuclear weapons changed since 1945? In this course, we will first examine the political science literature on these key questions about nuclear politics. We will read and critique works using different approaches in political science including quantitative analysis, experiments, game theory, historical case studies, and mixed methods. Students will then design and execute small research projects to address questions that have been inadequately addressed in the existing literature.

Same as: POLISCI 211N

**POLISCI 313. US-Russia Relations After the Cold War. 2 Units.**

A quarter century ago, the Soviet Union collapsed and the Cold War ended. At the time, Russian leaders aspired to build democratic and market institutions at home. They also wanted to join the West. American presidents Democrat and Republican encouraged these domestic and international changes. Today, U.S.-Russia relations are once again confrontational, reminiscent of relations during the Cold War. This course seeks to analyze shifts in U.S.-Russia relations, with special attention given to the U.S.-Russia relationship during Obama's presidency. Readings will include academic articles and a book manuscript by Professor McFaul on Obama's reset policy. Open to students with previous coursework involving Russia.

Same as: POLISCI 213, REES 213

**POLISCI 313R. Political Economy of Financial Crisis. 5 Units.**

Political responses to domestic and international financial crises. Monetary and fiscal policy. The role of interest groups. International cooperation and the role of the IMF.

Same as: POLISCI 213R

**POLISCI 314D. Democracy, Development, and the Rule of Law. 5 Units.**

Links among the establishment of democracy, economic growth, and the rule of law. How democratic, economically developed states arise. How the rule of law can be established where it has been historically absent. Variations in how such systems function and the consequences of institutional forms and choices. How democratic systems have arisen in different parts of the world. Available policy instruments used in international democracy, rule of law, and development promotion efforts.

Same as: INTNLREL 114D, IPS 230, POLISCI 114D

**POLISCI 314R. Challenges and Dilemmas in American Foreign Policy. 5 Units.**

This seminar will examine the complexities and trade offs involved in foreign policy decision-making at the end of the twentieth century and the dawn of the post-9/11 era. Students will analyze dilemmas confronting policymakers through case studies including post-conflict reconstruction and state-building, nuclear proliferation, democratization and peace negotiation. The seminar will conclude with a 48-hour crisis simulation. For advanced undergraduates and graduate students. Application for enrollment required. Applications will be available for pick up in Political Science Department (Encina West 100) starting late-October.

Same as: POLISCI 214R

**POLISCI 315A. The Rise of Asia. 3-5 Units.**

We will examine the sources and implications of the rise of Asia in the international system. Topics will include military competition, international cooperation, regional integration, domestic politics, business and investment, legalization, environmental issues, demographics, social issues, and the role of technology.

Same as: POLISCI 115A

**POLISCI 315F. Nuclear Weapons and International Politics. 5 Units.**

Why do states develop nuclear weapons and why do some states, that have the technological capacity to build nuclear weapons, refrain from doing so? What are the strategic consequences of new states deploying nuclear weapons? What is the relationship between the spread of nuclear energy and the spread of nuclear weapons? We will study the political science and history literature on these topics. Research paper required. Same as: POLISCI 215F

**POLISCI 316S. Decision Making in U.S. Foreign Policy. 5 Units.**

Formal and informal processes involved in U.S. foreign policy decision making. The formation, conduct, and implementation of policy, emphasizing the role of the President and executive branch agencies. Theoretical and analytical perspectives; case studies. Interested students should attend the first day of class. Admission will be by permission of the instructor. Priority to IPS students. Same as: IPS 316S

**POLISCI 317M. Special Topics: International Democratization. 5 Units.**

Analyzing the international aspects of democratization involves understanding at least the following: (1) what is democracy (2) what domestic-level processes increase or decrease the level of democracy (3) what kind of influences from the outside world work, and do not work, in furthering democracy, and in what ways. This course spans all subfields of political science, and spills over into law, economics, and sociology. A complicating factor is the geographical expanse of democratic institutions and efforts to promote them. Eastern Europe, Russia, the Middle East, Sub-Saharan Africa, post-civil war El Salvador and Cambodia, are only some of the regions and countries that have been impacted. Their vastly different backgrounds challenge anyone attempting the puzzle. A further complication is the variety of ways in which the outside world may affect the scope and quality of democracy. These ways include but are not limited to: pressures exercised by regional economic institutions and alliances, the power of ideas and socialization, transfers of wealth, demands for trade liberalization, the training of civic activists, reports issued by foreign election observers. Same as: POLISCI 217M

**POLISCI 318J. Japanese Politics and International Relations. 5 Units.**

The domestic politics, political economy, and international relations of contemporary Japan. The role of political parties, the bureaucracy, and private actors. Economic development and challenges. Relations with the United States and East Asia. Same as: POLISCI 218J

**POLISCI 319. Directed Reading in International Relations. 1-10 Unit.**

May be repeated for credit.

**POLISCI 31N. Political Freedom: Rights, Justice, and Democracy in the Western Tradition. 3 Units.**

Freedom is one of our core values. Most people can agree that freedom is a good thing. Yet there is far less agreement about how to understand the concept itself and what kinds of political arrangements are best suited to protect and enhance freedom. Is freedom about being left alone? Undertaking action with others? Participating in governance? Does freedom require a limited state? An active and interventionist government? A robustly participatory political system? How is freedom connected to other political values, like justice and equality? This seminar will consider and evaluate some of the most controversial and challenging answers that have been given to these questions by both historical and contemporary political thinkers from Europe and North America. Thinkers covered will include: Plato, Thomas Hobbes, John Locke, Alexis de Tocqueville, John Stuart Mill, Karl Marx, Robert Putnam, and Jeremy Waldron.

**POLISCI 31Q. Justice and the City. 3 Units.**

Cities have most often been where struggles for social justice happen, where injustice is most glaring and where new or renewed visions of just communities are developed and tested. What makes a city just or unjust? How have people tried to make cities more just? Why have these efforts succeeded or failed? Each of our sessions will focus on questions like these and include a case study of a particular city, largely with a focus on the United States, including very local cases like San Francisco, Palo Alto and East Palo Alto. The central goal of this class is for you to gain an understanding of the roles of urban design and urban policies in making cities just or unjust places. You will critically engage with some of the debates on cities and justice and gain experience connecting theoretical debates about justice and democracy to empirical data and contemporary work on city design, planning, and policies through readings, our class discussions, and a sustained research project looking a particular city in depth.

**POLISCI 320R. The Presidency. 3-5 Units.**

This course provides students with a comprehensive perspective on the American presidency and covers a range of topics: elections, policy making, control of the bureaucracy, unilateral action, war-making, and much more. But throughout, the goal is to understand why presidents behave as they do, and why the presidency as an institution has developed as it has, with special attention to the dynamics of the American political system and how they condition incentives, opportunities, and power. Same as: POLISCI 220R

**POLISCI 321. Law and Politics Workshop. 2-3 Units.**

This workshop will feature guest speakers who are political scientists or law professors specializing in the legal regulation of politics. Students will be responsible for response papers to each scholarly paper presented. On weeks without guest speakers, topics to be covered will include election law, administrative law, legislation, judicial behavior and public opinion, as well as the political science relevant to those areas of law. The final grade will be determined by class participation (10%), response papers (30%) and final research paper (60%). Students can take the course for R credit for either 2 or 3 units, depending on paper length. Elements used in grading: Class participation (10%), Response papers (30%) and final paper of no less than 18 pages for 2 units of credit and 26 pages for 3 units of credit (60%). (Cross-listed as POLISCI 321).

**POLISCI 322A. Advances in Political Psychology. 3-5 Units.**

Among the topics: the comparative contributions of rational choice and political psychology; political information process; coordinating vs. inducing preferences; identities and values; and prejudice and politics.

**POLISCI 322S. Topics in Constitutional History. 5 Units.**

Originalism has become the dominant topic in contemporary constitutional interpretation. Is it possible to interpret the Constitution according to its original, meaning, intentions, and understandings? Should we think of the Constitution as a fixed set of rules laid down linguistically, or a set of understandings shaped by the nation's history? How should modern interpreters assess the legacy of major epochs of constitutional change, from the founding era through Reconstruction and on to the great disputes over the New Deal and civil rights? These are the questions this course will entertain.

**POLISCI 323. Pivotal Moments in American Institutions and Public Law, 1781-Present. 5 Units.**

(Same as Law 680) American lawyers and policymakers work today in a system of institutions that are strikingly unique in comparative and historical terms. With some exceptions, that system is characterized by relatively stable political and legal institutions, low levels of explicit corruption, high bureaucratic capacity in public organizations, and relatively open, impersonal access to political, policymaking, and legal institutions. Although these characteristics are now too often taken for granted, the process through which they emerged remains remarkably opaque. In the 1780s under the Articles of Confederation, the United States was a poor developing country on the fringe of the Atlantic community with limited capacity and a striking inability to provide basic public goods, such as security. One hundred years later, it well along the way to becoming the richest nation in the world. How did this transformation occur? Drawing on judicial opinions, legal scholarship, political science, economics, and history, this course explores how institutions evolved to create such a system. It traces the problem of institutional development through several critical periods in the history of American public law, including the emergence of the Constitution, the events leading up to and following the Civil War, the Progressive era, World War II, 1964-75, and the emergence of the modern administrative state. Although the primary focus is on the American experience, we place these developments in comparative context as well.

**POLISCI 324. Graduate Seminar in Political Psychology. 1-3 Unit.**

For students interested in research in political science, psychology, or communication. Methodological techniques for studying political attitudes and behaviors. May be repeated for credit.  
Same as: COMM 308

**POLISCI 326. Race and Racism in American Politics. 5 Units.**

Topics include the historical conceptualization of race; whether and how racial animus reveals itself and the forms it might take; its role in the creation and maintenance of economic stratification; its effect on contemporary U.S. partisan and electoral politics; and policy making consequences.

Same as: AMSTUD 226, CSRE 226, POLISCI 226

**POLISCI 326T. The Politics of Education. 3-5 Units.**

America's public schools are government agencies, and virtually everything about them is subject to political authority—and thus to decision through the political process. This seminar is an effort to understand the politics of education and its impacts on the nation's schools. Our focus is on the modern era of reform, with special attention to the most prominent efforts to bring about fundamental change through accountability (including No Child Left Behind), school choice (charter schools, vouchers), pay for performance, and more and more to the politics of blocking that has made genuine reform so difficult to achieve.

Same as: POLISCI 226T

**POLISCI 327. Minority Behavior and Representation. 5 Units.**

Politics of minorities in the U.S. Topics include: historic and contemporary struggles of Latinos, African Americans, and gays and lesbians for political power and social acceptance; group-level public opinion and electoral behavior; scholarship on group influence in the policy making process and policy issues of importance; and the jurisprudence shaping minority political access and civil rights.

**POLISCI 327C. Law of Democracy. 3-5 Units.**

Combined with LAW 7036 (formerly Law 577). This course is intended to give students a basic understanding of the themes in the legal regulation of elections and politics. We will cover all the major Supreme Court cases on topics of voting rights, reapportionment/redistricting, ballot access, regulation of political parties, campaign finance, and the 2000 presidential election controversy. The course pays particular attention to competing political philosophies and empirical assumptions that underlie the Court's reasoning while still focusing on the cases as litigation tools used to serve political ends. Elements used in grading: Class participation and one day take home final exam. (POLISCI 327C; LAW 577).

Same as: COMM 361

**POLISCI 329. Directed Reading and Research in American Politics. 1-10 Unit.**

May be repeated for credit.

**POLISCI 330A. Classical Seminar: Origins of Political Thought. 3-5 Units.**

(Formerly CLASSHIS 133/333.) Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

Same as: CLASSICS 181, CLASSICS 381, PHIL 176A, PHIL 276A, POLISCI 230A

**POLISCI 331. High-Stakes Politics: Case Studies in Political Philosophy, Institutions, and Interests. 3-5 Units.**

Normative political theory combined with positive political theory to better explain how major texts may have responded to and influenced changes in formal and informal institutions. Emphasis is on historical periods in which catastrophic institutional failure was a recent memory or a realistic possibility. Case studies include Greek city-states in the classical period and the northern Atlantic community of the 17th and 18th centuries including upheavals in England and the American Revolutionary era.

Same as: CLASSICS 382, POLISCI 231

**POLISCI 332. Topics in Political Philosophy. 5 Units.**

Leading ideas in *A Theory of Justice*, *Political Liberalism*, and *The Law of Peoples*.

Same as: PHIL 372D

**POLISCI 332T. The Dialogue of Democracy. 4-5 Units.**

All forms of democracy require some kind of communication so people can be aware of issues and make decisions. This course looks at competing visions of what democracy should be and different notions of the role of dialogue in a democracy. Is it just campaigning or does it include deliberation? Small scale discussions or sound bites on television? Or social media? What is the role of technology in changing our democratic practices, to mobilize, to persuade, to solve public problems? This course will include readings from political theory about democratic ideals - from the American founders to J.S. Mill and the Progressives to Joseph Schumpeter and modern writers skeptical of the public will. It will also include contemporary examinations of the media and the internet to see how those practices are changing and how the ideals can or cannot be realized.

Same as: AMSTUD 137, COMM 137W, COMM 237, POLISCI 232T



**POLISCI 333. Social Agency. 2-4 Units.**

Humans are agents who live in a social world. Philosophical reflection on human agency needs to include reflection both on the agency of individual human agents and on forms of social agency that involve multiple individuals. This seminar will focus on aspects of the latter. What is it for multiple individuals to think and to act together – to engage in shared intentional/shared cooperative activity? to deliberate together? to engage in what some have called team reasoning? What kinds of social agency are characteristic of larger social organizations or groups? What would it be for larger groups themselves to be agents, ones who have their own distinctive intentions on the basis of which they act? What is the relation between these larger forms of social agency and small-scale shared cooperative activity? In all these cases how do we best understand what we are talking about when we speak of what we intend or believe and of what we are doing? Readings to be drawn from recent work of Michael Bratman, Margaret Gilbert, Christian List, Kirk Ludwig, Philip Pettit, John Searle, Scott Shapiro, and others, as well as classic work of H.L.A. Hart. Prerequisite: graduate standing in Philosophy or permission of instructor. 2 unit option for PhD students only; all others must enroll for 4 units. Same as: PHIL 377

**POLISCI 333M. Research and Methods in Political Theory. 3-5 Units.**

This seminar has two aims. First, we discuss recent scholarship that examines the relationship between normative and empirical (or positive) work. In particular, we focus on normative work in political theory/philosophy and empirical work in political science and other social sciences. Second, we discuss in an informal workshop setting the ongoing work of graduate students, considering how, if at all, the readings on methodology could inform this work.

**POLISCI 333S. Marx. 2-4 Units.**

This course examines the works of a thinker who radically transformed the ways that we think about modern society. Marx saw fundamental problems with capitalist societies, including: un-freedom, alienation, inequality, and bureaucratization. He developed a theory to account for these problems. Our task will be to read his works critically and to evaluate their contributions to our understanding the relationship between politics, social structure, knowledge and human agency. We will also be especially interested in comparing his view with alternative diagnoses of the problems of modern capitalist societies, especially those of Max Weber and John Rawls. Same as: PHIL 339

**POLISCI 334. Philanthropy and Civil Society. 1-3 Unit.**

Cross-listed with Law (LAW 781), Political Science (POLISCI 334) and Sociology (SOC 374). Associated with the Center for Philanthropy and Civil Society (PACS). Year-long workshop for doctoral students and advanced undergraduates writing senior theses on the nature of civil society or philanthropy. Focus is on pursuit of progressive research and writing contributing to the current scholarly knowledge of the nonprofit sector and philanthropy. Accomplished in a large part through peer review. Readings include recent scholarship in aforementioned fields. May be repeated for credit for a maximum of 9 units. Same as: EDUC 374, SOC 374

**POLISCI 334P. Deliberative Democracy and its Critics. 3-5 Units.**

This course examines the theory and practice of deliberative democracy and engages both in a dialogue with critics. Can a democracy which emphasizes people thinking and talking together on the basis of good information be made practical in the modern age? What kinds of distortions arise when people try to discuss politics or policy together? The course draws on ideas of deliberation from Madison and Mill to Rawls and Habermas as well as criticisms from the jury literature, from the psychology of group processes and from the most recent normative and empirical literature on deliberative forums. Deliberative Polling, its applications, defenders and critics, both normative and empirical, will provide a key case for discussion. Same as: AMSTUD 135, COMM 135, COMM 235, COMM 335, POLISCI 234P

**POLISCI 335A. Adam Smith: From Moral Philosophy to Political Economy. 3-5 Units.**

This course is designed for graduate students and advanced undergraduates interested in moral philosophy or modern political economy. The course blends two approaches to Adam Smith. We use political thought and intellectual history to introduce students to the intellectual roots of classical Liberalism; asking: What are the moral psychological foundations of justice?, Does the free market make everyone, including the least advantaged, better off? How do we sustain a good society? We use social science to study Smith's integrated approach to human cooperation in three realms, society, politics, and markets; asking: Why isn't the entire world developed? How did Europe develop out of feudalism? How does a community sustain moral behavior? The two perspectives allow us to discover that Smith has ideas on these subjects that expand today's frontiers of both positive and normative social science.

**POLISCI 335J. Creative Political Thinking: From Machiavelli to Madison. 4-5 Units.**

How can we account for creativity and innovation in political thinking? Are these qualities simply a product of political expediency and rhetorical urgency, or do they also depend on qualities of mind and historical contingencies that have to be studied individually? This class will explore these questions with three noteworthy cases: Niccolo Machiavelli, John Locke, and James Madison. Extensive reading in both primary writings and secondary sources. Same as: HISTORY 205G, HISTORY 305G, POLISCI 235J

**POLISCI 336. Introduction to Global Justice. 4 Units.**

This course provides an overview of core ethical problems in international politics, with special emphasis on the question of what demands justice imposes on institutions and agents acting in a global context. The course is divided into three sections. The first investigates the content of global justice, and comprises of readings from contemporary political theorists and philosophers who write within the liberal contractualist, utilitarian, cosmopolitan, and nationalist traditions. The second part of the course looks at the obligations which global justice generates in relation to a series of real-world issues of international concern: global poverty, human rights, natural resources, climate change, migration, and the well-being of women.. The final section of the course asks whether a democratic international order is necessary for global justice to be realized. Same as: ETHICSOC 136R, INTNLREL 136R, PHIL 76, POLISCI 136R

**POLISCI 336S. Justice. 4-5 Units.**

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors. Same as: ETHICSOC 171, PHIL 171, POLISCI 103, PUBLPOL 103C, PUBLPOL 307

**POLISCI 337A. Political Philosophy: The Social Contract Tradition. 4 Units.**

(Graduate students register for 276.) Why and under what conditions do human beings need political institutions? What makes them legitimate or illegitimate? What is the nature, source, and extent of the obligation to obey the legitimate ones, and how should people alter or overthrow the others? Study of the answers given to such questions by major political theorists of the early modern period: Hobbes, Locke, Rousseau, and Kant. Same as: PHIL 176, PHIL 276, POLISCI 137A

**POLISCI 337L. Ancient Greek Law and Justice. 3-5 Units.**

The development and practice of law and legal procedure in the ancient Greek world, emphasizing the well documented case of classical Athens. Constitutional, criminal, and civil law, approached through analysis of actual laws and speeches by litigants in Athenian courtrooms. Review of a growing scholarship juxtaposing Greek law to other prominent legal traditions and exploring the role of law in Greek social relations, economics, and literature, and its relationship to Greek conceptions of justice.

Same as: CLASSICS 378

**POLISCI 338. Universal Basic Income: the philosophy behind the proposal. 4 Units.**

The past three decades have seen the elaboration of a vast body of literature on unconditional basic income a radical policy proposal Philippe Van Parijs referred to as a disarmingly simple idea. It consists of a monthly cash allowance given to all citizens, regardless of personal desert and without means test to provide them with a standard of living above the poverty line. The seminar will seek to engage students in normative debates in political theory (feminism, liberalism, republicanism, communism, libertarianism, etc.) by appealing to the concrete example of basic income. It will allow students to learn a great deal about a policy that is gaining tremendous currency in academic and public debates, while discussing and learning about prominent political theorists - many of whom have written against or for basic income at one point in their career. The seminar is open to undergraduate and graduate students in all departments. There are no pre-requisites. We will ask questions such as: is giving people cash no strings attached desirable and just? Would basic income promote a more gender equal society through the remuneration of care-work, or would it risks further entrenching the position of women as care-givers? Would alternative policies be more successful (such as the job guarantees, stakeholder grants or a negative income tax)? How can we test out basic income? What makes for a reliable and ethical basic income pilot? Students in Politics, Philosophy, Public Policy, Social Work, and Sociology should find most of those questions relevant to their interests. Some discussions on how to fund basic income, on the macro-economic implications of basic income and on the existing pilots projects (in Finland, Namibia, India, Canada and the US) may be of interest to Economists; while our readings on the impact of new technologies and artificial intelligence on the future of work and whether a basic income could be a solution, are likely to be on interest to computer scientists and engineers. By the end of the class, students will have an in depth knowledge of the policy and will have developed skills in the normative analysis of public policy. They will be able to deploy those critical and analytical skills to assess a broad range of other policies.

Same as: ETHICSOC 174X, ETHICSOC 274X, PHIL 174B, PHIL 274B

**POLISCI 339. Directed Reading and Research in Political Theory. 1-5 Unit.**

May be repeated for credit.

**POLISCI 340A. Democratic Politics. 5 Units.**

This course examines the relationship between democratic ideals and contemporary democratic politics.

Same as: POLISCI 240A

**POLISCI 340L. China in World Politics. 5 Units.**

The implications of the rise of China in contemporary world politics and for American foreign policy, including issues such as arms and nuclear proliferation, regional security arrangements, international trade and investment, human rights, environmental problems, and the Taiwan and Tibet questions.

Same as: POLISCI 140L

**POLISCI 343A. Field Methods. 3-5 Units.**

Familiarizes students with a variety of field methods potentially applicable to ongoing research projects and dissertations. Topics include case selection, process tracing, participant observation, interviewing, archival research, survey design, lab experiments, field experiments, and ethical concerns in the field. Students develop a field research strategy as a final project. Prerequisites: 440A,B,C.

**POLISCI 344. Politics and Geography. 3-5 Units.**

The role of geography in topics in political economy, including development, political representation, voting, redistribution, regional autonomy movements, fiscal competition, and federalism.

**POLISCI 344A. Authoritarian Politics. 3-5 Units.**

Examination of how authoritarian regimes govern. Topics include: historical determinants of authoritarian government, typologies of authoritarian rule and impact of authoritarian governance on economic growth.

Same as: POLISCI 244A

**POLISCI 344U. Political Culture. 3-5 Units.**

The implications of social norms, preferences and beliefs for political and economic behavior and societal outcomes.

Same as: POLISCI 244U

**POLISCI 346P. The Dynamics of Change in Africa. 4-5 Units.**

Crossdisciplinary colloquium; required for the M.A. degree in African Studies. Open to advanced undergraduates and PhD students. Addresses critical issues including patterns of economic collapse and recovery; political change and democratization; and political violence, civil war, and genocide. Focus on cross-cutting issues including the impact of colonialism; the role of religion, ethnicity, and inequality; and Africa's engagement with globalization.

Same as: AFRICAST 301A, HISTORY 246, HISTORY 346, POLISCI 246P

**POLISCI 347A. Games Developing Nations Play. 5 Units.**

If, as economists argue, development can make everyone in a society better off, why do leaders fail to pursue policies that promote development? The course uses game theoretic approaches from both economics and political science to address this question. Incentive problems are at the heart of explanations for development failure. Specifically, the course focuses on a series of questions central to the development problem: Why do developing countries have weak and often counterproductive political institutions? Why is violence (civil wars, ethnic conflict, military coups) so prevalent in the developing world, and how does it interact with development? Why do developing economies fail to generate high levels of income and wealth? We study how various kinds of development traps arise, preventing development for most countries. We also explain how some countries have overcome such traps. This approach emphasizes the importance of simultaneous economic and political development as two different facets of the same developmental process. No background in game theory is required.

Same as: ECON 162, POLISCI 247A

**POLISCI 347D. Rebooting Government with Design Thinking. 3-4 Units.**

Students apply tools of human-centered design to issues of government performance. Small project teams work with NGO and government partners (in the U.S. and abroad) on concrete design challenges focused on issues such as how to deliver services more effectively and ensure that citizens' voices are heard. Students identify needs, generate concepts, create prototypes, and test their appropriateness. Taught through the Hasso Plattner Institute of Design at Stanford (<http://dschool.stanford.edu>). Enrollment limited. Application required. Prerequisites: consent of instructor(s).

Same as: PUBLPOL 347D

**POLISCI 347G. Governance and Poverty. 3-5 Units.**

Poverty relief requires active government involvement in the provision of public services such as drinking water, healthcare, sanitation, education, roads, electricity and public safety. Failure to deliver public services is a major impediment to the alleviation of poverty in the developing world. This course will use an interdisciplinary approach to examining these issues, bringing together readings from across the disciplines of political science, economics, law, medicine and education to increase understanding of the complex causal linkages between political institutions, the quality of governance, and the capacity of developing societies to meet basic human needs. Conceived in a broadly comparative international perspective, the course will examine cross-national and field-based research projects, with a particular focus on Latin America and Mexico.

**POLISCI 348. Chinese Politics. 3-5 Units.**

China, one of the few remaining communist states in the world, has not only survived, but has become a global political actor of consequence with the fastest growing economy in the world. What explains China's authoritarian resilience? Why has the CCP thrived while other communist regimes have failed? How has the Chinese Communist Party managed to develop markets and yet keep itself in power? What avenues are there for political participation? How does censorship work in the information and 'connected' age of social media? What are the prospects for political change? How resilient is the part in the fave of technological and economic change? Materials will include readings, lectures, and selected films. This course has no prerequisites. (Graduate students register for 348.).

Same as: POLISCI 148

**POLISCI 348S. Latin American Politics. 3-5 Units.**

Fundamental transformations in Latin America in the last two decades: why most governments are now democratic or semidemocratic; and economic transformation as countries abandoned import substitution industrialization policies led by state intervention for neoliberal economic policies. The nature of this dual transformation.

Same as: POLISCI 248S

**POLISCI 349. Directed Reading and Research in Comparative Politics. 1-10 Unit.**

May be repeated for credit.

**POLISCI 34S. Religion and Politics. 3 Units.**

What is the relationship between religion, international conflict and peace? This course takes up this question by examining contemporary thinking in international relations, conflict management, political science, and religious ethics. Topics to be taken up include: whether religion is fundamentally a positive or negative force in conflict management; how do major world religions think about war and peace; the relationship of religion to terrorism; whether thinking about religion in international conflict requires its own categories, distinct from models concerning ethnic or nationalistic communities in conflict; varieties of religious militancy; religion's potential role in conflict resolution; among others. Through these investigations, students will better grasp the contemporary scholarship on the place of religion in international conflict and peace building. Readings are interdisciplinary in nature, and include case studies. No prerequisite. Open to all majors/minors, and will be particularly beneficial to students in International Relations, Religious Studies, International Policy Studies, and Political Science, as well as students with specific regional political interests where the themes of the course are especially relevant (e.g., Middle East, Latin America, Russia and Eastern Europe, Africa, and so on).

**POLISCI 351A. Foundations of Political Economy. 3 Units.**

Introduction to political economy with an emphasis on formal models of collective choice, public institutions, and political competition. Topics include voting theory, social choice, institutional equilibria, agenda setting, interest group politics, bureaucratic behavior, and electoral competition.

**POLISCI 351B. Economic Analysis of Political Institutions. 4 Units.**

Applying techniques such as information economics, games of incomplete information, sequential bargaining theory, repeated games, and rational expectations of microeconomic analysis and game theory to political behavior and institutions. Applications include agenda formation in legislatures, government formation in parliamentary systems, the implications of legislative structure, elections and information aggregation, lobbying, electoral competition and interest groups, the control of bureaucracies, interest group competition, and collective choice rules.

**POLISCI 351C. Institutions and Bridge-Building in Political Economy. 4 Units.**

This course critically surveys empirical applications of formal models of collective-choice institutions. It is explicitly grounded in philosophy of science (e.g., Popperian positivism and Kuhn's notions of paradigms and normal science). Initial sessions address the meanings and roles of the concept of institutions in social-science research. Historically important works of political science and/or economics are then considered within a framework called Components of Institutional Analysis (or CIA), which provides a fully general way of evaluating research that is jointly empirical and formal theoretical. The course concludes with contemporary instances of such bridge-building. The over-arching objectives are to elevate the explicitness and salience of desirable properties of research and to illustrate the inescapable tradeoffs among the stipulated criteria. Although this is a core course in the GSB Political Economy PhD curriculum, its substantive foci may differ across years depending on the instructor. For Professor Krehbiel's sessions, the emphasis is on legislative behavior, organization, and lawmaking, and on inter-institutional strategic interaction (e.g. between executive, legislative, and judicial branches in various combinations). Students should have taken POLECON 680 and POLECON 681. Also listed as Political Science 351C.

**POLISCI 352. Introduction to Game Theoretic Methods in Political Science. 3-5 Units.**

Concepts and tools of non-cooperative game theory developed using political science questions and applications. Formal treatment of Hobbes' theory of the state and major criticisms of it; examples from international politics. Primarily for graduate students; undergraduates admitted with consent of instructor.

Same as: POLISCI 152

**POLISCI 353A. Workshop in Statistical Modeling. 1 Unit.**

Mathematical and statistical models and applications to political science. Guest speakers, faculty, and students present research papers. Prerequisite: 356A and 450B.

**POLISCI 353C. Workshop in Statistical Modeling. 1-2 Unit.**

Continuation of 353B. May be repeated for credit. Prerequisite: 353A and B. May be repeated for credit.

**POLISCI 354. Thinking Strategically. 5 Units.**

This course provides an introduction to strategic reasoning. We discuss ideas such as the commitment problem, credibility in signaling, cheap talk, moral hazard and adverse selection. Concepts are developed through games played in class, and applied to politics, business and everyday life.

Same as: POLISCI 153

**POLISCI 355A. Data Science for Politics. 5 Units.**

Data science is quickly changing the way we understand and engage in the political process. In this course we will develop fundamental techniques of data science and apply them to large political datasets on elections, campaign finance, lobbying, and more. The objective is to give students the skills to carry out cutting edge quantitative political studies in both academia and the private sector. Students with technical backgrounds looking to study politics quantitatively are encouraged to enroll.

Same as: POLISCI 150A

**POLISCI 355B. Machine Learning for Social Scientists. 5 Units.**

Machine learning—the use of algorithms to classify, predict, sort, learn and discover from data—has exploded in use across academic fields, industry, government, and non-profit. This course provides an introduction to machine learning for social scientists. We will introduce state of the art machine learning tools, show how to use those tools in the programming language R, and demonstrate why a social science focus is essential to effectively apply machine learning techniques. Applications of the methods will include forecasting social phenomena, the analysis of social media data, and the automatic analysis of text data. Political Science 150A or an equivalent is required. (Prerequisite 150A/355A).

Same as: POLISCI 150B

**POLISCI 355C. Causal Inference for Social Science. 5 Units.**

Causal inference methods have revolutionized the way we use data, statistics, and research design to move from correlation to causation and rigorously learn about the impact of some potential cause (e.g., a new policy or intervention) on some outcome (e.g., election results, levels of violence, poverty). This course provides an introduction that teaches students the toolkit of modern causal inference methods as they are now widely used across academic fields, government, industry, and non-profits. Topics include experiments, matching, regression, sensitivity analysis, difference-in-differences, panel methods, instrumental variable estimation, and regression discontinuity designs. We will illustrate and apply the methods with examples drawn from various fields including policy evaluation, political science, public health, economics, business, and sociology. Political Science 150A and 150B or an equivalent is required.

Same as: POLISCI 150C

**POLISCI 356A. Formal Theory I: An Introduction to Game Theory. 3-5 Units.**

An introduction to noncooperative game theory through applications in political science. Topics will include the Hotelling-Downs model, the probabilistic voting model, political bargaining models and political agency models, among others.

**POLISCI 356B. Formal Theory II: Models of Politics. 3-5 Units.**

A continuation of Formal Theory I covering advanced topics, including classical political economy, comparative institutions, theories of conflict and cooperation, dynamic political economy, and the new behavioral political economy.

**POLISCI 357. Sampling and Surveys. 5 Units.**

The importance of sample surveys as a source of social science data including public opinion, voting, welfare programs, health, employment, and consumer behavior. Survey design, sampling theory, and estimation. Nonresponse, self-selection, measurement error, and web survey methods. Prerequisite: 350B or equivalent.

**POLISCI 358. Data-driven Politics. 3-5 Units.**

Covers advanced computational and statistical methods for collecting and modeling large-scale data on politics. Topics will include automated and computer-assisted methods for collecting, disambiguating, and merging unstructured data (web-scraping, identity resolution, and record-linkage), database management (SQL, data architecture), data-reduction techniques for measuring the political preferences for large numbers of individuals, topic models applied to political text/speech, and social network analysis for mapping relationships and identifying influential actors.

**POLISCI 359. Advanced Individual Study in Political Methodology. 1-10 Unit.**

May be repeated for credit.

**POLISCI 362. New Economics of Organization. 5 Units.**

Survey of economic approaches to organization, emphasizing theory and application, with attention to politics.

**POLISCI 400. Dissertation. 1-18 Unit.****POLISCI 400C. Research Design. 5 Units.**

Required of Political Science PhD candidates with International Relations, American Politics, or Comparative Politics as their first or second field. Other by consent of instructor. Students develop their own research design. Prerequisites: 410A&B or 420A&B or 440A&B.

**POLISCI 404. Dispute Resolution in International Economic Law. 1 Unit.**

(Same as LAW 356.) Topics include: theoretical work on international trade and investment disputes; empirical work on WTO dispute resolution and the efficacy of developing country participation; and legal analysis of current, prominent disputes in the WTO and under international investment treaties. Substantial paper required. May be repeated for credit.

**POLISCI 40SI. Rejecting Tyranny: Civil Resistance in Times of Crisis. 1 Unit.**

Donald Trump's rise to power was anything but conventional. Although divisive among both Democrats and Republicans, he was still popular enough in the eyes of the electorate to become the leader of the free world. Is he a hero? Is he a dictator? Or something different altogether? As Trump often elicits comparisons to famous and infamous leaders of the past such as Hitler, Mussolini, and FDR, as well as right wing nationalists leaders in the present day such as Duterte and Le Pen, this class will examine the extent to which Trump's behavior resembles these authority figures and what our society should do to respond. Learning will be facilitated through discussion sections and guest professors from various Stanford departments including History, Political Science, and the Hoover Institution. Views from all sides of the political spectrum are welcome. Note: this class does not begin until the Tuesday of the second week of Spring quarter (Apr 11). Enrollment will be decided on the first day of class.

**POLISCI 410A. International Relations Theory, Part I. 3-5 Units.**

This course offers a PhD-level introductory overview of the field of international relations. The primary purpose is to understand and evaluate the main theories, arguments, claims, and conjectures made by scholars in the field so as to enable students to situate arguments in the conceptual structure and intellectual history of IR theory.

**POLISCI 410B. International Relations Theory, Part II. 3-5 Units.**

Second of a three-part graduate sequence. History of international relations theory, current debates, and applications to problems of international security and political economy. Prerequisite: 410A.

**POLISCI 410C. Security and Armed Conflict. 3-5 Units.**

Third of a three-part graduate sequence. Theory and evidence on domestic and international armed conflict, terrorism, nuclear deterrence and proliferation, and some "new security" issues. Prerequisite: POLISCI 410A.

**POLISCI 411A. Workshop in International Relations. 1 Unit.**

For graduate students. Contemporary work. Organized around presentation of research by students and outside scholars. May be repeated for credit.

**POLISCI 411B. Workshop in International Relations. 1-2 Unit.**

For graduate students. Contemporary work. Organized around presentation of research by students and outside scholars. May be repeated for credit.

**POLISCI 411C. Workshop in International Relations. 1 Unit.**

For graduate students. Contemporary work. Organized around presentation of research by students and outside scholars. May be repeated for credit.

**POLISCI 412. The Politics and Economics of Modern Europe. 3-5 Units.**

What are the implications of European integration for social and economic policy and outcomes? In this course, we will examine how EU membership has altered the democratic politics of Europe, with a special focus on policymaking during Europe's most recent financial crisis.

**POLISCI 420A. American Political Institutions. 3-5 Units.**

Theories of American politics, focusing on Congress, the presidency, the bureaucracy, and the courts.

**POLISCI 420B. Topics in American Political Behavior. 3-5 Units.**

For graduate students with background in American politics embarking on their own research. Current research in American politics, emphasizing political behavior and public opinion. Possible topics: uncertainty and ambivalence in political attitudes, heterogeneity in public opinion, the structure of American political ideology, political learning, the media as a determinant of public opinion, and links between public opinion and public policy.

**POLISCI 420C. Discovery in American Politics. 5 Units.**

What are the "novel facts" being generated in the study of American politics, and how are these discoveries being made? Emphasis on strengths and limitations of emerging methodologies and review of the substantive contributions they yield. Student-led replication of extant research and development of original research ideas a key component of the course. Prerequisites: 420A,B.

**POLISCI 421K. Questionnaire Design for Surveys and Laboratory Experiments: Social and Cognitive Perspectives. 4 Units.**

The social and psychological processes involved in asking and answering questions via questionnaires for the social sciences; optimizing questionnaire design; open versus closed questions; rating versus ranking; rating scale length and point labeling; acquiescence response bias; don't-know response options; response choice order effects; question order effects; social desirability response bias; attitude and behavior recall; and introspective accounts of the causes of thoughts and actions.

Same as: COMM 339, PSYCH 231

**POLISCI 421R. American Political Development, 1865-present. 3-5 Units.**

In this reading-intensive course, we will conduct a wide-ranging survey of major transformations in the American political system in the post-Civil War period. Our inquiries about these transformations will focus on the origins of the modern administrative state, the interactive role of the state and social movements, and changes in the party system. We'll examine these developments not only to understand institutional change, but to learn how changing institutions have shaped the behavior of the American electorate.

Same as: POLISCI 221A

**POLISCI 422. Workshop in American Politics. 1 Unit.**

Research seminar. Frontiers in mass political behavior. Prerequisite: 420B or equivalent. Course may be repeated for credit.

**POLISCI 422F. Seminar on Electoral Change. 3-5 Units.**

This seminar will examine contemporary American and European public opinion and elections using a variety of databases, several of which have become newly available to scholars this decade (eg. YouGov/Polimetrix, ongoing FSI-Hoover Comparative Surveys). Department faculty will present research and some visitors will appear. Students will be expected to complete a significant research paper.

**POLISCI 423A. The Laboratory of the Study of American Values I. 1-5 Unit.**

Designed for graduate students who are writing dissertations about American public opinion. Students participate in all phases of the research process and include questions on nationally representative surveys. Enrollment is limited to members of the Laboratory for the Study of American Values.

**POLISCI 423B. The Laboratory of the Study of American Values II. 1-5 Unit.**

Designed for graduate students who are writing dissertations about American public opinion. Students participate in all phases of the research process and include questions on nationally representative surveys. Enrollment is limited to members of the Laboratory for the Study of American Values.

**POLISCI 424A. Democratic Elections. 3-5 Units.**

How do democratic elections work? Do elections make representatives accountable, and if so, under what conditions? What preferences do electorates reveal to us when they choose candidates for office, and how do candidates and representatives respond to these preferences? What external factors change the dynamics between candidates and electorates? In this class we will study the functioning of democratic elections, mainly in the context of legislative elections. Because this is an elections course, the unit of analysis will be the constituency or the candidate rather than the individual voter, as it might be in a behavior course. We want to understand how candidates make it to office, i.e., the aggregated choices of many voters, and how the prospect of reelection shapes their behavior in office.

**POLISCI 425. Political Communication. 1-5 Unit.**

An overview of research in political communication with particular reference to work on the impact of the mass media on public opinion and voting behavior. Limited to Ph.D. students. Prerequisite: 260 or consent of instructor.

Same as: COMM 360G

**POLISCI 425S. Topics in Political Communication: Media Bias, Selective Exposure, and Political Polarization. 1-5 Unit.**

This course surveys theories of media bias, biased processing of information, and the empirical challenges facing researchers attempting to link changes in the composition of audiences to attitudinal and behavioral outcomes. (Limited to PhD students).

Same as: COMM 362

**POLISCI 426S. Theories of Racism in American Politics: A Critique. 0 Units.****POLISCI 427R. Race and Racism in American Politics. 5 Units.**

Topics include the historical conceptualization of race; whether and how racial animus reveals itself and the forms it might take; its role in the creation and maintenance of economic stratification; its effect on contemporary U.S. partisan and electoral politics; and policy making consequences.

**POLISCI 428. Political Economy and Political Behavior. 4 Units.**

[Same as POLECON 677] This seminar will expose students to cutting-edge research in political behavior and political economy published in the leading political science (and other social science) journals. The aim is for students to learn the contemporary literature so that they can be producers of research. To that end, the required assignments in the class will be aimed at professional development: writing an original research note, writing a review, and delivering a scholarly presentation.

**POLISCI 42Q. The Rwandan Genocide. 5 Units.**

Between April and July of 1994 more than 800,000 Rwandans, mostly Tutsi but also moderate Hutus, were killed in the most rapid genocide the world has ever known. The percentage of Rwandans killed in a single day of the genocide was ten times greater than the percentage of Americans killed in the entire Vietnam war. What could bring humans to plan and carry out such an orgy of violence? Could it have been prevented? Why did the United States or any other major power not intervene to stop the killing? To what extent should the United Nations be held accountable for the failure to end the genocide? What were the consequences of the genocide for the region of Central Africa? How did international actors respond to the challenges of reconstructing Rwanda after the killings? What has happened to the perpetrators of the genocide? This course surveys scholarly and journalistic accounts of the genocide to seek answers to these questions. This seminar will be residence based in Crothers, but will be open to Crothers residents and non-residents.

**POLISCI 430. Origins of Political Thought. 3-5 Units.**

Political philosophy in classical antiquity, focusing on canonical works of Thucydides, Plato, Aristotle, and Cicero. Historical background. Topics include: political obligation, citizenship, and leadership; origins and development of democracy; and law, civic strife, and constitutional change.

Same as: CLASSICS 390, PHIL 276D

**POLISCI 430A. Ancient Greek Economic Development. 4-5 Units.**

(Formerly CLASSHIS 330A.) Drawing on Herodotus and other literary sources, ancient historians have traditionally seen classical Greece as a very poor land. Recent research, however (much of it conducted here at Stanford), suggests that Greece in fact saw substantial economic growth and rising standards of living across the first millennium BCE. This seminar tests the poor Hellas/wealthy Hellas models against literary and archaeological data. We will develop and test hypotheses to explain the rate and pace of economic change in the Greek world.

Same as: CLASSICS 384A

**POLISCI 430B. Ancient Greek Economic Development. 1-5 Unit.**

(Formerly CLASSHIS 330B.) Drawing on Herodotus and other literary sources, ancient historians have traditionally seen classical Greece as a very poor land. Recent research, however (much of it conducted here at Stanford), suggests that Greece in fact saw substantial economic growth and rising standards of living across the first millennium BCE. This seminar tests the poor Hellas/wealthy Hellas models against literary and archaeological data. We will develop and test hypotheses to explain the rate and pace of economic change in the Greek world.

Same as: CLASSICS 384B

**POLISCI 431L. INEQUALITY: Economic and Philosophical Perspectives. 5 Units.**

The nature of and problem of inequality is central to both economics and philosophy. Economists study the causes of inequality, design tools to measure it and track it over time, and examine its consequences. Philosophers are centrally concerned with the justification of inequality and the reasons why various types of inequality are or are not objectionable. In this class we bring both of these approaches together. Our class explores the different meanings of and measurements for understanding inequality, our best understandings of how much inequality there is, its causes, its consequences, and whether we ought to reduce it, and if so, how. This is an interdisciplinary graduate seminar. We propose some familiarity with basic ideas in economics and basic ideas in contemporary political philosophy; we will explain and learn about more complex ideas as we proceed. The class will be capped at 20 students.

Same as: ECON 380, ETHICSOC 371R, PHIL 371D

**POLISCI 432R. Selections in Modern Political Thought. 3-5 Units.**

This graduate-level seminar explores selections from the canon of Western political thought from the late fifteenth through nineteenth centuries. Throughout the course, we will engage in close textual readings of individual thinkers and consider some of the larger questions raised by political modernity. The Fall 2015 offering of the course will focus on the three modern social contract thinkers: Thomas Hobbes, John Locke, and Jean-Jacques Rousseau.

Same as: ETHICSOC 432X

**POLISCI 433. Workshop in Political Theory. 1-2 Unit.**

For graduate students. May be repeated for credit.

**POLISCI 434. Egalitarianism. 5 Units.**

This seminar will explore different theories of equality in contemporary political philosophy. Topics include: the currency of equality (equality of what?); equality versus sufficiency or prioritarianism; the relationship between equality and responsibility; the value of equality; and different interpretations of equality of opportunity. Readings will be drawn from the work of Elizabeth Anderson, G.A. Cohen, Ronald Dworkin, Thomas Nagel, Derek Parfit, John Rawls, Thomas Scanlon, Amartya Sen, and others.

**POLISCI 434A. Ethics, Economics and the Market. 4 Units.**

Economic analysis inevitably raises moral questions. Getting clear on those moral questions, and the competing answers to them, can help improve both economic analysis and our understanding of the values involved in alternative social policies. This course focuses on a central economic institution: the market. How have the benefits and costs of using markets been understood? For example, it is often claimed that markets are good for welfare, but how is welfare to be understood? What is the connection between markets and different values such as equality and autonomy? What, if anything is wrong with markets in everything? Are there moral considerations that allow us to, distinguish different markets? This course examines competing answers to these questions, drawing on historical and contemporary literature. Readings include Adam Smith, JS Mill, Karl Marx, Michael Walzer, Dan Hausman and Michael McPherson and Debra Satz among others. For graduate students only.

Same as: ETHICSOC 303R, PHIL 375

**POLISCI 435R. Political Realism. 3-5 Units.**

This seminar will explore various articulations of political realism in their historical contexts. Realism is generally taken to be a pragmatic approach to a political world marked by the competition for material interests and the struggle for power. Yet beyond a shared critique of idealism and an insistence on the priority and autonomy of the political, realists tend to have very different normative visions and political projects. We will consider the works of several political realists from the history of political and international relations thought, including: Thucydides, Machiavelli, Hobbes, Carr, Niebuhr, and Morgenthau.

Same as: PHIL 372R

**POLISCI 436R. Amartya Sen's capability theory. 2-4 Units.**

Amartya Sen's pioneering work attempts to open up economics to missing informational and evaluative dimensions. This seminar will explore Sen's "capability approach" and its implications for the study of economics, gender, and justice. It will look at different ways that the capability approach has been developed, in particular, by Martha Nussbaum, but also by other political philosophers.

Same as: PHIL 378

**POLISCI 437. Autonomy. 5 Units.**

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**POLISCI 437C. 20th Century and Contemporary Political Theory. 3-5 Units.**

This course provides a survey of some of the major contributions to political thought in the past century. The course will place special emphasis on the development of theories of political authority and legitimacy in the context of the modern bureaucratic state, as well as the connection between authority and other key concepts in normative political authority: democracy, justice, and freedom.

**POLISCI 438. Democracy and the Constitution. 5 Units.**

(Same as LAW 268) Connections between democratic theory and constitutional theory. Sources include literature from political philosophy, constitutional law, and jurisprudence, and arguments about freedom of expression, campaign finance, legislative apportionment, federalism, and separation of powers. Readings from Scalia, Breyer, Ely, Ackerman, Dahl, Rawls, Habermas, Dworkin, Riker, and Schumpeter, as well as constitutional cases.

Same as: PHIL 374C

**POLISCI 43Q. Immigration Crisis? Policy Dilemmas in the US and Europe. 3 Units.**

Immigration is a hotly contested social, economic, and political phenomenon in countries throughout the world. People migrate for many reasons, including the desire to start careers, reunite families, and escape oppression. While each story of migration is unique, migration in the modern world has certain commonalities, and these patterns often manifest as political conflict. Labor migration promises economic productivity and efficiency but may threaten existing labor protections and social welfare guarantees to natives. Facilitating migration from failed nation-states may protect the human rights of migrants but introduce security concerns. In the 21st century, the world has witnessed political violence by natives and migrants, both first and second generations including the September 11th attacks, the London bombings, the mass killings in Norway, and the Paris attacks. How can policymakers harness the promises of immigration without succumbing to its pitfalls? Why do some countries respond so differently than others in similar circumstances? When does the meaning of citizenship evolve and when does it stay the same? What lessons do other countries have for the United States as it considers immigration reform? This course is designed to provide students with an overview of immigration law and politics in the United States and other countries, particularly in the European Union. Students will develop the necessary tools to critically analyze immigration policies, starting with the historical evolution of immigration policy in the United States. We will visit Angel Island and discuss the legacy of the Chinese Exclusion Act as well as contemporary immigration politics in San Francisco, a so-called sanctuary city for undocumented immigrants. There will also be a screening on La Haine (Hate), an acclaimed French film which chronicles the challenges of immigrant integration. Students will study the economics of immigration and the politics of refugees in the context of post-9/11 security dilemmas. Students will design a concrete immigration policy proposal.

**POLISCI 440A. Theories in Comparative Politics. 3-5 Units.**

Required of Political Science Ph.D. students with comparative politics as first or second concentration; others by consent of instructor. Theories addressing major concerns in the comparative field including democracy, regime change, the state, revolutions, national heterogeneity, and economic performance.

**POLISCI 440B. Comparative Political Economy. 3-5 Units.**

Required of Political Science Ph.D. students with comparative politics as a first or second concentration; others by consent of the instructor. The origins of political and economic institutions and their impact on long run outcomes for growth and democracy. Emphasis is on the analysis of causal models, hypothesis testing, and the quality of evidence.

**POLISCI 440C. Methods in Comparative Politics. 5 Units.**

Required of Political Science Ph.D. candidates with comparative politics as a first or second concentration; others by consent of instructor. Current methodological standards in comparative politics. Students develop their own research design that meets these standards.

**POLISCI 440D. Workshop in Comparative Politics. 1-2 Unit.**

Faculty, guest speakers, and graduate students conducting research in comparative politics present work-in-progress. Auditors welcome. Course may be repeated for credit.

**POLISCI 441L. Grad Seminar on Middle Eastern Politics. 3-5 Units.**

Survey of major topics in the study of Middle Eastern politics including state formation, authoritarian resilience and political Islam.

**POLISCI 443S. Political Economy of Reform in China. 3-5 Units.**

Content, process, and problems of China's post-Mao reforms. Changes in property rights, markets, credit, and the role of the state in economic development. Comparative insights about reform in the Chinese communist system that distinguishes it from the experience of regimes in E. Europe and the former Soviet Union.

**POLISCI 443T. Approaches to Chinese Politics. 3-5 Units.**

Major secondary literature on Chinese politics, involving the evolution of theoretical concepts and social scientific approaches characterizing the field. Subjects include changes made to defining fundamental issues of Chinese political theory, and the implications of shifts in research methods and analytical tools. Prerequisite: basic knowledge of politics of post-1949 China.

**POLISCI 444. Comparative Political Economy: Advanced Industrial Societies. 3-5 Units.**

Political economy approaches to key policy outcomes including redistribution, the size of government, fiscal behavior, and pork-barrel politics. Theories related to institutions, interest groups, and geography, focusing on middle- and upper-income countries.

**POLISCI 446E. Field Experiments in Political Economy. 3-5 Units.**

This seminar introduces recent field experimental work in political economy and comparative politics. Instead of surveying research in this area broadly, we will work through a number of recent working papers. The first objective of the seminar is to develop an understanding of different elements of a field experiment. To this end, we will untangle project parts related to implementation, data collection, analysis, and writing. A typical weekly meeting will include the following: discussion on framing and contribution to literature, replication of the study material, and potential extensions of the analysis. We will also go through survey instruments and any other material made available by authors. A second objective is to introduce students to writing pre-analysis plans for their own research. Each student will be expected to prepare a detailed pre-analysis plan for a proposed field experiment and will have the opportunity to workshop this plan with the class towards the end of the quarter.

**POLISCI 448R. Workshop: China Social Science. 1 Unit.**

For Ph.D. students in the social sciences and history. Research on contemporary society and politics in the People's Republic of China. May be repeated for credit. Prerequisite: consent of instructor. Same as: SOC 368W

**POLISCI 450A. Political Methodology I: Regression. 5 Units.**

Introduction to statistical research in political science, with a focus on linear regression. Teaches students how to apply multiple regression models as used in much of political science research. Also covers elements of probability and sampling theory.

**POLISCI 450B. Political Methodology II: Causal Inference. 5 Units.**

Survey of statistical methods for causal inference in political science research. Covers a variety of causal inference designs, including experiments, matching, regression, panel methods, difference-in-differences, synthetic control methods, instrumental variables, regression discontinuity designs, quantile regression, and bounds. 450A is a prerequisite for this class.

**POLISCI 450C. Political Methodology III: Model-Based Inference. 3-5 Units.**

Provides a survey of statistical tools for model-based inference in political science. Topics include generalized linear models for various data types and their extensions, such as discrete choice models, survival outcome models, mixed effects and multilevel models.

**POLISCI 450D. Political Methodology IV: Advanced Topics. 3-5 Units.**

Covers advanced statistical tools that are useful for empirical research in political science. Possible topics include missing data, survey sampling and experimental designs for field research, machine learning, text mining, clustering, Bayesian methods, spatial statistics, and web scraping.

**POLISCI 451. Design and Analysis of Experiments. 3-5 Units.**

Political scientists increasingly rely on experimental methods. This course covers the principles and logic of experimental design as applied to laboratory, field and survey experiments. We discuss the strengths and limitations of experiments in relation to observational methods. Design considerations include randomization, the construction of treatments, the use of deception, the ethical implications of deception, and new developments in subject recruitment. Turning to the analysis of experimental data, we describe the methods for estimating treatment effects, interactions, and more complex indirect effects stemming from either mediator or moderator variables. We also cover appropriate data analytic strategies for quasi-experimental designs including interrupted time series, matching and propensity scores.

**POLISCI 452. Text as Data. 3-5 Units.**

Topics covered will include preprocessing texts (unigrams, bigrams, and a brief introduction to natural language processing), unsupervised learning (clustering, topic models, and computer-assisted methods), supervised learning (including SVM, lasso, naive Bayes, and a matrix smoothing method), and methods for evaluation (cross-validation, model based, expert based). This class is ideal for students in the dissertation phase of research who have texts they would like to analyze, but aren't quite sure what to do with them. Prerequisites are at least 350a and 350b and an willingness to learn programming skills (including Python and R).

**POLISCI 45N. Civil War Narratives. 3 Units.**

Preference to freshmen. Focus is on a new statistics-based theory to account for the susceptibility of countries to civil war. How to write a theory-based historical narrative. Students write and present an original historical narrative focusing on how well the theory explains a particular history and on the importance of factors that are absent from the theory in explaining civil war onsets.

**POLISCI 474. Design and Analysis of Surveys. 1-5 Unit.****POLISCI 51K. Election 2016. 1 Unit.**

The 2016 Presidential Election season has been anything but ordinary. So much in the Democratic and Republican primaries consistently defied conventional wisdom and upended the predictions of experts. This course will attempt, with the help of distinguished guests, to make sense of an election that defies all historical precedent and to take stock of the health of American democracy. This class is jointly offered for Continuing Studies students and Stanford students. As a 1 unit, online course for Stanford students, enrollment is unlimited. Registration for the course offers online access to a livestream of each class session, participation in online discussions, access to course website and materials, and admission to a lottery for attending each class in person.

Same as: CSRE 51K, HISTORY 51K

**POLISCI 57E. State of the Union 2014. 1 Unit.**

This course will examine major themes that contribute to the health, or disease, of the US body politic. Challenges and opportunities abound: we live in an age of rising inequality, dazzling technological innovation, economic volatility, geopolitical uncertainty, and the accumulating impact of climate change. These conditions confront our political leaders and us as citizens of a democracy plagued by dysfunction. What are the implications for the body politic? Led by Rob Reich (Political Science, Stanford), David Kennedy (History, Stanford), and James Steyer (CEO, Common Sense Media), the course will bring together distinguished analysts of American politics. Together, we will examine the following topics: inequality; energy and the environment; media and technology; the economy; and the 2014 midterm elections. The course is designed for the entire Stanford community: jointly offered for undergraduate and graduate students at Stanford (through listings in Political Science and History) and for community members through the Continuing Studies Program. For students, the course is available for 1 credit. This course may not be taken for a Letter Grade.

Same as: HISTORY 57E

**POLISCI 70. Dangerous Ideas. 1 Unit.**

Ideas matter. Concepts such as race, progress, and evil have inspired social movements, shaped political systems, and dramatically influenced the lives of individuals. Others, like religious tolerance, voting rights, and wilderness preservation play an important role in contemporary debates in the United States. All of these ideas are contested, and they have a real power to change lives, for better and for worse. In this one-unit class we will examine these dangerous ideas. Each week, a faculty member from a different department in the humanities and arts will explore a concept that has shaped human experience across time and space. Some weeks will have short reading assignments, but you are not required to purchase any materials.

Same as: ARTHIST 36, COMPLIT 36A, EALC 36, ENGLISH 71, FRENCH 36, HISTORY 3D, MUSIC 36H, PHIL 36, RELIGST 21X, SLAVIC 36

**POLISCI 71. Current Issues in European Security. 1 Unit.**

Russia's annexation of Crimea in Spring 2014 posed not only a threat to post-World War II Europe formed around the norm of national sovereignty, but possibly also the very real threat that Russia had awakened from its 20 years of peacefulness to once again impose its will on Eastern Europe. Is Europe again under threat from the East? In Current Issues in European Security, students will attend public events organized by Stanford's Europe Center and Freeman Spogli Institute for International Studies. These events – talks by political leaders and scholars from the U.S. and Europe – will engage and encourage students to understand the deepening crises in Ukraine, conflict in the Baltics, and European security as a whole. Students will leave the course with a better understanding of the multi-faceted dilemmas policy makers face, historical background, and possible paths forward for global decision makers. In addition to attending the events, students will write a final memo recommending a course of action for US policy makers. Events will typically be scheduled from 12 noon to 1:30 p.m. but may be held at other times. There will be approximately six events in spring quarter, and students may also be required to attend one or two separate discussion sessions.

**POLISCI 72. Policy, Politics, and the Presidency: Understanding the 2016 Campaign from Start to Finish. 2 Units.**

(Same as LAW 7057). In 2016, Americans will once again go to the polls to select a new president. But what will actually happen behind-the-scenes between now and then is largely a mystery to most. This course will introduce students to the nuts-and-bolts of a presidential campaign. Each week, we will explore a different topic related to running for the presidency – policy formation, communications, grassroots strategy, digital outreach, campaign finance – and feature high-profile guest speakers who have served in senior roles on both Democratic and Republican campaigns. Students, guests, and faculty will also participate in discussions on how these topics will relate to the 2016 presidential contest, which will begin in earnest over the course of the quarter.

Same as: COMM 153A, COMM 253A, PUBLPOL 146, PUBLPOL 246

**POLISCI 73. Energy Policy in California and the West. 1 Unit.**

This seminar provides an in-depth analysis of the role of California state agencies and Western energy organizations in driving energy policy development, technology innovation, and market structures, in California, the West and internationally. The course covers three areas: 1) roles and responsibilities of key state agencies and Western energy organizations; 2) current and evolving energy and climate policies; and 3) development of the 21st century electricity system in California and the West. The seminar will also provide students a guideline of what to expect in professional working environment. Specific meeting dates for the course are as follows: April 21 10am-2pm/ May 12 10am-1pm/ June 2 10am-1pm.

Same as: CEE 263G, PUBLPOL 73

**POLISCI 74. Presidential Politics: Race, Gender, and Inequality in the 2016 Election. 1 Unit.**

From the 2016 nomination process to the election. The complexities of identity and its role in uniting and dividing the electorate. Panels covering the media, political participation, and group affiliation.

Same as: AFRICAAM 12, CSRE 12



**POLISCI 801. TGR Project. 0 Units.**

**POLISCI 802. TGR Dissertation. 0 Units.**

**POLISCI 96X. Mobilizing Democracy: Campaigns, Elections, and Voting. 1 Unit.**

Alternative Spring Break: America is often thought of as the archetypal democracy. While most democracies have surprisingly short lifespans, America has persisted for 238 years. However, in the 21st century, we have grounds to question the quality of our democracy. Turnout of the Voting Age Population hovers around 50 percent and today, we are seeing increasing legal challenges to voting rights. In the backdrop of these statistics, there is an entire industry devoted to campaigns. In the 2012 presidential race alone, almost \$2.5 billion was poured into the campaign-industrial complex. Given that this cycle is a presidential election year, those amounts are expected to be surpassed. As a consequence, many questions arise: How do politicians engage voters in elections at the various levels of government? Where do they spend their money and why? In the age of big data, how accurately can elections be predicted? How do we maximize participation in elections?.

**POLISCI 97X. Bridging the Civil-Military Divide: Military Service as Public Service in the 21st Century. 1 Unit.**

Alternative Spring Break: Today, fewer than 0.5 percent of Americans serve in the military, as compared to roughly 12 percent during the second World War. This has led to a widening gap in knowledge about the military, its members and the functions they perform, as well as its basic structure and tradition of service. This course is intended to introduce students to the notion of military service as public service and explore how misperceptions on both sides affect the civil-military divide. We will explore military service from the life of an enlisted soldier deployed to Afghanistan, to an officer working at the Pentagon on broad national security strategy. How does society conceive of a soldier, a sailor, an airman, a marine? How do Americans perceive military service and what role do service members play in our society?.

**POLISCI 99Z. Introduction to the Science of Politics. 4 Units.**

Why do countries go to war? Why are some countries democratic and others autocratic? How can we improve political representation in the United States and other countries? We will use scientific methods to answer these and other fundamental questions about politics.

## Program in Writing & Rhetoric (PWR)

**PWR 191. Advanced Writing. 3 Units.**

Open to undergraduates and graduate students. Crafting nonfiction prose in a range of genres. Focus is on the relationship of genre and form; attention to developing stylistic versatility. Individual conferences with instructor. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

**PWR 192. Projects in Research, Writing, and Rhetoric. 1-5 Unit.**

Advanced work on research projects, early drafts of theses, proposals. Shared work, discussions, and examination of methods, rhetorics, and styles in all disciplines. May be repeated for credit. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

**PWR 193. Writing the Honors Thesis. 1-5 Unit.**

For students from all majors in the process of writing an honors thesis. Review of key elements of thesis process, including literature reviews, structure, argumentation, style, and documentation. Group and individual workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

**PWR 194. Topics in Writing and Rhetoric. 4 Units.**

Understanding rhetoric as readers and interpreters of texts and to develop skills as writers and speakers. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).

**PWR 194AB. Topics in Writing & Rhetoric: Freedom's Mixtape: DJing Contemporary African American Rhetorics. 4 Units.**

Black music in all its genres, styles and eras has always been about freedom and transformation. About both Black people and the whole society. About the US Black experience, the African continent and the diaspora. These musical forms and the social movements they reflect and help shape are therefore central to the study of African American rhetoric. From overtly translating the ideas of social movements for mass audiences, to capturing the mood of a moment or move, to reflecting and influencing the aesthetics and styles that attend public discourse, to simply being a space where debates get worked out in community, music in Black traditions are as important a space of engagement as political speeches, sermons, websites, or even #BlackTwitter. This course will use Black music and its relationship to both social movements and everyday dialogue and debate to introduce study in African American Rhetoric as a field of study.

Same as: AFRICAAM 194A

**PWR 194ABA. Topics in Writing & Rhetoric: Contemporary Black Rhetorics: Prince. 2-3 Units.**

This course will examine Prince's music, life and impact and their relationship to both social movements and everyday dialogue and debate to introduce African American Rhetoric as a field of study. Students in the course will trace specific themes in Prince's music throughout his career, write an album review, and create a blog on some aspect of Prince.

**PWR 194AJ. Topics in Writing & Rhetoric: Contemporary Black Rhetorics: Black Twitter and Black Digital Cultures. 4 Units.**

Does not fulfill NSC requirement. This course will examine Black engagements with digital culture as sites for community building, social action and individual and collective identity formation. By studying phenomena like #BlackTwitter, memes, Vine, selfie culture, blogging, "social watching," and more, we will explore how Black technology use addresses questions like identity performance and expression, hyper visibility and invisibility of Black lives, Black feminisms, misogynoir and Black women/femme leadership in social movements, the roles and influence of Black Queer cultures online, and social activism and movements in online spaces. From #YouOKSis, #BlackLivesMatter and #AfroLatinidad to the Clapback, roasts and "reads," we will work from the serious to the silly, from individuals to collectives, from activism to everyday life, and from distinct Black cultures to diasporic connections and exchange. Participants in the course will create a social media autobiography, a "read/ing" of a Black cultural practice or phenomenon online, host an online discussion, and prepare a pitch for a longer research project they might pursue as a thesis or an ongoing study. Bring your GIFs, memes, and emoji, and a willingness to be in community both online and off for this new course! Prerequisite: first level of the writing requirement or equivalent transfer credit. For topics, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-pwr-courses>. Same as: AFRICAAM 194

**PWR 194BR. Topics in Writing & Rhetoric: The Rhetoric of Health and Medicine. 4 Units.**

This course will aim to give students a foundation in the rhetoric of health and medicine across major stakeholders researchers, government, institutions, doctors, patients, journalists, and a general public obsessed with health and wellness. For example, we will analyze key theories about the relation of institutions, doctors, and patients, from Foucault's Birth of the Clinic to Rita Charon's Narrative Medicine: Honoring the Stories of Illness. We will also investigate how patients make sense of their illnesses through art and memoirs, how doctors are trained in an empathetic bedside manner, and the rhetoric of medical breakthroughs. From this foundation, students will choose an issue to tackle in their own research projects, from the politicization of Planned Parenthood and women's healthcare, to the experience of trans patients seeking care, to the rhetoric of access vs. coverage in current debates about health insurance. Prerequisite: completion of WR-1 & WR-2 req or permission of instructor. For full description, see <https://undergrad.stanford.edu/programs/pwr/courses/additional-elective-courses/rhetoric-health-and-medicine>.

**PWR 194C. Make Them Laugh: Comedy as Persuasion and Argument. 4 Units.**

Exploration of major theories of comedy and application of these theories to historical and contemporary comedic practice, with particular attention to comedy as a form of argument in a range of contexts. For more information, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr). Prerequisite: first two levels of the undergraduate writing requirement or equivalent transfer credit. Not repeatable for credit.

**PWR 194DH. Topics in Writing and Rhetoric: Empathy, Ethics, and Compassion Meditation. 4 Units.**

Does not fulfill NSC requirement. In this course, we'll extend this discussion by expanding our thinking about rhetoric as a means of persuasion to consider its relation to empathy-as a mode of listening to and understanding audiences and communities we identify with as well as those whose beliefs and actions can be lethal. We'll also practice compassion meditation and empathetic rhetoric to see how these ethical stances affect us individually and investigate the ways they may and may not be scaled to address social justice more broadly. Finally, with the course readings and discussions in mind, you will explore a social justice issue and create an essay, a workshop, campaign or movement strategy, podcast, vlog, infographic, Facebook group, syllabus, etc. to help move us closer to positive change. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-pwr-courses>. Same as: CSRE 94

**PWR 194KD. Topics in Writing and Rhetoric: Technology and Human Values. 4 Units.**

Pining for a job in Google X but a little afraid of what disrupting the next social system will do to humans when all is said and done? Unsure where the real conversation is happening at Stanford about how to think more carefully and thoughtfully about the tech we are being trained to make? Curious to know what underlying common ground might link fuzzies with techies, humanists with engineers, scientists with philosophers? These are some of the issues we'll address in this seminar. You will be able to choose your own current topic: drones, tech and medicine, Big Data, Cloud applications, AI and consciousness, cybersecurity, tech and the law, for which you will choose readings and write a seminar paper and then co-lead discussion. The class goals are to know better the ethical value of one's tech work and research and to be able to express to scientists and non-scientists alike the ways in which this work contributes to the greater human good (beyond strict convenience or short-term profit). Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-pwr-courses>.

**PWR 194KT. Topics in Writing & Rhetoric: The Last Hopi On Earth: The Rhetoric of Entertainment Inequity. 4 Units.**

While #OscarsSoWhite brought attention to the Academy's overwhelmingly White, male membership, the underbelly of the entertainment industry itself is rife with inequitable hiring of not only on-camera and on-stage performers but also directors, writers, and others behind the scenes. While there are several organizations from Racebending.com to the Geena Davis Institute on Gender in Media that seek to usher in more equitable representation, push back against the Industry's disparate employment practices has been documented for more than fifty years with what many argue is not proportionally positive movement. White males still garner almost half of all theatrical and television roles and represent more than 80% of episodic directors while entertainment hubs Los Angeles and New York City are more than 50% people of color and female. What will it take to attain equity in the entertainment industry? Why does it matter? In this course, students will examine rhetorical issues in promoting, defending, and opposing entertainment industry practices - writing and speaking across genres in persuasive response - and ultimately develop a collaborative 5-year strategic plan to usher in equity. This course is part of the PWR advanced elective track in Social and Racial Justice (SRJ). Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For video course description, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-courses/last-hopi-earth-rhetoric-entertainment-inequity>. Same as: CSRE 194KT

**PWR 194MF. Topics in Writing & Rhetoric: In the Margins: Race, Gender and the Rhetoric of Science. 4 Units.**

Every day a new headline alerts us to the lack of race and gender diversity in the tech sector in Silicon Valley. At the same time, science and technology are often lauded as objective systems capable of producing color- and gender-blind truths and social good for all of us. This course pushes beyond the headlines and the hashtags to think about the complex relationship between gender, race and science. Together we will research chronically understudied voices and contributions in the history of science and technology and have the opportunity to read and participate in some of the efforts to highlight their stories through a Wikipedia edit-a-thon and final research project. We will also rigorously think through why the historical and current under-representation of women and people of color matters for the questions that are asked, methodologies that are used, and science and technology that is eventually produced. This course fulfills the advanced PWR requirement for the Notation in Science Communication (NSC). Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-pwr-courses>.

**PWR 194SB. Topics in Writing and Rhetoric: Rhetoric of Science. 4 Units.**

Understanding rhetoric as readers and interpreters of texts and to develop skills as writers and speakers. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-pwr-courses>.

**PWR 194SS. Topics in Writing & Rhetoric: Making Rhetoric Matter: Human Rights at Home. 4 Units.**

'Human rights' often sounds like it needs defending in far-off places: in distant public squares where soldiers menace gatherings of citizens, in dark jails where prisoners are tortured for their politics, in unknown streets where gender inequality has brutal consequences. But Bryan Stevenson, a lawyer fighting for social and racial justice in the jails of Alabama, proposes that we try 'proximity': that we get close to the injustices that are already close to us. This class thus takes human rights as a local issue, focusing on how terms like 'human' and 'rights' are interpreted on our campus and in our neighborhoods, cities, and region. Instead of a traditional human rights policy framework, we'll use the lens of intersectional ethics to explore specific rhetorical issues in gender politics, citizenship, higher education, police brutality, and mass incarceration. We will write, speak, and move across genres, responding to the work of incarcerated artists, creating embodied workshops, 'translating' ideas into new media (does someone you know need an animated video about gender pronouns? Or maybe it's time for a podcast about #PrisonRenaissance?), doing collaborative research, and 'writing back' to our audiences. For course video and full description see: <https://undergrad.stanford.edu/programs/pwr/courses/advanced-courses/making-rhetoric-matter-human-rights-home>. This course is part of the PWR advanced elective track in Social and Racial Justice (SRJ). Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-pwr-courses>.

Same as: CSRE 194SS

**PWR 195. Writing Center Peer Tutor Seminar. 2-3 Units.**

For students selected to serve as peer writing tutors in the Hume Center for Writing and Speaking and/or at other campus sites. Readings on and reflection about writing processes, the dynamics of writing and tutoring situations, tutoring techniques, learning styles, diversity, and ethics. Observation of tutoring sessions, written responses to readings, and other written work. Instructor permission required. WR 1 pre-/co-requisite. Same as: PWR 295

**PWR 1A. Introduction to Writing at Stanford: Rhetorics of Popular Culture. 3 Units.**

Popular culture studies breaks down barriers between so-called "low" and "high" culture and uses the textual practices of everyday people to understand our social world. As a reaction to the "high culture" mediums of canonical literature and museum-worthy art, popular culture studies takes the perspective that everyday people, their practices, media, communication, and principles afford provocative insights into our social worlds. PWR1A students will study the rhetorical features and functions of popular culture, from young adult literature, to music, film, games, social media, and comics in order to develop our critical reading, writing, and research skills in preparation for academic work in both PWR1 and PWR2 as well as other writing and research intensive courses. Readings, writing, and other activities prompt students to consider the relationship between language, rhetoric and popular culture in an aim to interrogate popular culture broader social values and assumptions. Enrollment exclusive to incoming Stanford freshman student athletes. PWR1A classes are small, workshop-style meetings that encourage extensive interaction between students and instructors. PWR1A does not meet the Stanford first-year writing requirement.

**PWR 1AB. Writing & Rhetoric 1: Podcasts to Broadcasts: The Rhetoric of Radio. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1AH. Writing & Rhetoric 1: The Rhetoric of American Multicultural Experience. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of multicultural experience and cultural assimilation, focusing on the theme of social acceptance. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1AK. Writing & Rhetoric 1: The Rhetoric of Humor. 4 Units.**

In this class we will explore the how and why of humor through readings, classroom discussion, rhetorical analysis, and, most importantly, through writing, and examine the ways that humor, as a rhetorical tool, is deployed in written and oral texts. As we consider theories of humor, we will begin to understand how humor works and why it is so powerful. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. Enrollment is handled by the PWR office.

**PWR 1AM. Writing & Rhetoric 1: King Tut's Tomb, Penicillin, and Lilliputians: The Rhetoric of Discovery. 4 Units.**

In this course, as we investigate the power of the archetype of discovery, we also critically consider what these stories hide or gloss over. How revolutionary are most discoveries after all? What perspectives are left out? What is a truthful way to portray new insights? How do we capture popular attention but include the broader context of experiment and expeditions? You will gain a complex understanding of how writing and rhetoric both structure and hide knowledge from the audience, and how you can use this in your writing in both persuasive and responsible ways. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1AN. Writing & Rhetoric 1: The Rhetoric of Identity Cultivated Through a Hip-Hop World. 4 Units.**

This course seeks to explore the ways that we read and write ourselves into a world that is engrossed in Hip-Hop culture by asking: What does it mean to live in a world where Hip-Hop permeates every aspect of society? How can Hip-Hop culture be used to understand the rhetoric that is used in broader society in reference to both this moment in history and the culture itself? By engaging both Hip-Hop artists such as Kendrick Lamar and Nicki Minaj, and artists that operate in a Hip-Hop world like Beyoncé, this course investigates the ways that we write ourselves into a world engrossed in Hip-Hop culture that denies the humanity and value of its members. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1AO. Writing & Rhetoric 1: Visual Rhetoric Across the Globe: Capturing Culture in Images. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of styles of leadership across the globe and communication strategies used to bring about change. Exploration of how global leaders learn cross-cultural rhetoric skills to adapt to dynamic and unfamiliar situations. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1AT. Writing & Rhetoric 1: A Mountain for Itself: The Rhetoric of Wilderness. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1BK. Writing & Rhetoric 1: Writing What You Eat: The Rhetoric of Food. 4 Units.**

In this course, we will focus on the rhetoric of food in order to explore how our relationship to what we eat is reflected in writing about ourselves, our society, and our world. Essays, recipes, blog posts, and newspaper articles are some of the genres we will examine in order to explore how issues of identity, community, ethics, and wellness can be expressed in food writing. How does what we choose to eat reflect on how we see ourselves and the world around us? What responsibilities do we have, if any, as consumers of food in one of the world's richest nations? For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1BR. Writing & Rhetoric 1: Healthy or Cutthroat: The Rhetoric of Competition. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1BRA. Writing & Rhetoric 1: Growing Up Millennial: The Rhetoric of Coming of Age. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1BRB. Writing & Rhetoric 1: In Another's Shoes: The Rhetoric of Empathy. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1BW. Writing & Rhetoric 1: The Loyal Opposition: The Rhetoric of Dissent. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1CA. Writing & Rhetoric 1: The Rhetoric of Gaming. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1CG. Writing & Rhetoric 1: Mixtapes & Meetups: The Interactive Rhetoric of Media and Relationships. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of styles of leadership across the globe and communication strategies used to bring about change. Exploration of how global leaders learn cross-cultural rhetoric skills to adapt to dynamic and unfamiliar situations. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1CGA. Writing & Rhetoric 1: Popular Science to Girl Talk: Writing as Adaptation and Remix. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1CK. Writing & Rhetoric 1: Investigating the News: Journalism, Technology & the Future. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1CL. Writing & Rhetoric 1: The Politics of Difference, Identity, and Harm: The Rhetoric of Hate Crimes. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1CLA. Writing & Rhetoric 1: Hate Crime: Writing on Law and Politics. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1CS. Writing & Rhetoric 1: Debating the Environment. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1CW. Writing & Rhetoric 1: Sporting Rhetoric: Power, Performance, Profit and Politics. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1D. Writing Well: An Introduction to College Writing. 3 Units.**

Offered only to participants in the Summer College for High School Students. Develops critical reading, writing, and research skills applicable to any area of study. Emphases include close reading, analysis of varied texts, development of strong theses, revision strategies, and introduction to research-based argument. Classes are small, encouraging extensive interaction between students and instructors. Discussions of readings, peer work, and individual conferences with instructors. Each section has a thematic emphasis developed by the instructor; students choose sections based on their individual interests. Does not meet the Stanford first-year writing requirement.

**PWR 1DC. Writing & Rhetoric 1: Is This What a Feminist Looks Like? Race/Gender in the Obama Age. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the coverage of and activism in a post-racial U.S., including evaluation of the debate over the intersections of racial activism and feminist activism in U.S. politics. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1DH. Writing & Rhetoric 1: The Virtue of Vice and the Vice of Virtue: The Rhetoric of Criminality. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students investigate language and images that construct criminals, analyzing how these representations shape personal and cultural beliefs. Analysis of the costs and benefits of retributive, restorative, and transformative justice systems. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1DW. Writing & Rhetoric 1: Gangsters, Glamour Girls & Gold-diggers: Dialectic of Am. Culture & Hollywoo. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of American film and its conversation with American culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_uual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_uual/AP_univ_req_PWR_Courses.html).

**PWR 1EC. Writing & Rhetoric 1: From the Galleries to the Streets: The Rhetoric of Public Space Art. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1ECA. Writing & Rhetoric 1: Where I'm From: The Rhetorics of Mapping and Human Geography. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1EE. Writing & Rhetoric 1: Prowling Toward Certainty: Exploration as Argument. 4 Units.**

In a culture that rewards people who write and speak with conviction, ambivalence often seems like a personal shortcoming that must be remedied with certainty. Isn't it better to be confident and decisive? Writing teachers and textbooks tend to reinforce this view, insisting that students present a strong thesis as soon as possible. Even if you address counterarguments and offer concessions, your argument should override if not demolish them in the end. Even if you feel deeply ambivalent about a topic during your research, your final draft must demonstrate unwavering conviction: you slam your fist and make your point. Recent research questions the value of unwavering conviction. For example, management scholar Christina Ting Fong notes, "The results from two laboratory experiments demonstrate that individuals experiencing emotional ambivalence are better at recognizing unusual relationships between concepts, therefore showing an ability believed to be important to organizational creativity." What if, instead of sweeping your ambivalence under the rug, you tried to embrace it in your research and foreground it in your writing? Is ambivalence always a liability? What advantages can be found in the deep, risky waters of uncertainty? How do scientists, social scientists, and humanists regard ambivalence? What do ambivalent texts look and feel like? Can they move and persuade us? Is it possible to map and tap into a rhetoric of ambivalence? In this course, we'll explore such questions in an attempt to understand the relationship between ambivalence and persuasion. We'll analyze and discuss the ways that writers such as Annie Dillard, Stephen Jay Gould, and Michael Pollan not only engage their ambivalence but weave it into their prose. Most importantly, we'll explore how you can develop rhetorical strategies and habits of mind to achieve results in your own analytical and persuasive writing. We'll study how to craft compelling arguments that do fuller justice to complex emotions and ideas.

**PWR 1EL. Writing & Rhetoric 1: Propaganda: The Dark Side of Rhetoric. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1EP. Writing & Rhetoric 1: The Rhetoric of Global Development and Social Change. 4 Units.**

Since World War II, international development projects have marked every sector of global society. We will unpack and interrogate the numerous discourses around international "development" as a strategy for achieving social change and look at how culture, history, politics, and economics have informed development's connections to capitalism, modernity, and most recently, globalization. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1EV. Writing & Rhetoric 1: The Rhetoric of Globalization. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GAD. Writing & Rhetoric 1: Display Cases and Databases: The Rhetoric of Collection. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GAF. Writing & Rhetoric 1: Little Boxes: The Rhetoric of the American Suburb. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of the suburbs as a site of cultural debate through investigation of the ways that authors and artists imagine the physical landscape of the suburb and the inner lives of suburbanites. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_uual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_uual/AP_univ_req_PWR_Courses.html).

**PWR 1GAJ. Writing & Rhetoric 1: The Rhetoric of Eating. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_uual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_uual/AP_univ_req_PWR_Courses.html).

**PWR 1GAK. Writing & Rhetoric 1: No Filter: The Rhetoric of Young Adulthood. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GAL. Writing & Rhetoric 1: The Rhetoric of Disgust. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GAT. Writing & Rhetoric 1: Size Matters: The Writing and Rhetoric of Short Stories. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_uual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_uual/AP_univ_req_PWR_Courses.html).

**PWR 1GAU. Writing & Rhetoric 1: Mind vs. Brain: The Rhetoric of Consciousness. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GAW. Writing & Rhetoric 1: Global Exchange: Intercultural Communication. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. The American cultural apparatus, its limitations, and development of other world views. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GBJ. Writing & Rhetoric 1: The Rhetoric of Cultural Memories of Violence. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GBR. Writing & Rhetoric 1: Spill: The Rhetoric of Confessions and Self-Revelations. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GBW. Writing & Rhetoric 1: Deathbeds: Art and the Rhetoric of Disease. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GCD. Writing & Rhetoric 1: Domsdays: The Rhetoric of Apocalypse. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GCX. Writing & Rhetoric 1: "I Do": The Rhetoric of Consent. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of the idea of consent and the underlying principles of free will and autonomy in the fields of law, intellectual property, marriage contracts, political philosophy, medical ethics, and sex. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GDM. Writing & Rhetoric 1: Revolution and Revolt: Political Writing for Political Action. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GDS. Writing & Rhetoric 1: From Trash Talk to Toxic Discourse: Rhetorics of Waste. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GEM. Writing & Rhetoric 1: The Rhetoric of Foodie Culture. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GER. Writing & Rhetoric 1: The Rhetoric of Social Media. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of the multifaceted and hypertextual rhetoric of social media, the intersection between rhetoric and social media, and how new types of online media have heightened participation, openness, and a sense of community. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GEV. Writing & Rhetoric 1: All the World's a Stage: The Rhetoric of Theater. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students investigate the role theater plays in the rhetorical strategies of various literary and non-literary texts as well as visual materials such as films and cartoons. See [http://ual.stanford.edu/AP/univ\\_req/PWR/Req.html](http://ual.stanford.edu/AP/univ_req/PWR/Req.html).

**PWR 1GFL. Writing & Rhetoric 1: From Con Artists to Catfish: The Rhetoric of Trickery. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GGK. Writing & Rhetoric 1: Ladies, Tramps, and Other Furry Friends: The Rhetoric of Pets. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GGZ. Writing & Rhetoric 1: The Rhetoric of Race in American Cinema. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GIF. Writing & Rhetoric 1: Dark Humor: A Rhetoric of Social Taboos. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of dark humor as it deals with the most delicate subject matter, topics we designate as sacred and beyond criticism: violence and bodily damage, illness, aging and death, race and ethnicity, and gender and sexuality. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GIY. Writing & Rhetoric 1: Jekylls and Hydes: The Rhetoric of the Scientist. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GJE. Writing & Rhetoric 1: Gay Ghettoes, Queer Hoods: The Rhetoric of Race and Urban Sexual Subcultures. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the rhetoric of urban sexual subcultures, and how the rhetoric in medical science, journalism, and popular entertainment defines queers of color in intellectual thought and pop culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GJU. Writing & Rhetoric 1: 'Surface of Past Time': The Rhetoric of Nostalgia. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GLA. Writing & Rhetoric 1: Code Orange: Post-9/11 America and the Rhetoric of Alarm. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GLB. Writing & Rhetoric 1: In Poor Taste: The Rhetoric of Catastrophe Comedy. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GLD. Writing & Rhetoric 1: The Cyborg Body: The Rhetoric of Disability. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of disability, using the analogy of the cyborg, in an era when the human body has become plastic, digitized and surgically manipulated. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GLR. Writing & Rhetoric 1: Are you Fuzzy and Techie?: The Rhetoric of Art and Science. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GM. Writing & Rhetoric 1: Writing for the Wild and the Tame. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of the tension between reverence and science, language and feeling, natural and unnatural in the interrelationship of rhetoric and nature. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GMC. Writing & Rhetoric 1: Dancing about Architecture: Or Finding Words for the Wordless. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1GMD. Writing & Rhetoric 1: A History of Innocence: Stories We Tell About America. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1GMG. Writing & Rhetoric 1: Love to Hate: The Rhetoric of Misanthropy. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GMH. Writing & Rhetoric 1: Transformative Turns: The Rhetoric of Revolution. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GML. Writing & Rhetoric 1: The Rhetoric of Migrant Protest. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GMV. Writing & Rhetoric 1: Don't Take it Personally!: The Rhetoric of The Insult. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of how insults function rhetorically in specific situations and how they have catalyzed prolonged confrontations around race, education, politics, sexual orientation, and national standing. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GMX. Writing & Rhetoric 1: 'Too Much Information?': The Rhetoric of Social Networking and Online Privacy. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Critical analysis of the ways in which online life intersects with real life around issues including privacy, authorship, and morality. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GNL. Writing & Rhetoric 1: Punk Rock and Rhetoric of Protest Music. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GNV. Writing & Rhetoric 1: Rhetoric of Bioethics and Biopolitics. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GPS. Writing & Rhetoric 1: The Rhetoric of English. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GRA. Writing & Rhetoric 1: Millions Like Us: The Rhetoric of Crowds. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include symbolic meaning of rock, sports, and political events; virtual crowds online; and use of crowds to shape ideology. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GRK. Writing & Rhetoric 1: Plugged In: The Rhetoric of Networks. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GRL. Writing & Rhetoric 1: Queer Rhetoric: The Language of Sex, Gender, and Identity. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GRY. Writing & Rhetoric 1: Fashionable Fables: The Rhetoric of Modern Mythology. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GSG. Writing & Rhetoric 1: From Cowboys to Computers: Rhetoric of the American West. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GSO. Writing & Rhetoric 1: The Varieties of Conservative Experience. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GTJ. Writing & Rhetoric 1: Rhetoric of the Unruly: Iconoclasts and Their Controversies. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GTL. Writing & Rhetoric 1: Love at First Sight and Forever: The Rhetoric of Romance. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GVC. Writing & Rhetoric 1: The Rhetoric of Circus. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GVG. Writing & Rhetoric 1: The Way of the Dodo: Rhetoric of Extinction. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1GVN. Writing & Rhetoric 1: Noise Machines: The Rhetoric of Sound and Technology. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Critical analysis of the ways in which online life intersects with real life around issues including privacy, authorship, and morality. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1GWT. Writing & Rhetoric 1: Money for 'Nothing': The Rhetoric of Silicon Valley. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1HJ. Writing & Rhetoric 1: Not Just Art: The Rhetoric of Museums. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1HJA. Writing & Rhetoric 1: What None Can Avoid: The Rhetoric of Death. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1HZ. Introduction to College Writing. 3 Units.****PWR 1IF. Writing & Rhetoric 1: The Rhetoric of Language and Social Identity in America. 4 Units.**

Language and social identity are closely intertwined. Have you ever noticed that you change the way you speak to present a particular social identity? For example, have you ever switched between dialects or languages to show alignment with certain social groups or mark your 'in-group' status? Because language is flexible (and somewhat controllable), it can be used as a resource to create and index identity. However, given its flexible nature, criticizing someone's language often becomes a more socially acceptable way of attacking someone than something that seems like bald-faced racism/sexism/homophobia, etc. In this course we'll explore this complex link between identity and language. This course explores the way language and social identity are defined, discussed, and debated in America, and the assumptions this rhetoric presents about race, class, education and other social identities more broadly. Together, we'll consider: What's it like to grow up monolingual versus bilingual or multilingual? What role do our ethnicity and/or race play in how our language skills are perceived? What role do language attitudes and stereotypes play in influencing our daily lives? What role does the media play? How is language discussed in politics? Students will be able to work on a research project related to social identity and language on a topic of their choice.

**PWR 1IY. Writing & Rhetoric 1: Rhetorics of Travel and Tourism. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.



**PWR 1IYA. Writing & Rhetoric 1: The Art and Science of Gender and its Bending. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1JC. Writing & Rhetoric 1: Modern Family: The Rhetoric of Sex and Reproduction. 4 Units.**

The issue of reproduction provides a powerful rhetorical lens for looking critically and incisively into our own assumptions about race, gender, class, sexuality, power, rights, justice, "nature," technology, and modernity. With an intention to challenge assumptions, we will explore issues through a variety of perspectives. For example, we will explore theoretical debates over the "family" and its viability as a vehicle for securing recognition and rights, place liberal feminist ideas like "bodily autonomy" in conversation with complicatedly contradictory concepts like natal endangerment or father's rights in abortion and family planning, investigate legal and medical histories of eugenics, sterilization abuse, and practices of coercive and disciplinary contraception, and analyze rhetoric associated with different forms of commodified reproduction, from black women's forced "manufacture" of slave labor to practices of transnational gestational surrogacy. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1JD. Writing & Rhetoric 1: Frog Princes and Ugly Ducklings: The Rhetoric of Self-Transformation. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1JH. Writing & Rhetoric 1: Lies and the Lying Liars Who Tell Them: Rhetoric and Deception. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of untruth, misrepresentation, and deception in journalistic and scientific rhetoric. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1JJ. Writing & Rhetoric 1: The Rhetoric of Language and Thought. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1JL. Writing & Rhetoric 1: 'Saving Strangers': Rhetoric and Humanitarian Intervention. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Examination of how media representations of world crises are crafted to persuade us to action, appealing to our senses of justice, pragmatism, outrage, and compassion. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1JM. Writing & Rhetoric 1: Rhetoric of the Startups. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1JO. Writing & Rhetoric 1: Join the #LoveArmy: The Rhetoric of Radical Compassion. 4 Units.**

In this writing class, we will examine the power and possibility of radical compassion. We will briefly explore love's myriad forms before turning almost exclusively to *love of humanity* a deep social concern for all people and the willingness to act on that concern as an important foundation for justice. Our inquiry will take us through the fields of neuroscience, evolutionary biology, psychology, sociology, history, philosophy as well as cultural, feminist and religious studies. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1JP. Writing & Rhetoric 1: The Rhetoric of Consumer Culture. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students explore what consumerism says about the larger culture and the segmented groups within it, analyzing popular and scholarly texts as well as current trends in pop culture, to research how the activities of consumerism shape culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1JPA. Writing & Rhetoric 1: The Rhetoric of Liberal Arts Education. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1JS. Writing & Rhetoric 1: Beyond DNA: The Omics Revolution. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1KB. Writing & Rhetoric 1: Authentic Experience: The Rhetoric of Tourism. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1KBA. Writing & Rhetoric 1: On Display: The Rhetoric of Museums and Exhibition Spaces. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1KC. Writing & Rhetoric 1: The Rhetoric of Gender and Sexuality in Popular Culture. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1KD. Writing & Rhetoric 1: The Feature Article: Writing and Change. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. How various feature article writers argue the issues of soaring energy and food prices, serious market volatility, climate change, an ongoing war in the Middle East, and how terms like *“crisis”* or *“change”* impact the discussion. See [http://ual.stanford.edu/AP/univ\\_req/PWR/Courses.html](http://ual.stanford.edu/AP/univ_req/PWR/Courses.html).

**PWR 1KE. Writing & Rhetoric 1: The Science of Sports. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include sports at the level of cells and psychology, the science of sports equipment and sports spaces, the ethics of performance enhancement, and sports-related research projects on the Stanford campus. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1KG. Writing & Rhetoric 1: Rhetoric of McDonough. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1KJ. Writing & Rhetoric 1: The Rhetoric of Film. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1KM. Writing & Rhetoric 1: If These Walls Could Talk: The Rhetoric of Places and Spaces. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Explores the *“language”* of man-made environments such as universities, theme parks, monuments, shopping malls, museums, and public buildings. Students analyze space through physical exploration and critical inquiry and discover the applications of rhetoric not only to traditional texts but to physical structures and spaces as well. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1KMC. Writing & Rhetoric 1: Staying Cool on a Hot Planet: Environmental Rhetoric for a Changing World. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1KS. Writing & Rhetoric 1: Imagining Others: 21st Century Cosmopolitanism. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Exploration of cosmopolitanism, questions related to globalization, nationalism, citizenship, cultural values, aesthetics, and identity. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1KSA. Writing & Rhetoric 1: Constructing Childhood. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1KSB. Writing & Rhetoric 1: Health Matters: Health Innovation and Communication. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1KT. Writing & Rhetoric 1: The Emperor's New Clothes: The Rhetoric of Modern Mythology. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1LC. Writing & Rhetoric 1: Truth, Lies, and Contestation: Rhetorics of Sexual Victimization and Survival. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1LF. Writing & Rhetoric 1: The New Normal: The Rhetoric of Disability. 4 Units.**

In this class we will move beyond definitions of disability as “abnormality” or “deviance” to explore how advances in science, technology, medicine, and culture have transformed our understanding of what constitutes a “normal” human body. We will ask how arguments about disability incorporate concepts such as neurodiversity, chronic illness, and other invisible conditions. At the same time, we will study how contemporary perspectives on disability interact with issues such as technology, metaphors of the prosthesis, cultural constructions of the body, and even what it means to be human. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1LFA. Writing & Rhetoric 1: Back to the Future: The Rhetoric of Futurity. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1LH. Writing & Rhetoric 1: Ask What You Can Do: The Rhetoric of Public Leadership. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1LM. Writing & Rhetoric 1: Two Truths and a Lie: The Rhetoric of Authenticity. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1LMA. Writing & Rhetoric 1: From Page to Stage: The Rhetoric of American Drama. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1LO. Writing & Rhetoric 1: What Are We Trying to Sustain? Rhetoric of Nature's Values and Services. 4 Units.**

With increasing rates of environmental impacts from human activity, communities across the planet face challenges for sustainability. Given the many benefits we derive from nature - from cultural and spiritual benefits, to basic goods like food and water, to economic benefits from the use of natural resources - defining what we value and what we wish to sustain is a top priority. This class will examine diverse perspectives on the value and services we derive from nature and consider challenges for balancing multiple uses of nature in the context of sustainable resource management and conservation. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. Enrollment is handled by the PWR office.

**PWR 1LP. Writing & Rhetoric 1: Crafting Credibility: Rhetoric and Authority. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1LPG. Writing & Rhetoric 1: Power Lines and Water Pipes: Writing The Global City Through Infrastructure. 4 Units.**

What can power lines, water pipes, and fibre optic cables tell us about how different groups of people navigate life in global cities? While such infrastructures are often considered to be the mere "background" of socio-cultural life in cities, this course will center on them and their rhetorical contexts in order to explore how opportunity and inequality are imagined and discussed in urban spaces. We will contemplate how knowledge, relations of power, and practices of governance work within the framework of deep rhetorical analysis of urban infrastructures. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. Enrollment is handled by the PWR office.

**PWR 1LS. Writing & Rhetoric 1: Unequal by Design? The Rhetoric of Race, Class, and Education. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1MC. Writing & Rhetoric 1: Oppositional Rhetoric: Resistance and Public Protest. 4 Units.**

In 2010, the University of Michigan hosted an international conference entitled "Against Health," which questioned how health has become a moralizing system dictating how people should behave and make decisions. In 2014, the Whitney Biennial selected Jackie Wang's anti-racist essay "Against Innocence" to be sold as part of their elite art exhibition. But how can one be "against health" or "against innocence"? These titles pose riddles for their readers. They use a strategy of oppositional rhetoric to challenge foundational assumptions in provocative ways. How can we as writers contend with the challenges at the heart of such rhetoric? For a full course description, see <https://vcapwr-catalog.stanford.edu>. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. Enrollment is handled by the PWR office.

**PWR 1MD. Writing & Rhetoric 1: Heavenly Bodies: The Rhetoric of Sanctity and Martyrdom. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1MF. Writing & Rhetoric 1: Writing about Cities: Exploration, Observation, Research, Analysis. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1MG. Writing & Rhetoric 1: The Rhetoric of the American West. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1MGD. Writing & Rhetoric 1: Who speaks for nature? Rhetorics of environmentalism and justice. 4 Units.**

The last hundred years have seen organized environmentalism become a major force on the world stage. But the environment is still essentially contested. Who is at risk from environmental problems? What environmental problems should be prioritized? And who should be able to speak out as authentic protectors of the earth? In this course, we examine the ways that environmental and conservation writers from classic environmental writers to contemporary activists talk about nature to see how close readings of their work highlight fundamental disagreements about justice and politics in societies across the globe. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. Enrollment is handled by the PWR office.

**PWR 1MN. Writing & Rhetoric 1: Liberation or Occupation?: The Rhetoric of War. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1MO. Writing & Rhetoric 1: Imagining Technology: The Rhetoric of Humans and Machines. 4 Units.**

This course explores the ways that technology has been imagined on the page and on the screen. We look at how a diverse group of sources from Cold War comics to Elon Musk's twitter account contribute to an ever-changing definition of 'technology.' And we consider how our hopes and anxieties about technology are represented in creative genres and media. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1MR. Writing & Rhetoric 1: "Did You Hear That?": The Rhetoric of Ghost Story. 4 Units.**

This class will explore varied aspects of the rhetoric of haunting, considering the supernatural, the psychoanalytical, the traumatic, and the simply hard to believe. We will examine how ghosts represent cultural values and fears, investigating the rhetorical elements of the ghost story: How are supernatural accounts constructed? How are they debunked? What strategies do writers use to prove the impossible, to convince the world that ghosts can exist? We will use our explorations of the supernatural to shape our ability to make nuanced arguments, to draw effectively from research materials, and to think critically about what we see and hear. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1MS. Writing & Rhetoric 1: Seeing Nature: The Power of Environmental Visual Rhetoric. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1NA. Writing & Rhetoric 1: The Rhetoric of Childhood. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1NF. Writing & Rhetoric 1: Language 2.0: Investigating the Rhetoric of Digital Language. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1PB. Writing & Rhetoric 1: Supreme Court Rhetoric. 4 Units.**

Applying a rhetorical framework, we will discuss and analyze historical cases such as *Barron v Baltimore* (1833), in which the Court found that federal Bill of Rights guarantees were not binding upon states, as well as contemporary Supreme Court issues such as the debate surrounding the status of *Roe v. Wade* under the recently re-configured Roberts Court. We'll also discuss and examine the rhetoric of "amicus curiae" briefs, editorials about Court opinions, and pertinent lower court decisions. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1PF. Writing & Rhetoric 1: Body Rhetoric East and West: Gender, Sport, Art, and Medicine. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1PH. Writing & Rhetoric 1: He Said, She Said: The Rhetoric of Gender Politics. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include the ways in which news articles, movie clips, magazine advertisements, television commercials, and other texts present gender roles, and how the roles and bodies of both sexes are presented as objects open to scrutiny, critique, exploitation, abuse, and awe. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1RC. Writing & Rhetoric 1: Domestication: How Humans Shape the Natural World. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1RL. Writing & Rhetoric 1: The Rhetoric of Happiness. 4 Units.**

In this course, we will examine the notion of happiness &#8212; and some of its adjacent or "opposing" feelings, such as contentment, or depression and anger &#8212; and the rhetoric around it by studying an array of examples from various sources, such as books, websites, or films. Students will explore the contexts, motives, and ramifications of the representational strategies, while developing critical skills to analyze and articulate their research findings and arguments regarding topics of their choice. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1RP. Writing & Rhetoric 1: The Rhetoric of Archaeology. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1RT. Writing & Rhetoric 1: The War Between Wars: the "isms" of modernism. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of modernism in art, literature, and thought between the two world wars. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1SB. Writing & Rhetoric 1: The Rhetoric of Technology. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1SBB. Writing & Rhetoric 1: The Rhetoric of Robots, Cyborgs, Mutants and Other Posthumans. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1SC. Writing & Rhetoric 1: Banksy, B-girls, and the Rhetoric of Public Art. 4 Units.**

In the 21st century, public art is opening up: the 'hero-on-a-horse' is in decline, and hulkingly abstract metal sculptures are no longer commissioned for each urban plaza. In this class, we'll investigate together what public art might mean now. For example, should it made by a public or for a public, or in public places, or with public funding, or because of its political value in the public sphere? Who owns it, where does it belong, and what are its limits? Can public art be illegal, temporary, intangible, or created by people who don't even think of themselves as artists? For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1SE. Writing & Rhetoric 1: Rhetoric of Social Justice: Writing about Marginalization and Oppression. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1SG. Writing & Rhetoric 1: Body and Mind: The Rhetoric of Gesture. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1SH. Writing & Rhetoric 1: Strange Art, Stranger Politics: Absurdism and the Rhetoric of Social Action. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Topics include the benefits and drawbacks of deploying strange art as artistic and political protest, how breaking the aesthetic rules sometimes serves to argue for social change, and how absurdist protests succeed or fail to gain social traction. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1SHA. Writing & Rhetoric 1: Bench to Byline: The Life of Scientific Facts. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1SI. Writing & Rhetoric 1: Super-Storms, Polar Bears, and Droughts: The Rhetoric of Climate Change. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1SL. Writing & Rhetoric 1: New Media Rhetoric and Web 2.0. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students define new media and debate the ideas of web 2.0; the virtue of Web 2.0 in digital game modifications and the potential subversive effects of web 2.0 on advertising restrictions; and look into the possibilities and limitations of democracy 2.0. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1SLA. Writing & Rhetoric 1: "Advertising R Us": The Rhetoric of Advertising. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1SM. Writing & Rhetoric 1: The Elephant, the Tiger, and the Cellphone: Rhetoric of India and Indian Film. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the rhetoric of the India of the new millennium, including issues of gender, caste, class, religion, sexuality, nationalism, diaspora, outsourcing, and globalization. Service Learning Course (certified by Haas Center). See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1SN. Writing & Rhetoric 1: The Rhetoric of Containment: Cold War Ideology Post 9/11. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1SP. Writing & Rhetoric 1: Growing Up Global: The Rhetoric of Children's Culture Today. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1SR. Writing & Rhetoric 1: The Rhetoric of California. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1SS. Writing & Rhetoric 1: The Page and the Stage: Writing and Performance. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Students explore identity as a social, political, and cultural performance; how different situations call for particular styles of rhetorical performance; and how people evaluate and analyze different types of performances, including artistic and political performances, as well as the performances of everyday life. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1SSA. Writing & Rhetoric 1: Real and Imagined Lives: Narrative, Rhetoric, and Identity. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Analysis of the rhetoric of identity as constructed in a range of narrative forms including fiction, memoirs, political campaigns, and social media. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1ST. Writing & Rhetoric 1: The Rhetoric of Biomedical Ethics. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1SUA. Writing & Rhetoric 1: Such a Long Journey: South Asian Diaspora in the World. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1SW. Writing & Rhetoric 1: Scandals, Private Lives, and Public Faces: The Rhetoric of Stanford. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. Study of the early history and rhetoric of the public face of Stanford University, from the post-Gold Rush and Big Four railroad era to the building of the University. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 1TB. Writing & Rhetoric 1: Hashtag Activism. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1TD. Writing & Rhetoric 1: Anatomy of a Discipline: Rhetorics of Health, Illness, and Medicine. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1TS. Writing & Rhetoric 1: White Mice and White Coats: The Rhetoric of Biomedical Science. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1TSA. Writing & Rhetoric 1: 10,000 Ways That Didn't Work: The Rhetoric of Innovation. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 1TSC. Writing & Rhetoric 1: Academic Identity/ies: Culture and Politics in Higher Education. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1VK. Writing & Rhetoric 1: Rhetorics of Trauma. 4 Units.**

Spurred, in part, by the events of September 11th and the plight of American service members returning from combat experiences in the Middle East, the public's gaze has been drawn toward the concept of trauma. This course considers the rhetorics of trauma, that is, how survivors of traumatic incidents, witnesses, psychologists, doctors, civil and military leaders, politicians, and the general public interpret trauma. These different understandings of trauma compete for social awareness and limited resources. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1VL. Writing & Rhetoric 1: It's All Relative: The Rhetoric of the Modern American Family. 4 Units.**

The September 2017 issue of Interview Magazine features Kim Kardashian West dressed as Jackie Kennedy on the cover, along with her daughter, North. In the article, the magazine calls Kardashian West's popular reality show, a rooted-in-real life mirror to what the American family looks like today, bringing up topics such as race, gender, and more recently, trans identity. As early as 50 years ago, it would have been nearly impossible for a magazine to feature a white woman, especially one as notorious as Kim Kardashian, on its cover with her biracial, black daughter. So how did the mirror of the American Family change from the Mad Men ideal of a white, wealthy, suburban, nuclear family to a sprawling mega-family who document every moment of their lives for television screens? And is it even accurate to call the Kardashians the mirror? Who is left out of this reflection? In this class, we will explore how representations of American families reflect shifting trends on the national level, including increasingly nuanced understandings of race, gender, sexuality, and citizenship. Through engagements with various texts (television, films, articles, advertisements) we will practice making nuanced written arguments about the rhetoric of families as we work toward the final assignment, a research-based argument. We will analyze several topics in class to develop and improve analytic and argumentative writing skills, from debates over LGBTQ+ parenting to mixed race families and generational conflicts while asking, what makes a family? Which aspects of families are represented as ideal? And what do those ideals say about issues beyond the family?

**PWR 1WG. Writing & Rhetoric 1: Reading Minds: The Rhetoric of Consciousness. 4 Units.**

Rhetorical analysis of readings, research, and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1WI. Writing & Rhetoric 1: By Any Means Necessary: The Rhetoric of Black Radical Movements. 4 Units.**

In this class, students in this course will explore the many ways communities of color have effectively used writing and rhetoric to persuade, to educate, to inspire, to awaken, to motivate. Some potential examples of materials include persuasive pieces written by formerly enslaved Black people to abolish slavery; letters written from Japanese internment camps, trial statements from Native American political prisoners; videos of Black Panthers' speeches; and comedy sketches by undocumented queer youth organizers. For more information about PWR 1, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 1WS. PWR 1 Studio. 1 Unit.**

The PWR 1 Studio is designed for multilingual and/or international student writers and is taken concurrently with PWR 1. The Writing Studio provides students an opportunity to work with other multilingual students and an instructor with a background in second language writing to develop writing habits and strategies to support their work in PWR 1 and other communication contexts. Please see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1/pwr-writing-studio> for more information. Prerequisite: Application. Co-requisite: PWR 1.

**PWR 1ZS. Writing & Rhetoric 1: On Cages, Boxes & Boundaries: The Rhetoric of Limits. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-1>.

**PWR 295. Writing Center Peer Tutor Seminar. 2-3 Units.**

For students selected to serve as peer writing tutors in the Hume Center for Writing and Speaking and/or at other campus sites. Readings on and reflection about writing processes, the dynamics of writing and tutoring situations, tutoring techniques, learning styles, diversity, and ethics. Observation of tutoring sessions, written responses to readings, and other written work. Instructor permission required. WR 1 pre-/co-requisite. Same as: PWR 195

**PWR 2AB. Writing & Rhetoric 2: Makers, Crafters, Hackers: The Rhetoric of DIY. 4 Units.**

Prerequisite: PWR 1. In this course we will delve into the fascinating world of DIY (do it yourself) movements. You will examine the values, politics and ethics of DIY, such as what making has to do with empowerment and resistance, or whether our ideas of making and makers are gendered or attached to assumptions about class, ethnicity and ideology. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2AH. Writing & Rhetoric 2: Ethnic Narratives and the Rhetoric of American Identity. 4 Units.**

Prerequisite: PWR 1. In this class we will explore how race and ethnicity in America have become subjects of personal negotiations and public perception. The readings will address various topics such as biracial and bicultural identity, acculturation, stereotyping and self-image. In addition, we will approach each of the writings in this class as an opportunity to practice in-class rhetorical analysis and oral presentation skills and to practice discovering specific research questions. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2AM. Writing & Rhetoric 2: From Fossils to Fables: The PWR of Prehistory. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2AN. Writing & Rhetoric 2: Hear Me Out: The Rhetoric of Hip-Hop in Social Uprisings. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2ANA. Writing & Rhetoric 2: The Message in the Music. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2AO. Writing & Rhetoric 2: Rhetoric and Global Leadership. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of styles of leadership across the globe and communication strategies used to bring about change. Exploration of how global leaders learn cross-cultural rhetoric skills to adapt to dynamic and unfamiliar situations. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2AT. Writing & Rhetoric 2: House Red, Hot Bellies, and High Velocity Lead Therapy: The Rhetoric of Trauma. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2BK. Writing & Rhetoric 2: To Thine Own Self Be True: The Rhetoric of Authenticity. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2BR. Writing & Rhetoric 2: "I Feel Your Pain": The Rhetoric of Sympathy. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2BRB. Writing & Rhetoric 2: Eureka and Epiphanies: The Rhetoric of Inspiration. 4 Units.**

Prerequisite: PWR 1. In this course, we will inquire into how, exactly, inspiration works. Where do good ideas come from? What fosters creativity? And how do we inspire ourselves and others to follow through on those ideas? We'll address these questions from many disciplinary angles, including the history of theories of genius and creativity, the uses of spiritual and literary epiphany, and recent psychology research into growth mindsets. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2CA. Writing & Rhetoric 2: Networked Rhetoric: Social Networks, Participatory Media and the Future of Wr. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of the issues surrounding participatory media and social networking in contemporary digital culture from the perspective of both theory and practice. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2CAB. Writing & Rhetoric 2: The Rhetoric of Gender and Technology. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

**PWR 2CG. Writing & Rhetoric 2: Sounds of Stanford: Authoring, Archiving, and Podcasting. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2CGA. Writing & Rhetoric 2: Stories, Jokes, and Anecdotes: How to Engage an Audience. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2CK. Writing & Rhetoric 2: Speaking Out: Claiming Citizenship, Demanding Rights. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2CKA. Writing & Rhetoric 2: Rhetoric of Distraction. 4 Units.**

Prerequisite: PWR 1. In this class we will explore how race and ethnicity in America have become subjects of personal negotiations and public perception. The readings will address various topics such as biracial and bicultural identity, acculturation, stereotyping and self-image. In addition, we will approach each of the writings in this class as an opportunity to practice in-class rhetorical analysis and oral presentation skills and to practice discovering specific research questions. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2CL. Writing & Rhetoric 2: Crime, Media & Law: Critical Approaches to Violence. 4 Units.**

Prerequisite: PWR 1. Despite our fascination with extreme acts of violence, those who study the nature of illegality know the opposite to be true: Far from a problem of murder, crime is instead predominantly composed of everyday acts of offense that never garner police attention, such as tax evasion, the violation of environmental regulations, computer hacking, and recreational drug use. Critical criminologists term this kind of unprosecuted crime "crime's dark figure" because it flies below the radar of public awareness and judicial action. This course will take the divergence between cultural representations of crime and crime's "dark figure" as a point of departure. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2CR. Writing & Rhetoric 2: Communicating Science to the Public. 4 Units.**

As scientific knowledge and technology grow increasingly complex, the ability to explain science clearly and articulate science-based arguments to public audiences becomes more crucial, and more in demand. In this class, we will explore what makes written, spoken, and visual communication of science effective, compare the conventions of scholarly writing in the sciences to rhetorical strategies employed by popular science writers, and analyze problems with coverage of scientifically based issues in popular media and the promise and pitfalls of data visualization in conveying scientific information. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2CW. Writing & Rhetoric 2: Rhetorical Games: Sport (for) Development Policy in the 21st Century. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

**PWR 2CWA. Writing & Rhetoric 2: Global Games: Rhetoric of Sport for Development. 4 Units.**

Prerequisite: PWR 1. Sport has become "the" international relations and development concept of the new millennium. As a result, sport development is a source of much praise and criticism as scholars, activists, philanthropists, and journalists struggle to understand the rhetorical games at play in the global sport development policy landscape. As students deepen their awareness of rhetorical praxis and explore new modes as writers and communicators, they will survey seminal scholarship, case studies, and grassroots activist campaigns surrounding sport development in preparation for a sustained research project that addresses the sociopolitical implications of tying sport to development in the 21st century. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2CWB. Writing & Rhetoric 2: Hear/Say: The Art of Rhetorical Listening. 4 Units.**

Prerequisite: PWR 1. Why do we listen? How do we listen to learn, to understand? And to whom do we listen? And how does listening impact how we orient ourselves in the world? Rhetorical listening has been central to feminist rhetorical praxis, which has traditionally focused on the rescue, recovery, and (re)inscription of non-majority cultures and communities into the rhetorical tradition. In short, rhetorical listening asks us to reconsider the role listening plays, and the values which we ascribe to listening, in processes of knowledge construction inside and outside the academy. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2DC. Writing & Rhetoric 2: The Popular Science of Sex. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of the intersection between social debate and scientific research about sex and gender; how social debates draw on, represent, respond to, and influence scientific studies; and how the process shapes our knowledge and beliefs about sex and gender. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2DH. Writing & Rhetoric 2: I \_\_\_\_ Therefore I Am? The Rhetoric of 21st Century Identity. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2DHA. Writing & Rhetoric 2: Action Research: Making Time for Social Justice. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.



**PWR 2DHB. Writing & Rhetoric 2: Feel Me? The Rhetoric, Practice and Complication of Empathy. 4 Units.**

Prerequisite: PWR 1. In this course, we'll be examining what empathy is&#8212;both affective and cognitive&#8212;and what role it might, or might not, play in our everyday lives and in promoting ethical action. To do so, we'll study the psychological, biological, and neurological bases of empathy, its significance in philosophy, contemplative/religious practices and ethics, and its possibilities as a rhetorical strategy and a political tool. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2EC. Writing & Rhetoric 2: 'Like' this Class: The Rhetoric of Public Relations. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2EE. Writing & Rhetoric 2: Once Upon a Cause: Producing Picture Books for Local Children. 4 Units.**

Prerequisite: PWR 1. Whether our favorite picture books as kids were timeless classics or new arrivals, whether they scared us or amused us, consoled us or challenged us, they moved and shaped us in profound ways. How could a few dozen pages and a few hundred words affect us so powerfully? Why did we want to hear and see and read our favorite picture books again and again? What was the secret to their magic? In this course you'll not only analyze that "magic" but will also collaborate closely with a group of classmates to create an original, compelling, and educationally appropriate picture book for second-graders in a local school. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2EL. Writing & Rhetoric 2: Rhetoric of Silence. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

**PWR 2ELA. Writing & Rhetoric 2: The Remix, the Original, and the Voice. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2EP. Writing & Rhetoric 2: Global Protest and Civil Unrest: The Rhetoric of Resistance. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

**PWR 2EPA. Writing & Rhetoric 2: Slacktivism to Hacktivism: The Rhetoric of Technology and Social Change. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

**PWR 2EPB. Writing & Rhetoric 2: Communicating Climate Justice in the Current Era. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2EPC. Writing & Rhetoric 2: Rhetoric of Resilience: Telling our Survival Stories. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2EV. Writing & Rhetoric 2: The Global Politics of Protest and Change. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2GAW. Writing & Rhetoric 2: 'Don't Stand so Close to Me': Cross-cultural Communication. 4 Units.**

Prerequisite: PWR 1. Despite universal attributes such as facial expressions and emotions, humans also have culturally based assumptions, values, and beliefs - from the shared assumptions and collectivist views of high-context cultures to the explicit and highly articulated rhetoric of more individualistic and low-context groups. Our course will explore rhetorical challenges in verbal and nonverbal communication across cultures. We'll consider not only language and argument but also proxemics - determined spatial distance between people - as well as eye contact and gestures. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2GM. Writing & Rhetoric 2: Unpredictable Dialogue: Art of the Interview, Art of the Essay. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the rhetorical craft of the interview, exploring structure, language, timing, and development in a range of forums, including documentaries, radio, transcription, campus conversations, and television. Research of a Stanford professor's work, including interview. Presentation of findings from research and interview to the class. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2GMA. Writing & Rhetoric 2: Breaking News, Making News 1.0. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2GMC. Writing & Rhetoric 2: A Thousand Words: When Art is Not Enough. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2GMD. Writing & Rhetoric 2: Archi-texts: Building Rhetorically. 4 Units.**

Prerequisite: PWR 1. Architecture is always the solution to a problem: Where am I going to sleep? What am I going to do with my dead? Where can I speak to my gods? In this sense, the structure, siting, materials and lighting that inhere in a work of architecture are direct responses to a lived problem. In this way, our class will draw on the rhetoric of architecture to illuminate the rhetoric of communication; we will do this under the premise that understanding the one can lead to a better understanding and practice of the other. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2GME. Writing & Rhetoric 2: Our America: Conviction, Passion, Paranoia. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2HL. Writing & Rhetoric 2: Developing and Communicating Your Expertise: The Rhetoric of Excellence. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2IY. Writing & Rhetoric 2: Many Faces of Sherlock: Race, Gender, Power, and the Rhetoric of the Detective. 4 Units.**

Prerequisite: PWR 1. In this class we'll look at the ways detective fiction has expanded with empowering results to genders, ethnicities, and social backgrounds that mainstream representations of Holmes haven't traditionally represented. We'll consider, for example, the Botswanan women sleuths of *The No. 1 Ladies' Detective Agency*, the hoodie-wearing, super strong *Luke Cage*, and Japanese manga's Detective Conan. We'll ask how movements such as Afrofuturism and G&#233;nero Negro combine the detective and speculative traditions with social commentary. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2JB. Writing & Rhetoric 2: Rhetoric of Ethics in Research and Technology. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the rhetoric of ethical discourse, including the ethical standards guiding research at Stanford and examples of ethical misconduct. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2JC. Writing & Rhetoric 2: Walk(s) of Shame: The Rhetoric of Respectability. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2JD. Writing & Rhetoric 2: Straight A's and Sports Cars: The Rhetoric of Success. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2JDC. Writing & Rhetoric 2: The Rhetoric of Collaboration: From Fandoms to Entrepreneurs. 4 Units.**

Prerequisite: PWR 1. In this class, we will research how collaboration between and among producers and consumers shapes our society. For example, we'll look at how *Harry Potter* and *Star Wars* fans have influenced their franchises marketing and how advocates for open information (like WikiLeaks) have impacted the political climate. We'll debate the impacts of collaborative efforts and consider both the rewards and risks that arise from collaboration. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2JH. Writing & Rhetoric 2: Cred: Rhetoric and Credibility in Research, Politics, and Everyday Life. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Work on making students more effective researchers and communicators in their areas of interest, with a focus on gaining and projecting credibility. Exploration of how speakers and writers gain and lose credibility, how people evaluate the credibility of others, and how the rules of credibility are different in politics, in scholarship, and in popular culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2JJ. Writing & Rhetoric 2: The Rhetoric of Language, Identity and Power. 4 Units.**

Prerequisite: PWR 1. In this writing and speaking course, you'll consider the construction and negotiation of power and difference through language as it intersects with gender, sexuality, race, ability, and class. We'll explore how this happens across spheres such as politics, education, science, sports and the media, intertwined with forces like globalization, immigration, and technology. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2JL. Writing & Rhetoric 2: Doomsday Rhetoric. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Investigation of how the doomsday epic expresses real concerns emerging from fields like technology, environmental studies, pathobiology, and politics. Consideration of apocalypticism as a mode of argument. Examination of how belief in the imminent destruction of the present world order influences our political decisions and personal behavior. Topics in religious eschatology and apocalypticism illuminate the genre's origins. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2JLA. Writing & Rhetoric 2: Speaking About Art: Narrating the Collections of the Cantor Art Center. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration and theory of successful strategies of oral communication, considering how words and images (in this case works of art) work together to create meaning, culminating in creation of an audio guide for the Cantor Arts Center. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2JLB. Writing & Rhetoric 2: Rhetoric and Education Reform. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of social, ideological, and pedagogical perspectives on education reform. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2JLC. Writing & Rhetoric 2: Illness Narratives: Attention, Empathy, and Storytelling. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

**PWR 2JM. Writing & Rhetoric 2: Criminal Matters: Evidence, Detection, Expertise. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2JO. Writing & Rhetoric 2: Rhetoric of J. O.. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2JP. Writing & Rhetoric 2: The Rhetoric of Art and Commerce. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Examination of unspoken rules regarding the separation of creativity and commerce and arguments about how consumer culture influences the work of the artist. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2JPA. Writing & Rhetoric 2: How We Got Schooled: The Rhetoric of Literacy and Education. 4 Units.**

Prerequisite: PWR 1. In this course, we will look closely these learning processes. Students will invent individual research projects and craft oral presentations to critically analyze conventional forms of learning and explore ways of learning that are not always obvious. We will research together the work of cultural critic Henry Giroux on global media as a force of education, poet and scholar bell hooks on classrooms as potential sites of both oppression and liberation, and education scholar Ken Robinson on creativity and schools. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2JS. Writing & Rhetoric 2: In Science We Trust. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2KC. Writing & Rhetoric 2: Technology and the Rhetoric of Embodiment. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

**PWR 2KD. Writing & Rhetoric 2: Un-Performing Ourselves: The Design and Craft of Presentations. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of how the application of performance techniques makes academic or professional presentations more compelling. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2KDA. Writing & Rhetoric 2: Remix Culture. 4 Units.**

Prerequisite: PWR 1. What does a musical about founding fathers (*Hamilton*) have to say about current political upheaval? What do plastic surgery resorts have to say about identify politics? What does Steph Curry's game have to say about Hamlet - and about Prince - with alternative forms of masculinity? In this course we will examine contemporary mashups and remixers and you will build a research project to ground our work across the quarter creating interesting, meaningful, and dynamic presentations and papers. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2KEB. Writing & Rhetoric 2: Sports Appeal: Packaging and Promoting Stanford Athletics. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2KEC. Writing & Rhetoric 2: It's About Time: Seizing Opportunity in Rhetoric, Writing, and Performance. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2KM. Writing & Rhetoric 2: A Planet on the Edge: The Rhetoric of Sustainable Energy. 4 Units.**

Prerequisite: PWR 1. Sea-level rise, the halting of major ocean circulatory currents, outbreaks of superstorms leading to floods and droughts - can an energy revolution still save a planet on the edge? This class explores the intricacies of sustainable energy, focusing on the myths, slogans, and rhetorical narratives that surround these debates. For example, is environmentalism inherently at odds with economic prosperity? Does living an environmentally conscious lifestyle require personal sacrifice and suffering? How does rhetorical framing affect the research, implementation, and public perception of new technologies in the field of sustainable energy? For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2KMA. Writing & Rhetoric 2: Natural Enemies: The Rhetoric of Invasion Biology. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of the use of metaphors and argument in the context of invasion biology and species conservation, especially the effects those metaphors and claims have on practice and policy outcomes. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2KS. Writing & Rhetoric 2: Happy Now? The Anatomy of Happiness. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. How the emerging field of happiness studies involves psychologists, economists and policy-makers in defining what happiness is and determining how society might create the conditions in which it can flourish. Exploration of how happiness studies can uncover happiness at the heart of arguments about democracy, religion, and personal lifestyles, exploring what makes people happy across cultural, social, and national contexts. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2KSA. Writing & Rhetoric 2: The Rhetoric of Childhood and Children's Culture. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2KSB. Writing & Rhetoric 2: Design Thinking: Bringing d. thinking to Research, Writing & Presentation. 4 Units.**

Prerequisite: PWR 1. There is no area of contemporary life where design is not a significant factor in shaping human experience. In this class, you will have the opportunity to learn more about design thinking and design studies. We will read works about play and creativity, the process of design thinking, and the ethics of design. You will choose a project idea and pursue research that will ultimately culminate in a print-based argument as well as a live oral presentation. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2KT. Writing & Rhetoric 2: The Great and Powerful Oz: The Rhetoric of Spokespersons. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2KTA. Writing & Rhetoric 2: A Rebel With A Cause: The Rhetoric of Giving a Damn. 4 Units.**

Prerequisite: PWR 1. In this course, we will explore a variety of movements from marriage equality and civil rights to climate change. We will also examine individuals and the manner in which they advance the causes that matter to them most, including astrophysicist Neil deGrasse Tyson, anti-racism activist Tim Wise, and equal education activist Malala Yousafzai. Ultimately, students will use knowledge gained to assist delivery of research, both in written and oral form, in cultural contexts and from the disciplinary perspective of students' choosing. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2LK. Writing & Rhetoric 2: Rhetoric in Crisis!. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2LM. Writing & Rhetoric 2: The Rhetoric and Aesthetic of War. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

**PWR 2LO. Writing & Rhetoric 2: Facing the Future: Climate Change Science, Impacts, and Solutions. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2LS. Writing & Rhetoric 2: Comics for Social Justice: The Rhetoric of Sequential Art. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2MBR. Writing & Rhetoric 2: Buying a Better You: The Rhetoric of Self Improvement and the American Ideal. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2MC. Writing & Rhetoric 2: Cultural Icons: The Rhetoric of Branding and Celebrity. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2MF. Writing & Rhetoric 2: Speaking About Art: Narrating the Cantor's Collections. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of strategies for developing museum audio guides, including analysis of existing guides and behind-the-scenes work in the Cantor Arts Center. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2MFA. Writing & Rhetoric 2: Searching for San Jose: Urban Studies Audio Walking Tours. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2MFB. Writing & Rhetoric 2: Sustainability: Making an Impact with Research and Rhetoric. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2MFC. Writing & Rhetoric 2: March for Science? Social Justice and the Rhetoric of Science. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2MGD. Writing & Rhetoric 2: Silicon Valley and the Future of Work: Rhetoric of Labor Utopias and Dystopias. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2MGE. Writing & Rhetoric 2: Rationality and culture: rhetorics of reason, madness, and science. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2MO. Writing & Rhetoric 2: Rhetoric of Scientific Controversies. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2MS. Writing & Rhetoric 2: Seriously Funny: The Rhetoric of Humor. 4 Units.**

Prerequisite: PWR 1. As a rhetorical technique, humor holds unique persuasive power on a variety of political and cultural stages, evident in popular parody, satire, roasts, alternative news sources, public relations campaigns, and advertisements. Given this importance, we might ask, "what makes humor persuasive?" In this course, we will study humor through a variety of critical lenses, including those that examine humor as a unique appeal to pathos and those that argue it is entirely reliant upon logic. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2NF. Writing & Rhetoric 2: Language Gone Viral: Investigating the Rhet. of Social Media and Digital Comm.. 4 Units.**

Prerequisite: PWR 1. In this course, we will reinforce our understanding of the research writing process and develop oral communication skills to investigate changes in digital language use. This course also examines the extent to which our daily lives have become deeply dependent on our usage of personal electronic devices for online communication. Is our attachment to technology truly limiting the quality of our conversations? Or could such interactions provide a means for introverts to better interact with others? For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2PB. Writing & Rhetoric 2: The Power of Political Photography. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Topics include the role of photographers and photo-journalists in helping viewers see the world differently and the political implications of fashion photography, environmental photography, music photography, and fashion photography. Traditional readings as well as archival and field research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2PBA. Writing & Rhetoric 2: Calling All Astronauts: Researching, Writing, and Talking about Tomorrow. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2PBC. Writing and Rhetoric 2: Why Do Geniuses Come in all Sizes, Shapes, and Colors?. 4 Units.****PWR 2PH. Writing & Rhetoric 2: Equal Treatment: The Rhetoric of Public Health. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of how public health discourses influence policymaking, practitioners, and community members, how the public understands the rhetoric of public health, and how that understanding affects public and government support of health-related research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2PHA. Writing & Rhetoric 2: You Go Girl: The Rhetoric of Gender Equality. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2PHB. Writing & Rhetoric 2: Indecision 2012: The Rhetoric of Politics. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2RC. Writing & Rhetoric 2: Red Pill or Blue Pill? : The Rhetoric of Drugs. 4 Units.**

Prerequisite: PWR 1. The theme of this course is the relationship between humans and drugs, particularly how the human brain interacts with and is altered by ingested substances. Simultaneously we will explore how drug use is promoted, regulated, sensationalized, and commercialized. We will examine a wide range of perspectives: indigenous discovery, cultural and medical applications, biological mechanisms, sociological implications, artistic and poetic interpretation, and constitutional law. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2RHC. Writing & Rhetoric 1: The Rhetoric of Speaking. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2RL. Writing & Rhetoric 2: The Rhetoric of the Natural and Beyond. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2RP. Writing & Rhetoric 2: The Power of Sports: Rhetoric and Athletics in Contemporary Society. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2RT. Writing & Rhetoric 2: Stepping Out of the Shadows: Music, Bass Guitar, and the Rhetoric of Revoluti. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of how the emergence of the electric bass in the fifties helped usher in a revolution that challenged commonplace assumptions concerning nationality, race, gender, and sexuality. Exploration of the history of the electric bass as a case study of musical revolutions, focusing on how music revolutions reflect emerging ideologies in any given culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2RTA. Writing & Rhetoric 2: Postmodernism and the Rhetoric of Uncertainty. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Inquiry into major theories of the postmodern and analysis of postmodernism's effect on culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SB. Writing & Rhetoric 2: Writing 'Science': Fact, Fiction, and Everything Between. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of science fiction and popular writing about science and technology as arguments about where we are headed, where we are, who we are, and what we value. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SBA. Writing & Rhetoric 2: The Rhetoric of Human Enhancement. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of science fiction and popular writing about science and technology as arguments about where we are headed, where we are, who we are, and what we value. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SC. Writing & Rhetoric 2: Are We There Yet?: The Rhetoric of Mobility. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2SG. Writing & Rhetoric 2: Bodies of Knowledge: The bodily foundations of human thought and reason. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SGA. Writing & Rhetoric 2: Lie Detection and the Social Functions of Deception. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SH. Writing & Rhetoric 2: The Ugly American: Tourism and the Rhetoric of Power. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Analysis of the Ugly American in aesthetics and culture, in films and novels, tourist locations and business conferences, to illuminate America's complex role in the world. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SI. Writing & Rhetoric 2: The Rhetoric of Privilege. 4 Units.**

Prerequisite: PWR 1. Drawing from academic articles, newspaper and magazine stories, social media, television, and film, we will examine rhetoric in moments like the Rio Olympics to bring to the forefront the privilege that lies beneath. We will analyze various forms of privilege and their intersections, from race and gender to socioeconomic class, sexual orientation, citizenship, physical ability, and so on. We will also scrutinize our own privilege as part of the Stanford community. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2SL. Writing & Rhetoric 2: Got Ads: Visual Design in Print Advertising. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Introduction to the rhetorical interplay of visuals, text, and design layout in print advertising, and narrative, classificatory, and dynamic patterns in print advertisement campaigns. Culminates in design and presentation of an original ad campaign. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SLA. Writing & Rhetoric 2: Information Design: The Visual Language of Graphic Communication. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SM. Writing & Rhetoric 2: Dirty, Pretty Things: The Rhetoric of Objects and Objectification. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Study of objects and objectification, from the relationships shared by cultures, objects, and people to how human beings have been objectified through colonialism, enslavement, sex-trafficking, and organ trade. Material objects discussed in terms of staging, collecting, design, location, inheritance, and cultural meaning. Service Learning Course (certified by Haas Center). See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SN. Writing & Rhetoric 2: Rhetoric of Activism. 4 Units.**

Prerequisite: PWR 1. This course examines the role of rhetoric in discussions surrounding political inactivity as well as the burgeoning activism of today. Quintessential to our investigation of the rhetorical modes of activism is our exploration of varied and often contesting definitions of "democracy" and "civic engagement." For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2SPA. Writing & Rhetoric 2: Other Selves: The Art & Science of Friendship. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SS. Writing & Rhetoric 2: Mass Audiences and Modern Communication. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of how the ability to reproduce a work for increasingly large audiences has fundamentally changed the nature of art and its effect on culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SSB. Writing & Rhetoric 2: Superfans and Scholars: Writing Fan Culture. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2ST. Writing & Rhetoric 2: Science, Democracy and Social Media. 4 Units.**

Prerequisite: PWR 1. Social media have greatly enlivened and democratized science communication so that it now moves between scientists and various audiences. Scientific content is no longer static, nor is it merely for advanced researchers. Scientists using social media are learning to assess content collaboratively to help provide better science in public communication. One of the particular obligations of university science students is to join the conversation, help review and revise content in the public sphere. Students in this course will actively engage in the evolving world of science communication and practice their scientific writing, research and oral presentation skills. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2STA. Writing & Rhetoric 2: Ethics and AI. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2SU. Writing & Rhetoric 2: Hollywood Bollywood: Rhetoric of India in Global Cinema. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Exploration of how the rhetoric of India is constructed for an international audience through films and how such representations have coincided with India's recent economic success to give rise to a new trend in global popular culture. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2SW. Writing & Rhetoric 2: Propaganda of World War II: Strategies of Persuasion. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. Through work with the Hoover Archives, exploration of how written, visual, and film sources were used by a variety of countries to influence their citizens during WWII. Topics include the rhetoric of eugenics, political speeches, war posters, and how advertising during WWII pursued clear agendas to support government goals. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2TB. Writing & Rhetoric 2: Hip-hop, Orality, and Dialect Diversity. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2TS. Writing & Rhetoric 2: The Rhetoric of the Experiment. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. See [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_ual/AP\\_univ\\_req\\_PWR\\_Courses.html](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_ual/AP_univ_req_PWR_Courses.html).

**PWR 2TSC. Writing & Rhetoric 2: Dangerous Emotions: The Rhetoric of Feeling and Identity. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2VK. Writing & Rhetoric 2: Framing Reality: The Rhetoric of Documentaries. 4 Units.**

Prerequisite: PWR 1. Further work in developing skills in argument and research-based writing, with emphasis on both written and oral/multimedia presentation of research. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2WG. Writing & Rhetoric 2: All That Jazz: The Rhetoric of American Musical Theater. 4 Units.**

Prerequisite: PWR 1. Building on a series of written assignments and oral presentations that culminate in a major research project, we'll explore the conventions and strategies that define the genre of American musical theater, analyzing how contemporary musicals mirror, revise, and even subvert these traditional rules. Watching musicals on film, reading reviews by theater critics, and attending a local production, we'll examine a range of cultural arguments made by American musicals. For more information about PWR 2, see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>. For full course descriptions, see <https://vcapwr-catalog.stanford.edu>. Enrollment is handled by the PWR office.

**PWR 2WS. PWR 2 Studio. 1 Unit.**

The PWR 2 Studio is designed for multilingual and/or international student writers and is taken concurrently with PWR 2. The Studio provides students an opportunity to work with other multilingual students and an instructor with a background in second language writing and speaking to develop writing habits and oral presentation strategies to support their work in PWR 1 and other communication contexts. Please see <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2/pwr-writing-studio> for more information. Prerequisite: Application. Co-requisite: PWR 2.

**PWR 2ZS. Writing & Rhetoric 2: Designing Memorials: Building Rhetoric into Commemoration. 4 Units.**

Rhetorical and contextual analysis of readings; research; and argument. Focus is on development of a substantive research-based argument using multiple sources. Individual conferences with instructor. See <https://undergrad.stanford.edu/programs/pwr/courses/pwr-2>.

**PWR 4. Directed Writing. 3-4 Units.**

Further work on developing writing. Analysis and research-based argument, writing for a range of audiences and in varied disciplinary contexts. Workshops and individual conferences. May be repeated for credit. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

**PWR 5. Independent Writing. 1-5 Unit.**

Individual writing project under the guidance of a PWR instructor. May be repeated for credit. Prerequisite: first two levels of the writing requirement or equivalent transfer credit.

**PWR 6. Writing Workshop. 1-3 Unit.**

Writing workshop for collaborative, group, and individual projects guided by a specific theme or genre.

**PWR 6ASB. ASB 2016-17: Redefining Stem. 1 Unit.**

Redefining STEM is an Alternative Spring Breaks course and trip organized through the Haas Center. This class aims to examine STEM as a social issue through four main intersections: culture/history of STEM, STEM education, science communication, and corporate science & service. See <http://asb.stanford.edu> for more information.

**PWR 6LSP. PWR 6 Leland Scholars Program: Academic Writing and Argument. 1 Unit.**

What does it mean to write effectively in today's culture? How do we best persuade others in the different contexts situations that we encounter each day? How can we argue effectively about ideas that matter to us, whether in the classroom, with friends, or in broader social contexts? These questions form the basis for this course, which focuses on providing an introduction to rhetorical thinking, college-level research, academic writing, and crafting well-reasoned arguments.

**PWR 6VT. Researching and Writing About Popular Culture. 3 Units.**

What does popular culture say about the larger culture? In this class, we use questions about pop culture – such as video games, pop music, sports, TV, and other popular products – as a basis for writing and researching. How do video games help us to learn about engineering and physics? How do the virtues of leadership and teamwork get exploited by the extraordinary amounts of money made by owners of professional sports teams? Have TV police shows shaped what courtroom juries expect from DNA evidence? We'll learn how to look at pop culture through the lens of the cultural critic – someone who uses concepts about sociology and anthropology, even biology and economics, to analyze human behavior and its implications. We'll be analyzing clips from pop culture samples – videos, magazines, advertisements, movies – as well as theories about media and pop culture to research how these everyday artifacts are at the same time both trashy, meaningless moments, and poignant reminders of who we are. We start by writing an analytical essay about popular culture commentary, move into writing about library research regarding a topic of your choice, and close by sharing research in oral presentations. At each step, we work together as a group, doing workshops and peer review to practice collaboration and project-based learning.

**PWR 91. Intermediate Writing. 3 Units.**

For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For topics, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).

**PWR 91CG. Intermediate Writing: Science and Technology Writing for Popular Audiences. 3 Units.**

Whether you're a fuzzy or a techie, chances are you've had to explain the content of the classes you've taken to outside audiences. You've had to explain to your parents how your/their tuition dollars are at work, or you've advocated for your well-rounded background during a job interview. Your access to Stanford has granted you a certain expert label, even if it doesn't always feel that way. This course leverages your growing expertise by introducing you to writing styles and genres that will allow you to communicate your technical interests to a non-expert, or popular, audience. We'll talk about stylistic points including story ledes and anecdotes, metaphor, and organizing familiar and non-familiar language in our writing. We'll also experiment with different genres that accomplish these translation goals by experimenting with writing abstracts, journalism pieces, provocative podcasts, first-person narratives, visual essays, and creative non-fiction essays. Our ultimate goal will be to not only better understand these styles and genres in order to communicate more effectively with a wide variety of audiences, but to also seek publication in local newspapers, blogs, and sources such as *Salon*, *Slate*, *The Huffington Post*, *The Atlantic*, and even *Wired* or *Radiolab*.

**PWR 91CL. Intermediate Writing: Self & Science. 4 Units.**

"Self & Science" mines the intersection of memoir and science writing. In this advanced experimental writing course, students will read a selection of essays by writers including Lewis Thomas, Oliver Sacks, Annie Dillard, and Mark Doty, which illustrate the shared intellectual foundation in observation of scientific and poetic inquiry. Building on these readings, students will be challenged to produce an experimental essay that transgresses genre boundaries in the service of considering how personal reflection can narrate researched discoveries. Over the course of the quarter, students are invited to bolster their overall communication acumen, enhance their ability to share valuable discoveries beyond the confines of their major discipline, and practice the difficult bliss of engaging a discerning public audience. Click here for course video and full description: <https://undergrad.stanford.edu/programs/pwr/courses/advanced-courses/self-science>.

**PWR 91CW. Intermediate Writing: Seeing is Believing. 4 Units.**

In this course, students will study and practice techniques and rhetorics of data visualization based on principles of rhetorical history, visual rhetorics and graphic design as well as cognitive science, design thinking, and other disciplines that inform critical conversations around information display and data visualization. For more information visit <https://undergrad.stanford.edu/programs/pwr/courses/additional-elective-courses/seeing-isand-believing-rhetoric-big-data-visualization>.

**PWR 91D. Intermediate Writing: Your American Life. 3 Units.**

In this course, you'll read and listen to some of the most moving and insightful pieces of the last decade, explore the important differences between print and oral storytelling, and then script and record your own full-length audio piece. Along the way, we will explore many craft elements that apply equally to print and audio pieces. You will learn, for example, how to organize your material, choose an effective structure, blend dramatization and reflection, ground insights in concrete scenes, create a strong narrative arc, and manage elements such as characterization, description, and dialogue. We will also, of course, explore craft elements unique to the audio form and you will learn how to use your voice and other sonic elements to craft the kind of piece you might hear on *This American Life*. Through a special arrangement with the Stanford Storytelling Project, in the spring of 2012 this course will feature special sessions with prominent contributors to *This American Life*. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).



**PWR 91E. Intermediate Writing: The Oral Tradition: Myth, Folklore, and Fairy Tale. 3 Units.**

Contemporary storytelling covers a variety of media - from movies to novels, theatre and beyond. What this course offers is an in depth study of the roots of that practice - the oral tradition. Over the course we will explore many different motifs and structures that arise in the oral tradition, myth, folklore and fairy tale. What universal themes do we detect, and what separates the progression of a Pacific Northwest Trickster story from an Arthurian romance? Why is it that in the early twenty first century many of our most acclaimed art forms carry narrative forms that are thousands of years old? Star Wars, Lord of the Rings and the recent Broadway show Jerusalem, all follow scenic progressions informed by myth. The first encounter with the story will be an oral narrative - the myth told unscripted in the classroom. The stories, which range from the Arthurian romance Parzival to Trickster folk tales, will be told in several sections - with a running exegesis and student response alongside. Many of these stories are now transcripts and have become works of literature. We will explore both the complementary aspects of this development, and areas of tension. During the course each student will embark on a project that demonstrates a thorough understanding of the topics covered, and utilizes those elements in their wider practice of writing and rhetoric. The project will be to research a story handed down within the family - an adventure of some distant relative, or a family migration from one country to another. Factoring in elements from the taught class, the student will mythologize the story: by writing an in depth commentary on its implications - factoring in contemporary, psychological and metaphorical associations. The second element will be to tell the story to the class. In these ways we experience myth as a living principle, not something just from a long time ago.

**PWR 91EC. Intermediate Writing: Farmers, Scientists, & Activists: Public Discourse of Food Economies. 4 Units.**

What are the possibilities in rethinking our food, the way we talk about it, the way we grow it, and the way we eat it? In this course, you will be paired with local organizations concerned with food economies, such as food activists, food banks, farmers, and farm collectives, to collaboratively draft and produce writing specific to the client. You will analyze and respond to a variety of professional writing situations, and practice project management, focusing on benchmarking and deliverables. The end result will be a multimodal, collaboratively-produced document or set of documents you can add to your public-facing portfolios. Students taking this course as part of the Notation in Science Communication can include their final project in their NSC e-portfolio. This course fulfills the advanced PWR requirement for the Notation in Science Communication (NSC). Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For video course description, see <https://undergrad.stanford.edu/programs/pwr/courses/advanced-courses/farmers-scientists-activists-public-discourse-food-economies>. (Cardinal Course certified by the Haas Center).

**PWR 91EP. Intermediate Writing: Communicating Climate Change: Navigating the Stories from the Frontlines. 4 Units.**

In the next two decades floods, droughts and famine caused by climate change will displace more than 250 million people around the world. In this course students will develop an increased understanding of how different stakeholders including scientists, aid organizations, locals, policy makers, activists, and media professionals communicate the climate change crisis. They will select a site experiencing the devastating effects and research the voices telling the stories of those sites and the audiences who are (or are not) listening. Students might want to investigate drought-ridden areas such as the Central Valley of California or Darfur, Sudan; Alpine glaciers melting in the Alps or in Alaska; the increasingly flooded Pacific islands; the hurricane ravaged Gulf Coast, among many others. Data from various stakeholders will be analyzed and synthesized for a magazine length article designed to bring attention to a region and/or issue that has previously been neglected. Students will write and submit their article for publication. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

Same as: EARTHSYS 154

**PWR 91F. Finding Your Story. 3 Units.**

Life challenges us to become aware of the stories that shape us—family stories, cultural mythologies, even popular movies, television shows, and songs—and then create and live our own story. We face this challenge throughout our lives but perhaps most acutely as we move into adulthood; this is the period when we most need to become conscious of stories and their power, to gather wisdom, practices, and resources for finding our own story. This class, designed with seniors in mind, will illuminate and explore these resources and give you the opportunity to reflect deeply, in discussion and writing, on what truly calls to you in this life. We will engage with some of the world's great stories—myths, parables, teaching tales, modern fiction, even aphorisms, koans, and riddles. In them we can find both elements that resonate with our own story and provocations that help us unearth and cultivate our native gifts—the genius in each of us. We will look at short excerpts from masterworks and myths from around the world, all voices in the largest conversation we have as humans, the one that asks: who am I? why am I here? what truly matters? how can I be happy? Together we will investigate how these stories, and stories like them, can be used to help us find our own story. Students in this course will have a special opportunity to meet personally with poet Billy Collins and singer Aimee Mann when they visit campus in April. Does not fulfill NSC requirement. For students who have completed the first level of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first level of the writing requirement or equivalent transfer credit. For more information, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).

**PWR 91JS. Intermediate Writing: Stanford Science Podcast. 3 Units.**

Effective communication of expert knowledge in the sciences to non-specialist audiences. Project-based work on a range and variety of communication challenges, contexts, and media. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

**PWR 91KS. Intermediate Writing: Design Thinking and Science Communication. 4 Units.**

Effective communication of expert knowledge in the sciences to non-specialist audiences. Project-based work on a range and variety of communication challenges, contexts, and media. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

**PWR 91KSA. Intermediate Writing: Storytelling and Science. 4 Units.**

What is story? What is storytelling? And why would storytelling be crucial for science communication? In this class we will develop your Story IQ: we will learn how humans evolved to be the storytelling animal, how stories shape our lives, and why and how science communication needs storytelling in order to be relevant to public audiences. We'll move from looking at story architecture, to critiquing story structures (and stories) in science communications, and then to creating compelling stories of our own that communicate and/or correct science research or discovery. For course video and full description, visit <https://undergrad.stanford.edu/programs/pwr/courses/additional-elective-courses/science-and-storytelling>.

**PWR 91KT. Intermediate Writing: Game Set Match: Shaping Publics to Shape Movements. 4 Units.**

The success of a movement is never the work of one individual. In this course, students will investigate the specific case of Los Alamos scientist Wen Ho Lee and the media advocacy that aided in his release from solitary confinement after being accused of spying for China. Students will then analyze the role the public and news media frequently must play in the success of a cause, ultimately developing a website that publishes resources and interventions including students own digital media that moves a civil rights issue of their choice. For course video and full description, visit <https://undergrad.stanford.edu/courses/additional-elective-courses/game-set-match-shaping-publics-shape-movements>.

**PWR 91MC. Intermediate Writing : Activist Rhetoric. 4 Units.**

How do activists effectively strategize for social change? In this hands-on approach to studying activism and social justice issues, students will encounter new methods for mass communication, collaboration, and self-inquiry. First, we will consider how activists address practical problems in a variety of contexts, from protest movements to direct action, political lobbying to philanthropic capitalism, from Black Lives Matter to immigration activists. We will visit Stanford Special Collections to find inspiration in the Huey P. Newton Collection—the archive of the Black Panther Party. To inform these experiences, we will read and analyze texts by the Combahee River Collective, Angela Davis, Judith Butler, Fred Moten, and Jackie Wang, as well as inviting several activists to visit our classroom. Through collaborative and creative coursework, students will gain experience in intersectional thinking, community organizing, and collective action by conducting teach-ins, writing their own social justice manifesto, and planning a final campus-wide action. This course is part of the PWR advanced elective track in Social and Racial Justice (SRJ). Prerequisite: first two levels of the writing requirement or equivalent transfer credit. See <https://undergrad.stanford.edu/programs/pwr/courses/advanced-courses/activist-rhetoric> for full course description.

**PWR 91NSC. Intermediate Writing: Introduction to Science Communication. 4 Units.**

With the growing impact of science and technology on our society, the emphasis on communicating that science well has never been greater. But what is effective science communication? Is it ever ok to use jargon? Is it ok to say "I" in my research report? How do I communicate complex topics in simple, but accurate, ways? In this course, we will explore the variety of formats that science communication can take—from technical research papers on particle physics to children's books about genetics. We will explore how different audiences shape the way science is communicated, and we will develop a set of best practices for effective science communication. Students will then apply these strategies in their own science communication projects. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/nsc>. Required of students admitted into the Notation for Science Communication after January 2015.

**PWR 91OID. Creating Your Digital Story: Learn How to Build Your Online Identity and Why it Matters. 3 Units.**

Have you ever Googled yourself? If so, what information about you rises to the top? A picture of you in your band uniform from your high school? A poem you wrote and published on your Tumblr? Maybe your scores from a 5K you ran last year? It might seem like you don't have much control over what you see about yourself in a Google search, but the fact is, you do. The more that you create your own content, the more that your self-created information will rise to the top. Through learning the theories, tools, and techniques behind digital image management, this class will help prepare you for curating your digital self. In so doing, we can get better connected with the individuals and/or organizations that interest us. We will practice several pragmatic techniques for building our own personal ePortfolio (i.e. a website). Through participating in hands-on activities, storytelling exercises, and in-class discussions, you will have the opportunity to enact what we're learning and to experiment with different forms of expressing yourself online.

**PWR 91RS. Intermediate Writing: Communicating Bioinformation. 3 Units.**

Effective communication of expert knowledge in the sciences to non-specialist audiences. Project-based work on a range and variety of communication challenges, contexts, and media. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

**PWR 91S. Intermediate Writing: Communicating Science. 3 Units.**

Effective communication of expert knowledge in the sciences to non-specialist audiences. Project-based work on a range and variety of communication challenges, contexts, and media. For students who have completed the first two levels of the writing requirement and want further work in developing writing abilities, especially within discipline-specific contexts and nonfiction genres. Individual conferences with instructor and peer workshops. Prerequisite: first two levels of the writing requirement or equivalent transfer credit. For more information, see [http://www.stanford.edu/dept/undergrad/cgi-bin/drupal\\_pwr/advanced\\_pwr](http://www.stanford.edu/dept/undergrad/cgi-bin/drupal_pwr/advanced_pwr).

**PWR 99A. Portfolio Preparation I. 1 Unit.**

A 1-unit course introducing ePortfolios and folio thinking for students in the Notation in Science Communication (NSC). The course will assist students in designing a rhetorical ePortfolio and in selecting and reflecting on writing samples that represent student learning in science communication. This is the first of a two-part ePortfolio requirement for the NSC. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

**PWR 99B. Portfolio Preparation II. 2 Units.**

A 2-unit culminating course on ePortfolios for students in the Notation in Science Communication (NSC). In this course, students will continue building, revising, and editing a portfolio of documents, slides, and videos that will demonstrate development as a science communicator. This is the second of a two-part ePortfolio requirement for the NSC. For more information, see <https://undergrad.stanford.edu/programs/pwr/explore/notation-science-writing>.

## Psychology (PSYCH)

**PSYCH 1. Introduction to Psychology. 5 Units.**

An introduction to the science of how people think, feel, and behave. We will explore such topics as intelligence, perception, memory, happiness, personality, culture, social influence, development, emotion, and mental illness. Students will learn about classic and cutting edge research, a range of methods, and discover how psychology informs our understanding of what it means to be human, addresses other fields, and offers solutions to important social problems. An alternative version of the course, PSYCH 1L, is also offered for reduced (3) units, but does not count for major/minor requirements for Psychology or other disciplines. For more information on PSYCH 1 and PSYCH 1L, visit <http://psychone.stanford.edu>.

**PSYCH 10. Introduction to Statistical Methods: Precalculus. 5 Units.**

Techniques for organizing data, computing, and interpreting measures of central tendency, variability, and association. Estimation, confidence intervals, tests of hypotheses, t-tests, correlation, and regression. Possible topics: analysis of variance and chi-square tests, computer statistical packages.

Same as: STATS 60, STATS 160

**PSYCH 101. Community Health Psychology. 4 Units.**

Social ecological perspective on health emphasizing how individual health behavior is shaped by social forces. Topics include: biobehavioral factors in health; health behavior change; community health promotion; and psychological aspects of illness, patient care, and chronic disease management. Prerequisites: HUMBIO 3B or PSYCH 1, or equivalent.

Same as: HUMBIO 128

**PSYCH 101S. Introduction to Neuroscience. 4 Units.**

Introduction to structure and function of the nervous system. The course first surveys neuroscience research methods, physiology, and gross anatomy. We then study the brain systems which produce basic functions such as perception and motion, as well as complex processes like sleep, memory, and emotion. Finally, we examine these principles in cases of neurological and psychiatric disorders.

**PSYCH 102. Longevity. 4 Units.**

Interdisciplinary. Challenges to and solutions for the young from increased human life expectancy: health care, financial markets, families, work, and politics. Guest lectures from engineers, economists, geneticists, and physiologists.

Same as: HUMBIO 149L, NENS 202

**PSYCH 102S. Introduction to Neuroscience. 4 Units.**

Introduction to structure and function of the nervous system. The course first surveys neuroscience research methods, physiology, and gross anatomy. We then study the brain systems which produce basic functions such as perception and motion, as well as complex processes like sleep, memory, and emotion. Finally, we examine these principles in cases of neurological and psychiatric disorders.

**PSYCH 103. Intergroup Communication. 3 Units.**

In an increasingly globalized world, our ability to connect and engage with new audiences is directly correlated with our competence and success in any field. How do our intergroup perceptions and reactions influence our skills as communicators? This course uses experiential activities and discussion sections to explore the role of social identity in effective communication. The objective of the course is to examine and challenge our explicit and implicit assumptions about various groups to enhance our ability to successfully communicate across the complex web of identity.

Same as: CSRE 103

**PSYCH 103F. Intergroup Communication Facilitation. 1 Unit.**

This is a TA training course for Psych 103 - Intergroup Communication.

Same as: CSRE 103F

**PSYCH 104S. Affective Science. 3 Units.**

This course will provide an introduction to a growing field known as affective science, which focuses on the study of emotion and other related phenomena (i.e., motivation, pain, etc.). We will explore core questions in affective science, including: 1) What is emotion and why is it useful? 2) How do emotions influence the way we perceive, attend to, and understand the world? 3) How do emotions become dysfunctional, and how can individuals control them? We will attempt to approach these questions from multiple perspectives, including i) neurobiological ii) behavioral, and iii) sociocultural perspectives.

**PSYCH 105. Social Neuroscience. 4 Units.**

Over the last 20 years, neuroscientists have become increasingly interested in studying topics that were previously the purview of social psychologists. In this seminar, we will survey neuroimaging research on topics such as self perception, person perception, empathy, and social influence. More broadly, we will consider the contributions that neuroscience can (and cannot) make to social psychological theory. Students will be responsible for leading discussions and producing one in-depth review or research paper at the end of the quarter.

**PSYCH 105S. General Psychology. 3 Units.**

In what ways does the scientific study of psychology increase our understanding of the thoughts, feelings, and behaviors we observe and experience in everyday life? What are the main areas of psychology and the different questions they seek to answer? This course will give you an introduction to the field of psychology and its many different areas. You will learn about the central methods, findings, and unanswered questions of these areas, as well as how to interpret and critically evaluate research findings.

**PSYCH 107S. Introduction to Social Psychology. 3 Units.**

A comprehensive overview of social psychology with in-depth lectures exploring the history of the field, reviewing major findings and highlighting areas of current research. Focus is on classic studies that have profoundly changed our understanding of human nature and social interaction, and, in turn, have triggered significant paradigm shifts within the field. Topics include: individuals and groups, conformity and obedience, attraction, intergroup relations, and judgment and decision-making.

**PSYCH 108. Longevity through Film. 3 Units.**

The media informs the understanding of life stages and shapes expectations about our futures. This course will explore the realities and fictions about life-span development through film. This course will revolve around selected films compared with the literature on life stages. Guest filmmakers, psychologists, sociologists and thought leaders will join the class to discuss human development.

**PSYCH 108S. Introduction to Social Psychology. 3 Units.**

This course aims to blend a comprehensive overview of social psychology with in-depth lectures exploring the history of the field, reviewing major findings and highlighting areas of current research. The course will focus on classic studies that have profoundly changed our understanding of human nature and social interaction, and, in turn, have triggered significant paradigm shifts within the field. Some of the topics covered in this class will include: individuals and groups, conformity and obedience, attraction, intergroup relations, and judgment and decision-making. The course, overall, will attempt to foster interest in social psychology as well as scientific curiosity in a fun, supportive and intellectually stimulating environment.

**PSYCH 109S. Introduction to Cognitive Neuroscience. 3 Units.**

3) Introduction of the neurobiology of behavior including the biology of nervous system, the neural basis for perception, learning, memory, decision making and neurological disorders. Introduction to different research techniques that are prevalent in current neuroscience studies including fMRI, EEG, TMS and single unit recording.

**PSYCH 10N. Kids, Culture, and Poverty: From Biology to Social Action. 4 Units.**

Years before they set foot in school, children growing up in poor families begin to diverge from children in richer families in their trajectories of cognitive and language growth. These differences have powerful and enduring consequences for the health, well-being, educational success, and longevity of individuals, as well as for the future prosperity of the societies in which children become adults. Early childhood is a time of both enormous promise and considerable risk, and parents in different cultures have widely differing practices and beliefs about their role in enabling children to avoid risk and achieve their potential. In this seminar we will evaluate evidence from the biological and social sciences showing how positive and negative experiences in infancy have profound and enduring effects on early brain architecture, with cascading consequences for later development in childhood and adulthood. We will also consider the challenges of designing more effective programs and social policies to provide support for families in diverse cultural contexts, with the goal of helping more children to reach their full potential.

**PSYCH 110S. Introduction to Cultural Psychology. 3 Units.**

In an increasingly globalized world, the ability to understand people from different cultural backgrounds, as well as understand how we are influenced by our own cultural contexts, is an essential skill. In this course, we will consider the many ways in which individuals shape, and are shaped by, institutions (e.g., education system; media; religion), social interactions (e.g., family; employers), and broad cultural ideas (e.g., democracy). Drawing from psychological research, we will analyze sociocultural sources of diversity in self, agency, cognition, emotion, motivation, development, and relationships. We will also analyze past and modern cultural products - including films, literature, music, and art - to better understand the transmission of culture. Each discussion will contribute to a better understanding of the hidden factors that guide daily experiences and the various opportunities and barriers to creating social change. The course will empower students to recognize and analyze the influence of culture on everyday functioning and apply that understanding to improving their own and other people's outcomes.

**PSYCH 111S. Abnormal Psychology. 3 Units.**

This course will provide an introduction to abnormal psychology. It will be targeted towards students who have had little or no exposure to coursework on mental disorders. The course will have three core aims: 1) Explore the nature of mental disorders, including the phenomenology, signs/symptoms, and causal factors underlying various forms of mental illness, 2) Explore conventional and novel treatments for various mental disorders, 3) Develop critical thinking skills in the theory and empirical research into mental disorders. The course will explore a wide range of mental disorders, including depression, anxiety, schizophrenia, addiction, eating disorders, and personality disorders.

**PSYCH 113S. Developmental Psychology. 3 Units.**

This class will introduce students to the basic principles of developmental psychology. As well as providing a more classic general overview, we will also look towards current methods and findings. Students will gain an appreciation of how developmental psychology as a science can be applied to their general understanding of children and the complicated process of growing into adults.

**PSYCH 115S. Personality Psychology. 3 Units.**

This course will focus on current empirical and theoretical approaches to personality. Lectures will be organized around the following questions central to personality research: How and why do people differ? How do we measure individual differences? Does personality change over time? How does personality interact with sociocultural factors to influence behavior? What makes people happy? What are the physical, mental, and social consequences of personalities?

**PSYCH 11N. Origin of Mental Life. 3 Units.**

Preference to freshmen. Mental life in infancy; how thinking originates. How do babies construe the objects, events, people, and language that surround them? Recent advances in psychological theory, hypotheses, and evidence about how the infant human mind develops.

**PSYCH 120. Cellular Neuroscience: Cell Signaling and Behavior. 4 Units.**

Neural interactions underlying behavior. Prerequisites: PSYCH 1 or basic biology.

Same as: BIO 153

**PSYCH 121. Ion Transport and Intracellular Messengers. 3 Units.**

(Graduate students register for 228.) Ion channels, carriers, ion pumps, and their regulation by intracellular messengers in a variety of cell types. Recommended: 120, introductory course in biology or human biology.

Same as: PSYCH 228

**PSYCH 125S. Language and Thought. 3 Units.**

How are we able to produce and comprehend language in all its complexity? How does language processing interact with other parts of cognition? In this course, we will focus on several main themes: language production and comprehension, discourse, language acquisition, bilingualism, and linguistic relativity. We will explore these themes through lecture, demonstrations, analysis of empirical work, and student-led discussion. Special attention will also be given to the various experimental methods we use to conduct psycholinguistic and developmental research (e.g., self-paced reading, eye-tracking, cross-modal priming, and neural imaging).

**PSYCH 12N. Self Theories. 3 Units.**

Preference to freshmen. The impact of people's belief in a growing versus fixed self on their motivation and performance in school, business, sports, and relationships. How such theories develop and can be changed.

**PSYCH 130. Experimental Pragmatics. 3 Units.**

How do we understand language as it is used in context? Pragmatic reasoning allows us to go beyond the literal semantics of what someone says to infer what they actually meant. This course will be an in-depth investigation of recent experimental work on pragmatics. Students will read the primary research literature as they learn the skills necessary to develop and run an original experiment investigating our pragmatic inference abilities. Required: Psych 131, Linguist 130A, Linguist 188, or permission of instructor.

**PSYCH 135. The Psychology of Diverse Community. 3 Units.**

This course is an exploration. Its aim is to identify distinguishing features of good diverse communities and articulate them well enough to offer principles or guidelines for how to design and manage such communities e.g. schools, universities, academic disciplines, etc.

Same as: CSRE 135P

**PSYCH 136. The Psychology of Scarcity: Its Implications for Psychological Functioning and Education. 3 Units.**

This course brings together several literatures on the psychological, neurological, behavioral and learning impact of scarcities, especially those of money (poverty) time and food. It will identify the known psychological hallmarks of these scarcities and explore their implications for psychological functioning, well-being and education—as well as, how they can be dealt with by individuals and in education.

Same as: PSYCH 236A

**PSYCH 136S. Learning and Memory: Theory and Applications. 3 Units.**

This course explores how our behavior in the present is guided by our past experiences, and how we can apply these principles to our own learning and to the broader world around us. We will explore the theory of learning and memory, including an introduction to multiple memory systems, the ways in which memory can succeed but also fail, and how memory integrity changes across the lifespan and across clinical populations. We will also explore applications of this theoretical content to the real world technologies and policies that touch our everyday lives, such as applications in brain training, advertising, the legal system, and the classroom.

**PSYCH 138. Wise Interventions. 4 Units.**

Classic and contemporary psychological interventions; the role of psychological factors in social reforms for social problems involving healthcare, the workplace, education, intergroup, relations, and the law. Topics include theories of intervention, the role of laboratory research, evaluation, and social policy.

Same as: PSYCH 238, PUBLPOL 238

**PSYCH 138S. Motivation to Learn. 3 Units.**

Why do some students delight at the thought of challenging tasks while others only care about getting the grade? Why do some seek out opportunities to learn in and out of school while others feel anxious just showing up to class? Why do our failures sometimes debilitate and other times invigorate? How do we turn our desires to achieve into concrete action? Where do these motivational processes come from and how might we use our understanding of motivation to improve educational systems? This course will address these and other fascinating questions as we consider theory and research on motivation, primarily as it applies to educational contexts. The course will be based largely around interactive discussions of primary source articles, with some lecture in order to provide you with important background information and a framework for discussing the readings.

**PSYCH 139S. Psychology of Women. 3 Units.**

Women comprise half of the human population, yet throughout much of history, the study of human thought and behavior has been largely male focused. In fact, some of the earliest psychological studies of women were conducted primarily to argue for the evolutionary supremacy of men. During the past fifty years, the field of psychology has made significant strides towards considering women and men equally worthy subjects of inquiry. In this course, we will discuss this growing body of research related to gender and the female experience. We will focus on six main themes: social and biological approaches to studying gender, evidence for gender similarities and differences, gender stereotypes and sexism, gender and language use, women in the workplace, and female sexuality. We will explore these themes through lectures, in class demonstrations, analysis of empirical work, and student led discussion.

**PSYCH 13N. Emotion Regulation. 3 Units.**

This seminar provides a selective overview of the scientific study of emotion regulation. Topics include: theoretical foundations, cognitive consequences, developmental approaches, personality processes and individual differences, and clinical and treatment implications. Our focus is on interesting, experimentally tractable ideas. Meetings will be discussion based.

**PSYCH 140. Introduction to Psycholinguistics. 4 Units.**

How do people do things with language? How do we go from perceiving the acoustic waves that reach our ears to understanding that someone just announced the winner of the presidential election? How do we go from a thought to spelling that thought out in a sentence? How do babies learn language from scratch? This course is a practical introduction to psycholinguistics – the study of how humans learn, represent, comprehend, and produce language. The course aims to provide students with a solid understanding of both the research methodologies used in psycholinguistic research and many of the well-established findings in the field. Topics covered will include visual and auditory recognition of words, sentence comprehension, reading, discourse and inference, sentence production, language acquisition, language in the brain, and language disorders. Students will conduct a small but original research project and gain experience with reporting and critiquing psycholinguistic research.

Same as: LINGUIST 145

**PSYCH 140S. Sport Psychology. 3 Units.**

Focus is on research methods and findings and how to apply these findings to students' own performance. Topics include methods of performance enhancement, psychological characteristics of top performers, group dynamics and processes, effective leadership practices, the effects of stereotyping on sport participation and performance, and debates in the field. Emphasis will be on sports, although most topics can be applied to performance in general.

**PSYCH 141. Cognitive Development. 3 Units.**

This course aims to offer an understanding of how human cognition & the ability to think, reason, and learn about the world & changes in the first few years of life. We will review and evaluate both classic findings and state-of-the-art research on cognitive development, and learn about the methods used to reveal what children know and think about the world. The course will help students to understand, discuss, and critically evaluate the major theories and explanations of intellectual growth, and consider implications of cognitive development research on real-world issues in education and social policy. Prerequisites: Psych 1.

**PSYCH 141S. Health Psychology. 3 Units.**

Why is it so difficult for people to stick to an exercise plan? Why don't people take their doctor's advice? Why aren't public health announcements more effective? This course addresses these questions by providing an overview of health psychology: the scientific study of behaviors and cognitive processes related to health states. In this course, we will discuss the mind/body connection, the influence of social/cultural and physical environments on our health, cognitive processing of health information, health belief models, and the link between emotion and health. Understanding the interactions between these biological, psychological, and social influences on individuals' health states is crucial for developing effective health communication and intervention programs. We will approach all course topics from both theory-driven and applied perspectives.

**PSYCH 145. Seminar on Infant Development. 1-2 Unit.**

For students preparing honors research. Conceptual and methodological issues related to research on developmental psycholinguistics; training in experimental design; and collection, analysis, and interpretation of data.

**PSYCH 146. Observation of Children. 3-5 Units.**

Learning about children through guided observations at Bing Nursery School, Psychology's lab for research and training in child development. Physical, emotional, social, cognitive, and language development. Recommended: 60.

**PSYCH 147. Development in Early Childhood. 3-5 Units.**

Supervised experience with young children at Bing Nursery School. 3 units require 4 hours per week in Bing classrooms throughout the quarter; 4 units require 7 hours per week; 5 units require 10.5 hours per week. Seminar on developmental issues in the Bing teaching/learning environment. Recommended: 60 or 146, or consent of instructor.

**PSYCH 147S. Introduction to the Psychology of Emotion. 3 Units.**

Our emotions influence how we perceive the world, inform how we make critical life decisions, and connect us with other people. Affective science, the scientific study of emotion, investigates how emotions shape our lives. In this course, we explore how emotions arise as feelings we experience, behaviors we commit, and physiological reactions to our environments. Across these levels of analysis, we will consider how emotions interact with our personalities, past experiences, future goals, stages of development, and socio-cultural surroundings. We will learn how affective science has clarified the nature of emotion, how emotions evolved across diverse animal species, and how emotions impact our health and relationships with others. You will leave this class with an improved, scientifically-informed understanding of your own and others emotions, and strategies for how to effectively use and manage your feelings in daily life.

**PSYCH 148S. The Psychology of Bias: Stereotyping, Prejudice, and Discrimination. 3 Units.**

From Black Lives Matter to mansplaining, issues of stereotyping, prejudice, and discrimination grab our attention and draw our concern. This course brings together research from social, cognitive, affective, developmental, cultural, and neural perspectives to examine the processes that reflect and perpetuate group biases. Along with these various research perspectives, we will consider perspectives of both privileged and disadvantaged group members. Where do stereotypes come from? Why is race so hard to talk about? Can we be biased without knowing it? How can we reduce prejudice and conflict? We will address these and other questions through lectures, class discussion, and group presentations.

**PSYCH 150. Race and Crime. 3 Units.**

The goal of this course is to examine social psychological perspectives on race, crime, and punishment in the United States. Readings will be drawn not only from psychology, but also from sociology, criminology, economics, and legal studies. We will consider the manner in which social psychological variables may operate at various points in the criminal justice system- from policing, to sentencing, to imprisonment, to re-entry. Conducted as a seminar. Students interested in participating should attend the first session and complete online application for permission at <https://goo.gl/forms/CAut7RKX6MewBluG3>. Same as: CSRE 150A

**PSYCH 150B. RACE AND CRIME PRACTICUM. 2-4 Units.**

This practicum is designed to build on the lessons learned in Psych 150: Race & Crime. In this community service learning course, students will participate in community partnerships relevant to race and crime, as well as reflection to connect these experiences to research and course content. Interested students should complete an application for permission at: <https://goo.gl/forms/CAut7RKX6MewBluG3>. Prerequisite: Psych 150 (taken concurrently or previously). Same as: CSRE 150B

**PSYCH 152. Mediation for Dispute Resolution. 3 Units.**

Mediation as more effective and less expensive than other forms of settling disputes such as violence, lawsuits, or arbitration. How mediation can be structured to maximize the chances for success. Simulated mediation sessions. Same as: EDUC 131

**PSYCH 152F. Doing Race and Ethnicity: How and Why it Matters. 3 Units.**

Going to school and work, renting an apartment, going to the doctor, watching television, voting, reading, and attending religious services are all activities that involve doing, consciously or unconsciously, race and ethnicity. In this course, we draw from history, psychology, genetics, and literary studies to understand contemporary racial formations and cultural representations. Course will include two 50-minute lectures with a required online discussion section. Enrollment capped at 20 students.

**PSYCH 154. Judgment and Decision-Making. 3 Units.**

Survey of research on how we make assessments and decisions particularly in situations involving uncertainty. Emphasis will be on instances where behavior deviates from optimality. Overview of recent works examining the neural basis of judgment and decision-making.

**PSYCH 155. Introduction to Comparative Studies in Race and Ethnicity. 5 Units.**

How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. Includes an optional Haas Center for Public Service certified Community Engaged Learning section. Same as: CSRE 196C, ENGLISH 172D, SOC 146, TAPS 165

**PSYCH 156. Communicating Neuroscience. 3 Units.**

Understanding the structure and function of the brain is presently an international goal with Brain Initiatives in the United States, Europe, and Japan. Due to this global interest, knowledge about the brain is influencing all aspects of society. As such, accurate communication and translation of neuroscience findings are of utmost importance. This course will examine ways to translate and to communicate neuroscience research for public outreach, with a focus on the role of technology. Topics include: television, feature articles, blogs, documentaries, and online videos. Students will learn different ways to accurately translate and communicate neuroscience topics in the context of theoretical and methodological approaches and to apply these tools in an original way to generate a completed outreach piece by the end of the course.

**PSYCH 161. Emotion. 3 Units.**

(Graduate students register for 261.) The scientific study of emotion. Topics: models of emotion, emotion antecedents, emotional responses (facial, subjective, and physiological), functions of emotion, emotion regulation, individual differences, and health implications. Focus is on experimentally tractable ideas. Same as: PSYCH 261

**PSYCH 164. Brain decoding. 3 Units.**

Can we know what someone is thinking by examining their brain activity? Using knowledge of the human visual system and techniques from machine learning, recent work has shown impressive ability to decode what people are looking at from their brain activity as measured with functional imaging. The course will use a combination of lectures, primary literature readings, discussion and hands-on tutorials to understand this emerging technology from basic knowledge of the perceptual (primarily visual) and other cognitive systems (such as working memory) to tools and techniques used to decode brain activity. Prerequisites: Either Psych 30 or Psych 50 or Consent of Instructor.

**PSYCH 168. Emotion Regulation. 3 Units.**

(Graduate students register for 268.) The scientific study of emotion regulation. Topics: historical antecedents, conceptual foundations, autonomic and neural bases, individual differences, developmental and cultural aspects, implications for psychological and physical health. Focus is on experimentally tractable ideas. Same as: PSYCH 268

**PSYCH 169. Advanced Seminar on Memory. 3 Units.**

Memory and human cognition. Memory is not a unitary faculty but consists of multiple systems that support learning and remembering, each with its own processing characteristics and neurobiological substrates. This advanced undergraduate seminar will consider recent discoveries about the cognitive and neural architectures of working, declarative, and nondeclarative memory. Required: 45.

**PSYCH 16N. Amines and Affect. 3 Units.**

Preference to freshmen. How serotonin, dopamine, and norepinephrine influence people's emotional lives. This course is ideal for students that would like to get deeper exposure to cutting edge concepts and methods at the intersection of psychology and biology, and who plan to apply their knowledge to future research.

**PSYCH 170. The Psychology of Communication About Politics in America. 4-5 Units.**

Focus is on how politicians and government learn what Americans want and how the public's preferences shape government action; how surveys measure beliefs, preferences, and experiences; how poll results are criticized and interpreted; how conflict between polls is viewed by the public; how accurate surveys are and when they are accurate; how to conduct survey research to produce accurate measurements; designing questionnaires that people can understand and use comfortably; how question wording can manipulate poll results; corruption in survey research.

Same as: COMM 164, COMM 264, POLISCI 124L

**PSYCH 171. Research Seminar on Aging. 4 Units.**

Two quarter practicum exposes students to multiple phases of research by participating in a laboratory focusing on social behavior in adulthood and old age. Review of current research; participation in ongoing data collection, analysis, and interpretation. Prerequisites: 1, research experience, and consent of instructor. May be repeated for credit.

**PSYCH 172. Self-fashioning. 3 Units.**

This undergraduate and graduate seminar will examine philosophical and psychological literature relevant to self-fashioning. Meetings will be discussion oriented, and each meeting will focus on a different question of theoretical and applied significance. Prerequisite: consent of instructor. May be repeat for credit.

Same as: PHIL 186A, PHIL 286A

**PSYCH 175. Social Cognition and Learning in Early Childhood. 4 Units.**

Social cognition - the ability to recognize others, understand their behaviors, and reason about their thoughts - is a critical component of what makes us human. What are the basic elements of social cognition, and what do children understand about other people's actions, thoughts, and feelings? How do these capacities help us understand the world, as learning unfolds in the first few years of life? This course will take a deeper look at the intersection of social cognition and cognitive development to better understand how children learn about the world. Students will explore various topics on social cognition with an emphasis on (but not limited to) developmental perspectives, including face perception, action understanding, Theory of Mind, communication, and altruism, and think about how these abilities might be linked to the developmental changes in children's understanding of the world. The course will encourage students to think hard about the fundamental questions about the human mind and how it interacts with other minds, and the value of studying young children in addressing these questions. Students should expect to read, present, and discuss theoretical and empirical research articles and to develop original research proposals as a final project. Students will have an opportunity to develop their proposals into a research project in PSYCH 187, a lab course offered every other year in Spring (next offer expected to be Spring 2018) as a sequel to this course. This course fulfills the WIM requirement. Prerequisites Psych 60 or Psych141, or see instructor.

**PSYCH 176. Biology, Culture and Family in Early Development. 3-4 Units.**

Early childhood is a time of both enormous promise and vulnerability. Parents differ widely in their practices and beliefs about their role in enabling children to avoid risk and to achieve their potential for a healthy and productive life in the particular physical, social and cultural contexts of the communities and societies in which they live. In this seminar we will evaluate evidence from the biological and social sciences showing how experiences in infancy have profound and enduring effects on early brain architecture, with consequences for later language, cognitive, and socio-emotional development in childhood and adulthood. We will also consider the challenges of designing more effective social policies and programs to provide support for families in diverse socioeconomic and cultural contexts, who all want to help their children thrive. A community-service learning option, working with children as a reading tutor, is included for students taking this class for 4-units. Enrollment is limited and consent of instructor is required. Please send a brief statement of your interests, goals, and academic preparation relevant to the themes of this class to Prof. Fernald (afernald@stanford.edu). Pre-requisites: Psych 01 and Psych 60, or Human Biology 3B.

Same as: HUMBIO 147

**PSYCH 178. New Methods for Old Questions: Linking Social Cognition and Social Cognitive Neuroscience. 3 Units.**

Novel technology can fuel new discoveries and generate new questions for future research. For instance, looking-time methods for studying infants or response time (RT) measures in cognitive psychology have been enabled by the use of computers and video cameras. More recently, neuroimaging techniques (such as fMRI) have transformed the field by offering a more direct look into the working human brain. These methods are, in a way, 'old' and 'new' ways of studying what psychologists want to study - mental representations. What are the promises and challenges of using these methods to study human cognition and its development? What have we learned, where have we fallen short, and why? Most importantly, how can we make the most out of these new methods to bear on our understanding of social cognition and its development? After the first two weeks of lectures on basic methods, each week we will consider a topic that has been extensively studied in cognitive development literature. Topics will include: perception of agency, theory of mind, and morality; on each topic, we will compare two different ways of studying mental representations - the 'old' way (behavior) and the 'new' way (neural response) - to assess their relative benefits and shortcomings, and to discuss the promises and pitfalls for combining the two. This course will be a combination of lectures, presentations, and discussions aimed primarily for upper-class undergraduate students or graduate students who do not have much background in neuroimaging methods, but interested in learning more about neuroimaging methods and think about how these methods can (and cannot) help address questions about social cognition and development. Prerequisite: Psych 60 or Psych141, or see instructor.

**PSYCH 180. Social Psychological Perspectives on Stereotyping and Prejudice. 4 Units.**

The seminar will review classic and current literature from social psychology on stereotyping and prejudice. We will cover the perceiver's perspective including the formation and maintenance of stereotypes, the functions and costs of stereotyping, and stereotype change. We will also explore how targets are affected by stereotypes and prejudice, as well as intergroup relations. Recent research concerning the role of cognitive, affective, motivational and behavioral processes will be emphasized.

**PSYCH 180A. SPARQshop: Social Psychological Answers to Real-world Questions. 3 Units.**

Undergraduate and graduate students will work in teams to design, build, test, and distribute online toolkits that help practitioners solve real-world problems by applying social science. Graduate students can build toolkits for their own research. Students will learn how to assess the needs of practitioner audiences; write text, design graphics, and program activities for these audiences; prepare, deliver, and produce a TED-style online video; design surveys in Qualtrics; and build and user-test the toolkit. Readings and class discussions will include modules on design thinking, storytelling, science writing, information design, and impact evaluation. For an example of a toolkit in progress, please visit [spacereface.org](http://spacereface.org). Permission of instructor required.

Same as: PSYCH 283A

**PSYCH 183. SPARQ Lab. 2-3 Units.**

Join SPARQ (Social Psychological Answers to Real-world Questions) as a research assistant and help with projects addressing real-world issues.

**PSYCH 186. The Psychology of Racial Inequality. 3 Units.**

Our topic is the psychology of racial inequality - thinking, feeling, and behaving in ways that contribute to racial stereotyping, prejudice, and discrimination, and how these processes in turn maintain and perpetuate inequality between racial groups. We will examine how these processes unfold at both the individual and the institutional levels. Throughout this course, you will familiarize yourself with the psychological perspectives, methods, and findings that help explain racial inequality, and we will explore ways to promote racial equality. The course will be conducted as a seminar, but most of what you learn will be through the readings and discussions. That is, this course is minimally didactic; the goal is to have you engage thoughtfully with the issues and readings spurred in part by sharing perspectives, confusions, and insights through writing and discussion. Each student will facilitate at least one class session by providing an introductory framework for the readings (~10-minute presentation with handouts that overviews the concepts, issues, and controversies). Together, we will broaden our knowledge base on the subject and explain, from a psychological perspective, the pervasiveness of racial inequality. Prerequisites: PSYCH 1 and PSYCH 10.

Same as: CSRE 186, PSYCH 286

**PSYCH 187. Research Design, Implementation, and Communication in Cognitive Development. 3-4 Units.**

As educated consumers of scientific literature, we read reports of research findings in our everyday lives, sometimes through primary sources (e.g., journal articles) or through popular media reports of these sources. In particular, findings from cognitive development research often attract a lot of public interest, particularly from parents, caregivers, and educators, as these findings have implications for how best to educate young children. However, reports of scientific findings in cognitive development and their real-world implications often fail to convey the importance of tightly controlled experimental designs, the issues and challenges in conducting experiments, and the difficulty of interpreting the results and linking them to real-world practices in early education. This course originates from the idea that having a first-hand experience in the actual research process is an effective way to provide a deeper understanding of these issues, and help us become better consumers of scientific knowledge. This course is an advanced, lab-based research class in cognitive development, primarily offered for those who have completed PSYCH175 or equivalent. Students will conduct a replication/extension of a published study (or, depending on instructor approval, develop their final proposal into a research project if the project fits certain criteria). In this course, students will form a small research team and experience the role of an independent researcher to partake in the process of designing and conducting an experiment. At the end of the quarter, students will present their findings in front of a scientific audience and submit a full empirical report. All prospective students must have completed PSYCH 175 (or have written an equivalent research proposal on a related topic), and contact the instructor at least three weeks before the term begins for instructor approval. Student should expect to spend a significant number of hours outside the classroom for data collection. Prerequisites: PSYCH175 (strongly recommended) and instructor approval.

**PSYCH 188. Special Research Projects. 1-6 Unit.**

For research in the Stanford Neurodevelopment, Affect, and Psychopathology Lab only.

**PSYCH 188A. Research and special lab with Bing. 1-6 Unit.**

Research and special lab with Bing. May be repeat for credit.

**PSYCH 189. Stanford Center on Longevity Practicum. 3 Units.**

Student involvement in an interdisciplinary center aimed at changing the culture of human aging using science and technology. May be repeated for credit.

**PSYCH 190. Special Research Projects. 1-6 Unit.**

May be repeated for credit. Prerequisite: consent of instructor.

**PSYCH 191. Special Research Projects in the Mind & Body Lab. 1-6 Unit.**

May be repeated for credit or for grade. Prerequisites: consent of instructor.

**PSYCH 192. Career and Personal Counseling. 3 Units.**

Theories and methods for helping people create more satisfying lives for themselves. Simulated counseling experiences.

Same as: EDUC 134, EDUC 234

**PSYCH 193. Special Laboratory Research. 1-6 Unit.**

May be repeated for credit. Prerequisites: 1, 10, and consent of instructor.

**PSYCH 194. Reading and Special Work. 1-3 Unit.**

Independent study. May be repeated for credit. Prerequisite: consent of instructor.

**PSYCH 195. Special Laboratory Projects. 1-6 Unit.**

Independent study. May be repeated for credit. Prerequisites: 1, 10, and consent of instructor.



**PSYCH 197. Advanced Research. 1-4 Unit.**

Limited to students in senior honors program. Weekly research seminar, independent research project under the supervision of an appropriate faculty member. A detailed proposal is submitted at the end of Autumn Quarter. Research continues during Winter and Spring quarters as 198. A report demonstrating sufficient progress is required at the end of Winter Quarter.

**PSYCH 198. Senior Honors Research. 1-4 Unit.**

Limited to students in the senior honors program. Finishing the research and data analysis, written thesis, and presentation at the Senior Honors Convention. May be repeated for credit.

**PSYCH 1L. Introduction to Psychology. 3 Units.**

A reduced-unit version of Stanford's popular Psych 1 class. An introduction to the science of how people think, feel, and behave. We will explore such topics as intelligence, perception, memory, happiness, personality, culture, social influence, development, emotion, and mental illness. Students will learn about classic and cutting edge research, a range of methods, and discover how psychology informs our understanding of what it means to be human, addresses other fields, and offers solutions to important social problems. The primary version of the course, PSYCH 1, is offered for 5 units and counts for major/minor requirements for Psychology and other disciplines. For more information on PSYCH 1 and PSYCH 1L, visit <http://psychone.stanford.edu>.

**PSYCH 201S. Bayesian Statistics for Psychologists. 3 Units.**

Have you ever collected data and then not know how to analyze it? Bayesian data analysis is a general purpose data analysis approach for making explicit hypotheses about where the data came from (e.g. the hypothesis that data from 2 experimental conditions came from two different distributions). In this course, we will explore and learn how to use Bayesian data analytic tools for analyzing data from psychology experiments. Students will develop a strong foundation for statistical intuitions and build on these intuitions to conduct Bayesian analyses of experimental data. The course will focus on the practicalities of running Bayesian analyses, of describing analyses for purposes of publication, and of making inferences about data and design decisions for subsequent experiments. This course is ideal for graduate or advanced-undergraduate students in Psychology, Linguistics, and related fields, who conduct experiments on human behavior; also appropriate for students without experience in psychological experiments but with experience in statistics.

**PSYCH 202. Cognitive Neuroscience. 3 Units.**

Graduate core course. The anatomy and physiology of the brain. Methods: electrical stimulation of the brain, neuroimaging, neuropsychology, psychophysics, single-cell neurophysiology, theory and computation. Neuronal pathways and mechanisms of attention, consciousness, emotion, language, memory, motor control, and vision. Prerequisite: For psychology graduate students, or consent of instructor.

**PSYCH 203. MODELS OF LANGUAGE ACQUISITION. 3 Units.**

How do children learn to understand and produce their native language? Language acquisition is a core topic in cognitive science and has been a key test case for formal approaches. Topics include: learnability theory, grammatical approaches, connectionist models, and probabilistic models.

**PSYCH 204. Computation and cognition: the probabilistic approach. 3 Units.**

This course will introduce the probabilistic approach to cognitive science, in which learning and reasoning are understood as inference in complex probabilistic models. Examples will be drawn from areas including concept learning, causal reasoning, social cognition, and language understanding. Formal modeling ideas and techniques will be discussed in concert with relevant empirical phenomena.

Same as: CS 428

**PSYCH 204A. Human Neuroimaging Methods. 3 Units.**

This course introduces the student to human neuroimaging using magnetic resonance scanners. The course is a mixture of lectures and hands-on software tutorials. The course begins by introducing basic MR principles. Then various MR measurement modalities are described, including several types of structural and functional imaging methods. Finally algorithms for analyzing and visualizing the various types of neuroimaging data are explained, including anatomical images, functional data, diffusion imaging (e.g., DTI) and magnetization transfer. Emphasis is on explaining software methods used for interpreting these types of data.

**PSYCH 204B. Computational Neuroimaging: Methods & Analyses. 3 Units.**

This course introduces the student to human neuroimaging using magnetic resonance scanners. The course is a mixture of lectures and hands-on software tutorials. The course begins by introducing basic MR principles. Then various MR measurement modalities are described, including several types of structural and functional imaging methods. Finally algorithms for analyzing and visualizing the various types of neuroimaging data are explained, including anatomical images, functional data, diffusion imaging (e.g., DTI) and magnetization transfer. Emphasis is on explaining software methods used for interpreting these types of data. Required: Psych 204a; Recommended: Cognitive Neuroscience.

**PSYCH 205. Foundations of Cognition. 1-3 Unit.**

Topics: attention, memory, language, similarity and analogy, categories and concepts, learning, reasoning, and decision making. Emphasis is on processes that underlie the capacity to think and how these are implemented in the brain and modeled computationally. The nature of mental representations, language and thought, modular versus general purpose design, learning versus nativism. Prerequisite: 207 or consent of instructor. Open to Psychology PhD students only.

**PSYCH 206. Cortical Plasticity: Perception and Memory. 1-3 Unit.**

Seminar. Topics related to cortical plasticity in perceptual and memory systems including neural bases of implicit memory, recognition memory, visual priming, and perceptual learning. Emphasis is on recent research with an interdisciplinary scope, including theory, behavioral findings, neural mechanisms, and computational models. May be repeated for credit. Recommended: 30, 45.

**PSYCH 207. Professional Seminar for First-Year Ph.D. Graduate Students. 2-3 Units.**

Required of and limited to first-year Ph.D. students in Psychology. Major issues in contemporary psychology with historical backgrounds.

**PSYCH 207B. Professional Development Seminar in Psychology. 0-1 Units.**

For graduate students who wish to gain professional development skills to pursue an academic career. May be repeated for credit. Course is intended for second year Ph.D. student in Psychology but open to all years.

**PSYCH 209. Neural Network Models of Cognition: Principles and Applications. 4 Units.**

Neural Network models of cognitive and developmental processes and the neural basis of these processes, including contemporary deep learning models. Students learn about fundamental computational principles and classical as well as contemporary applications and carry out exercises in the first six weeks, then undertake projects during the last four weeks of the quarter. Recommended: computer programming ability, familiarity with differential equations, linear algebra, and probability theory, and one or more courses in cognition, cognitive development or cognitive/systems neuroscience.

**PSYCH 20N. How Beliefs Create Reality. 3 Units.**

This seminar will take an interdisciplinary approach to exploring how subjective aspects of the mind (e.g., thoughts, beliefs, and expectations) can fundamentally change objective reality. Over the course of the semester, students will be challenged to think critically about research from psychology, sociology, and medicine, which suggests that what we think, believe and expect plays a significant role in determining our physical health, performance and well-being. Students will explore research on how mindsets about nutrition, exercise, and stress can alter the body's response to those phenomena. Students will also uncover how social interactions with friends, family, colleagues and the media influence the perceived quality and impact of cultural products such as art, music, and fashion. And students will learn about the neurological and physiological underpinnings of the placebo effect, a powerful demonstration of expectation that produces real, healing changes in the body. Finally, students will have the opportunity to consider real world applications in disciplines including policy, business, medicine, academics, athletics and public health and consider the ethical implications of those applications. Throughout the class active participation and an open mind will be critical to success. The final weeks of class will be dedicated to student designed studies or interventions aimed to further explore the power of self-fulfilling prophecies, placebo effects, and the social-psychological creation of reality.

**PSYCH 211. Developmental Psychology. 1-3 Unit.**

Prerequisite: 207 or consent of instructor.

**PSYCH 212. Classic and contemporary social psychology research. 1-3 Unit.**

Evolution of ideas from early experiments on group dynamics, attitude change, and cognitive dissonance to later work on behavioral and emotional attribution, and more contemporary work on strategies and shortcomings in judgment and decision-making and on implicit influences on attitudes and behavior. Other topics include social dilemmas, conflict and misunderstanding, positive psychology, and the application of social psychological principles and findings to ongoing social problems including social inequality, education, and the challenge of addressing climate change.

**PSYCH 213. Affective Science. 3 Units.**

This seminar is the core graduate course on affective science. We consider definitional issues, such as differences between emotion and mood, as well as issues related to the function of affect, such as the role affect plays in daily life. We review autonomic, neural, genetic, and expressive aspects of affective responding. Later in the course we discuss the role of affect in cognitive processing, specifically how affective states direct attention and influence memory, as well as the role of affect in decision making. We will also discuss emotion regulation and the strategic control of emotion; the cultural shaping of emotional experience and regulation; disorders of emotion; and developmental trajectories of experience and control from early to very late life. Meetings are discussion based. Attendance and active participation are required. Prerequisite: 207 or consent of instructor.

**PSYCH 215. Mind, Culture, and Society. 3 Units.**

Social psychology from the context of society and culture. The interdependence of psychological and sociocultural processes: how sociocultural factors shape psychological processes, and how psychological systems shape sociocultural systems. Theoretical developments to understand social issues, problems, and polity. Works of Baldwin, Mead, Asch, Lewin, Burner, and contemporary theory and empirical work on the interdependence of psychology and social context as constituted by gender, ethnicity, race, religion, and region of the country and the world. Prerequisite: 207 or consent of instructor.

**PSYCH 216. Public Policy and Social Psychology: Implications and Applications. 4 Units.**

Theories, insights, and concerns of social psychology relevant to how people perceive issues, events, and each other, and links between beliefs and individual and collective behavior will be discussed with reference to a range of public policy issues including education, public health, income and wealth inequalities, and climate change. Specific topics include: situationist and subjectivist traditions of applied and theoretical social psychology; social comparison, dissonance, and attribution theories; stereotyping and stereotype threat, and sources of intergroup conflict and misunderstanding; challenges to universality assumptions regarding human motivation, emotion, and perception of self and others; also the general problem of producing individual and collective changes in norms and behavior.

Same as: IPS 207B, PUBLPOL 305B

**PSYCH 217. Topics and Methods Related to Culture and Emotion. 1-3 Unit.**

Preference to graduate students. How cultural factors shape emotion and other feeling states. Empirical and ethnographic literature, theories, and research on culture and emotion. Applications to clinical, educational, and occupational settings. Research in psychology, anthropology, and sociology. May be repeated for credit.

**PSYCH 21N. How to Make a Racist. 3 Units.**

How do children, with no innate beliefs or expectations about race, grow up to be racist? To address this complex question, this seminar will introduce students to the cognitive, social, and cultural factors that contribute to the development of racial stereotyping, prejudice, and discrimination. We will begin by defining key concepts (e.g., 'What is race and what is racism?'), and will then take a developmental approach to examine racist thought from early childhood until adulthood. The seminar will include lectures that will provide an introduction to each topic. These lectures will be supplemented by readings and discussion. Students will engage thoughtfully and critically with the topics and readings by sharing experiences, perspectives, confusions, and insights through discussion and in writing. Students with diverse experiences and perspectives will be welcomed and encouraged to participate.

Same as: AFRICAAM 121N, CSRE 21N

**PSYCH 220. Special Topics in Cognitive Development. 1-3 Unit.**

In the last few years, research at the intersection of cognitive and social development has burgeoned, yielding unprecedented knowledge about the roots of the human (social) mind in infants and children. In this course, using an outstanding new volume edited by Susan Gelman and Mahzarin Banaji, we will discuss work that highlights the social nature of cognitive development (e.g., the degree to which social learning may account for uniquely human cognitive abilities) and that explores the early emergence of social knowledge and understanding (e.g., mental models of relationships, knowledge of good and bad, beliefs about ingroups and outgroups, and knowledge of other people's minds). Prerequisites: Psychology 207 or permission of instructor.

**PSYCH 221. Image Systems Engineering. 1-3 Unit.**

This course is an introduction to digital imaging technologies. We focus on the principles of key elements of digital systems components; we show how to use simulation to predict how these components will work together in a complete image system simulation. The early lectures introduce the software environment and describe options for the course project. The following topics are covered and software tools are introduced:

- Basic principles of optics (Snell's Law, diffraction, adaptive optics).
- Image sensor and pixel designs
- Color science, metrics, and calibration
- Human spatial resolution
- Image processing principles
- Display technologies

A special theme of this course is that it explains how imaging technologies accommodate the requirements of the human visual system. The course also explains how image systems simulations can be useful in neuroscience and industrial vision applications. The course consists of lectures, software tutorials, and a course project. Tutorials and projects include extensive software simulations of the imaging pipeline. Some background in mathematics (linear algebra) and programming (Matlab) is valuable. Pre-requisite: EE 261 or equivalent. Or permission of instructor required.

**PSYCH 222. From Classic Experiments to Cutting Edge Neuroimaging: The Functional Neuroanatomy of Visual Cortex. 1-3 Unit.**

We will discuss the fundamental organizational principles of the visual system starting by discussing classic papers in non-human primates and proceeding to discuss recent neuroimaging studies in humans. We will then examine how understanding these organizational principles has influenced mapping the functional organization of visual system. Finally, we will analyze neuroimaging datasets and examine how well one can evaluate and define visual areas in the human brains by understanding these principles.

**PSYCH 223. Social Norms. 3 Units.**

This course covers research and theory on the origins and function of social norms. Topics include the estimation of public opinion, the function of norms as ideals and standards of judgment, and the impact of norms on collective and individual behavior. In addition to acquainting students with the various forms and functions of social norms the course will provide students with experience in identifying and formulating tractable research questions.

**PSYCH 224. Research Topics in Emotion Regulation. 1 Unit.**

Current research findings and methods, ongoing student research, and presentations by visiting students and faculty. May be repeated for credit. Prerequisite: consent of instructor.

**PSYCH 226. Models and Mechanisms of Memory. 1-3 Unit.**

Current topics in memory as explored through computational models addressing experimental findings and physiological and behavioral investigations. Topics include: episodic and statistical learning; impact of prior knowledge on new learning; and the role of MTL structures in learning and memory. May be repeated for credit.

**PSYCH 228. Ion Transport and Intracellular Messengers. 3 Units.**

(Graduate students register for 228.) Ion channels, carriers, ion pumps, and their regulation by intracellular messengers in a variety of cell types. Recommended: 120, introductory course in biology or human biology. Same as: PSYCH 121

**PSYCH 231. Questionnaire Design for Surveys and Laboratory Experiments: Social and Cognitive Perspectives. 4 Units.**

The social and psychological processes involved in asking and answering questions via questionnaires for the social sciences; optimizing questionnaire design; open versus closed questions; rating versus ranking; rating scale length and point labeling; acquiescence response bias; don't-know response options; response choice order effects; question order effects; social desirability response bias; attitude and behavior recall; and introspective accounts of the causes of thoughts and actions.

Same as: COMM 339, POLISCI 421K

**PSYCH 232. Brain and Decision Making. 3 Units.**

Neuroeconomics combines experimental techniques from neuroscience, psychology, and experimental economics, such as electrophysiology, fMRI, eye tracking, and behavioral studies, and models from computational neuroscience and economics. May be repeated for credit. Prerequisite: consent of instructor.

**PSYCH 234. Special Topics in Depression. 3 Units.**

In this course we will discuss current issues in the study of major depression, including the epidemiology and phenomenology of depression and other affective disorders, psychological and biological theories of depression, gender differences in depression, cognitive and social functioning of depressed persons, findings from neuroimaging studies of depression, depression in children, risk factors for depression, issues involving suicide, and implications of the NIMH RDoC initiative for the study of depression and other psychiatric diagnostic categories. Prerequisite: graduate standing in Psychology or consent of instructor.

**PSYCH 235. Motivation and Emotion. 3 Units.**

This graduate seminar will take a social-cognitive perspective on motivation and emotion. Meetings will be discussion oriented, and each meeting will focus on a different question of theoretical and applied significance. Prerequisite: 207 or consent of instructor.

**PSYCH 236A. The Psychology of Scarcity: Its Implications for Psychological Functioning and Education. 3 Units.**

This course brings together several literatures on the psychological, neurological, behavioral and learning impact of scarcities, especially those of money (poverty) time and food. It will identify the known psychological hallmarks of these scarcities and explore their implications for psychological functioning, well-being and education—as well as, how they can be dealt with by individuals and in education. Same as: PSYCH 136

**PSYCH 236C. Seminar in Semantics: Formal semantics and the psychology of reasoning. 2-4 Units.**

Discussion of topics at the interface of natural language semantics and psychology of reasoning, such as conditionals, causal language, the language of uncertainty, generics, and syllogistic reasoning. Same as: LINGUIST 236

**PSYCH 237. Mathematical Cognition. 2-4 Units.**

The course will examine the basis of numerical and mathematical abilities, and the acquisition and learning of mathematical skills, drawing on experimental and modeling studies. Topics will include numerosity, counting, basic arithmetic, and fractions, as well as algebraic and geometric reasoning as well as insight into mathematical and scientific problems. Roles of rules, procedures and symbolic, spatial, and sensory-motor representations; relationship between skill and understanding; nature of discovery and insight in mathematical reasoning; the relationship between insight and proof. Open to PhD and Masters students and to Juniors and Seniors who have completed an introductory level course in cognitive or developmental psychology.

**PSYCH 238. Wise Interventions. 4 Units.**

Classic and contemporary psychological interventions; the role of psychological factors in social reforms for social problems involving healthcare, the workplace, education, intergroup, relations, and the law. Topics include theories of intervention, the role of laboratory research, evaluation, and social policy. Same as: PSYCH 138, PUBLPOL 238

**PSYCH 239. Formal and Computational Approaches in Psychology and Cognitive Science. 3 Units.**

Do psychology and cognitive science need formal theories and/or explicit computational models? What insights should such things provide? What is the proper relationship between different theoretical and modeling approaches? Between different levels or kinds of analysis? Where do informally stated theories fit in and what are the roles of formal and computational modeling approaches in relation to other less explicitly specified forms of theorizing? This seminar will explore these issues and compare different formal and computational model variants, especially connectionist and probabilistic models, within 3-4 different target domains. Possible target domains include categorization, property induction, causal learning, perceptual decision making, language acquisition, semantics and pragmatics, and mid-level vision.

**PSYCH 240. What Changes?. 3 Units.**

When children get older, they start to behave differently. What's changing? In other words, what specific mechanisms underlie different developmental correlations between age and behavioral competence. Of course, the answer (or more likely, answers plural) to this question will differ vastly from domain to domain, but are there generalizations that we can make about the ways that different factors affect behavior across domains - differences in developmental drivers for so-called "lower-level" tasks versus "higher-level" tasks, or age-related differences in the determinants of change during specific time periods? In this course, we'll try to get a handle on some of the extant proposals on these questions, and maybe offer some of our own.

**PSYCH 241. Probabilistic Models of Social Behavior and Affect. 4 Units.**

How do we reason about other people and ourselves? Is human behavior in social situations a set of ad-hoc and irrational responses—or can we understand humans as making rational inferences under uncertainty about the people they are interacting with? This project-based seminar will re-examine classic findings from social psychology and affective science through the lens of rational analysis and probabilistic models. In collaboration with instructors, students will develop projects focused on making testable theoretical models of classic tasks and literatures with the goal of creating a publishable end product. Phenomena under consideration include but are not limited to: cognitive dissonance, attribution theory, mindset theory, stereotyping, and emotion perception.

**PSYCH 242. Theoretical Neuroscience. 3 Units.**

Survey of advances in the theory of neural networks, mainly (but not solely) focused on results of relevance to theoretical neuroscience. Synthesizing a variety of recent advances that potentially constitute the outlines of a theory for understanding when a given neural network architecture will work well on various classes of modern recognition and classification tasks, both from a representational expressivity and a learning efficiency point of view. Discussion of results in the neurally-plausible approximation of back propagation, theory of spiking neural networks, the relationship between network and task dimensionality, and network state coarse-graining. Exploration of estimation theory for various typical methods of mapping neural network models to neuroscience data, surveying and analyzing recent approaches from both sensory and motor areas in a variety of species. Prerequisites: calculus, linear algebra, and basic probability theory, or consent of instructor.

Same as: APPPHYS 293

**PSYCH 243. General Development Seminar. 1-2 Unit.**

May be repeated for credit. Prerequisite: consent of instructors. Restricted to Developmental graduate students.

**PSYCH 244. Psychology of Aging. 1-3 Unit.**

Theory and research in gerontology. Normal and abnormal changes that occur in biological, cognitive, and psychological aging. Emphasis is on the environmental factors that influence the aging process. Prerequisite: graduate standing in Psychology or consent of instructor.

**PSYCH 246. Cognitive and Neuroscience Friday Seminar. 1 Unit.**

Participant presentations. May be repeated for credit. Prerequisite: graduate standing in psychology or neuroscience program.

**PSYCH 248. Advanced fMRI modeling and analysis. 3 Units.**

This seminar will discuss the state of the art in methods for the modeling and analysis of functional magnetic resonance imaging data. Potential topics include connectivity modeling, causal modeling, multivariate pattern analysis, encoding models, and classification analysis. The seminar will include hands-on analysis exercises in addition to lectures.

**PSYCH 248A. fMRI Analysis Bootcamp. 3 Units.**

This course will provide a hands-on overview of methods for processing and analysis of functional magnetic resonance imaging data. Topics include preprocessing, statistical modeling, spatial normalization, statistical power analysis, multiple comparison correction, connectivity modeling, machine learning, and Bayesian modeling. The seminar will include hands-on analysis exercises in addition to lectures.

**PSYCH 249. Large-Scale Neural Network Modeling for Neuroscience. 3 Units.**

Introduction to designing, building, and training neural networks for modeling brain and behavioral data, including: deep convolutional neural network models of sensory systems (vision, audition, somatosensation); recurrent neural networks for dynamics, memory and attention; integration of variational and generative methods for cognitive modeling; and methods and metrics for comparing such models to real-world neural data. Attention will be given both to established methods as well as cutting-edge techniques. Students will learn conceptual bases for deep neural network models, and will also implement learn to implement and train large-scale models in Tensorflow using GPUs. Requirements: Fluency in Unix shell and Python programming, familiarity with differential equations, linear algebra, and probability theory, and one or more courses in cognitive or systems neuroscience.

Same as: CS 375

**PSYCH 249L. Workshop on Incremental Language Processing. 1 Unit.**

Language is processed incrementally over time. This has consequences for language comprehension, production, acquisition, and change, all of which occur at different timescales. What is the role of time in language? The class will be based around visiting lectures by major researchers in this area, along with meetings to prepare for their visits by discussing key readings. May be repeated for credit.

Same as: LINGUIST 249L

**PSYCH 24N. Neuroforecasting. 3 Units.**

Preference to freshmen. This course explores whether brain activity can be used not only to predict the choices of individuals, but also of separate groups of individuals in the future (e.g., in markets). Questions include how neuroforecasting is possible, whether it can add value to other forecasting tools (e.g., traditional measures like behavioral choice and subjective ratings), and when it extends to different aggregate scenarios. The course is ideal for students that would like to extend neural predictions about individual choice to group choice, and who plan to apply this knowledge in future research.

**PSYCH 250. High-level Vision: From Neurons to Deep Neural Networks. 3 Units.**

Interdisciplinary seminar focusing on understanding how computations in the brain enable rapid and efficient object perception. Covers topics from multiple perspectives drawing on recent research in Psychology, Neuroscience, Computer Science and Applied Statistics. Emphasis on discussing recent empirical findings, methods and theoretical debates in the field. Topics include: theories of object perception, neural computations underlying invariant object perception, how visual exemplars and categories are represented in the brain, what information is present in distributed activations across neural populations and how it relates to object perception, what modern statistical and analytical tools there are for multi-variate analysis of brain activations.

Same as: CS 431

**PSYCH 250A. High-level Vision: From Neurons to Deep Neural Networks. 1-2 Unit.**

This advanced level seminar is an interdisciplinary course focusing on understanding how computations in the brain enable rapid and efficient object perception. The course will cover topics from multiple perspectives drawing on recent research in neuroscience, computer science and psychology. Emphasis will be placed on examining recent findings pertaining to computational theories of high-level vision, ongoing debates in the field, and discussion of recent empirical findings.

**PSYCH 251. Lab in Experimental Methods. 4 Units.**

Laboratory class in experimental methods for psychology, with a focus on technical/computer-based methods. Programming experience helpful although not required. Topics include data collection on the web, data management and data analysis.

**PSYCH 252. Statistical Methods for Behavioral and Social Sciences. 1-6 Unit.**

For students who seek experience and advanced training in empirical research. Analysis of data from experimental through factorial designs, randomized blocks, repeated measures; regression methods through multiple regression, model building, analysis of covariance; categorical data analysis through two-way tables. Integrated with the use of statistical computing packages. Prerequisite: 10 or equivalent.

**PSYCH 253. High-Dimensional Methods for Behavioral and Neural Data. 3 Units.**

Introduction to high-dimensional data analysis and machine learning methods for use in the behavioral and neurosciences, including: supervised methods such as SVMs, linear and nonlinear regression and classifiers, and regularization techniques; statistical methods such as bootstrapping, signal detection, factor analysis, and reliability theory; metrics for model/data comparison such as representational similarity analysis; and unsupervised methods such as clustering. Students will learn theory as well as a programming framework for implementing all methods in practice. Prerequisites: Math 51 or equivalent and Psych 251 or programming background.

**PSYCH 254. Affective Neuroscience. 3 Units.**

Theory and research. Comparative and human research approaches map affective function to neuroanatomical and neurochemical substrates. Prerequisite: consent of instructor.

**PSYCH 255. Seminar on Motivation. 3 Units.**

Selective overview of the scientific study of motivation. Our focus is on interesting, experimentally tractable ideas. Meetings will be discussion based.

**PSYCH 257. Individually Supervised Practicum. 3-5 Units.**

Satisfies INS requirements for curricular practical training. Relevant experience for graduate students as part of their program of study. May be repeated for credit. Prerequisites: graduate standing in Psychology, consent of adviser.nn (Staff).

**PSYCH 258. Graduate Seminar in Social Psychology Research. 1-3 Unit.**

For students who are already or are planning to become involved in research on social construal and the role that it plays in a variety of phenomena, notably the origin and escalation of conflict.

**PSYCH 25N. Psychology, Inequality, and the American Dream. 3 Units.**

Despite legal prohibitions against discrimination and the fact that many people endorse egalitarian values, inequality persists in America. What role do psychological factors play in perpetuating inequality? How can psychologically "wise" reforms promote equal opportunity? Topics include prejudice and discrimination, school achievement, social class, and race/ethnicity.

**PSYCH 261. Emotion. 3 Units.**

(Graduate students register for 261.) The scientific study of emotion. Topics: models of emotion, emotion antecedents, emotional responses (facial, subjective, and physiological), functions of emotion, emotion regulation, individual differences, and health implications. Focus is on experimentally tractable ideas. Same as: PSYCH 161

**PSYCH 261A. Learning and Cognition in Activity. 3 Units.**

Methods and results of research on learning, understanding, reasoning, problem solving, and remembering, as aspects of participation in social organized activity. Principles of coordination that support cognitive achievements and learning in activity settings in work and school environments. Same as: EDUC 295

**PSYCH 263. Cognitive Neuroscience: Vision. 3 Units.**

Decision, categorization. Bayesian inference, working memory, attention, cognitive control, conscious perception and awareness. The neural basis for all of these cognitive functions have been extensively studied in the domain of vision. Why vision? Because a great deal of scientific inquiry has delineated both the behavioral and physiological aspects of basic sensory processing in vision. Because of this, cognitive neuroscience questions can be precisely formulated in the context of vision. As a result we have some of the best answers to the question of what neural mechanisms underlie cognitive functions in the domain of vision. The course will combine lectures and in-depth discussions of primary literature to develop key concepts in the neuroscience of vision and how these concepts have been built on to understand the neural basis of higher cognition. Guest instructors will include Bill Newsome, Tirin Moore and Kalanit Grill-Spector.

**PSYCH 265. Social Psychology and Social Change. 2-3 Units.**

The course is intended as an exploration of the major ideas, theories, and findings of social psychology and their applied status. Special attention will be given to historical issues, classic experiments, and seminal theories, and their implications for topics relevant to education. Contemporary research will also be discussed. Advanced undergraduates and graduate students from other disciplines are welcome, but priority for enrollment will be given to graduate students. In order to foster a vibrant, discussion-based class, enrollment will be capped at 20 students. Interested students should enroll in the class through simple enroll or axess, and complete this survey (<https://tinyurl.com/SPSC17>) to be considered for admission to the course. Please contact the course TA, Michael Schwalbe ([schwalbe\[at\]stanford.edu](mailto:schwalbe[at]stanford.edu)), if you have any further questions. Same as: EDUC 371

**PSYCH 266. Current Debates in Learning and Memory. 1-3 Unit.**

Memory is not a unitary faculty, but consists of multiple forms of learning and remembering. The cognitive and neural architectures of memory, focusing on the application of functional brain imaging (primarily fMRI and ERP). Psych 45 and Psych 169 required if undergraduate student.

**PSYCH 268. Emotion Regulation. 3 Units.**

(Graduate students register for 268.) The scientific study of emotion regulation. Topics: historical antecedents, conceptual foundations, autonomic and neural bases, individual differences, developmental and cultural aspects, implications for psychological and physical health. Focus is on experimentally tractable ideas. Same as: PSYCH 168

**PSYCH 269. Graduate Seminar in Affective Science. 1 Unit.**

May be repeated for credit. Prerequisite: graduate standing in Psychology. (Gotlib).

**PSYCH 26N. Language Acquisition: Exploring the Minds of Children. 3 Units.**

Language is an extraordinary competence distinguishing humans from other species, yet there is debate about the role of biology in guiding language acquisition. Does language development follow an innate 'bioprogram' or does it build on more general cognitive abilities, influenced by early experience? Topics include biological and experiential influences on the emergence of linguistic ability as children learn a first language. Discussions of theory and research, visits to Stanford laboratories and observations of very young language learners.

**PSYCH 270. The Self: Representations and Interventions. 3 Units.**

We will examine research and theory on mental models of the self, others, and the social world; how these develop; and how interventions can alter or leverage these mental models to improve human functioning and outcomes.

**PSYCH 271. Writing About Psychology. 3 Units.**

Writing clear and compelling prose is a vital skill for any psychologist, but one that is often not formally taught. This graduate seminar will provide a chance for students to think systematically about writing for audiences within and outside of psychology, and to concretely improve pieces of writing that matter to them. The course will take the form of a "writer's workshop", in which each student will bring two pieces of writing: one empirical, and one intended for a popular audience, to be discussed by the class. All class members will discuss each piece of writing twice, providing constructive feedback for the target student to revise her or his work. The workshop will be supplemented by general discussions of writing principles and examples of good writing in psychology.

**PSYCH 274. Graduate Research Workshop on Psychological Interventions. 3 Units.**

Psychological research has the potential to create novel interventions that promote the public good. This workshop will expose students to psychologically 'wise' intervention research and to support their efforts to conduct such interventions, especially in the context of education, broadly conceived, as well as other areas. The first part of the class will address classic interventions and important topics in intervention research, including effective delivery mechanisms, sensitive behavioral outcomes, the role of theory and psychological process, and considerations of the role of time and of mechanisms that can sustain treatment effects over time. In the second part of the class, students will present and receive feedback on their own ongoing and/or future intervention research. Prerequisite: Graduate standing in Psychology or Education, or consent of instructor. Same as: EDUC 287

**PSYCH 275. Graduate Research. 1-15 Unit.**

Intermediate-level research undertaken with members of departmental faculty. Prerequisite: consent of instructor.nn (Staff).

**PSYCH 276. Graduate Research. 1-15 Unit.**

Intermediate-level research undertaken with psychology faculty. Prerequisite: consent of instructor.

**PSYCH 278. Social Cognitive Development: New Methods for Answering Old Questions. 1-2 Unit.**

Novel technology can fuel new discoveries and generate new questions for future research, for instance, the use of video cameras has transformed the field of developmental psychology. More recently, the use of neuroimaging techniques (such as fMRI) to study the developing brain has been gaining lots of interest among developmental psychologists. What are the promises and challenges of using these neuroimaging methods to study cognitive development? This course will be a discussion-based seminar class (with some lectures from the instructor and from students) aimed for graduate students who are interested in learning more about how these methods can help address questions about cognitive development, with a particular focus on children's developing understanding of their social world.

**PSYCH 279. Topics in Cognitive Control. 1-3 Unit.**

The processes that enable flexible behavior by biasing contextually relevant perceptual, mnemonic, and response representations or processing pathways. Cognitive control is central to volitional action, allowing work with memory, task/goal states, and overriding inappropriate responses. Current models of cognitive control, functional neuroimaging, and neuropsychological evidence. Recommended: 45. May be repeated for credit.

**PSYCH 280. Foundations and Contemporary Topics in Social-Educational Psychology. 2-4 Units.**

At its core, social psychology is concerned with educational problems because it addresses the problem of how to change hearts and minds in lasting ways. This course explores the major ideas, theories, and findings of social psychology, their educational implications, and the insights they shed into how and when people change. There will be a focus on educational issues. Intersections with other disciplines, in particular social development and biology, will be addressed. Historical tensions and traditions, as well as classic studies and theories, will be covered. Graduate students from other disciplines, and advanced undergraduates, are welcome (class size permitting). Same as: EDUC 307

**PSYCH 281. Practicum in Teaching. 1-5 Unit.**

Enrollment limited to teaching assistants in selected Psychology courses. May be repeated for credit.

**PSYCH 282. Practicum in Teaching PSYCH 1. 1-2 Unit.**

Logistical TA training including: preparing for sections; creating, correcting exams; grading an iterative writing assignment; office hours; review sessions; developing audiovisual expertise; communicating via coursework. Review of student evaluations with instructor to set goals and strategies. Second quarter focuses on pedagogical improvement. Limited to current PSYCH 1 TAs. May be repeated for credit.

**PSYCH 283. International Conflict Resolution Colloquium. 1 Unit.**

(Same as LAW 611.) Sponsored by the Stanford Center on International Conflict and Negotiation (SCICN). Conflict, negotiation, and dispute resolution with emphasis on conflicts and disputes with an international dimension, including conflicts involving states, peoples, and political factions such as the Middle East and Northern Ireland. Guest speakers. Issues including international law, psychology, and political science, economics, anthropology, and criminology. Same as: IPS 250A

**PSYCH 283A. SPARQshop: Social Psychological Answers to Real-world Questions. 3 Units.**

Undergraduate and graduate students will work in teams to design, build, test, and distribute online toolkits that help practitioners solve real-world problems by applying social science. Graduate students can build toolkits for their own research. Students will learn how to assess the needs of practitioner audiences; write text, design graphics, and program activities for these audiences; prepare, deliver, and produce a TED-style online video; design surveys in Qualtrics; and build and user-test the toolkit. Readings and class discussions will include modules on design thinking, storytelling, science writing, information design, and impact evaluation. For an example of a toolkit in progress, please visit [spacereface.org](http://spacereface.org). Permission of instructor required. Same as: PSYCH 180A

**PSYCH 284. Computational Modeling of a Range of Neural Circuits. 1-3 Unit.**

Lectures, student presentations, and extensive software exercises. Focus on quantifiable models of neural signaling, starting with physical specification of input signals, sensory transductions, spiking, and mean electrical field potentials, and the inter-relation to BOLD signals (fMRI). Applications will be drawn from many examples, but a there will be a particular focus on the visual pathways and how measurements and models relate to visual perception.

**PSYCH 285. Graduate Seminar on Theory of Mind. 3 Units.**

Theory of Mind is the ability to reason and think about other minds. It has been a topic of extensive research and heated debates in the past few decades. The course will provide an in-depth overview of the major theories that have motivated empirical research. Students will read and discuss theoretical papers as well as empirical work that have supported or refuted these theories, and the latest research on Theory of Mind, from various disciplines including (but not limited to), cognitive development, comparative psychology, and cognitive neuroscience.

**PSYCH 286. The Psychology of Racial Inequality. 3 Units.**

Our topic is the psychology of racial inequality - thinking, feeling, and behaving in ways that contribute to racial stereotyping, prejudice, and discrimination, and how these processes in turn maintain and perpetuate inequality between racial groups. We will examine how these processes unfold at both the individual and the institutional levels. Throughout this course, you will familiarize yourself with the psychological perspectives, methods, and findings that help explain racial inequality, and we will explore ways to promote racial equality. The course will be conducted as a seminar, but most of what you learn will be through the readings and discussions. That is, this course is minimally didactic; the goal is to have you engage thoughtfully with the issues and readings spurred in part by sharing perspectives, confusions, and insights through writing and discussion. Each student will facilitate at least one class session by providing an introductory framework for the readings (~10-minute presentation with handouts that overviews the concepts, issues, and controversies). Together, we will broaden our knowledge base on the subject and explain, from a psychological perspective, the pervasiveness of racial inequality. Prerequisites: PSYCH 1 and PSYCH 10. Same as: CSRE 186, PSYCH 186

**PSYCH 287. Brain Machine Interfaces: Science, Technology, and Application. 1-3 Unit.**

This course explores the current state of brain-machine interfaces: technologies that directly stimulate and/or record neural activity. Such interfaces are being used to treat nervous system disorders, including hearing, seeing, and motor dysfunction. We expect that the range of applications will expand over the next decade to other neurological conditions and to augmentation of function. The material we cover aims to explain some of the existing technology and to clarify its limitations and promise. The course organization is designed to develop new ideas and promote new collaborations for extending the reach of these technologies. The class will feature lecturers with expertise in brain-machine interfaces of various sorts or related technologies and methods, as well as directed readings and discussion about new work in the field. In the previous year lectures were given by: Brian Wandell, Daniel Palanker, Nikos Logothetis, John Oghalai, Stephen Baccus, Paul Nuyujukian, Dan Yoshor and Nick Melosh. Same as: NSUR 287

**PSYCH 290. Graduate Research Methods. 2 Units.**

Primary tool use for psychologists: basics of experiment design; computer-based experiments; web-based experiments; data analysis packages and data presentation; exploratory statistics; eye-tracking methods; psychophysiology methods; survey construction; corpus and discourse analysis; and perhaps hypnosis. Prerequisite: Ph.D. student in Psychology.

**PSYCH 292. Special Topics in Emotion Regulation. 1 Unit.**

This seminar will consider special topics in emotion regulation. Admission is by invitation only.

**PSYCH 293. Communication, Intentionality, and the Origins of Language. 3 Units.**

How did language evolve to become a ubiquitous, definitional part of human life? What relationship does children's early language have to their understanding of intentionality and other methods of non-verbal communication? This seminar will survey theoretical and experimental work on the foundations of human language, communication, and intentionality, with the goal of understanding what we know and what questions are still open. Areas of focus include developmental work on communication; whether early language use is referential/intentional and whether early words are general or particular; and research on language evolution and animal communication.

**PSYCH 294. Human Prosociality. 3 Units.**

Human beings engage in a vast amount of prosocial behaviors (including altruism and cooperation) that critically support our success as a social species. That said, the psychological underpinnings of prosociality remain surprisingly enigmatic. This seminar will survey classic and modern theories of prosocial behavior from evolutionary biology, economics, psychology, and neuroscience, with an emphasis on common ideas about the cognitive and affective mechanisms supporting such behaviors. Students will be responsible for leading discussions and producing one in-depth review or research paper at the end of the quarter.

**PSYCH 295. Seminar on the Science of Meditation. 3 Units.**

What is meditation? What immediate and longer-term effects does this practice have on cognition? What are the mechanisms of these effects? In this small seminar we will try to gain insight into these questions by reading and discussing recent papers drawn from psychology and neuroscience. Emphasis will be placed on careful consideration of the evidence within papers and theoretical synthesis across papers. We will also use ancient and modern studies of meditation to reflect on possibilities for the scientific study subjective experience. May be repeat for credit.

**PSYCH 298. Advanced Studies in Health Psychology. 3 Units.**

This course provides an overview of the major concepts and questions in the field of health psychology. Through reading, lecture and interactive discussion, students have the opportunity to explore and think critically about a number of psychological and social influences in determining health including: emotions, beliefs, relationships, stress, motivation, behavior change, spirituality, culture, and social influence. Students will also discuss the role of important and current topics in the field of health psychology and medicine such as the changing role of the patient and provider relationship, health-care policy and the environment, placebo effects, wearable health devices, and the use of technology in medicine. Course is offered to graduate students and advanced undergraduates with permission from the instructor.

**PSYCH 29N. Growing Up in America. 3 Units.**

Preference to freshmen. To what extent is it possible to describe an "American" experience? How are different people included in or excluded from the imagined community that is America? How do a person's race, class, gender and sexuality affect his or her experience of belonging to this country? These are just some of the questions we will consider as we familiarize ourselves with the great diversity of childhood and young adult experiences of people who have grown up in America. We will read and discuss narratives written by men and women, by urban, suburban, and rural Americans, and by Asian Americans, African Americans, Native Americans, Latina/os, and European Americans.

**PSYCH 30. Introduction to Perception. 3 Units.**

Behavioral and neural aspects of perception focusing on visual and auditory perception. Topics include: scientific methods for studying perception, anatomy and physiology of the visual and auditory systems, color vision, depth perception, motion perception, stereopsis, visual recognition, pitch and loudness perception, speech perception, and reorganization of the visual system in the blind.

**PSYCH 303. Human and Machine Hearing. 3 Units.**

Topics: Linear and nonlinear system theory applied to sound and hearing; understanding how to model human hearing in the form of algorithms that can process general sounds efficiently; how to construct, display, and interpret "auditory images"; how to extract features compatible with machine-learning systems; how to build systems that extract information from sound to do a job; and example applications of machine hearing to speech, music, security and surveillance, personal sound diaries, smart house, etc. Prerequisites: basic calculus and algorithms.

**PSYCH 30N. The Science of Diverse Communities. 3 Units.**

This course is an exploration. Most generally, its aim is to identify distinguishing features of good diverse communities and articulate them well enough to offer principles or guidelines for how to design and manage such communities - all with a particular focus on educational communities like schools, universities, academic disciplines, etc., but with the hope that such principles might generalize to other kinds of organizations and the broader society. The readings range from those on the origins of human communities and social identities to those on intergroup trust building. They also aim to embed our discussions in the major diversity issues of the day, or example, what's in the news about campus life. Thus the course has a practical purpose: to develop testable ideas for improving the comfort level, fairness and goodness-for-all of identity diverse communities—especially in educational settings. The course also has a basic science purpose: to explore the psychological significance of community. Is there a psychological need for community? Is there something about a need for community that can't be reduced to other needs, for example, for a gender, racial or sexual-orientation identity? How strong is the need for community against other needs? What kinds of human groupings can satisfy it? In meeting this need, can membership in one community substitute for membership in others? What do people need from communities in order to thrive in them? Do strong diverse communities dampen intergroup biases? Can strong community loyalty mitigate identity tensions within communities? Such questions, the hope is, will help us develop a more systematic understanding of the challenges and opportunities inherent in diverse human communities.

Same as: CSRE 30N, EDUC 30N, SOC 179N

**PSYCH 35. Minds and Machines. 4 Units.**

(Formerly SYMSYS 100). An overview of the interdisciplinary study of cognition, information, communication, and language, with an emphasis on foundational issues: What are minds? What is computation? What are rationality and intelligence? Can we predict human behavior? Can computers be truly intelligent? How do people and technology interact, and how might they do so in the future? Lectures focus on how the methods of philosophy, mathematics, empirical research, and computational modeling are used to study minds and machines. Undergraduates considering a major in symbolic systems should take this course as early as possible in their program of study.

Same as: LINGUIST 35, PHIL 99, SYMSYS 1

**PSYCH 373. Research Seminar: Mind, Brain, and Computation. 1 Unit.**

Faculty and student research presentations focusing on work linking cellular, systems, cognitive, behavioral, and computational neuroscience. Limited to affiliates of the Center for Mind, Brain and Computation. May be repeated for credit.

**PSYCH 383. International Conflict Resolution. 2 Units.**

Same as LAW 5009; formerly Law 656) This seminar examines the challenges of managing and resolving intractable political and violent intergroup and international conflicts. Employing an interdisciplinary approach drawing on social psychology, political science, game theory, and international law, the course identifies various tactical, psychological, and structural barriers that can impede the achievement of efficient solutions to conflicts. We will explore a conceptual framework for conflict management and resolution that draws not only on theoretical insights, but also builds on historical examples and practical experience in the realm of conflict resolution. This approach examines the need for the parties to conflicts to address the following questions in order to have prospects of creating peaceful relationships: (1) how can the parties to conflict develop a vision of a mutually bearable shared future; (2) how can parties develop trust in the enemy; (3) how can each side be persuaded, as part of a negotiated settlement, to accept losses that it will find very painful; and (4) how do we overcome the perceptions of injustice that each side are likely to have towards any compromise solution? We will consider both particular conflicts, such as the Israeli-Palestinian conflict and the South African transition to majority rule, as well as cross-cutting issues, such as the role international legal rules play in facilitating or impeding conflict resolution, the intragroup dynamics that affect intergroup conflict resolution efforts, and the role of criminal accountability for atrocities following civil wars. Special Instructions: Section 01: Grades will be based on class participation, written assignments, and a final exam. Section 02: Up to five students, with consent of the instructor, will have the option to write an independent research paper for Research (R) credit in lieu of the written assignments and final exam for Section 01. After the term begins, students (max 5) accepted into the course can transfer from section (01) into section (02), which meets the R requirement, with consent of the instructor. Same as: IPS 250

**PSYCH 45. Introduction to Learning and Memory. 3 Units.**

The literature on learning and memory including cognitive and neural organization of memory, mechanisms of remembering and forgetting, and why people sometimes falsely remember events that never happened. Cognitive theory and behavioral evidence integrated with data from patient studies and functional brain imaging. Required prerequisite: PSYCH 1.

**PSYCH 459. Frontiers in Interdisciplinary Biosciences. 1 Unit.**

Students register through their affiliated department; otherwise register for CHEMENG 459. For specialists and non-specialists. Sponsored by the Stanford BioX Program. Three seminars per quarter address scientific and technical themes related to interdisciplinary approaches in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and the world present breakthroughs and endeavors that cut across core disciplines. Pre-seminars introduce basic concepts and background for non-experts. Registered students attend all pre-seminars; others welcome. See <http://biox.stanford.edu/courses/459.html>. Recommended: basic mathematics, biology, chemistry, and physics.

Same as: BIO 459, BIOC 459, BIOE 459, CHEM 459, CHEMENG 459

**PSYCH 4N. Predicting aggregate choice. 3 Units.**

Preference to freshmen. Is prediction of group choice possible and how can it be done? This course is ideal for students that would like to extend predictions about individual choice to group choice, and who plan to apply this knowledge to future research.

**PSYCH 50. Introduction to Cognitive Neuroscience. 4 Units.**

Survey of topics relating brain activity to cognitive processes and behavior. The course begins with an overview of neurophysiology and techniques to measure brain activity. We then discuss perceptual and motor processes before investigating neural responses related to attention, memory, and cognitive control. The course concludes with a discussion of brain processes related to reward, decision making, and social cognition.



**PSYCH 50A. Practicum in Teaching: Intro to Cognitive Neuroscience. 3-4 Units.**

TA training for Intro to Cognitive Neuroscience: preparing for sections, grading assignments, reviewing and answering questions in Canvas online forums and supporting office hours and review sections. Enrollment limited to teaching assistants for Psych 50: Intro to Cognitive Neuroscience. May be repeat for credit.

**PSYCH 60. Introduction to Developmental Psychology. 3 Units.**

Psychological development from birth to adulthood, emphasizing infancy and the early and middle childhood years. The nature of change during childhood and theories of development. Recommended: PSYCH 1.

**PSYCH 60A. Introduction to Developmental Psychology Section. 2 Units.**

Guided observation of children age 2-5 at Bing Nursery School. Corequisite: 60.

**PSYCH 70. Self and Society: Introduction to Social Psychology. 4 Units.**

Why do people behave the way they do? This is the fundamental question that drives social psychology. Through reading, lecture, and interactive discussion, students have the opportunity to explore and think critically about a variety of exciting issues including: what causes us to like, love, help, or hurt others; the effects of social influence and persuasion on individual thoughts, emotion, and behavior; and how the lessons of social psychology can be applied in contexts such as health, work, and relationships. The social forces studied in the class shape our behavior, though their operation cannot be seen directly. A central idea of this class is that awareness of these forces allows us to make choices in light of them, offering us more agency and wisdom in our everyday lives. Same as: SOC 2

**PSYCH 75. Introduction to Cultural Psychology. 5 Units.**

The cultural sources of diversity in thinking, emotion, motivation, self, personality, morality, development, and psychopathology.

**PSYCH 7N. Learn to Intervene, Wisely. 3 Units.**

Do you ever look around and see ways that the world could be a better place, especially if people behaved a little differently? Do you wonder what prevents better outcomes? In this seminar, we will examine social-psychological processes that lie behind diverse social problems, especially how people make sense of themselves, other people, or important situations, sometimes in pejorative ways that undermine outcomes. Then we will examine interventions that address critical processes to promote human flourishing. You'll have the opportunity to read and discuss classic and contemporary 'wise' psychological interventions such as: how a change in the sign on a hospital soap dispenser can increase soap use; how a change in survey items can raise voter turnout; how a change in a single question can improve dating relationships; and how reading-and-writing exercises that address students' beliefs about intelligence and belonging in school can improve achievement years into the future. In learning about this research, you will discover more about psychological processes, how basic research helps clarify these processes, how they contribute in complex field settings to social problems, and how they can be altered. As you learn from past research, you'll have the opportunity to design your very own 'wise intervention' and to workshop others' efforts. You will identify a social problem on campus of interest to you, say: How can you reduce waste in the cafeteria? How can you get more people to take the stairs? How can you get people to hold more inclusive attitudes? Then you will identify a psychological process you think contributes to this problem, implement an intervention in the field and track the results. When you have completed this seminar, you will more fully understand the psychological aspect of social problems and how this can be addressed through rigorous research.

**PSYCH 7Q. Language Understanding by Children and Adults. 3 Units.**

How do we first learn to find meaning in strings of speech sounds? Understanding spoken language requires the rapid integration of acoustic information with linguistic knowledge and with conceptual knowledge based on experience with how things happen in the world. Topics include research on early development of language understanding and laboratory methods of how young children make sense of speech. Observations of preschool children and visits to Stanford laboratories. Might be repeatable for credit.

**PSYCH 80. Introduction to Personality and Affective Science. 3 Units.**

How do we measure personality and emotion? What parts of your personality and emotions are set at birth? What parts of your personality and emotions are shaped by your sociocultural context? Can your personality and emotions make you sick? Can you change your personality and emotions? There are questions we begin to address in this introductory course on personality and emotion. Prerequisite: Psych 1.

**PSYCH 801. Master's TGR Project. 0 Units.**

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**PSYCH 802. PhD TGR Dissertation. 0 Units.**

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**PSYCH 8N. The New Longevity. 3 Units.**

Adult development from the perspective of life-span theory -- a conceptual framework that views development as a series of adaptations to physical, societal and individual resources and constraints. Students will learn about demographic and medical changes, ways that individuals typically change socially, emotionally and cognitively as they move through adulthood. An understanding of the conceptual foundations of the life-span approach and place aging of young people today in historical context.

**PSYCH 90. Introduction to Clinical Psychology. 3 Units.**

History of clinical psychology, models and assessment of personality, behavior, cognition, psychopathology, and approaches to the treatment of abnormal behavior. Emphasis is on current theory, research, issues in, and the role of clinical psychology in contemporary society. Recommended: 1.

**PSYCH 95. Introduction to Abnormal Psychology. 3 Units.**

Theories of and approaches to understanding the phenomenology, etiology, and treatment of psychological disorders among adults and children. Research findings and diagnostic issues. Recommended: PSYCH 1.

**PSYCH 9N. Reading the Brain: the Scientific, Ethical, and Legal Implications of Brain Imaging. 3 Units.**

It's hard to pick up a newspaper without seeing a story that involves brain imaging, from research on psychological disorders to its use for lie detection or "neuromarketing". The methods are indeed very powerful, but many of the claims seen in the press are results of overly strong interpretations. In this course, you will learn to evaluate claims based on brain imaging research. We will also explore the deeper ethical and philosophical issues that arise from our ability to peer into our own brains in action. The course will start by discussing how to understand and interpret the findings of brain imaging research. We will discuss how new statistical methods provide the ability to accurately predict thoughts and behaviors from brain images. We will explore how this research has the potential to change our concepts of the self, personal responsibility and free will. We will also discuss the ethics of brain imaging, such as how the ability to detect thoughts relates to personal privacy and mental illness. Finally, we will discuss the legal implications of these techniques, such as their use in lie detection or as evidence against legal culpability.

## Public Policy (PUBLPOL)

### **PUBLPOL 101. Politics and Public Policy. 4-5 Units.**

American political institutions (the Presidency, Congress, and the Court) and political processes (the formation of political attitudes and voting) have for some time now been criticized as inadequate to the task of making modern public policy. Against the backdrop of American culture and political history we examine how public policy has been and is being made. We use theories from Political Science and Economics to assess the state of the American system and the policy making process. We use case studies and lectures to analyze contemporary issues including environmental policy, taxes and spending, gun control, economic growth and inequality and mobility. In some of these issue areas we use comparative data from other countries to see how the U.S. is doing relative to other countries. In addition to class room lecture and discussion, student groups are formed to analyze policy issues of relevance to them. Undergraduate Public Policy students are required to enroll in this class for five units.

Same as: AMSTUD 123X, POLISCI 102, PUBLPOL 201

### **PUBLPOL 103C. Justice. 4-5 Units.**

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors.

Same as: ETHICSOC 171, PHIL 171, POLISCI 103, POLISCI 336S, PUBLPOL 307

### **PUBLPOL 103D. Ethics and Politics of Public Service. 3-5 Units.**

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford.

Same as: CSRE 178, ETHICSOC 133, HUMBIO 178, PHIL 175A, PHIL 275A, POLISCI 133, URBANST 122

### **PUBLPOL 103E. Ethics on the Edge Public Policy Core Seminar. 3 Units.**

This seminar-style course will explore additional foundational readings on organizational ethics (business, non-profit, and governmental organizations) and policy ethics. Themes will include, among others: race and police brutality incidents; national security (including cyber threats); the Iran nuclear agreement; Brexit; non-profit organizations in the policy and US landscape; sexual harassment networks; and various corporate matters. Organizing themes include, among others: ethics of leadership; ethics of persuasion and compromise; influence of bias in organizational and policy ethics; ethics of social movements; discrepancies between discourse and action; emotion and ethics; and interpreting and explaining ethics. In addition, the course will offer training in a wide variety of skills for effective communication of ethics for policy purposes (developing succinct arguments, presentations, website discourse, commenting in meetings and conferences, interviews, statement of personal views, interacting with the media and social media, and mapping complex ethical analysis). Most of the assignments allow students flexibility to explore topics of their choice. The objective is to engage actively and improve skills in a supportive environment. A short, analytically rigorous final paper in lieu of final exam. Attendance required. Grading will be based on short assignments, class participation, and the short final paper. The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. Everyone will be challenged. Students wishing to take the course who are unable to sign up within the enrollment limit should contact Dr. Susan Liautaud at [susanl1@stanford.edu](mailto:susanl1@stanford.edu). Distinguished Career Institute Fellows are welcome and should contact Dr. Susan Liautaud directly at [susanl1@stanford.edu](mailto:susanl1@stanford.edu). This three-credit seminar accompanies PUBLPOL 134 Ethics on the Edge but can also be taken as a stand-alone course. \*Public Policy majors taking the course to complete the core requirements and students taking the course for Ways credit must obtain a letter grade. Other students may take the course for a letter grade or C/NC.

Same as: PUBLPOL 203E

**PUBLPOL 103F. Ethics of Truth in a Post-Truth World. 3 Units.**

This course will explore changing notions of truth in a world in which technology, global risks, and societal developments are blurring the boundaries of humanity and boring through traditional notions of nation states, institutions, and human identity. We will ask one overarching question: does truth matter anymore? If so, why and how? If not, why not? Either way, how does truth relate to ethical decision-making by individuals and institutions and to an ethical society? Five themes will organize our exploration of more specific topics: honesty; identity; memory; authenticity and integrity; and religious truth. Examples of topics to be explored include, among others: fake news; President Trump's campaign strategy and presidency; Syrian refugees and the Rohingyas; University history (Rhodes, Georgetown slavery, Yale Calhoun College...); new questions in gender and racial identity; Chinese beautifying app Meitu and other social media "truth modifiers"; the sharing economy; the impact of compromised truth on history; and Brexit. Scotty McClennan will explore truth through major literary characters and the impact of religion on truth. We will consider how we determine and verify the truth; how we "do" truth; the role of truth in ethical decision-making; the importance of truth to effective ethical policy; and the relationship of the truth to a life well lived. An analytically rigorous short final paper in lieu of exam. This three-credit seminar may be taken as a stand-alone course or may accompany PUBLPOL 134 Ethics on the Edge. The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. Everyone will be challenged. Distinguished Career Institute Fellows are welcome and should contact Dr. Susan Liautaud directly at susanl1@stanford.edu. Students wishing to take the course who are unable to sign up within the enrollment limit should contact Dr. Susan Liautaud at susanl1@stanford.edu. \*Public Policy majors taking the course to complete the core requirements and students taking the course for Ways credit must obtain a letter grade. Other students may take the course for a letter grade or C/NC.

Same as: PUBLPOL 203F

**PUBLPOL 103Z. Ethics and Politics in Public Service. 4 Units.**

Ethical and political questions in public service work, including volunteering, service learning, humanitarian assistance, and public service professions such as medicine and teaching. Motives and outcomes in service work. Connections between service work and justice. Is mandatory service an oxymoron? History of public service in the U.S. Issues in crosscultural service work. Integration with the Haas Center for Public Service to connect service activities and public service aspirations with academic experiences at Stanford.

Same as: CSRE 133P, POLISCI 133Z, URBANST 122Z

**PUBLPOL 104. Economic Policy Analysis. 4-5 Units.**

The relationship between microeconomic analysis and public policy making. How economic policy analysis is done and why political leaders regard it as useful but not definitive in making policy decisions. Economic rationales for policy interventions, methods of policy evaluation and the role of benefit-cost analysis, economic models of politics and their application to policy making, and the relationship of income distribution to policy choice. Theoretical foundations of policy making and analysis, and applications to program adoption and implementation. Prerequisites: ECON 50 and ECON 102B. Undergraduate Public Policy students are required to take this class for a letter grade and enroll in this class for five units.

Same as: ECON 150, PUBLPOL 204

**PUBLPOL 105. Empirical Methods in Public Policy. 4-5 Units.**

Methods of empirical analysis and applications in public policy. Emphasis on causal inference and program evaluation. Public policy applications include health, education, and labor. Assignments include hands-on data analysis, evaluation of existing literature, and a final research project. Objective is to obtain tools to 1) critically evaluate evidence used to make policy decisions and 2) perform empirical analysis to answer questions in public policy. Prerequisite: ECON 102B. Enrollment is limited to Public Policy students. Public Policy students must take the course for a letter grade.

Same as: PUBLPOL 205

**PUBLPOL 106. Law and Economics. 4-5 Units.**

This course explores the role of law in promoting well-being (happiness). Law, among its other functions, can serve as a mechanism to harmonize private incentives with cooperative gains, to maintain an equitable division of those gains, and to deter "cheating" and dystopia. Law is thus essential to civilization. Economic analysis of law focuses on the welfare-enhancing incentive effects of law and its enforcement and on law's role in reducing the risks of cooperation, achieved by fixing expectations of what courts or the state will do in various futures. Prerequisite: ECON 51 or PUBLPOL 51.

Same as: ECON 154, PUBLPOL 206

**PUBLPOL 107. Public Finance and Fiscal Policy. 5 Units.**

What role should and does government play in the economy? What are the effects of government spending, borrowing, and taxation on efficiency, equity and economic stability and growth? The course covers economic, historical and statistical analyses and current policy debates in the U.S. and around the world. Policy topics: Fiscal crises, budget deficits, the national debt and intergenerational equity; tax systems and tax reform; social security and healthcare programs and reforms; transfers to the poor; public goods and externalities; fiscal federalism; public investment and cost-benefit analysis; and the political economy of government decision-making. Prerequisites: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51), ECON 52 (can be taken concurrently).

Same as: ECON 141

**PUBLPOL 111. Leadership Challenges. 4-5 Units.**

This course will examine the responsibilities and challenges for those who occupy leadership roles in professional, business, non-profit, and academic settings. Topics will include characteristics and styles of leadership, organizational dynamics, forms of influence, decision making, diversity, social change, and ethical responsibilities. Class sessions will include visitors who have occupied prominent leadership roles. Readings will include excerpts of relevant research, problems, exercises, and case studies. Requirements will include class participation and short written weekly reflection papers (2 to 3 pages) on the assigned readings. The class will be capped at 50 students.

Same as: ETHICSOC 111

**PUBLPOL 115. Practical Training. 1-5 Unit.**

Qualified Public Policy students obtain employment in a relevant research or industrial activity to enhance their professional experience consistent with their degree programs. Prior to enrolling students must get internship approved by the Public Policy Program. At the start of the quarter, students must submit a one page statement showing the relevance of the employment to the degree program along with an offer letter. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program. Meets the requirements for Curricular Practical Training for students on F-1 visas. May be repeated for credit.

**PUBLPOL 118. Disasters, Decisions, Development in Sustainable Urban Systems. 3-5 Units.**

CEE 224X of the CEE 224XYZ SUS Project series is joining forces with D3: Disasters, Decisions, Development to offer D3+SUS, which will connect principles of sustainable urban systems with the challenge of increasing resilience in the San Francisco Bay Area. The project-based learning course is designed to align with the Resilient By Design | Bay Area Challenge (<http://www.resilientbayarea.org/>); students will learn the basic concepts of resilience and tools of risk analysis while applying those mindsets and toolsets to a collective research product delivered to the RBD community. Students who take D3+SUS are encouraged to continue on to CEE 224Y and CEE 224Z, in which teams will be paired with local partners and will develop interventions to improve the resilience of local communities. For more information, visit <http://sus.stanford.edu/courses>.

Same as: ESS 118, ESS 218, GEOPHYS 118X, GEOPHYS 218X, GS 118, GS 218, POLISCI 224A

**PUBLPOL 120. Social Science Field Research Methods and Applications. 5 Units.**

Fundamentals of the design, implementation and interpretation of social science field research. Building on a basic knowledge of statistical methods and economics, the course introduces observational field research and compares it with experimental field research. Significant attention devoted to explaining the details of research design as well as what can and cannot be learned through each type of field research. Emphasis placed on the theory of the design and analysis of statistical experiments. Topics include: sample size selection, power and size of statistical hypothesis tests, partial compliance, sample selection bias and methods for accounting for it. Development of critical reading skills emphasized through class discussions of academic journal articles and popular media accounts of field research. Examples of best practice field research studies presented as well as examples of commonly committed errors; students are expected to articulate and challenge or defend underlying assumptions and the extent to which real-world research matches up with concepts covered in lecture. Practical aspects of field work, including efficient and cost-effective data collection, teamwork, field team supervision, budget management, and common ethical considerations. Grading based on weekly problem sets that focus on developing data analysis skills using statistical software, a midterm examination, and a final project in which students write a detailed research proposal. Students can also apply to participate in a course project designing a field research project and implementing it in a developing country context during four weeks of the summer. Prerequisites: either ECON 1 and either STATS 60 or Econ 102A or equivalent.

Same as: EARTHSYS 120, ECON 121, PUBLPOL 220

**PUBLPOL 121L. Racial-Ethnic Politics in US. 5 Units.**

This course examines various issues surrounding the role of race and ethnicity in the American political system. Specifically, this course will evaluate the development of racial group solidarity and the influence of race on public opinion, political behavior, the media, and in the criminal justice system. We will also examine the politics surrounding the Multiracial Movement and the development of racial identity and political attitudes in the 21st century. PoliSci 150A, Stats 60 or Econ 1 is strongly recommended.

Same as: CSRE 121L, POLISCI 121L

**PUBLPOL 122. Biosecurity and Bioterrorism Response. 4-5 Units.**

Overview of the most pressing biosecurity issues facing the world today. Guest lecturers have included former Secretary of State Condoleezza Rice, former Special Assistant on BioSecurity to Presidents Clinton and Bush Jr. Dr. Ken Bernard, Chief Medical Officer of the Homeland Security Department Dr. Alex Garza, eminent scientists, innovators and physicians in the field, and leaders of relevant technology companies. How well the US and global healthcare systems are prepared to withstand a pandemic or a bioterrorism attack, how the medical/healthcare field, government, and the technology sectors are involved in biosecurity and pandemic or bioterrorism response and how they interface, the rise of synthetic biology with its promises and threats, global bio-surveillance, making the medical diagnosis, isolation, containment, hospital surge capacity, stockpiling and distribution of countermeasures, food and agriculture biosecurity, new promising technologies for detection of bio-threats and countermeasures. Open to medical, graduate, and undergraduate students. No prior background in biology necessary. 4 units for twice weekly attendance (Mon. and Wed.); additional 1 unit for writing a research paper for 5 units total maximum.

Same as: BIOE 122, EMED 122, EMED 222, PUBLPOL 222

**PUBLPOL 123. Thinking About War. 4-5 Units.**

Introduction to the ideas, important writers, and policy decisions about warfare. Topics include: what causes wars, great strategists of warfare, whether nuclear weapons require different strategy than conventional war, fostering innovation, what creates stable peace, and what warfare feels like to those who fight it. Each class session is organized around a question; first half of each session will explore concepts, second half will apply them in a historical case or policy decision.

Same as: PUBLPOL 223

**PUBLPOL 124. American Political Institutions in Uncertain Times. 5 Units.**

This course examines how the rules that govern elections and the policy process determine political outcomes. It explores the historical forces that have shaped American political institutions, contemporary challenges to governing, and prospects for change. Topics covered include partisan polarization and legislative gridlock, the politicization of the courts, electoral institutions and voting rights, the expansion of presidential power, campaign finance and lobbying, representational biases among elected officials, and the role of political institutions in maintaining the rule of law. Throughout, emphasis will be placed on the strategic interactions between Congress, the presidency, and the courts and the importance of informal norms and political culture.

Same as: POLISCI 120C

**PUBLPOL 126B. Curricular Public Policies for the Recognition of Afro-Brazilians and Indigenous Population. 3-4 Units.**

Recently two laws in Brazil (10639/2003 and 13465/2008), which came about due to intense pressure from Black and Indigenous social movements throughout the 20th century, have introduced changes in public education curriculum policies. These new curriculum policies mandate that the study of Afro-Brazilian, African, and Indigenous histories and cultures must be taught at all educational levels including at the elementary, secondary, and post-secondary levels. As part of this mandate, educators are now directed to incorporate considerations of ethnic-racial diversity in relation to people's thinking and experiences. These policies aim to fight racism as well as other forms of discrimination, and moreover, encourage the building of more equitable pedagogies. This course will discuss past and current policies and practices in Brazilian education from the point of view of different social projects organized by Indigenous Peoples, Afro-Brazilians, Asian-Brazilians, as well as Euro-Brazilians. It will also focus on Latin American efforts to promote equity in education, as well as to articulate different points of view, and reinforce and build epistemologies that support the decolonization of thinking, behaviors, research and policies. As part of this process, the course will study the experiences of people demanding these new public policies in terms of the extent to which they were able to influence institutional structures and to establish particular policy reforms. The course will also analyze theoretical frameworks employed by opponents of these movements to resist policies that might challenge their privileged place in society. In doing this, the course will offer theoretical and methodological avenues to promote research that can counter hegemonic curricular policies and pedagogical practices. The course will be fully participatory and oriented towards generating ongoing conversations and discussion about the various issues that arose in Brazil in relation to these two recent laws. To meet these goals, we will do a close reading of relevant scholarly works, paying particular attention to their theoretical frameworks, research designs, and findings. Same as: AFRICAAM 126B, CSRE 126B, EDUC 136B, EDUC 236B

**PUBLPOL 129. Conversations on the Indian Economy. 1 Unit.**

This course is intended to give students the opportunity to engage with Stanford faculty, across the University's different schools, who undertake research related to the modern Indian economy, including professors from the Humanities and Sciences, Engineering, GSB and schools of medicine, as well as from different research centers across the University. In addition, the course will feature conversations with several members of the Silicon Valley Community, as well as from India. The format is intended to promote discussion and debate, and to provide students an opportunity to learn about new developments and initiatives regarding India. Class meetings will be in the form of round-table interactions and exchanges.

**PUBLPOL 132. The Politics of Policy Making. 3 Units.**

Public policymaking in the United States is part of a political process that can take years or even decades to play out. A familiarity with the politics of policymaking is key to understanding why some reform attempts are successful while others are not. This course will give students a behind-the-scenes look at how policy actually gets made. Students will gain exposure to the theory and literature behind policy formulation, and engage in debates over historical and contemporary efforts at reform. Same as: PUBLPOL 232

**PUBLPOL 133. Political Power in American Cities. 5 Units.**

The major actors, institutions, processes, and policies of sub-state government in the U.S., emphasizing city general-purpose governments through a comparative examination of historical and contemporary politics. Issues related to federalism, representation, voting, race, poverty, housing, and finances.

Same as: AMSTUD 121Z, POLISCI 121, URBANST 111

**PUBLPOL 134. Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals. 3 Units.**

(Same as LAW 7020) The objective of the course is to explore the increasing ethical challenges in a world in which technology, global risks, and societal developments are accelerating faster than our understanding can keep pace. We will unravel the factors contributing to the seemingly pervasive failure of ethics today among organizations and leaders across all sectors: business, government and non-profit. A framework for ethical decision-making underpins the course. The relationship between ethics and culture, global risks (poverty, cyber-terrorism, climate change, etc.) leadership, law and policy will inform discussion. Prominent guest speakers will attend certain sessions interactively. A broad range of international case studies might include: the Rohingya crisis in Myanmar; civilian space travel (Elon Musk's Mars plans); designer genetics; social media ethics (e.g. Facebook and Russia and on-line sex trafficking); free speech on University campuses (and Gawker type cases); artificial intelligence; Brexit; corporate and financial sector scandals (Epi pen pricing, hedge funds, Wells Fargo, Volkswagen emissions testing manipulation); and non-profit sector ethics challenges (e.g. should NGOs engage with ISIS). Final project in lieu of exam on a topic of student's choice. Attendance required. Class participation important (with multiple opportunities to earn participation credit beyond speaking in class). Strong emphasis on rigorous analysis, critical thinking and testing ideas in real-world contexts. Students wishing to take the course who are unable to sign up within the enrollment limit should contact Dr. Susan Liautaud at susanl1@stanford.edu. The course offers credit toward Ethics in Society, Public Policy core requirements (if taken in combination with PUBLPOL 103E or PUBLPOL 103F), and Science, Technology and Society majors and satisfies the undergraduate Ways of Thinking requirement. The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. Everyone will be challenged. Distinguished Career Institute Fellows are welcome and should contact Dr. Susan Liautaud directly at susanl1@stanford.edu. \*Public Policy majors taking the course to complete the core requirements must obtain a letter grade. Other students may take the course for a letter grade or C/NC. Same as: ETHICSOC 234R, PUBLPOL 234

**PUBLPOL 135. Regional Politics and Decision Making in Silicon Valley and the Greater Bay Area. 4 Units.**

Dynamics of regional leadership and decision making in Silicon Valley, a complex region composed of 40 cities and four counties without any overarching framework for governance. Formal and informal institutions shaping outcomes in the region. Case studies include transportation, workforce development, housing and land use, and climate change.

**PUBLPOL 136. The Sharing Economy. 3 Units.**

The rapid growth of the sharing economy, sometimes also called the peer to peer economy, is made possible by the ubiquity of smart phones, inefficiency of ownership, and measures designed to create and measure trust among participants. The course will explore not only the rapid rise of certain companies but also the shadow side of commercialized relationships. We will examine the economics and development consequences of the sharing economy, primarily with an urban focus, along an emphasis on the design of platforms and markets, ownership, the nature of work, environmental degradation and inequality. Same as: URBANST 136

**PUBLPOL 137. Innovations in Microcredit and Development Finance. 3 Units.**

The role of innovative financial institutions in supporting economic development, the alleviation of rural and urban poverty, and gender equity. Analysis of the strengths and limits of commercial banks, public development banks, credit unions, and microcredit organizations both in the U.S. and internationally. Readings include academic journal articles, formal case studies, evaluations, and annual reports. Priority to students who have taken any portion of the social innovation series: URBANST 131, 132, or 133. Recommended: ECON 1A or 1B. Same as: URBANST 137

**PUBLPOL 14. Navigating Financial Crises in the Modern Global Economy. 1 Unit.**

What causes financial crises? What are the keys to anticipating, preventing, and managing disruptions in the global financial system? This course prepares students to navigate future episodes as policymakers, finance professionals, and citizens by going inside the practical decisions made in an unfolding crisis, from the U.S. government and IMF to the boardroom and trading floor. Students will learn warning signs of distress; market structures that govern crisis dynamics; strategic interactions among the key actors; and lessons learned for creating a more resilient system. Concepts will be applied to real-world experiences in emerging market crises, the U.S. housing and global financial crisis, and the European sovereign crisis, as well as prospective risks from China's financial system and unwinding of extraordinary central bank stimulus.

Same as: ECON 14

**PUBLPOL 143. Finance and Society for non-MBAs. 4 Units.**

The financial system is meant to help people, businesses, and governments fund, invest, and manage risks, but it is rife with conflicts of interests and may allow people with more information and control to harm those with less of both. In this interdisciplinary course we explore the forces that shape the financial system and how individuals and society can benefit most from this system without being unnecessarily harmed and endangered. Topics include the basic principles of investment, the role and "dark side" of debt, corporations and their governance, banks and other financial institutions, why effective financial regulations are essential yet often fail, and political and ethical issues in finance. The approach will be rigorous and analytical but not overly technical mathematically. Prerequisite: Econ 1.

Same as: ECON 143, IPS 227, MS&E 147, POLISCI 127A

**PUBLPOL 144. Giving 2.0: Philanthropy by Design. 4 Units.**

Seminar and practicum. Students drive an actual \$10,000 philanthropic process and design their own social change strategy. Topics: strategic planning, nonprofit assessment and site visits, innovative social change models, and leadership development. Speakers include philanthropic leaders and social entrepreneurs. Class activities: group grant assessments and selection, creative problem solving, and decision-making simulations. Individual project: Social Impact Strategic Plan. Must attend first class; limited enrollment. Recommended: PUBPOL 183.

**PUBLPOL 146. Policy, Politics, and the Presidency: Understanding the 2016 Campaign from Start to Finish. 2 Units.**

(Same as LAW 7057). In 2016, Americans will once again go to the polls to select a new president. But what will actually happen behind-the-scenes between now and then is largely a mystery to most. This course will introduce students to the nuts-and-bolts of a presidential campaign. Each week, we will explore a different topic related to running for the presidency – policy formation, communications, grassroots strategy, digital outreach, campaign finance – and feature high-profile guest speakers who have served in senior roles on both Democratic and Republican campaigns. Students, guests, and faculty will also participate in discussions on how these topics will relate to the 2016 presidential contest, which will begin in earnest over the course of the quarter.

Same as: COMM 153A, COMM 253A, POLISCI 72, PUBLPOL 246

**PUBLPOL 147. Ending Poverty with Technology. 5 Units.**

There are growing worries that new technologies may eliminate work, increase inequality, and create a large dependent class subsisting on transfers. But can technology instead be turned against itself and used to end poverty? This class explores the sources of domestic poverty and then examines how new technologies might be developed to eliminate poverty completely. We first survey existing poverty-reducing products and then attempt to imagine new products that might end poverty by equalizing access to information, reducing transaction costs, or equalizing access to training. In a follow-up class in the spring quarter, students who choose to continue will select the most promising ideas, continue to develop them, and begin the design task within Stanford's new Poverty and Technology Lab.

Same as: SOC 157

**PUBLPOL 148. Ending Poverty with Technology: A Practicum.. 5 Units.**

Will robots, automation, and technology eliminate work and create a large poverty-sticken dependent class? Or will they eliminate poverty, free us from the tyranny of work, and usher in a new society defined by leisure and creative pursuits? This two-quarter class is dedicated to exploring new theories about poverty while at the same time incubating applied technology solutions. The first quarter is devoted to examining the theory of technology-based solutions to poverty, and the second quarter is devoted to planning a viable technology-based product that will reduce poverty. This product may then be built in a follow-up Using Tech for Good (Computer Science 50) class in the first quarter of 2018 (but class participants are not required to take that follow-up class). The course is premised on the view that innovative solutions to poverty will be based on new conversations and an authentic collaboration between Silicon Valley and leaders from education, government, and low-income communities.

Same as: SOC 158

**PUBLPOL 152. Negotiation. 3 Units.**

Students learn to prepare for and conduct negotiations in a variety of arenas including getting a job, managing workplace conflict, negotiating transactions, and managing personal relationships. Interactive class. The internationally travelled instructor who has mediated cases in over 75 countries will require students to negotiate real life case studies and discuss their results in class. Application required before first day of class; students should enroll on Axess and complete the application on Canvas before March 18.

Same as: CEE 151, CEE 251, EARTH 251

**PUBLPOL 154. Politics and Policy in California. 5 Units.**

State politics and policy making, including the roles of the legislature, legislative leadership, governor, special interests, campaign finance, advocacy groups, ballot initiatives, state and federal laws, media, and research organizations. Case studies involving budgets, education, pensions, health care, political reform, environmental reforms, water, transportation and more. Evaluation of political actions, both inside and outside of government, that can affect California policy and social outcomes. Meetings with elected officials, policymakers, and advocates in class and during a day-long field trip to Sacramento.

**PUBLPOL 156. Health Care Policy and Reform. 5 Units.**

Focuses on healthcare policy at the national, state, and local levels. Includes sessions on international models, health insurance, the evolution of healthcare policy in the U.S., key U.S. healthcare topics (Patient Protection and Affordable Care Act, Medicare, Medicaid, public employee retiree health care), the role of technology, reform proposals (single payer, national health care, consumer-based systems, regulated markets, state and local reform efforts), efficiency/cost drivers and prospects for future policy. The course includes sessions on effective memo writing and presentation of policy proposals.

**PUBLPOL 157. Political Data Science. 5 Units.**

Introduction to methods of research design and data analysis used in quantitative political research. Topics covered include hypothesis testing, linear regression, experimental and observational approaches to causal inference, effective data visualization, and working with big data. These topics will be introduced using data sets from American politics, international relations, and comparative politics. The course begins with an intensive introduction to the R programming language used throughout the course. Satisfies quantitative methods requirement for the Political Science Research Honors Track. Prerequisites: Stat 60 or instructor consent.

Same as: POLISCI 155

**PUBLPOL 158. Housing & Community Development--Policy and Practice. 3 Units.**

How federal, state and local governments have worked with private and nonprofit sector actors in creating housing, as well as downtown, waterfront and neighborhood development. Legal and financial mechanisms, tax policy, reuse of historic structures, affordable shelter.

Same as: URBANST 168

**PUBLPOL 159. Economic, Legal, and Political Analysis of Climate-Change Policy. 5 Units.**

This course will advance students understanding of economic, legal, and political approaches to avoiding or managing the problem of global climate change. Theoretical contributions as well as empirical analyses will be considered. It will address economic issues, legal constraints, and political challenges associated with various emissions-reduction strategies, and it will consider policy efforts at the local, national, and international levels. Specific topics include: interactions among overlapping climate policies, the strengths and weaknesses of alternative policy instruments, trade-offs among alternative policy objectives, and decision making under uncertainty. Prerequisites: Econ 50 or its equivalent.

Same as: EARTHSYS 159, ECON 159, ECON 209

**PUBLPOL 167. How To Be a Politician. 2 Units.**

Do you want to run for political office one day? This course will give you a full toolkit for winning elections. It will help students think about their personal narrative, how to present themselves to the electorate, and the issues and messages that should underpin their future campaign. It will also provide students with a practical understanding of how to build a campaign apparatus, fundraise effectively, and develop a winning strategy. The class will be highly interactive giving each student the chance to hone their candidacy, and there will be opportunities to work on debate skills, speech giving, and media performance. We will look at campaigns from across the world, as well as invite politicians and political consultants to speak to us. This class is designed for any student who has dreamed of running for office: be it locally or becoming President.

Same as: PUBLPOL 267

**PUBLPOL 168. Global Organizations: The Matrix of Change. 4 Units.**

We derive analytical tools from the social sciences in studying a variety of organizations given their strategies, and in particular, when their strategies change. Focus is on how to design effective organizations and projects within and across institutional settings. This class is associated with a study trip to India during spring break. Recommended: FINANCE 377, MS&E 180, SOC 160, ECON 149, or MGTECON 330.

Same as: PUBLPOL 268, SOC 168, SOC 268

**PUBLPOL 172. Children, Youth, and the Law. 5 Units.**

How the legal rights of children and adolescents in America are defined, protected, and enforced through the legal process within the context of their developmental needs and competing societal interests. Topics: origins and definitions of children's rights; adoption; custody; the juvenile justice system; education; freedom of speech; and sex. The class is interactive, using hypotheticals for discussion and analysis. A and B alternate; students may take one or both. Prerequisite: Upper division course with preference given to upperclassmen.

Same as: HUMBIO 172B

**PUBLPOL 174. The Urban Economy. 4 Units.**

Applies the principles of economic analysis to historical and contemporary urban and regional development issues and policies. Explores themes of urban economic geography, location decision-making by firms and individuals, urban land and housing markets, and local government finance. Critically evaluates historical and contemporary government policies regulating urban land use, housing, employment development, and transportation. Prerequisite: Econ 1A or permission of instructor.

Same as: URBANST 173

**PUBLPOL 178. The Science and Practice of Effective Advocacy. 3-5 Units.**

How can purposeful collective action change government policy, business practices and cultural norms? This course will teach students about the components of successful change campaigns and help develop the practical skills to carry out such efforts. The concepts taught will be relevant to both issue advocacy and electoral campaigns, and be evidence-based, drawing on lessons from social psychology, political science, communications, community organizing and social movements. The course will meet twice-a-week for 90 minutes, and class time will combine engaged learning exercises, discussions and lectures. There will be a midterm and final. Students will be able to take the course for 3 or 5 units. Students who take the course for 5 units will participate in an advocacy project with an outside organization during the quarter, attend a related section meeting and write reflections. If you enroll in the course for 5 units, you also need to enroll in the section URBANST 178-section 02.

Same as: CSRE 178P, URBANST 178

**PUBLPOL 190. Indigenous Cultural Heritage: Protection, Practice, Repatriation. 3 Units.**

This interdisciplinary seminar explores pressing questions relating to the protection, practice and repatriation of the cultural heritage of Indigenous peoples from North America and beyond. Using an innovative combination of in-class lectures and videos of interviews with renowned experts, including Indigenous leaders, scholars, artists and performers and museum professionals from around the world, this seminar will explore and problematize, among other subjects: the impact of colonialism, urbanization and other political, legal, economic, religious and cultural forces on understandings and definitions of "indigenous" and "cultural heritage"; the development of international law relating to Indigenous peoples; cultural rights; international, domestic, and tribal heritage protection and repatriation laws/initiatives including the 2007 United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the 1990 US Native American Graves Protection and Repatriation Act (NAGPRA), and others; past and present Western museum practices and guidelines relating to display, preservation, provenance research and repatriation of indigenous cultural material; the meaning of repatriation to Indigenous peoples and other stakeholders; and resolving repatriation disputes, including by alternative dispute resolution (ADR) processes. While case studies will relate primarily to Indigenous peoples of North America, comparisons will be drawn with the situation of Indigenous peoples in other regions, such as Oceania and Russia. Each week students will brainstorm actionable ideas for amending/supplementing current frameworks in order to give force to the cultural rights enumerated in UNDRIP. The overall seminar experience will involve discussions of lectures and video content, assigned readings, quizzes, a class visit to the Cantor Center Native Americas collection, and visits to our classroom by experts. Elements used in grading: class participation, attendance and a final project (one-day take-home exam; or research paper or film project with instructor's consent).

Same as: ARTHIST 190A, ARTHIST 490A, PUBLPOL 290

**PUBLPOL 197. Junior Honors Seminar. 5 Units.**

Primarily for students who expect to write an honors thesis. Weekly sessions go through the process of selecting a research question, finding relevant bibliography, writing a literature review, introduction, and study design, culminating in the write-up of an honors thesis proposal (prospectus) and the oral presentation of each student's research project. Students also select an adviser and outline a program of study for their senior year. Enrollment limited to 15.

Same as: ECON 198

**PUBLPOL 198. Directed Readings in Public Policy. 1-5 Unit.****PUBLPOL 199. Senior Research. 1-15 Unit.**

May be repeated for credit.

**PUBLPOL 19Q. Measuring the Performance of Governments in the U.S.. 3 Units.**

Spending by federal, state, and local governments accounts for about one-third of U.S. GDP and governments employ more than one-in-seven workers in the U.S. For most U.S. residents, government is represented by a complicated web of federal, state, and local policies. There is an increasingly contentious debate about the proper role of the government and regarding the impact of specific government policies. This debate is rarely grounded in a common set of facts. In this seminar, we will explore how each level of government interacts with U.S. residents through government services, public programs, taxes, and regulations. We will examine financial results for different levels of government while considering the net effects of government intervention on the health and economic well-being of individuals and families. Particular attention will be paid to certain sectors (e.g. education, health care, etc.) and to certain groups (e.g. those in poverty, the elderly, etc.). Along the way we will accumulate a set of metrics to assess the performance of each level of government while highlighting the formidable challenges of such an exercise. Prerequisite: Econ 1.

Same as: ECON 19Q

**PUBLPOL 200A. Senior Practicum. 5 Units.**

Small student teams conduct policy analyses requested by government and nonprofit organizations. With guidance from the instructor and client organization, each team researches a real-world problem and devises implementable policy recommendations to help address it. The project culminates in a professional report and presentation to the client organization. Prerequisites: core courses in Public Policy or consent of instructor.

**PUBLPOL 200B. Senior Practicum. 5 Units.**

Small student teams conduct policy analyses requested by government and nonprofit organizations. With guidance from the instructor and client organization, each team researches a real-world problem and devises implementable policy recommendations to help address it. The project culminates in a professional report and presentation to the client organization. Prerequisites: core courses in Public Policy or consent of instructor.

**PUBLPOL 200C. Senior Practicum. 5 Units.**

Small student teams conduct policy analyses requested by government and nonprofit organizations. With guidance from the instructor and client organization, each team researches a real-world problem and devises implementable policy recommendations to help address it. The project culminates in a professional report and presentation to the client organization. Prerequisites: core courses in Public Policy or consent of instructor.

**PUBLPOL 200H. Senior Honors Seminar. 3 Units.**

Honors students conduct original research for oral presentations and a paper on their policy-related Honors thesis topic. The course is designed to help students make progress on their theses and improve their analytical, research, and communication skills.

**PUBLPOL 201. Politics and Public Policy. 4-5 Units.**

American political institutions (the Presidency, Congress, and the Court) and political processes (the formation of political attitudes and voting) have for some time now been criticized as inadequate to the task of making modern public policy. Against the backdrop of American culture and political history we examine how public policy has been and is being made. We use theories from Political Science and Economics to assess the state of the American system and the policy making process. We use case studies and lectures to analyze contemporary issues including environmental policy, taxes and spending, gun control, economic growth and inequality and mobility. In some of these issue areas we use comparative data from other countries to see how the U.S. is doing relative to other countries. In addition to class room lecture and discussion, student groups are formed to analyze policy issues of relevance to them. Undergraduate Public Policy students are required to enroll in this class for five units.

Same as: AMSTUD 123X, POLISCI 102, PUBLPOL 101

**PUBLPOL 203E. Ethics on the Edge Public Policy Core Seminar. 3 Units.**

This seminar-style course will explore additional foundational readings on organizational ethics (business, non-profit, and governmental organizations) and policy ethics. Themes will include, among others: race and police brutality incidents; national security (including cyber threats); the Iran nuclear agreement; Brexit; non-profit organizations in the policy and US landscape; sexual harassment networks; and various corporate matters. Organizing themes include, among others: ethics of leadership; ethics of persuasion and compromise; influence of bias in organizational and policy ethics; ethics of social movements; discrepancies between discourse and action; emotion and ethics; and interpreting and explaining ethics. In addition, the course will offer training in a wide variety of skills for effective communication of ethics for policy purposes (developing succinct arguments, presentations, website discourse, commenting in meetings and conferences, interviews, statement of personal views, interacting with the media and social media, and mapping complex ethical analysis). Most of the assignments allow students flexibility to explore topics of their choice. The objective is to engage actively and improve skills in a supportive environment. A short, analytically rigorous final paper in lieu of final exam. Attendance required. Grading will be based on short assignments, class participation, and the short final paper. The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. Everyone will be challenged. Students wishing to take the course who are unable to sign up within the enrollment limit should contact Dr. Susan Liautaud at [susanl1@stanford.edu](mailto:susanl1@stanford.edu). Distinguished Career Institute Fellows are welcome and should contact Dr. Susan Liautaud directly at [susanl1@stanford.edu](mailto:susanl1@stanford.edu). This three-credit seminar accompanies PUBLPOL 134 Ethics on the Edge but can also be taken as a stand-alone course. \*Public Policy majors taking the course to complete the core requirements and students taking the course for Ways credit must obtain a letter grade. Other students may take the course for a letter grade or C/NC.

Same as: PUBLPOL 103E



**PUBLPOL 203F. Ethics of Truth in a Post-Truth World. 3 Units.**

This course will explore changing notions of truth in a world in which technology, global risks, and societal developments are blurring the boundaries of humanity and boring through traditional notions of nation states, institutions, and human identity. We will ask one overarching question: does truth matter anymore? If so, why and how? If not, why not? Either way, how does truth relate to ethical decision-making by individuals and institutions and to an ethical society? Five themes will organize our exploration of more specific topics: honesty; identity; memory; authenticity and integrity; and religious truth. Examples of topics to be explored include, among others: fake news; President Trump's campaign strategy and presidency; Syrian refugees and the Rohingyas; University history (Rhodes, Georgetown slavery, Yale Calhoun College...); new questions in gender and racial identity; Chinese beautifying app Meitu and other social media "truth modifiers"; the sharing economy; the impact of compromised truth on history; and Brexit. Scotty McClennan will explore truth through major literary characters and the impact of religion on truth. We will consider how we determine and verify the truth; how we "do" truth; the role of truth in ethical decision-making; the importance of truth to effective ethical policy; and the relationship of the truth to a life well lived. An analytically rigorous short final paper in lieu of exam. This three-credit seminar may be taken as a stand-alone course or may accompany PUBLPOL 134 Ethics on the Edge. The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. Everyone will be challenged. Distinguished Career Institute Fellows are welcome and should contact Dr. Susan Liautaud directly at susanl1@stanford.edu. Students wishing to take the course who are unable to sign up within the enrollment limit should contact Dr. Susan Liautaud at susanl1@stanford.edu. \*Public Policy majors taking the course to complete the core requirements and students taking the course for Ways credit must obtain a letter grade. Other students may take the course for a letter grade or C/NC.

Same as: PUBLPOL 103F

**PUBLPOL 204. Economic Policy Analysis. 4-5 Units.**

The relationship between microeconomic analysis and public policy making. How economic policy analysis is done and why political leaders regard it as useful but not definitive in making policy decisions. Economic rationales for policy interventions, methods of policy evaluation and the role of benefit-cost analysis, economic models of politics and their application to policy making, and the relationship of income distribution to policy choice. Theoretical foundations of policy making and analysis, and applications to program adoption and implementation. Prerequisites: ECON 50 and ECON 102B. Undergraduate Public Policy students are required to take this class for a letter grade and enroll in this class for five units.

Same as: ECON 150, PUBLPOL 104

**PUBLPOL 205. Empirical Methods in Public Policy. 4-5 Units.**

Methods of empirical analysis and applications in public policy. Emphasis on causal inference and program evaluation. Public policy applications include health, education, and labor. Assignments include hands-on data analysis, evaluation of existing literature, and a final research project. Objective is to obtain tools to 1) critically evaluate evidence used to make policy decisions and 2) perform empirical analysis to answer questions in public policy. Prerequisite: ECON 102B. Enrollment is limited to Public Policy students. Public Policy students must take the course for a letter grade.

Same as: PUBLPOL 105

**PUBLPOL 206. Law and Economics. 4-5 Units.**

This course explores the role of law in promoting well-being (happiness). Law, among its other functions, can serve as a mechanism to harmonize private incentives with cooperative gains, to maintain an equitable division of those gains, and to deter "cheating" and dystopia. Law is thus essential to civilization. Economic analysis of law focuses on the welfare-enhancing incentive effects of law and its enforcement and on law's role in reducing the risks of cooperation, achieved by fixing expectations of what courts or the state will do in various futures. Prerequisite: ECON 51 or PUBLPOL 51.

Same as: ECON 154, PUBLPOL 106

**PUBLPOL 220. Social Science Field Research Methods and Applications. 5 Units.**

Fundamentals of the design, implementation and interpretation of social science field research. Building on a basic knowledge of statistical methods and economics, the course introduces observational field research and compares it with experimental field research. Significant attention devoted to explaining the details of research design as well as what can and cannot be learned through each type of field research. Emphasis placed on the theory of the design and analysis of statistical experiments. Topics include: sample size selection, power and size of statistical hypothesis tests, partial compliance, sample selection bias and methods for accounting for it. Development of critical reading skills emphasized through class discussions of academic journal articles and popular media accounts of field research. Examples of best practice field research studies presented as well as examples of commonly committed errors; students are expected to articulate and challenge or defend underlying assumptions and the extent to which real-world research matches up with concepts covered in lecture. Practical aspects of field work, including efficient and cost-effective data collection, teamwork, field team supervision, budget management, and common ethical considerations. Grading based on weekly problem sets that focus on developing data analysis skills using statistical software, a midterm examination, and a final project in which students write a detailed research proposal. Students can also apply to participate in a course project designing a field research project and implementing it in a developing country context during four weeks of the summer. Prerequisites: either ECON 1 and either STATS 60 or Econ 102A or equivalent.

Same as: EARTHSYS 120, ECON 121, PUBLPOL 120

**PUBLPOL 221. Sentencing, Corrections, and Criminal Justice Policy. 3 Units.**

This introductory course will familiarize students with the history, structure, and performance of America's sentencing and corrections system. Sentencing is the process by which criminal sanctions are imposed in individual cases following criminal convictions. Corrections deals with the implementation and evaluation of criminal sentences after they are handed down. In fact, the two subject areas are inseparable. The course will examine sentencing and corrections from global and historical views, from theoretical and policy perspectives, and with close attention to many problem-specific areas. We will explore sentencing theories and their application, the nature, scope and function of corrections, the impact of mass incarceration on crime and communities, the effectiveness of rehabilitation, the relationship between sanctions and crime, and the consequences of prisoner reentry. These topics will be considered as they play out in current political and policy debates. Guest lectures may include presentations by legal professionals, victims, offenders, and correctional leaders. We also plan to visit a correctional facility. This course is open to 1Ls, 2Ls, and 3Ls in the Law School. Special Instructions: Grades will be based on class participation, and either: (1) three reflection papers of 5 to 7 pages each, or (2) a longer research paper. After the term begins, students accepted into the course can transfer from section (01) into section (02) which meets the research (R) requirement, with consent of the instructor. Elements used in grading: Class participation, reflection papers or research paper. Cross-listed with Comparative Studies in Race & Ethnicity (CSRE 221) and open to Juniors and Seniors, Law (LAW 621), Public Policy (PUBLPOL 221). Same as: CSRE 221

**PUBLPOL 222. Biosecurity and Bioterrorism Response. 4-5 Units.**

Overview of the most pressing biosecurity issues facing the world today. Guest lecturers have included former Secretary of State Condoleezza Rice, former Special Assistant on BioSecurity to Presidents Clinton and Bush Jr. Dr. Ken Bernard, Chief Medical Officer of the Homeland Security Department Dr. Alex Garza, eminent scientists, innovators and physicians in the field, and leaders of relevant technology companies. How well the US and global healthcare systems are prepared to withstand a pandemic or a bioterrorism attack, how the medical/healthcare field, government, and the technology sectors are involved in biosecurity and pandemic or bioterrorism response and how they interface, the rise of synthetic biology with its promises and threats, global bio-surveillance, making the medical diagnosis, isolation, containment, hospital surge capacity, stockpiling and distribution of countermeasures, food and agriculture biosecurity, new promising technologies for detection of bio-threats and countermeasures. Open to medical, graduate, and undergraduate students. No prior background in biology necessary. 4 units for twice weekly attendance (Mon. and Wed.); additional 1 unit for writing a research paper for 5 units total maximum. Same as: BIOE 122, EMED 122, EMED 222, PUBLPOL 122

**PUBLPOL 223. Thinking About War. 4-5 Units.**

Introduction to the ideas, important writers, and policy decisions about warfare. Topics include: what causes wars, great strategists of warfare, whether nuclear weapons require different strategy than conventional war, fostering innovation, what creates stable peace, and what warfare feels like to those who fight it. Each class session is organized around a question; first half of each session will explore concepts, second half will apply them in a historical case or policy decision. Same as: PUBLPOL 123

**PUBLPOL 224. Social Entrepreneurship and Innovation Lab (SE Lab) - Global & Planetary Health. 3 Units.**

Social Entrepreneurship and Innovation Lab (SE Lab) - Global & Planetary Health is a new Collaboratory workshop for students/fellows to design/develop innovative social ventures/solutions addressing key challenges in public health and the environment, in support of the UN Sustainable Development Goals (SDGs 2030). SE Lab is open to students/fellows across Stanford and combines design thinking exercises, short lectures & case studies, workshops, small group teamwork, presentations, guest speakers, and faculty, practitioner and peer feedback to support/advance development of your ideas/plans. Join SE Lab with an idea or simply the desire to join a team. Enrollment limited to 50. Instructor's permission required.

Same as: HRP 224, MED 224

**PUBLPOL 225. Place-Making Policies. 5 Units.**

This reading and research seminar considers the numerous ways that governments conduct social policy by shaping and remaking geographic places. Representative topics include: housing aid programs, exclusionary zoning, controls on internal migration and place of residence, cars and their place in cities, and the politics of western water projects. Students will conduct original field research on the consequences of these policies for economic, social, and political outcomes. Prerequisites: None.

Same as: POLISCI 220, URBANST 170

**PUBLPOL 231. Health Law: Finance and Insurance. 3 Units.**

(SAME AS LAW 3001, MGTECON 331) This course provides the legal, institutional, and economic background necessary to understand the financing and production of health services in the U.S. We will discuss the Affordable Care Act, health insurance (Medicare and Medicaid, employer-sponsored insurance, the uninsured), the approval process and IP protection for pharmaceuticals, and antitrust policy. We may discuss obesity and wellness, regulation of fraud and abuse, and medical malpractice. The syllabus for this course can be found at <https://syllabus.stanford.edu>. Elements used in grading: Participation, attendance, class presentation, and final exam.

Same as: HRP 391

**PUBLPOL 232. The Politics of Policy Making. 3 Units.**

Public policymaking in the United States is part of a political process that can take years or even decades to play out. A familiarity with the politics of policymaking is key to understanding why some reform attempts are successful while others are not. This course will give students a behind-the-scenes look at how policy actually gets made. Students will gain exposure to the theory and literature behind policy formulation, and engage in debates over historical and contemporary efforts at reform.

Same as: PUBLPOL 132

**PUBLPOL 234. Ethics on the Edge: Business, Non-Profit Organizations, Government, and Individuals. 3 Units.**

(Same as LAW 7020) The objective of the course is to explore the increasing ethical challenges in a world in which technology, global risks, and societal developments are accelerating faster than our understanding can keep pace. We will unravel the factors contributing to the seemingly pervasive failure of ethics today among organizations and leaders across all sectors: business, government and non-profit. A framework for ethical decision-making underpins the course. The relationship between ethics and culture, global risks (poverty, cyber-terrorism, climate change, etc.) leadership, law and policy will inform discussion. Prominent guest speakers will attend certain sessions interactively. A broad range of international case studies might include: the Rohingya crisis in Myanmar; civilian space travel (Elon Musk's Mars plans); designer genetics; social media ethics (e.g. Facebook and Russia and on-line sex trafficking); free speech on University campuses (and Gawker type cases); artificial intelligence; Brexit; corporate and financial sector scandals (Epi pen pricing, hedge funds, Wells Fargo, Volkswagen emissions testing manipulation); and non-profit sector ethics challenges (e.g. should NGOs engage with ISIS). Final project in lieu of exam on a topic of student's choice. Attendance required. Class participation important (with multiple opportunities to earn participation credit beyond speaking in class). Strong emphasis on rigorous analysis, critical thinking and testing ideas in real-world contexts. Students wishing to take the course who are unable to sign up within the enrollment limit should contact Dr. Susan Liautaud at [susanl1@stanford.edu](mailto:susanl1@stanford.edu). The course offers credit toward Ethics in Society, Public Policy core requirements (if taken in combination with PUBLPOL 103E or PUBLPOL 103F), and Science, Technology and Society majors and satisfies the undergraduate Ways of Thinking requirement. The course is open to undergraduate and graduate students. Undergraduates will not be at a disadvantage. Everyone will be challenged. Distinguished Career Institute Fellows are welcome and should contact Dr. Susan Liautaud directly at [susanl1@stanford.edu](mailto:susanl1@stanford.edu). \*Public Policy majors taking the course to complete the core requirements must obtain a letter grade. Other students may take the course for a letter grade or C/NC. Same as: ETHICSOC 234R, PUBLPOL 134

**PUBLPOL 238. Wise Interventions. 4 Units.**

Classic and contemporary psychological interventions; the role of psychological factors in social reforms for social problems involving healthcare, the workplace, education, intergroup, relations, and the law. Topics include theories of intervention, the role of laboratory research, evaluation, and social policy. Same as: PSYCH 138, PSYCH 238

**PUBLPOL 242. Design Thinking for Public Policy Innovators. 3 Units.**

What happens when new technology is developed so quickly that society isn't sure if it poses an opportunity or a danger? How should we regulate it when there are real risks but also real potential for societal benefit? Both of which are hard to measure? These kinds of dilemmas are arising now in bioengineering, information technology, and beyond. The scientific and policy communities are trying to address these issues, but the clash of cultures between a fast-moving innovation mindset and a risk-averse safety and security mindset affects how this work progresses. In this experimental class, you will explore how design thinking can be used to reinvent a policy ecosystem by focusing on the challenge policymakers face in trying to establish new rules and/or standards that they hope a wide variety of constituent groups will accept and follow and will keep pace with future innovations. This is a new approach to a critical problem & you must be willing to dig into unknown territory. If you're looking for a survey course in design methods, this class is not for you. Limited enrollment. Admission by application. See <http://dschool.stanford.edu/classes>.

**PUBLPOL 245. Does Google Need a Foreign Policy? Private Corporations & International Security in the Digital Age. 4 Units.**

Facebook has more users than any nation has citizens. Apple CEO Tim Cook speaks more often with Chinese President Xi Jinping than President Trump does. Google's revenues exceed the GDPs of more than half the world's countries. Cybersecurity companies produce weapons that once only foreign governments wielded. These and other technology companies are increasingly caught in the maw of global politics whether it's entering challenging new foreign markets, developing platforms that enable millions of people around the world to organize for both noble and nefarious aims, or developing products that can become tools of intelligence agencies worldwide for surveillance, counterintelligence, and information warfare. In several respects, tech companies wield more power than governments. We examine the changing role of corporations in international politics, the role of the state, and critical challenges that large technology companies face today in particular. We discuss contending perspectives about key issues with guest lectures by industry and US government leaders as well as simulations of foreign policy crises from the board room to the White House Situation Room. No background in political science or computer science is required. Admission based on application. Instructor consent required. See course notes for details. Same as: IPS 245

**PUBLPOL 246. Policy, Politics, and the Presidency: Understanding the 2016 Campaign from Start to Finish. 2 Units.**

(Same as LAW 7057). In 2016, Americans will once again go to the polls to select a new president. But what will actually happen behind-the-scenes between now and then is largely a mystery to most. This course will introduce students to the nuts-and-bolts of a presidential campaign. Each week, we will explore a different topic related to running for the presidency – policy formation, communications, grassroots strategy, digital outreach, campaign finance – and feature high-profile guest speakers who have served in senior roles on both Democratic and Republican campaigns. Students, guests, and faculty will also participate in discussions on how these topics will relate to the 2016 presidential contest, which will begin in earnest over the course of the quarter. Same as: COMM 153A, COMM 253A, POLISCI 72, PUBLPOL 146

**PUBLPOL 247. The Politics of Inequality. 5 Units.**

This course is about the distribution of power in contemporary democratic societies, and especially in the US: who governs? Is there a "power elite," whose preferences dominate public policy making? Or, does policy reflect a wide range of interests? What is the relationship between income and power? What are the political consequences of increasing income inequality? How do income differences across racial and ethnic groups affect the quality of their representation? What are effective remedies for unequal influence? Finally, which institutions move democratic practice furthest towards full democratic equality? This course will address these questions, focusing first on local distributions of power, and then considering the implications of inequality in state and national politics. Students will have the opportunity to study income inequality using income and labor force surveys in a mid-term assignment. Then, in a final paper, students will conduct an empirical examination of the implications of income inequality for American democracy.

Same as: POLISCI 147P, SOC 178

**PUBLPOL 267. How To Be a Politician. 2 Units.**

Do you want to run for political office one day? This course will give you a full toolkit for winning elections. It will help students think about their personal narrative, how to present themselves to the electorate, and the issues and messages that should underpin their future campaign. It will also provide students with a practical understanding of how to build a campaign apparatus, fundraise effectively, and develop a winning strategy. The class will be highly interactive giving each student the chance to hone their candidacy, and there will be opportunities to work on debate skills, speech giving, and media performance. We will look at campaigns from across the world, as well as invite politicians and political consultants to speak to us. This class is designed for any student who has dreamed of running for office: be it locally or becoming President.

Same as: PUBLPOL 167

**PUBLPOL 268. Global Organizations: The Matrix of Change. 4 Units.**

We derive analytical tools from the social sciences in studying a variety of organizations given their strategies, and in particular, when their strategies change. Focus is on how to design effective organizations and projects within and across institutional settings. This class is associated with a study trip to India during spring break. Recommended: FINANCE 377, MS&E 180, SOC 160, ECON 149, or MGTECON 330.

Same as: PUBLPOL 168, SOC 168, SOC 268

**PUBLPOL 290. Indigenous Cultural Heritage: Protection, Practice, Repatriation. 3 Units.**

This interdisciplinary seminar explores pressing questions relating to the protection, practice and repatriation of the cultural heritage of Indigenous peoples from North America and beyond. Using an innovative combination of in-class lectures and videos of interviews with renowned experts, including Indigenous leaders, scholars, artists and performers and museum professionals from around the world, this seminar will explore and problematize, among other subjects: the impact of colonialism, urbanization and other political, legal, economic, religious and cultural forces on understandings and definitions of "indigenous" and "cultural heritage"; the development of international law relating to Indigenous peoples; cultural rights; international, domestic, and tribal heritage protection and repatriation laws/initiatives including the 2007 United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the 1990 US Native American Graves Protection and Repatriation Act (NAGPRA), and others; past and present Western museum practices and guidelines relating to display, preservation, provenance research and repatriation of indigenous cultural material; the meaning of repatriation to Indigenous peoples and other stakeholders; and resolving repatriation disputes, including by alternative dispute resolution (ADR) processes. While case studies will relate primarily to Indigenous peoples of North America, comparisons will be drawn with the situation of Indigenous peoples in other regions, such as Oceania and Russia. Each week students will brainstorm actionable ideas for amending/supplementing current frameworks in order to give force to the cultural rights enumerated in UNDRIP. The overall seminar experience will involve discussions of lectures and video content, assigned readings, quizzes, a class visit to the Cantor Center Native Americas collection, and visits to our classroom by experts. Elements used in grading: class participation, attendance and a final project (one-day take-home exam; or research paper or film project with instructor's consent).

Same as: ARTHIST 190A, ARTHIST 490A, PUBLPOL 190

**PUBLPOL 298. Directed Readings in Public Policy. 1-5 Unit.****PUBLPOL 301A. Microeconomics for Policy. 4-5 Units.**

Microeconomic concepts relevant to decision making. Topics include: competitive market clearing, price discrimination; general equilibrium; risk aversion and sharing, capital market theory, Nash equilibrium; welfare analysis; public choice; externalities and public goods; hidden information and market signaling; moral hazard and incentives; auction theory; game theory; oligopoly; reputation and credibility. Undergraduate Public Policy students may take PublPol 51 as a substitute for the Econ 51 major requirement. Economics majors still need to take Econ 51. Prerequisites: ECON 50 and MATH 51 or equiv.

Same as: IPS 204A, PUBLPOL 51

**PUBLPOL 301B. Economic Policy Analysis for Policymakers. 4-5 Units.**

This class provides economic and institutional background necessary to conduct policy analysis. We will examine the economic justification for government intervention and illustrate these concepts with applications drawn from different policy contexts. The goal of the course is to provide you with the conceptual foundations and the practical skills and experience you will need to be thoughtful consumers or producers of policy analysis. Prerequisites: ECON 102B or PUBLPOL 303D.

Same as: IPS 204B

**PUBLPOL 302A. Introduction to American Law. 3-5 Units.**

For undergraduates. The structure of the American legal system including the courts; American legal culture; the legal profession and its social role; the scope and reach of the legal system; the background and impact of legal regulation; criminal justice; civil rights and civil liberties; and the relationship between the American legal system and American society in general.

Same as: AMSTUD 179, POLISCI 122

**PUBLPOL 302B. Economic Analysis of Law. 3 Units.**

(Same as LAW 7502.) This course will provide a broad overview of the scholarly field known as "law and economics." The focus will be on how legal rules and institutions can correct market failures. We will discuss the economic function of contracts and, when contracts fail or are not feasible, the role of legal remedies to resolve disputes. We will also discuss at some length the choice between encouraging private parties to initiate legal actions to correct externalities and governmental actors, such as regulatory authorities. Extensive attention will be given to the economics of litigation, and to how private incentives to bring lawsuits differs from the social value of litigation. The economic motive to commit crimes, and the optimal governmental response to crime, will be studied in depth. Specific topics within the preceding broad themes include: the Coase Theorem; the tradeoff between the certainty and severity of punishment; the choice between ex ante and ex post sanctions; negligence versus strict liability; property rules; remedies for breach of contract; and the American rule versus the English rule for allocating litigation costs. Because this course is taught jointly with Law 7502 in the Law School, it will not be mathematically oriented; there are no prerequisites to take the course.

**PUBLPOL 303D. Applied Econometrics for Public Policy. 4-5 Units.**

This course aims to present the theory and practice of empirical research in economics with particular emphasis on topics relating to public policy questions. We will start with basic regression analysis and introduce the statistical software STATA. The course will put a substantial amount of effort on work with STATA in analyzing actual data sets, reproducing and criticizing results in scientific research and learning the actual practice of econometrics. We will focus on the identification of causal effects and the various econometric techniques available to learn about causality. While this is primarily a methodology module, most examples and applications will be drawn from the area of public policy. The final will be a 3-5 hour take-home exam. Prerequisite: Econ 102A.

**PUBLPOL 304A. The Ethics and Politics of Collective Action. 3-4 Units.**

Collective action problems arise when actions that are individually rational give rise to results that are collectively irrational. Scholars have used such a framework to shed light on various political phenomena such as revolutions, civil disobedience, voting, climate change, and the funding of social services. We examine their findings and probe the theoretical foundations of their approach. What does this way of thinking about politics bring into focus, and what does it leave out? What role do institutions play in resolving collective action problems? And what if the required institutions are absent? Can we, as individuals, be required to cooperate even if we expect that others may not play their part? Readings drawn from philosophy, political science, economics, and sociology. Same as: ETHICSOC 180M, PHIL 73, POLISCI 131A

**PUBLPOL 305B. Public Policy and Social Psychology: Implications and Applications. 4 Units.**

Theories, insights, and concerns of social psychology relevant to how people perceive issues, events, and each other, and links between beliefs and individual and collective behavior will be discussed with reference to a range of public policy issues including education, public health, income and wealth inequalities, and climate change. Specific topics include: situationist and subjectivist traditions of applied and theoretical social psychology; social comparison, dissonance, and attribution theories; stereotyping and stereotype threat, and sources of intergroup conflict and misunderstanding; challenges to universality assumptions regarding human motivation, emotion, and perception of self and others; also the general problem of producing individual and collective changes in norms and behavior.

Same as: IPS 207B, PSYCH 216

**PUBLPOL 306. Writing and Rhetoric for Policy Audiences. 4 Units.**

This course offers hands-on learning of effective writing and presentation techniques for audiences that include policy makers, decision stakeholders, interest groups, the media, and the public. Class time will be spent learning lessons in rhetoric, analyzing multiple written genres (memo, op-ed, report, media communications), participating in peer review, and practicing presentation strategies (elevator pitch, press conference, media interview, board meeting, formal presentation). Course texts include sample memos, op-eds, and white papers, as well as rhetoric handouts and videos. Students will draft, revise, and submit writing for policy audiences in the compilation of a final portfolio. Students will also produce oral and multimedia arguments, individually and in teams. Students will be responsible for timely peer review and short presentations on course materials. Enrollment limited. Prerequisite: consent of instructor.

**PUBLPOL 307. Justice. 4-5 Units.**

Focus is on the ideal of a just society, and the place of liberty and equality in it, in light of contemporary theories of justice and political controversies. Topics include financing schools and elections, regulating markets, discriminating against people with disabilities, and enforcing sexual morality. Counts as Writing in the Major for PoliSci majors. Same as: ETHICSOC 171, PHIL 171, POLISCI 103, POLISCI 336S, PUBLPOL 103C

**PUBLPOL 308. Political Analysis for Public Policymakers. 4 Units.**

Policymakers in the United States, whether elected or unelected, operate in a governmental system where politics pervades nearly every element of their daily activity. This course provides students with both the theory and real-world examples they need to understand and evaluate the impact of politics, political institutions, and the political process on policymaking. Readings will include selections from the public policy, political science, legal, and economics literatures.

**PUBLPOL 309. Practicum. 1-10 Unit.**

Applied policy exercises in various fields. Multidisciplinary student teams apply skills to a contemporary problem in a major policy exercise with a public sector client such as a government agency. Problem analysis, interaction with the client and experts, and presentations. Emphasis is on effective written and oral communication to lay audiences of recommendations based on policy analysis.

**PUBLPOL 309X. Public Policy Research Project. 1-10 Unit.**

Supervised research internship. Individual students perform policy research for outside client, applying analytical skills from core curriculum. Requires permission of program director.

**PUBLPOL 310. Master of Arts Thesis. 1-5 Unit.**

Restricted to students writing a master's thesis in Public Policy. May be repeated for credit.

**PUBLPOL 311. Public Policy Colloquium. 1 Unit.**

Weekly colloquia speaker series required for M.P.P. and M.A. in Public Policy students. Themes vary each quarter. Open only to Public Policy graduate students; permission number required to enroll.

**PUBLPOL 315. Practical Training. 1-5 Unit.**

Qualified Public Policy students obtain employment in a relevant research or industrial activity to enhance their professional experience consistent with their degree programs. Prior to enrolling students must get internship approved by the Public Policy Program. At the start of the quarter, students must submit a one page statement showing the relevance of the employment to the degree program along with an offer letter. At the end of the quarter, a three page final report must be supplied documenting work done and relevance to degree program. Meets the requirements for Curricular Practical Training for students on F-1 visas. May be repeated for credit.

**PUBLPOL 316. Global Education Policy & Organization. 3-5 Units.**

Education policy, politics, and development. Topics include: politics, interests, institutions, policy, and civil society; how schools and school systems operate as political systems; how policy making occurs in educational systems; and theories of development.

Same as: EDUC 306B

**PUBLPOL 317. Comparing Institutional Forms: Public, Private, and Nonprofit. 4 Units.**

For students interested in the nonprofit sector, those in the joint Business and Education program, and for Public Policy MA students. The focus is on the missions, functions, and capabilities of nonprofit, public, and private organizations, and the managerial challenges inherent in the different sectors. Focus is on sectors with significant competition among institutional forms, including health care, social services, the arts, and education. Sources include scholarly articles, cases, and historical materials.

Same as: EDUC 377, GSBGEN 346, SOC 377

**PUBLPOL 319. Legislation. 3 Units.**

(Same as Law 7048) Lawyers work in a legal system largely defined by statutes, and constantly shaped by the application of legislative power. This course is about statutes and the legislative institutions that create them. It discusses some of the key laws governing access to legislative power and the procedures that culminate in the production of statutes in the legislature. The course is divided into two parts. The first part will focus on the acquisition of legislative power. Key topics include bribery laws, lobbying and indirect influence on legislative activity, and campaign finance regulations. The second part will focus on the exercise of legislative power. Through a number of public policy case studies, students will better understand the organization of the U.S. Congress, the ways in which power is exercised in that institution, and the intersection between politics, the law, and policymaking. Elements used in grading: Class participation and final exam.

**PUBLPOL 342. Energy Efficiency: Technology, Policy, and Investment. 1-2 Unit.**

Provides students with a basic understanding of the technologies, policies, and investments behind energy efficiency. Explores each of these dimensions, and their interplay, through structured lectures and expert perspectives from leading professionals and practitioners. The seminar covers the following energy efficiency topics: fundamental concepts; history and achievements; role of policy and new policy frameworks; investment, strategy and finance; evolving digital/analytical and platform tools; low income programs; international development; relationship between efficiency and climate change; energy efficiency and the changing grid; and new entrants and business models. Limited to 30 students. Prerequisite: at least one  $\zeta$  or equivalent  $\zeta$  of CEE 100, CEE 226A, CEE 107A/207A, ENVRES 280, LAW 2503, GSBGEN 532. Same as: MS&E 442

**PUBLPOL 347D. Rebooting Government with Design Thinking. 3-4 Units.**

Students apply tools of human-centered design to issues of government performance. Small project teams work with NGO and government partners (in the U.S. and abroad) on concrete design challenges focused on issues such as how to deliver services more effectively and ensure that citizens' voices are heard. Students identify needs, generate concepts, create prototypes, and test their appropriateness. Taught through the Hasso Plattner Institute of Design at Stanford (<http://dschool.stanford.edu>). Enrollment limited. Application required. Prerequisites: consent of instructor(s). Same as: POLISCI 347D

**PUBLPOL 353A. Science and Technology Policy. 4-5 Units.**

U.S. policies for science, technology, and innovation; political institutions that create and carry out these policies; government programs that support scientific research and the development and use of new technologies; political controversies surrounding some science and technologies and the regulation of research and technology; international aspects of science and technology; the roles of scientists, engineers, and physicians in creating and implementing policy; and opportunities to do policy work in government and other organizations. Assignments: analyzing the politics of particular executive and legislative proposals, assessing options for trying to reach specific policy objectives, and preparing mock memos and testimony. This course is designed primarily for graduate students in science, engineering, and medicine who want to learn more about science and technology policy and how it is made. Public Policy 353A is a "gateway course" - an introduction - both for students pursuing a joint degree or co-terminal degree in Public Policy and for other graduate students interested in S&T policy or possible careers in the policy world. Junior and senior undergraduate students are also welcome to enroll.

**PUBLPOL 354. Economics of Innovation. 5 Units.**

The role of innovation and technological change in long run economic growth and the sources of innovation in science, technology, and commercialization. Founding of new industries and new markets. Commercialization of new technologies. Incentives and organization of science. Entrepreneurship. Openness and proprietary/controlled innovation. Selected public policies toward invention and innovation. The industrial revolution, the shifting international location of innovation, and the information revolution. Focus of the second half of the course is on the newest research on the newest industries. Prerequisites: ECON 51 (Public Policy majors may take PUBLPOL 51 as a substitute for ECON 51) and Econ 102B. Same as: ECON 113

**PUBLPOL 364. The Future of Finance. 2 Units.**

(Same as Law 1038) If you are interested in a career in finance or that touches finance (computational science, economics, public policy, legal, regulatory, corporate, other), this course will give you a useful perspective. We will take on hot topics in the current landscape of global financial markets such as how the world has evolved post-financial crisis, how it is being disrupted by FinTech, RegTech, artificial intelligence, crowd financing, blockchain, machine learning & robotics (to name a few), how it is being challenged by IoT, cyber, financial warfare & crypto currency risks (to name a few) and how it is seizing new opportunities in fast-growing areas such as ETFs, new instruments/payment platforms, robo advising, big data & algorithmic trading (to name a few). The course will include guest-lecturer perspectives on how sweeping changes are transforming business models and where the greatest opportunities exist for students entering or touching the world of finance today including existing, new and disruptive players. While derivatives and other quantitative concepts will be handled in a non-technical way, some knowledge of finance and the capital markets is presumed. Elements used in grading: Class Participation, Attendance, Final Paper. Consent Application: To apply for this course, students must complete and email to the instructors the Consent Application Form, which is available on the Public Policy Program's website at <https://publicpolicy.stanford.edu/academics/undergraduate/forms>. See Consent Application Form for submission deadline.

Same as: ECON 152, ECON 252, STATS 238

**PUBLPOL 51. Microeconomics for Policy. 4-5 Units.**

Microeconomic concepts relevant to decision making. Topics include: competitive market clearing, price discrimination; general equilibrium; risk aversion and sharing, capital market theory, Nash equilibrium; welfare analysis; public choice; externalities and public goods; hidden information and market signaling; moral hazard and incentives; auction theory; game theory; oligopoly; reputation and credibility. Undergraduate Public Policy students may take PublPol 51 as a substitute for the Econ 51 major requirement. Economics majors still need to take Econ 51.

Prerequisites: ECON 50 and MATH 51 or equiv.

Same as: IPS 204A, PUBLPOL 301A

**PUBLPOL 55N. Public Policy and Personal Finance. 3 Units.**

The seminar will provide an introduction and discussion of the impact of public policy on personal finance. Voters regularly rate the economy as one of the most important factors shaping their political views and most of those opinions are focused on their individual bottom lines. In this course we will discuss the rationale for different public policies and how they affect personal financial situations. We will explore personal finance issues such as taxes, loans, charity, insurance, and pensions. Using the context of (hypothetical) personal finance positions, we will discuss the public policy implications of various proposals and how they affect different groups of people, for example: the implications of differential tax rates for different types of income, the promotion of home ownership in the U.S., and policies to care for our aging population. While economic policy will be the focus of much of the course, we will also examine some of the implications of social policies on personal finance as well. There will be weekly readings and several short policy-related writing assignments.

Same as: ECON 25N

**PUBLPOL 73. Energy Policy in California and the West. 1 Unit.**

This seminar provides an in-depth analysis of the role of California state agencies and Western energy organizations in driving energy policy development, technology innovation, and market structures, in California, the West and internationally. The course covers three areas: 1) roles and responsibilities of key state agencies and Western energy organizations; 2) current and evolving energy and climate policies; and 3) development of the 21st century electricity system in California and the West. The seminar will also provide students a guideline of what to expect in professional working environment. nnSpecific meeting dates for the course are as follows: April 21 10am-2pm/ May 12 10am-1pm/ June 2 10am-1pm.

Same as: CEE 263G, POLISCI 73

**PUBLPOL 74. Public Service Internship Preparation. 1 Unit.**

Are you prepared for your internship this summer? This workshop series will help you make the most of your internship experience by setting learning goals in advance; negotiating and communicating clear roles and expectations; preparing for a professional role in a non-profit, government, or community setting; and reflecting with successful interns and community partners on how to prepare sufficiently ahead of time. You will read, discuss, and hear from guest speakers, as well as develop a learning plan specific to your summer or academic year internship placement. This course is primarily designed for students who have already identified an internship for summer or a later quarter. You are welcome to attend any and all workshops, but must attend the entire series and do the assignments for 1 unit of credit.

Same as: ARTSINST 40, EARTHSYS 9, EDUC 9, HUMBIO 9, URBANST 101

**PUBLPOL 78N. Economic Policies of the Presidential Candidates. 3 Units.**

In nearly all polls, American voters rank the economy as one of their most important concerns. In the presidential election, much of the debate for voters will be on questions of economic policy. In this course, we will delve deeply into economic policy issues to understand options for government intervention and possible outcomes. We will combine economic analysis with political science methodology to understand efficient and implementable policy proposals.nnSpecific areas of interest will be taxation, budget, entitlement programs, economic regulation and competition policy, trade, demography, income inequality, and monetary policy. The course will incorporate other timely and salient policy issues as they arise during the course of the campaign. n nStudents will be expected to write a short paper and make an oral presentation to the class. A wide range of topics will be acceptable, including those directly related to campaign issues as well as other long-term economic issues facing the country.

Same as: ECON 78N

**PUBLPOL 801. TGR Project. 0 Units.**

Instructor and program consent required prior to enrollment.

**PUBLPOL 85. Environmentalism in California. 1 Unit.**

Alternative Spring Break: With climate change posed to be one of the most pressing issues of the 21st Century, environmental preservation is emerging at a top priority. In addition to the federal government, state and local governments regulate the environment. In this course, we will learn about what environmental policy looks like in at the state level in California. Since the Golden State has an ambitious environmental preservation plan, there will be a lot of content. To make this class more manageable, we will be focusing on two areas specifically: water and energy. Finally, we will spend that last few weeks of the course learning about environmental justice, and specifically, how climate change impacts Indigenous communities in California and how the state is mitigating the impact. All major backgrounds are welcome.

**PUBLPOL 95S. Protest in Modern China. 5 Units.**

How has protest impacted the history of China? In this course, we study the history of state-citizen confrontation from the fall of the Qing Dynasty in 1911 to the Occupy Central movement in 2014. We seek to understand the politics of civic engagement in China today as part of politicized, global conversation about human rights, democracy, and revolution. We will examine a wide range of primary sources, explore archival offerings on campus, and hone critical reading and analytical writing skills.

Same as: HISTORY 95S

## Religious Studies (RELIGST)

**RELIGST 1. Religion Around the Globe. 4 Units.**

This course surveys major religious traditions of the world. Through examination of a variety of materials, including scriptures and other spiritual writings, religious objects and artifacts, and modern documentary and film, we explore Buddhism, Christianity, Hinduism, Islam, Judaism, and Daoism as rich historical and living traditions.

**RELIGST 105. Religion and War in America. 4 Units.**

Scholars have devoted much attention to wars in American history, but have not agreed as to whether religion was a major cause or simply a cover for political, economic, and other motives. We will compare interpretations that leave religion out, with those that take it into account. We will also look at the impact of war on the religious lives of ordinary Americans. We will examine both secondary as well as primary sources, beginning with King Philip's War in the 17th century, and ending with the "War on Terror" in the present day.

Same as: AMSTUD 105R, CSRE 105, HISTORY 254D, HISTORY 354D

**RELIGST 10Q. Literature, Medicine and Empathy. 3 Units.**

In recent years, there has been a groundswell of interest in empathy as a key competency of the emotionally intelligent, and a primary motivator of moral behavior. But what is empathy, exactly? This seminar will seek to find out, exploring the concept through the lens of literature and medicine. nReading novels and exploring the philosophical beginnings of the term empathy, we will learn about the range of ways in which human beings have attempted to know and understand the other. Guided by research studies and our own experience, we will explore the critical question of whether empathy really does lead to altruism. We will consider why it can be so hard for human beings to walk in another's shoes and why we so often fail to do so. Through memoirs of suffering, we will learn about empathy in medicine and about what the latest studies in biology and neuroscience can teach us about how we relate to each other. Lastly, we will explore the dangers and limitations of empathy, reading scholarly circuits and discussing the role of empathy in life and society.

Same as: MED 10Q

**RELIGST 114. Yoga Ancient and Modern. 4 Units.**

Originating in ancient India, yoga went through many developments over more than 4000 years in India and other parts of Asia. Having migrated to Euro-America in the late nineteenth century, today yoga is everywhere—studios, schools, gyms, malls, resorts, ashrams, retreat centers. It comes in many flavors— austere, with meditative instructors and Sanskrit chants; stylish, in 105-degree heat, with portable-miked instructors loudly motivating students to go through poses with speed and intensity; niche-crafted to meet the needs of busy professionals, pregnant women, senior citizens, or people with back problems. It may appear as a spiritual path or as a heavily marketed commodity. It generates lawsuits as teachers dispute ownership of certain styles, or as some Americans oppose its teaching yoga in public schools. In the first half of the course we will study the history of yoga in India, reading primary texts composed between about 500 BCE and 1600 CE. In the second half we will learn about yoga's globalization in the last century. Participating in a yoga class is recommended. 2 units of independent study (S-NC) are offered for those who participate in a weekly yoga class and write short reflections on the experience.

**RELIGST 115X. Europe in the Middle Ages, 300-1500. 3-5 Units.**

This course provides an introduction to Medieval Europe from the fall of Rome to the Renaissance. While the framework of the course is chronological, we'll concentrate particularly on the structure of medieval society. Rural and urban life, kingship and papal government, wars and plagues provide the context for our examination of the lives of medieval people, what they believed, and how they interacted with other, both within Christendom and beyond it.

Same as: HISTORY 15D, HISTORY 115D

**RELIGST 117. Christianity in 21st-century America. 4 Units.**

As the largest religion practiced in the United States, Christianity not only shapes the lives of a large number of its citizens but also impinges on public discourse, policies, and debates. This course investigates the ways in which Christianity in America is changing and what these changes bode for its role in the public and private spheres. Issues include shifting demographics lead to declining numbers in 'mainline' denominations; the polarization of Christian conservatives and religious 'nones'; interfaith toleration and cooperation alongside interreligious conflict; the rise of 'spiritual, not religious' young adults; the effects of immigration; religion and science.

Same as: AMSTUD 117R

**RELIGST 118. Gandhi, Nonviolence, Religion. 4 Units.**

We will study Gandhi and his era, focusing on sources that relate Gandhi's theory and practice of nonviolence to religion and ethics. Topics include Gandhi's biography and personal influences; his construction of Hinduism and inclination to asceticism; his encounters with Jainism and Christianity; his attempts to negotiate the increasingly intractable and violent issues between Hindus and Muslims leading up to independence/partition; and the religious arguments involved in his bitter break with the leader of the anti-caste and untouchable liberation movement, B.R. Ambedkar. We will locate discussions of religion within larger political and social circumstances. Readings include *The Story of My Experiments with Truth*, *Hind Swaraj*, and other writings by Gandhi; the *Bhagavad Gita*; Erik Erikson's psychoanalytic study, *Gandhi's Truth*; and recent critical works on Gandhi and religion.

**RELIGST 119. Religion, Violence, and Nonviolence. 4 Units.**

College courses and public events often address "religion and violence"—an important topic, but one-sided. We will study ways in which religious leaders, movements, and discourses have (1) promoted violent conflict, aggression, and oppression; and (2) contributed to nonviolence, peacebuilding, and liberation of the oppressed. An overarching theme will be a view of religions as fields of interpretation. No religion is essentially violent or peaceful; intricately connected to the world around them, religions become what they become through interpretation and action. Each week will have two meetings: one featuring an outstanding guest lecturer and one to discuss the lecture topic, with assigned readings and films. Topics under consideration include: Buddhism and Violence; Dorothy Day and Catholic Nonviolent Resistance to Nuclear Weapons; Just War and Jihad; The Contribution of Negro Spirituals to Liberation; The Quakers: Pacifist Convictions and Activism; Violence/Nonviolence in Jainism; The Role of Christian Faith in M.L. King's Political Work; Spirituality and Religious Peacebuilding. For lecture series with required attendance and written reflections for 2 units, take RELIGST 29.

**RELIGST 11N. The Meaning of Life: Philosophical, Aesthetic, and Religious Perspectives. 3 Units.**

Raise ultimate questions about life. Yes, the unexamined life is not worth living, but also the un-lived life is not worth examining. Students and professor examine their own lives in the light of questions that the readings and lectures bring up: 1. The big picture: Is there such a thing as "the" meaning of life? 2. What is entailed in making personal-existential sense of one's own life? 3. What constitutes the good life, lived in society? 4. How can a university education bear upon the search for a meaningful life? 5. What "methods" for or approaches to life can one learn from studies in the humanities? After introductory lectures, the seminar studies a series of artworks, poems, diverse texts, and a film, all of which bear on the questions mentioned above – works such: 1. Plato's Allegory of the Cave, from "The Republic" 2. Manet's "A bar at the Folies Bergere" 3. A comparison/contrast of Monet's early (1862) "Still Life" and van Gogh's late (1889) "Irises" 4. Lyric poetry T.S. Eliot: "The Love Song of J. Alfred Prufrock," "The Waste Land," and "East Coker"; Edwin Muir: "The Heart Could Never Speak"; Philip Larkin: "Days" 5. Martin Heidegger's "What Is Metaphysics?" 6. Jean-Paul Sartre's novel "Nausea" 7. Marx's Paris Manuscripts of 1844 8. Bergman's "The Seventh Seal".

**RELIGST 124. Sufi Islam. 4 Units.**

The complex of Islamic intellectual and social perspectives subsumed under the term Sufism. Sufi mystical philosophies and historical and social evolution. Major examples include: Qushayrî, Râbî'a, Junayd, Hallâj, Sulamî, Ibn al-'Arabî, Rûmî, Nizâm al-Dîn Awliyâ'. Social and political roles of Sufi saints and communities. Readings include original prose and poetry in translation, secondary discussions, and ethnography.

**RELIGST 126. Protestant Reformation. 3-5 Units.**

The emergence of Protestant Christianity in 16th-century Europe. Analysis of writings by evangelical reformers (Luther, Calvin, Zwingli, Sattler, Hubmeier, Müntzer) and study of reform movements (Lutheran, Reformed, Anabaptist, Spiritualist) in their medieval context and as expressions of new and influential visions of Christian belief, life, social order.

Same as: HISTORY 126B

**RELIGST 12N. Perspectives on the Good Life. 3-4 Units.**

The question is how to approach and evaluate different perspectives on the good life, especially when those perspectives are beautifully, and elusively, presented to us as texts. We will consider both classic and modern writers, from the West and from China; some are explicitly religious, some explicitly secular; some literary, some philosophical. Most of the class will revolve around our talk with each other, interpreting and questioning relatively short texts. The works we will read - by Dante, Dickenson, Zhuangzi, Shklar, and others - are not intended to be representative of traditions, of eras, or of disciplines. They do, however, present a range of viewpoint and of style that will help frame and re-frame our views on the good life. They will illustrate and question the role that great texts can play in a modern 'art of living.' Perhaps most important, they will develop and reward the skills of careful reading, attentive listening, and thoughtful discussion. (Note: preparation and participation in discussion are the primary course requirement. Enrollment at 3 units requires a short final paper; a more substantial paper is required for the 4-unit option.)



**RELIGST 130. Sex and Gender in Judaism and Christianity. 3 Units.**

What role do Jewish and Christian traditions play in shaping understandings of gender differences? Is gender always imagined as dual, male and female? This course explores the variety of ways in which Jewish and Christian traditions - often in conversation with and against each other - have shaped gender identities and sexual politics. We will explore the central role that issues around marriage and reproduction played in this conversation. Perhaps surprisingly, early Jewish and Christian also espoused deep interest in writing about 'eunuchs' and 'androgynes,' as they thought about Jewish and Christian ways of being a man or a woman. We will examine the variety of these early conversations, and the contemporary Jewish and Christian discussions of feminist, queer, trans- and intersex based on them.

Same as: FEMGEN 130, JEWISHST 120

**RELIGST 132. Jesus the Christ. 4 Units.**

How did Jesus of Nazareth, who never claimed to be Christ or divine, become the son of God after his death? Sources include the history of first-century Judaism and Christianity.

**RELIGST 132C. How Jesus the Jew became God. 4 Units.**

Contemporary historical-critical methods in investigating how one might study Jewish and Christian texts of the 1st century CE. Social contexts including economic realities and elite ideological views. What can be known historically about 1st-century Judaism and Jesus' part in it. How Jewish apocalyptic messianism shaped the birth of Christianity and its trajectory through the 1st century.

**RELIGST 132D. Early Christian Gospels. 4 Units.**

An exploration of Christian gospels of the first and second century. Emphasis on the variety of images and interpretations of Jesus and the good news, the broader Hellenistic and Jewish contexts of the gospels, the processes of developing and transmitting gospels, and the creation of the canon. Readings include the Gospel of John, the Gospel of Mark, the Gospel of Thomas, the Gospel of Mary and other canonical and non-canonical gospels.

Same as: CLASSICS 145

**RELIGST 135. Islam in America. 4 Units.**

This course explores the history of Islam in North America with special emphasis on the experience of Muslims in the United States. Contrary to popularly held belief, Muslims have been critical participants in the construction of American identity from the 16th century onwards when Muslim slaves were forcibly brought to Colonial America. Our course will explore the diverse ways Muslims in America have imagined, practiced, and negotiated their religious identity. We will move chronologically, and we will focus upon three crucial themes: the convergence of constructions of racial, religious, and national identities in America; the ever-shifting terrain of notions of authority and authenticity amongst Muslims in America; and global resonances of the practices and ideas of American Muslims.

Same as: AFRICAAM 135A, AMSTUD 135X, CSRE 135, GLOBAL 137

**RELIGST 139. Religion along the Silk Road. 4 Units.**

From roughly the year 1 to the year 1000, a vibrant trade route stretched across Central Asia, linking Europe, India and East Asia. Along this route, merchants bought and sold the silk that gave the route its name, along with paper, ceramics, spices, precious stones and any number of other commodities. Together with these trade goods, merchants, missionaries, farmers and artisans who participated in this vast commercial network, exchanged ideas, scriptures, practices and beliefs, including those associated with major religious traditions; Buddhism, Zoroastrianism, Christianity, Judaism, Manichaeism and Islam followed the same routes as silk and spice. In this course we will examine the spread of all of these religions across the Silk Road, what happened when they interacted, and what this tells us about the relation between commerce, trade and geography in the pre-modern world.

**RELIGST 13N. Losing My Religion: Secularism and Spirituality in American Lives. 2-4 Units.**

In this seminar you will explore theory and practice, sociological data, spiritual writing, and case studies in an effort to gain a more nuanced understanding about how religion, spirituality, and secularism attempt to make legible the constellation of concerns, commitments, and behaviors that bridge the moral and the personal, the communal and the national, the sacred, the profane, and the rational. Together we will cultivate critical perspectives on practices and politics, beliefs and belonging that we typically take for granted.

Same as: AMSTUD 117N, EDUC 117N

**RELIGST 13Q. Mystical Journeys: Beyond Knowing and Reason. 3 Units.**

What makes a mystic a mystic? This question has many sides. Why do we call someone a mystic? Is there such a thing as mystical experience? Do experiences make a mystic? Do beliefs? Practices? Many religious traditions have records of visionaries whose lives and writings open windows on the more hidden and aspirational aspects of belief and practice. These writings also take many forms: poems, letters, teachings, and accounts of visions, which we will encounter in the course of the quarter. Readings for the course will cover a cross-section of texts taken from Christian, Jewish, Muslim, Buddhist, and Native American sources.

**RELIGST 140. RELIGION AND ETHICS: The Limits of Dialogue. 3 Units.**

How do religious traditions address ethical problems? Although *the good* seems like a universal goal, religious traditions force us to consider non-universal ways of defining it. From marriage to genetic engineering, from abortion to organ donation, issues of community, faith, and practice continue to complicate our ethical thinking. Exploration of case-studies and concepts, with readings from Kant, Foucault, Butler and others, as well as Jewish and Christian interpretations of the Bible.

**RELIGST 143. Empathy. 3 Units.**

Empathy is fashionable these days - whether in Silicon Valley or the latest neuroscience. There is a deep sense that we need to learn how to walk in the shoes of another. This course will trace the meaning and practice of empathy through Buddhist compassion; Christianity's commandments to love our neighbor; Enlightenment moral philosophy; nineteenth-century aesthetics; and twenty-first century neuroscience. We will also explore how the arts - drama, novels, poetry, and the visual arts - especially enable us to understand and empathize with the other.

**RELIGST 144. John Calvin and Christian Faith. 5 Units.**

Close reading and analysis of Calvin's *Institutes of the Christian Religion* as a classic expression of Christian belief.

**RELIGST 148A. St. Paul and the Politics of Religion. 4 Units.**

The major letters written by Paul, the Apostle, and his biography, Acts of the Apostles. Historical context in first century Jewish cultural politics. Origins of Christianity, and the split into Judaism and Christianity. The relationship between Jews and non-Jews. The juxtaposition of law and faith. Origins of cultural universalism. Paul as Jewish radical versus Paul, the first Christian thinker and theologian. Recent philosophical readings of Paul (Taubes, Badiou, and Agamben).

**RELIGST 14N. Demons, Death, and the Damned: The 'Other' and the Otherworldly in America. 3 Units.**

This course will examine how beliefs about the "other world" actually shape and are shaped by Americans' this-worldly actions and interactions (i.e. in the demonization of the "other," whether defined religiously, racially, ethnically, or in gendered terms). Students will ask how ideas about demons and death, heaven and hell have reflected the concerns, values, and identities of Americans over time. Students will learn how to read primary sources against secondary literature.

**RELIGST 150. The Lotus Sutra: Story of a Buddhist Book. 4 Units.**

The Lotus school of Mahayana, and its Indian sources, Chinese formulation, and Japanese developments.

**RELIGST 151. Religious Poetry of India. 4 Units.**

India has a rich literature of devotional and mystical poetry composed by "poet-saints" in common vernacular languages. This passionate and contemplative poetry flourished between the 6th and 18th centuries, inspiring religious and social movements that are still vibrant today. It also lives as music, remaining popular and powerful in the form of songs in many styles. We will study this material through the lenses of poetry, religion, performance, and politics.

**RELIGST 160. Religion in Modern African Literature. 4 Units.****RELIGST 161. Modern Religious Thought: From Galileo to Freud. 4-5 Units.**

The three centuries following the Protestant Reformation led to a gradual clarification of the notions of the religious and secular and gave rise to a new genre of religious thought, ideally freed from theology, church or synagogue—a secular philosophy of religion, or in some cases a religiously-imbued philosophy. We will examine some of the foundations of religious thought in modernity, including Galileo, Spinoza, Diderot, Kant, Hegel, Schleiermacher, Kierkegaard, Feuerbach, Marx, Nietzsche and Freud.

**RELIGST 162X. Spirituality and Nonviolent Urban and Social Transformation. 3 Units.**

A life of engagement in social transformation is often built on a foundation of spiritual and religious commitments. Case studies of nonviolent social change agents including Rosa Parks in the civil rights movement, César Chávez in the labor movement, and William Sloane Coffin in the peace movement; the religious and spiritual underpinnings of their commitments. Theory and principles of nonviolence. Films and readings. Service learning component includes placements in organizations engaged in social transformation. Service Learning Course (certified by Haas Center).

Same as: CSRE 162A, URBANST 126

**RELIGST 165. Modern Jewish Mystics: Devotion in a Secular Age. 4 Units.**

The twentieth-century was a time of tremendous upheaval and unspeakable tragedy for the Jewish communities of Europe. But the past hundred years were also a period of great renewal for Jewish spirituality, a renaissance that has continued into the present day. We will explore the mystic writings of figures from the Safed Renaissance, the Hasidic masters, with a particular focus on the works of Martin Buber, Hillel Zeitlin, Abraham Isaac Kook, Abraham Joshua Heschel, and Arthur Green. We will examine their teachings in light of the challenges of the two World Wars, the Holocaust, and the processes of modernity and secularism. Consideration will be made of the unique cultural contexts of modern Israel and contemporary America.

Same as: JEWISHST 125

**RELIGST 166. The Divine Feminine in India. 4 Units.**

What happens when God is a woman? Is the Goddess a feminist? The Goddess, in her numerous incarnations, is foundational to much of Indian religiosity, whether Hindu, Buddhist, or even Jain; and in turn, without her story, much of the theology and practice of these religions remains incomprehensible. This course examines the principal expressions of the theology and ritual worship of the Goddess in Indian history, from the Vedas to the Hindu Epics, to Indian philosophy, tantric ritual practice and modern global and new age movements in order to understand how the gendering of divinity affects theological speculation, religious experience, and embodied religious identity.

Same as: FEMGEN 166

**RELIGST 169. Sacred Words: Jewish Thought and the Question of Language. 4 Units.**

Jews have long been referred to as the people of the book, but they might better be referred to as the people of the word. Drawing upon texts from the Hebrew Bible to the works of modern Hebrew writers like of Hayyim Nahman Bialik and Amos Oz, this seminar will chart the development of Jewish thinking on language over the past two millennia. We will explore issues such as: the idea of canonization; oral versus written language; the nature and possibility of translation; the origins of language; notions of negative theology; mystical approaches to the word; the rebirth of Hebrew as a spoken and cultural language; and the limits of language after the Holocaust. This course will also bring Jewish thought into dialogue with contemporary philosophical reflections on issues of language. Modern explorations of language will prove an interesting way of deepening our understanding of the Jewish thinkers on one hand, and enriching contemporary intellectual discourse on the other.

Same as: JEWISHST 129

**RELIGST 170A. Biblical Hebrew, First Quarter. 2 Units.**

Establish a basic familiarity with the grammar and vocabulary of Biblical Hebrew and will begin developing a facility with the language. Students that are enrolled in this course must also enroll in Beginning Hebrew. This course requires no prior knowledge of Hebrew and will begin with learning the alphabet. By the end of the year, students will be able to translate basic biblical texts, will be familiar with common lexica and reference grammars, and will have sufficient foundational knowledge to enable them to continue expanding their knowledge either in a subsequent course or own their own.

Same as: AMELANG 170A, JEWISHST 107A

**RELIGST 170D. Readings in Talmudic Literature. 1 Unit.**

Readings of the talmudic texts. Some knowledge of Hebrew is preferred. The ongoing seminar is designed to study the making of the talmudic sugya (unit of discourse), along with classic commentaries. Students will consider some of the recent developments in the academic study of Talmudic literature, introduced by the instructor. The goal of the ongoing seminar is to provide Stanford students and faculty with the opportunity to engage in regular Talmud study, and to be introduced to a variety of approaches to studying Talmudic texts. Class meets on Fridays, from 12:00-1:15 pm in Hillel (Koret Pavilion Taube Hillel House; Ziff Center for Jewish Life). May be repeat for credit.

Same as: JEWISHST 127D, JEWISHST 227D

**RELIGST 170E. Readings in Talmudic Literature Advanced. 1 Unit.**

Readings of the talmudic texts. Knowledge of Hebrew is required. The ongoing seminar is designed to study the making of the talmudic sugya (unit of discourse), along with classic commentaries. Students will consider some of the recent developments in the academic study of Talmudic literature, introduced by the instructor. The goal of the ongoing seminar is to provide Stanford students and faculty with the opportunity to engage in regular Talmud study, and to be introduced to a variety of approaches to studying Talmudic texts. Meeting time and location TBA. May be repeated for credit.

Same as: JEWISHST 127E, JEWISHST 227E

**RELIGST 171A. Biblical Greek. 3-5 Units.**

(Formerly CLASSGRK 5.) This is a one term intensive class in Biblical Greek. After quickly learning the basics of the language, we will then dive right into readings from the New Testament and the Septuagint, which is the ancient Greek translation of the Hebrew Bible. No previous knowledge of Greek required. If demand is high for a second term, an additional quarter will be offered in the Spring.

Same as: CLASSICS 6G, JEWISHST 5

**RELIGST 171X. Intensive Biblical Greek. 8 Units.**

Equivalent to two quarters of Biblical Greek (CLASSICS 6G, 7G). Students will learn the core of New Testament Greek with the goal of learning to accurately translate and read the New Testament. Students will read one-third of the Gospel of John during the course and will be well-prepared to read the Greek New Testament independently after the course. Focus on knowledge of key vocabulary and grammar needed to read the Greek Bible with ease. No previous knowledge of Greek required. Course does not fulfill the Stanford language requirement.

Same as: JEWISHST 5G

**RELIGST 173. What is Enlightenment? Religion in the Age of Reason. 4 Units.**

Many contemporary attitudes towards religion were forged in 17th- and 18th-century Europe in the midst of heated debates over the meaning and value of Christianity in a world 'come of age': Liberal calls for justice, toleration, and pluralism in matters religious; secular suspicions about religious superstition, fanaticism, and ideology; skepticism regarding the solubility of ultimate questions of meaning and metaphysics. Seminal readings on religion from Descartes, Pascal, Leibniz, Voltaire, Hume, Mendelssohn and Kant.

**RELIGST 173X. Latin 400-1700 CE. 1-2 Unit.**

Readings in later Latin, drawing on the vast bodies of texts from the late antique, medieval and early modern periods. Each week students will prepare selections in advance of class meetings; class time will be devoted to translation and discussion. Students taking this course will gain exposure to a wide range of later Latin texts; hone translation skills; and develop an awareness of the grammatical and stylistic features of post-classical Latin. The course is aimed both at classical Latinists seeking to broaden their reading experience and at medievalists and early modernists seeking to consolidate their Latin language skills. Sample readings: K.P. Harrington et al, *Medieval Latin* 2nd edn. M. Riley, *The Neo-Latin Reader*: selections from Petrarch to Rimbaud. Prior experience in Latin is required, preferably CLASSICS 11L. Equivalent accepted. Anyone unsure whether to take this course is encouraged to contact the instructor in advance.

Same as: CLASSICS 6L, CLASSICS 208L

**RELIGST 176. Religious Diversity: Theoretical and Practical Issues. 4 Units.**

What does it mean for a religion to be true? If one religion is true, what about the truth of other religious possibilities? How, and why, should religious traditions be compared? Readings address tolerance and pluralism, relativism, comparative theory, and new religious virtues.

**RELIGST 179. Doing the Sacred: Religion and Performance. 4 Units.**

This course investigates religion as practice and performance, rather than as belief and doctrine. A performance-centered emphasis helps us understand how domination and authority, as well as creativity and individual resistance, underlie culture. From initiatory rites to cyber sermons, human action offers raw, physical data that unveils the mechanisms of social control, ideology, and individual resistance. Reorienting religion from the perspective of religious acts / actors – those who are doing something they consider sacred – evokes many interpretive possibilities: How do these performances create and maintain communities? How do they resolve conflicts that arise within everyday affairs? In what ways do they generate meaning and shape identity? What can these enactments reveal about the constructions of power, gender, and race? This course explores such issues, probing the complicated relationship between human intention and social reality. Ultimately, a study of religion and performance seeks to understand how performance and transcendence interact to make participants into who they are. The readings cover an array of religious traditions – medieval and evangelical Christian, Hindu, Native American, Jewish, Buddhist, African and Haitian Vodou – all of which present a rich repertoire of sacred drama, dance, and music. We will discuss performances that make modern readers uncomfortable, such as sacrifice and flagellation, and examine why they are meaningful within their specific cultural context. Finally, we will consider how secular practices and the internet mimic religious behavior. However divergent, all of these examples demonstrate how religious performance is no mere artifice, but a vehicle for the practitioner's own pious posturing – one that is spiritually innovative and self-affirming – yet shaped by hierarchical regimes.

**RELIGST 17N. Love, Power, and Justice: Ethics in Christian Perspective. 3 Units.**

From its inception, the Christian faith has, like all religions, implied an ethos as well as a worldview, a morality and way of life as well as a system of beliefs, an ethics as well as a metaphysics. Throughout history, Christian thinkers have offered reasoned accounts of the moral values, principles, and virtues that ought to animate the adherents of what eventually became the world's largest religion. We will explore a variety of controversial issues, theological orientations, and types of ethical reasoning in the Christian tradition, treating the latter as one 'comprehensive doctrine' (John Rawls) among many; a normative framework (actually a variety of contested religious premises, moral teachings, and philosophical arguments) formally on par with the religious ethics of other major faiths as well as with the various secular moral theories typically discussed in the modern university. We will learn to interpret, reconstruct, criticize, and think intelligently about the coherence and persuasiveness of moral arguments offered by a diverse handful of this religious tradition's best thinkers and critics, past and present.

**RELIGST 180. Gender Relations in Islam. 4 Units.**

This course investigates the ways in which gender identities and relationships between men and women have been articulated, constructed, and refashioned throughout the Muslim world. Starting with problematizing the fixed notions of gender and sexuality, we map the attitudes toward these notions through visiting a diverse array of sources from the Qur'an, Sunna, and legal documents to historical and anthropological case studies, literature, and film from South East Asia to Europe and North America. We examine the notions of femininity and masculinity in the Qur'an, family laws, and attitudes toward homosexuality and transgendered populations. We read examples of ambiguous use of language with regards to gender and sexuality in Persian poetry and mystical traditions. We study the dynamic relationship between Islam and Feminism in the Muslim world. Finally, we witness the implications of these attitudes in our case studies and stories, from a divorce court in Iran to a wedding in Sudan.

Same as: FEMGEN 180

**RELIGST 181. Heidegger and Mysticism. 5 Units.**

The new paradigm for understanding Heidegger makes possible a fresh look at his long-standing interest in western mysticism as well as in Daoism. Part One: a radical recasting of Heidegger's thought, including his readings of the Presocratics (6th century BCE). In light of that, Part Two: a reading of selected texts of western mystics as well as Laozi's *Dao De Jing* / *Tao Te Ching* (6th century BCE).  
Same as: PHIL 133S

**RELIGST 183. Atheism: Hegel to Heidegger. 5 Units.**

The radical changes in ideas of God between Hegel and Heidegger, arguing that their questions about theism and atheism are still pertinent today. Texts from Hegel, Feuerbach, Marx, Nietzsche, and Heidegger: on God, history, and the social dimensions of human nature. N.B.: Class size limited. Apply early at [tsheehan@stanford.edu](mailto:tsheehan@stanford.edu).  
Same as: PHIL 133T

**RELIGST 18N. Religion and Politics: Comparing Europe to the U.S.. 3-4 Units.**

Interdisciplinary and comparative. Historical, political, sociological, and religious studies approaches. The relationship between religion and politics as understood in the U.S. and Europe. How this relationship has become tense both because of the rise of Islam as a public religion in Europe and the rising influence of religious groups in public culture. Different understandings and definitions of the separation of church and state in Western democratic cultures, and differing notions of the public sphere. Case studies to investigate the nature of public conflicts, what issues lead to conflict, and why. Why has the head covering of Muslim women become politicized in Europe? What are the arguments surrounding the Cordoba House, known as the Ground Zero Mosque, and how does this conflict compare to controversies about recent constructions of mosques in Europe? Resources include media, documentaries, and scholarly literature.  
Same as: JEWISHST 18N

**RELIGST 199. Individual Work. 1-15 Unit.**

Prerequisite: consent of instructor and department. May be repeated for credit.

**RELIGST 19N. Everyone Eats: Food, Religion and Culture. 3 Units.**

Food is one of the most essential aspects of the human experience. The decisions and choices we make about food define who we have been, who we are now, and who we want to become. In this seminar we will study how food habits have shaped religious traditions, and vice versa, how religious traditions have shaped food ways. Some traditions are centered around food regimens such as the dietary laws, derived from biblical law that shapes Jewish and Christian tradition very differently. Indeed, many religious and ethical thinkers, as well as anthropologists, have interpreted the meanings of the dietary laws very differently. Further, in many religious traditions the killing of animals and consumption of meat is deeply fraught. We will explore the history of food practices and their contemporary impact; the connections between food, religion, and identity; the meanings that religious thinkers and anthropologists have attributed to food habits; as well as the creative translations of religious traditions into contemporary food ethics by various social movements and groups, predominantly in the U.S.  
Same as: CSRE 19N, JEWISHST 19N

**RELIGST 2. Is Stanford a Religion?. 4 Units.**

This course seeks to introduce students to the study of religion by posing a two-part question: What is a religion, and does Stanford qualify as one? Scientific, pragmatic, seemingly secular, Stanford may not seem at all similar to religions like Christianity, Judaism or Buddhism, but a deeper look reveals that it has many of the qualities of religion—origin stories, rituals and ceremonies, sacred spaces and times, visions of the future, even some spirits. By learning some of the theories and methods of the field of religious studies, students will gain a better understanding not just of Stanford culture but of what motivates people to be religious, the roles religion plays in people's lives, and the similarities and differences between religious and secular culture.

**RELIGST 201. Islamic Law. 3-5 Units.**

(This course is combined with LAW 586) Topics include marriage, divorce, inheritance, ritual, war, rebellion, abortion, and relations with non-Muslims. The course begins with the premodern period, in which jurists were organized in legal traditions called *schools of law*. After examining the nature and functions of these institutions, we turn to the present era to study the relationship between customary law, state law, and the Islamic legal heritage in Egypt and Indonesia. The course explores Muslim laws and legal institutions and the factors that have shaped them, including social values and customs, politics, legal precedents, and textual interpretation.  
Same as: RELIGST 301

**RELIGST 201A. Gender in Classical Islamic Law. 3-5 Units.**

The course examines classical Islamic society and law. It covers historical development, the unity and diversity of Muslim legal traditions, and the relationship between laws and values. Constructions of gender in law are examined through rituals, marriage, divorce, birth control, child custody, and sexuality.  
Same as: RELIGST 301A

**RELIGST 204. Paleography of Medieval and Early Modern Manuscripts. 3-5 Units.**

Introductory course in the history of writing and of the book, from the late antique period until the advent of printing. Opportunity to learn to read and interpret medieval manuscripts through hands-on examination of original materials in Special Collections of Stanford Libraries as well as through digital images. Offers critical training in the reading of manuscripts for students from departments as diverse as Classics, History, Philosophy, Religious Studies, English, and the Division of Languages Cultures and Literatures.  
Same as: CLASSICS 215, DLCL 209, HISTORY 309G

**RELIGST 205. Religious Poetry. 4 Units.**

Religious poetry drawn from the Islamic, Christian, Confucian and Daoist traditions. Limited enrollment or consent of the instructor required.

**RELIGST 208A. Ex Oriente Lux: Orientalism and the Study of Religion. 3-5 Units.**

This seminar is designed to expose students to issues relating to discourse and subjectivity within the textual constructions of Oriental religions in the colonial era. We will begin with Edward W. Said's provocative work on notions of representation and power embedded in the discourse on the Orient that established, produced, and, ultimately, perpetuated western knowledge about the Other. We will then discuss the impact of the Oriental Renaissance and the vital role that Eastern wisdom played in constructing the field of Comparative Religious Studies. In addition, students will also read ethnographies, fables, and travelogues that both support and undermine Said's thesis of an active West constructing a largely passive East.  
Same as: RELIGST 308A

**RELIGST 208C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.**

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.  
Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 208C, MUSIC 408C, REES 208C, REES 408C, RELIGST 308C

**RELIGST 209. Priests, Prophets, and Kings: Religion and Society in Late Antique Iran. 4-5 Units.**

This course is designed as a broad introduction to the religious and social history of the Sasanian Empire, encompassing the period from 224-651 CE as well as the early years of Islamic rule in Iran. Among the topics we will discuss are: the lives and deeds of the powerful Iranian emperors such as Shapur I and II in relation to the Roman emperors Diocletian and Constantine; the transformation of Zoroastrianism into a powerful official religion of the state and its subsequent orthodoxy; the emergence of the prophet Mani and the confrontation of Manicheism with the Zoroastrian priesthood; the conversion of Constantine to Christianity and its political and social ramifications in Iran; the establishment of an independent Iranian Christian church; the importance of Armenia in the Sasanian-Roman conflict; and a brief discussion of the history of the Jewish community under the Sasanians. We will end the quarter by examining the Arab-Islamic conquests of Iran and the profound social changes experienced by the Zoroastrian communities in the early centuries of Islam in Iran.

Same as: CLASSICS 147, CLASSICS 247, RELIGST 309

**RELIGST 209A. Sugar in the Milk: Modern Zoroastrianism as Race, Religion, and Ethnicity. 4-5 Units.**

Modern Zoroastrian experience as race, religion, and ethnic identity. Some 60,000 Zoroastrians now live in India and have resided there for a millennium. In the 19th century, these peoples from Persia became colonial elites yet were acutely aware that they were not quite Indian, British, or Persian. Diverse ways this experience of dislocation has served as a defining characteristic in Parsi communal identity and contrast these South Asian experiences with the minority socio-politics of those who remained in Iran. Survey the colonial and post-colonial communities in England, East Africa, Hong Kong, Australia, and North America and examine the expression of these global diasporic experiences in literature and the arts.

Same as: RELIGST 309A

**RELIGST 209D. 'Crow Eaters' & 'Fire Worshippers': Exploring Contemporary Zoroastrianism Thru Reading Parsi Lit. 3-5 Units.**

In the past three decades Parsi fiction has rapidly emerged as a unique and creative voice in modern Anglophone literature from South Asia. From Bapsi Sidhwa to Thrity Umrigar to Rohinton Mistry, Parsi novelists address the most poignant concerns of Zoroastrians living in an era of rapid social, political, and religious transformation. The erosion of tradition; the breakdown of the Parsi family; the demise of religion among the young; and the cultural losses and gains of living in diaspora are common themes in their works. The unique vantage point of the Parsis; neither Hindu nor Muslim, neither quite Indian nor quite British; will serve as a lens for examining the inherent tensions in multicultural societies both East and West.

Same as: RELIGST 309D

**RELIGST 209E. Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran. 3-5 Units.**

Designed as a broad introduction to the world of ancient Iran, students will be introduced to the Indo-European inheritance in ancient Iranian culture; the shared world of ritual, religion, and mythology between Zoroastrianism in Iran and Vedic Hinduism in India; and to the contours of early Zoroastrian religious thought. We will also survey mythoepic literature in translation from the archaic Avesta through the late antique Zoroastrian Middle Persian corpus to the early medieval national epic of Iran, the Book of Kings of Ferdowsi.

Same as: CLASSICS 148, CLASSICS 248, RELIGST 309E

**RELIGST 212. Chuang Tzu. 5 Units.**

The *Chuang Tzu* (Zhuangzi) in its original setting and as understood by its spiritual progeny. Limited enrollment.

**RELIGST 216. Japanese Buddhism. 4 Units.**

Focus on the religious lives of lay people in medieval Japan, as evidenced in collections of Buddhist stories (setsuwashu), narrative picture scrolls (emaki), and related historical materials. All readings are in English, but the instructor will also work with students interested in reading the original Japanese.

**RELIGST 217. Japanese Studies of Religion in China. 3 Units.**

(Graduate students register for 317.) Readings in Japanese secondary sources on Chinese religions.

Same as: RELIGST 317

**RELIGST 217X. Minorities In Medieval Europe. 5 Units.**

This course examines attitudes towards outsider groups within medieval society and the treatment of these groups by medieval Christians. Heretics, Jews, Muslims, homosexuals, prostitutes and usurers occupied ambivalent and at times dangerous positions within a society that increasingly defined itself as Christian. Differences in the treatment of these various 'outcast' groups, their depiction in art, their legal segregation, and their presumed association with demonic activity are addressed through discussion, and readings from primary and secondary source material.

Same as: HISTORY 217S

**RELIGST 218. Islam, Race and Revolution: A Pan-American Approach. 3-5 Units.**

Taking a pan-American approach to the study of religious traditions, this upper-level course traces the history of the critical intersection between race, religion and revolution among Muslims from the turn of the nineteenth century until the present day. Moving from the Atlantic Revolutions of the late eighteenth and early nineteenth centuries, to the United States, to the decolonizing Third World, and then finally to the contemporary Middle East, this class will emphasize that Islam and race together have been used by many groups in order to challenge existing power structures, agitate for change, and more than occasionally, transform the social, cultural and governmental structures comprising their worlds. Moreover, although this class is concentrated upon religious formations in the Americas, students will explore global events throughout the Muslim world in order to examine how global politics contribute to religious formations, solidarities and identities. At the conclusion of this course, students will be expected to write a 10-15 page research paper, and a topic will be chosen in consultation with the instructor. Students will also be expected to write weekly reflection papers, which will serve to facilitate class discussion. Undergraduates register for 200-level for 5 units. Graduate students register for 300-level for 3-5 units.

Same as: AMSTUD 218, CSRE 218, RELIGST 318

**RELIGST 218X. The Holy Dead: Saints and Spiritual Power in Medieval Europe. 4-5 Units.**

Examines the cult of saints in medieval religious thought and life. Topics include martyrs, shrines, pilgrimage, healing, relics, and saints' legends.

Same as: HISTORY 218, HISTORY 318, RELIGST 318X

**RELIGST 21X. Dangerous Ideas. 1 Unit.**

Ideas matter. Concepts such as race, progress, and evil have inspired social movements, shaped political systems, and dramatically influenced the lives of individuals. Others, like religious tolerance, voting rights, and wilderness preservation play an important role in contemporary debates in the United States. All of these ideas are contested, and they have a real power to change lives, for better and for worse. In this one-unit class we will examine these dangerous ideas. Each week, a faculty member from a different department in the humanities and arts will explore a concept that has shaped human experience across time and space. Some weeks will have short reading assignments, but you are not required to purchase any materials.

Same as: ARTHIST 36, COMPLIT 36A, EALC 36, ENGLISH 71, FRENCH 36, HISTORY 3D, MUSIC 36H, PHIL 36, POLISCI 70, SLAVIC 36

**RELIGST 221B. What is Talmud?. 5 Units.**

In what sense can Talmud be studied as literature? Which voices can be identified? Concepts of author, editor, or redactor. The basic textual units of Talmud: sugya, chapter, and tractate. The sugya as literary genre. The aesthetic of talmudic dialectics. Prerequisite: reading Hebrew with some understanding of biblical Hebrew.  
Same as: RELIGST 321B

**RELIGST 221D. Readings in Syriac Literature. 2-5 Units.**

In recent years, there has been growing interest in the works of Syriac speaking Christians in antiquity and beyond. This course offers an introduction to the Syriac language, including its script, vocabulary and grammar, and a chance to read from a selection of foundational Syriac Christian texts.  
Same as: JEWISHST 221D, JEWISHST 321D, RELIGST 321D

**RELIGST 222B. Sufism Seminar. 3-5 Units.**

Sufism through original texts and specialized scholarship. Prerequisite: ability to read at least one major language of Islamic religious literature (Arabic, Persian, Turkish, Urdu).  
Same as: RELIGST 322B

**RELIGST 223. Studying Islam: History, Methods, Debates. 4 Units.**

Islam as a subject of academic inquiry since the 19th century. Origins and critiques of major methodological perspectives in Islamic studies such as philology, religious studies, history, art history, and anthropology. Landmarks in the development of the field and the work of major scholars. Academic debates regarding unity versus diversity, orientalism, fundamentalism and Islamism, Sufism, and gender. Current trends in scholarship on medieval and modern Muslim societies. Prerequisite: course work in Islamic studies or methodology in religious studies.

**RELIGST 224. Classical Islamic Texts. 3 Units.**

The course is based on readings in primary Arabic sources in the key fields of pre-modern Islamic scholarship. The list of readings and topics will depend on the interests of the students. In addition to focusing on the language, contents, and context of the texts covered, the course introduces genre-specific historical research methods. The reading selections may be derived from Qurʾānic interpretation (tafsir), the hadith literature, adab, biographical dictionaries, fiqh, taʾrikh, kalam, or Sufism. Reading knowledge of Arabic is required.  
Same as: RELIGST 324

**RELIGST 224B. Unveiling the Sacred: Explorations in Islamic Religious Imagination. 3-5 Units.**

Poetry and prose in translation as well as historical studies. Islamic movements invested in the idea that the sensory world has a hidden or esoteric counterpart that can be understood or experienced through following particular religious programs. Various forms of Shiʿism and Sufism, millenarian and apocalyptic movements, the Nation of Islam and its offshoots. Philosophical propositions, historical contexts, and the role of ritual in the construction of religious systems.  
Same as: RELIGST 324B

**RELIGST 226A. Judaism and Hellenism. 3-5 Units.**

interactions and conflicts between Jews and Greeks in the centuries following the conquests of Alexander the Great and the cultural/religious repercussions of their encounter. In what ways were Jews influenced by Greek culture? In what ways, and for what reasons, did they resist it? And how the interaction of these cultures shape the subsequent development of Judaism and Christianity? Jewish texts in the Greco-Roman period, including Jewish-Greek writers like Philo of Alexandria, the Apocrypha, the Dead Sea Scrolls, selected writings from the New Testament, and the Passover Haggadah.  
Same as: RELIGST 326A

**RELIGST 226D. Jewish-Christian Relations in Antiquity. 1-2 Unit.**

Constructions of identity, community, ethnicity: these considerations frame the investigation of ancient Christian rhetoric and theology contra Iudaeos. This historical project will be set within the larger intellectual and cultural context of a) learned Graeco-Roman traditions of ethnic stereotyping; b) forensic rhetoric; and c) philosophical paideia; and these traditions will be considered within their larger social context of the Mediterranean region (I-III). Specifically, various Christian, and especially Latin traditions contra Iudaeos (IV-VI) will be studied.  
Same as: CLASSGEN 126B

**RELIGST 227. The Qurʾan. 5 Units.**

Early history, themes, structure, chronology, and premodern interpretation. Relative chronology of passages.  
Same as: RELIGST 327

**RELIGST 228. The Buddha's Word at Stanford. 3-5 Units.**

Linked to an exhibition at the Cantor Museum, this course investigates the history of Buddhist manuscript and print culture in Asia using manuscripts and woodblock prints in Stanford's own collections (5 units for 228).  
Same as: RELIGST 328

**RELIGST 229. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire. 3-5 Units.**

Stretching from India to Ethiopia, the Persian Empire the largest empire before Rome has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the West and Greek democracy. This course will provide a general introduction to the Persian Empire, beginning in the 6th century BCE to the fall of Persia to Alexander the Great in 331 BCE. We shall not only examine the originality of the first world empire of antiquity, but the course will also attempt to present a broad picture of the diverse cultural institutions and religious practices found within the empire. Readings in translation from the royal edicts and the inscriptions of Cyrus, Darius, and Xerxes will allow us to better appreciate the subtle ways in which these Persian kings used religion to justify and propagate the most ambitious imperial agenda the world had ever seen. In concluding the quarter, students will evaluate contemporary representations of Persia and the Persians in politics and popular culture in a wide array of media, such as the recent film *300* and the graphic novel on which it is based, in an attempt to better appreciate the enduring legacy of the Greco-Persian wars.  
Same as: CLASSICS 146, CLASSICS 246, RELIGST 329

**RELIGST 230B. Zen Studies. 4 Units.**

Readings in recent English-language scholarship on Chan and Zen Buddhism.  
Same as: RELIGST 330B

**RELIGST 231X. Learning Religion: How People Acquire Religious Commitments. 4 Units.**

This course will examine how people learn religion outside of school, and in conversation with popular cultural texts and practices. Taking a broad social-constructivist approach to the variety of ways people learn, this course will explore how people assemble ideas about faith, identity, community, and practice, and how those ideas inform individual, communal and global notions of religion. Much of this work takes place in formal educational environments including missionary and parochial schools, Muslim madrasas or Jewish yeshivot. However, even more takes place outside of school, as people develop skills and strategies in conversation with broader social trends. This course takes an interdisciplinary approach to questions that lie at the intersection of religion, popular culture, and education. May be repeat for credit.  
Same as: AMSTUD 231X, EDUC 231, JEWISHST 291X

**RELIGST 234. Emmanuel Levinas: Ethics, Philosophy and Religion. 4 Units.**

Emmanuel Levinas (1906-1995) is a major French philosopher of the second half of the twentieth century and is among the half-dozen most important Jewish thinkers of the century. Born in Lithuania, Levinas lived most of his life in France; he was primarily a philosopher but also a deeply committed Jewish educator who often lectured and wrote about Judaism and Jewish matters. Levinas was influenced by Bergson, Husserl, Heidegger, and others, like Buber and Rosenzweig. We will look at the philosophical world in which he was educated and explore his unique development as a philosopher in the years after World War Two. Levinas reacted against the main tendencies of Western philosophy and religious thought and as a result shaped novel, powerful, and challenging ways of understanding philosophy, religion, ethics, and politics. In this course, we will examine works from every stage of Levinas's career, from his early study of Husserl and Heidegger to the emergence of his new understanding of the human condition and the primacy of ethics, the face-to-face encounter with the human other, the role of language and the relationship between ethics and religion, and finally his understanding of Judaism and its relationship to Western philosophy. We will be interested in his philosophical method, the relevance of his thinking for ethics and religion, the role of language in his philosophy and the problem of the limits of expressibility, and the implications of his work for politics. We shall also consider his conception of Judaism, its primary goals and character, and its relation to Western culture and philosophy. Same as: JEWISHST 224, JEWISHST 324, RELIGST 334

**RELIGST 235. Religion in Modern Society: Secularization and the Sacred. 4 Units.**

What is the status of religion in modern life? Is the modern world "secular" in some fundamental, irreversible way and what does this mean? This course will explore these questions through variety of readings from leading sociologists, philosophers, and anthropologists. Our goal will be to understand in what ways industrialization, political liberalization, the rise of technology, and the success of modern science have been used to support the "secularization" thesis that the modern West rendered religion a thing of the past. A central question to be asked will be: do assessments of the place of religion in modernity necessitate a philosophy of history i.e., a theory not only of historical change, but of the meaning of this change as well? The course will begin by looking at the origins of the theory of secularization from its beginnings in Enlightenment attempts to understand the meaning of history. We will then turn to contemporary debates over the term "secular" against its counterpart, "religious", and the problems with their application to non-Western societies. We will read works by Talal Asad, Saba Mahmood, Max Weber, Charles Taylor, Jürgen Habermas, and Pope Benedict XVI. Same as: RELIGST 335

**RELIGST 238. Christian Neo-Platonism, East and West. 3-5 Units.**

Christianity's shift to neo-Platonic Greek philosophical categories and its significance for contemporary spirituality. Readings from Plotinus, Proclus, Greek fathers such as Pseudo-Dionysus, and from Ambrose and Augustine. Same as: RELIGST 338

**RELIGST 239. Luther and the Reform of Western Christianity. 3-5 Units.**

Luther's theology, ethics, biblical interpretation, and social reforms and their significance for the remaking of Western Christianity. Readings include Luther's own writings and secondary sources about Luther and his world. Same as: RELIGST 339

**RELIGST 24. Sexuality, Gender, and Religion. 2 Units.**

From ancient times to the present, religious texts, authority figures, adherents, and critics have had a great deal to say about sexuality and gender, with powerful impacts in personal, social and political spheres. Today these debates are more wide ranging and public than ever. In this lecture and discussion series, distinguished scholars from within and beyond Stanford will consider how sexuality and gender become "religious" in Judaism, Islam, Christianity, Hinduism, and Buddhism. Same as: FEMGEN 24

**RELIGST 244. Explaining Religion. 3-5 Units.**

There are broadly two different, and sometimes mutually exclusive, ways of explaining social religious phenomena: idealism and materialism. One gives ideas ultimate causal primacy while the other emphasizes economic, technological, geographical, and demographic factors. This course examines arguments for and against each approach. Topics include rational choice theory, functionalism, Marxism, cultural materialism, and the unconscious. Case studies include Jewish and Indian dietary restrictions, competition between Christian denominations, survival strategies of minority religions, apocalyptic movements, etc. For the final paper, each student will write on a religious tradition of his/her choice. Same as: RELIGST 344

**RELIGST 245. Religion, Reason, and Romanticism. 5 Units.**

The late 18th-century European cultural shift from rationalist to romantic modes of thought and sensibility. Debates about religion as catalysts for the new *Zeitgeist*. Readings include: the Jewish metaphysician, Mendelssohn; the dramatist, Lessing; the philosopher of language and history, Herder; the critical idealist, Kant; and the transcendental idealist, Fichte.

**RELIGST 246. Constructing Race and Religion in America. 4-5 Units.**

This seminar focuses on the interrelationships between social constructions of race, and social interpretations of religion in America. How have assumptions about race shaped religious worldviews? How have religious beliefs shaped racial attitudes? How have ideas about religion and race contributed to notions of what it means to be "American"? We will look at primary and secondary sources, and at the historical development of ideas and practices over time. Same as: AFRICAAM 236, AMSTUD 246, CSRE 246, HISTORY 256G, HISTORY 356G, RELIGST 346

**RELIGST 247B. Readings in Chinese Religious Texts: The Lingbao Scriptures. 4 Units.**

A survey of the original Lingbao scriptures. Composed in the late-4th / early 5th century, these texts radically revised Daoist practice, incorporated elements of Buddhist thought and practice, and created liturgies that are still used in Daoist communities today. (Reading knowledge of Literary Chinese 22 required). Same as: RELIGST 347B

**RELIGST 251. Readings in Indian Buddhist Texts. 3-5 Units.**

(Graduate students register for 351.) Introduction to Buddhist literature through reading original texts in Sanskrit. Prerequisite: Sanskrit. Undergraduates register for 200-level for 5 units. Graduate students register for 300-level for 3-5 units. Same as: RELIGST 351

**RELIGST 252A. The Story of a Buddhist Megascripture: Readings in the Avatamsaka. 3-5 Units.**

In this course we will explore the massive Mahayana Buddhist scriptural compilation known as the Avatamsaka Sutra (more correctly: Buddhavatamsaka Sutra). We will investigate the development of the text in India, study its contents, and consider its later reception in East Asia. Since much of the course will be devoted to reading sections of the Buddhavatamsaka, a reading knowledge of Chinese is required. Same as: RELIGST 352A

**RELIGST 253. Recent Research on Japanese Buddhism. 3-5 Units.**

Readings in recent English-language scholarship on Japanese Buddhism. Undergraduates must enroll for 5 units; graduate students can enroll for 3-5 units. Prerequisite: Solid foundation in either Buddhist studies or East Asian Studies (5 units for 253, 3-5 units for 353). Same as: RELIGST 353

**RELIGST 254. Recent Contributions to Buddhist Studies. 3-5 Units.**

This reading intensive course will examine nine areas in recent work in Buddhist studies, including ethnography, archaeology, monasticism, the study of "experience," and gender. May be repeated for credit. Same as: RELIGST 354

**RELIGST 255. Religion and Power in the Making of Modern South Asia. 3-5 Units.**

This course examines the diverse ways that religious traditions have been involved in the brokering of power in South Asia from the late seventeenth century to the present day. We will examine the intersection of religion and power in different arenas, including historical memory, religious festivals, language politics, and violent actions. At the core of our inquiry is how religion is invoked in political contexts (and vice-versa), public displays of religiosity, and the complex dynamics of religion and the state. Among other issues, we will particularly engage with questions of religious identity, knowledge, and violence. Undergraduates must enroll in RELIGST 255 for 5 units. Graduate students must enroll RELIGST 355 for 3-5 units. HISTORY297F must be taken for 4-5 units. Same as: HISTORY 297F, RELIGST 355

**RELIGST 256. The Brahma Net Sutra (Fanwang Jing). 4 Units.**

A study of an important Chinese Buddhist apocryphal work, with special attention to interpretation of content, impact on monastic codes in medieval China, transmissional history and commentarial tradition. Same as: RELIGST 356

**RELIGST 257. Readings in Daoist Texts. 4 Units.**

Readings from primary sources. Prerequisite: classical Chinese. Same as: RELIGST 357

**RELIGST 257X. Female Divinities in China. 4-5 Units.**

This course examines the fundamental role of powerful goddesses in Chinese religion. It covers the entire range of imperial history and down to the present. It will look at, among other questions, what roles goddesses played in the spirit world, how this is related to the roles of human women, and why a civilization that excluded women from the public sphere granted them a dominant place, in the religious sphere. It is based entirely on readings in English.

Same as: FEMGEN 293E, HISTORY 293E, HISTORY 393E, RELIGST 357X

**RELIGST 258. Japanese Buddhist Texts. 3-5 Units.**

Readings in medieval Japanese Buddhist materials. May be repeated for credit. Prerequisite: background in Japanese or Chinese. Same as: RELIGST 358

**RELIGST 259. Religion and Music in South Asia. 4-5 Units.**

How music and other arts in South Asia are intertwined with religion. Classical, devotional, folk, and popular examples introduce Gods as musicians, sound as God, music as yoga, singing as devotion, music as *ecstasy*-inducing, music as site for doctrinal argument, music and religion as vehicles for nationalism. Co-taught by professors of Music and Religious Studies, focusing Hinduism and Islam in India, Pakistan, and the diaspora. Music practice along with academic study; guest artists and films; no background required.

Same as: MUSIC 186, MUSIC 286

**RELIGST 26. The Bible and its Interpreters. 4 Units.**

Introduction to major stories, figures, and themes of the Christian Bible and their retellings in theological writing, art, literature, film, and music throughout the ages.

**RELIGST 260. Buddhism & Modernity. 3-5 Units.**

Is Buddhism a philosophy? A mind science? An ancient mystical path? A modern construct? This seminar will evaluate a variety of answers to these questions by exploring how Buddhism has been understood in the modern era. Our primary source materials will range from Orientalist poetry to Zen essays to Insight Meditation manuals to 21st-century films. We will examine how these works shape Buddhism, consider their pre-modern influences, and turn to recent scholarship to discuss how romantic, imperialist, anti-modern, nationalist, therapeutic, and scientific frames depict one of today's most popular religions. This course is cross-listed as RELIGST 260/360. Undergraduates must enroll in RELIGST 260 for 5 units. Graduate students must enroll RELIGST 360 for 3-5 units.

Same as: RELIGST 360

**RELIGST 262. Sex and the Early Church. 4 Units.**

Sex and the Early Church examines the ways first- through sixth-century Christians addressed questions regarding human sexuality. We will pay particular attention to the relationship between sexuality and issues of gender, culture, power, and resistance. We will read a Roman gynecological manual, an ancient dating guide, the world's first harlequin romance novels, ancient pornography, early Christian martyrdom accounts, stories of female and male saints, instructions for how to best battle demons, visionary accounts, and monastic rules. These will be supplemented by modern scholarship in classics, early Christian studies, gender studies, queer studies, and the history of sexuality. The purpose of our exploration is not simply to better understand ancient views of gender and sexuality. Rather, this investigation of a society whose sexual system often seems so surprising aims to denaturalize many of our own assumptions concerning gender and sexuality. In the process, we will also examine the ways these first centuries of what eventually became the world's largest religious tradition has profoundly affected the sexual norms of our own time. The seminar assumes no prior knowledge of Judaism, Christianity, the bible, or ancient history.

Same as: FEMGEN 262, RELIGST 362

**RELIGST 263. Judaism and the Body. 4 Units.**

Representations and discourses of the body in Jewish culture; theories of body and ritual. Case studies of circumcision, menstrual impurity, and intersexuality. Readings include classical texts in Jewish tradition and current discussions of these textual traditions.

**RELIGST 263A. A Ripple on the Ocean of Zen: Reading the Zenkai Ichiran. 3-5 Units.**

Imakita Ksen (1816-1892), the master of D. T. Suzuki's teacher, wrote the Zenkai Ichiran in 1862 for his feudal lord, a staunch supporter of Confucianism, in order to convey the attraction of Zen to him in Confucian language. One way of reading this short work in Classical Chinese is as a product of religious conflict within the nineteenth century Japanese world, but the text also reflects the form that had been taken by a lengthy tradition of polemical Buddhist writing dating back over one and a half millennia in East Asia at the very point that Buddhists were about to turn to resisting the inroads not of Confucianism but of Christianity. This reading class will allow students familiar with original East Asian Buddhist materials to appreciate some related non-Buddhist sources. But it possible to translate into English a book that itself translated Buddhism into Confucian terms? Undergraduates register for 200-level for 5 units. Graduate students register for 300-level for 3-5 units. Same as: RELIGST 363



**RELIGST 264. Hindu Tantra. 4 Units.**

What is Tantra? Tantric forms of ritual and philosophy have been integral to the practice of Hinduism for most of its history. Tantra has provided initiates with a spiritual technology for embodying the divine and transcending the cycle of rebirth; on a social and political level, Tantra has mediated the institutions of Hindu kingship and appealed to a diverse population of initiates. This course covers a number of influential and well-documented Hindu tantric traditions, exploring several prominent features of Tantric religion as they develop historically, including: tantric ritual practice (core technologies of the subtle body, mantras, ma, alas, etc., along with the more notorious elements of sex and transgression), theology and philosophical speculation, as well as Tantra's relationship to the outside world and state power.

Same as: RELIGST 364

**RELIGST 265. Creating the Universe: Buddhist Science, Ritual and Art. 5 Units.**

Much of Buddhist ritual and art can usefully be thought of as technology--physical pieces that, when arranged systematically, make a given practice effective. This class is about the Buddhist scientific perspectives underlying the production of such ritual and art in Tibet, Nepal, and India. The course is organized around cosmological and biological topics such as physical models of the universe, the types of beings that dwell in the world, and the cycles of life and death. Within these topics, we will investigate the relationships between sacred texts, ritual practices, and visual arts as the material culture of religion.

Same as: RELIGST 365

**RELIGST 269. Plotinus and Augustine. 3-5 Units.**

Professor's permission required to register. A reading course focused on the influence of Plotinus Enneads on Augustine's Confessions, early dialogues, and sections on reason and memory in the De trinitate. Proficiency in Greek and Latin will be helpful but is not required. Professor's prior permission required, interested students should contact the professor about course schedule: tsheehan@stanford.edu. Undergraduates register for 200-level for 5 units. Graduate students register for 300-level for 3-5 units.

Same as: PHIL 229, PHIL 329, RELIGST 369

**RELIGST 271A. Dante's Spiritual Vision. 4-5 Units.**

Poetry, ethics, and theology in Dante's Divine Comedy. Supplementary readings from classical authors such as St. Thomas Aquinas, and from modern writers, such as Jorge Borges. Fulfills capstone seminar requirement for the Philosophy and Literature tracks. Students may take 271A without taking 271B. Consent of the instructor required.

**RELIGST 271B. Dante's Spiritual Vision. 4-5 Units.**

Poetry, ethics, and theology in Dante's Divine Comedy. Supplementary readings from classical authors such as St. Thomas, and from modern writers, such as Jorge Borges. Fulfills capstone seminar requirement for the Philosophy and Literature tracks. Prerequisite: 271A.

**RELIGST 273. Historicism and Its Problems: Ernst Troeltsch, the Study of Religion, and the Crisis of Historicism. 3-5 Units.**

Examination of the early twentieth-century historian of religion, philosopher of culture, sociologist of religion, Christian theologian, and philosopher of history, Ernst Troeltsch, within the context of the late nineteenth-century "crisis of historicism," i.e., the historicization and relativization of religious, ethical, social, and political norms. Attention to seminal theorists of history (Herder, Kant, Ranke, Hegel, Nietzsche) in the post-Enlightenment German intellectual tradition and the attempts of Christian and Jewish thinkers in the Weimar era (Barth, Gogarten, Rosenzweig, L. Strauss) to "overcome" the crisis wrought by a radically historical approach to human culture.

Same as: RELIGST 373

**RELIGST 274. From Kant to Kierkegaard. 3-5 Units.**

(Graduate students register for 374. Undergrads register for 274 for 5 units.) The philosophy of religion emerged from the European Enlightenment as a new genre of reflection on religion distinct from both dogmatic theology and rationalist dreams of a "natural" religion of reason. Neither beholden to pre-critical tradition, nor dismissive of what Thomas Nagel has termed "the religious attitude," this new, ostensibly secular, genre of religious thought sought to rethink the meaning of Christianity at a time of immense philosophical ferment. The main currents of religious thought in Germany from Kant's critical philosophy to Kierkegaard's revolt against Hegelianism. Emphasis on the theories of religion, the epistemological status of religious discourse, the role of history (especially the figure of Jesus), and the problem of alienation/reconciliation in seminal modern thinkers: Kant, Schleiermacher, Hegel, and Kierkegaard.

Same as: RELIGST 374

**RELIGST 275. Kierkegaard. 3-5 Units.**

(Graduate students register for 375.) Close reading of Kierkegaard's magnum opus, *Concluding Unscientific Postscript to Philosophical Fragments*, in its early 19th-century context.

Same as: RELIGST 375

**RELIGST 277. The Later Heidegger: Art, Poetry, Language. 3 Units.**

Lectures and seminar discussions of the problematic of the later Heidegger (1930 - 1976) in the light of his entire project. Readings from "On the Origin of the Work of Art" and Elucidations of Holderlin's Poetry. Same as: PHIL 234B, RELIGST 377

**RELIGST 278. Heidegger: Confronting the Ultimate. 3-5 Units.**

Heidegger's work on meaning, the self, and the sacred. Texts include *Being and Time*, courses and opuscula up to 1933, the *Letter on Humanism*, and *Contributions of Philosophy*.

Same as: RELIGST 378

**RELIGST 279. After God: Why religion at all?. 4 Units.**

God is dead, but where does religion come from? The end of the quest for God in twentieth century philosophy. Robert Bellah's Religion in Human Evolution plus seminal works of Heidegger, including *Being and Time*, 'What Is Metaphysics?' 'Nietzsche's Saying 'God is Dead.' 'N.B.: Class size limited. Apply early at tsheehan@stanford.edu.

Same as: RELIGST 379

**RELIGST 279A. Heidegger on human being and God. 4 Units.**

This lecture-seminar first raises the question of essential characteristics of human being, such as temporality, mortality, hermeneutics and the relation to meaning, and then, via readings from Karl Rahner, asks whether human being is open to a possible relation to a supernatural divinity.

Same as: RELIGST 379A

**RELIGST 279X. American Jewish History: Learning to be Jewish in America. 2-4 Units.**

This course will be a seminar in American Jewish History through the lens of education. It will address both the relationship between Jews and American educational systems, as well as the history of Jewish education in America. Plotting the course along these two axes will provide a productive matrix for a focused examination of the American Jewish experience. History students must take course for at least 3 units. Same as: AMSTUD 279X, EDUC 279, HISTORY 288D, JEWISHST 297X

**RELIGST 280. Schleiermacher: Reconstructing Religion. 3-5 Units.**

Idealist philosopher, Moravian pietist, early German Romantic, co-founder of the University of Berlin, head preacher at Trinity Church, translator of Plato's works, Hegel's opponent, pioneer in modern hermeneutics, father of modern theology. Schleiermacher's controversial reconception of religion and theology in its philosophical context.

Same as: RELIGST 380

**RELIGST 281. Asian Religions in America; Asian American Religions. 4 Units.**

This course will analyze both the reception in America of Asian religions (i.e. of Buddhism in the 19th century), and the development in America of Asian American religious traditions.

Same as: AMSTUD 281, ASNAMST 281, RELIGST 381

**RELIGST 282. King Solomon and the Search for Wisdom. 4 Units.**

What is wisdom according to the Bible? The course addresses this question by surveying various biblical and post-biblical texts associated with King Solomon. Other topics include the on-going debate over the historical existence of a Solomonic kingdom, the origins and history of the Jerusalem Temple, and Solomon's role in Jewish, Christian and Islamic tradition.

Same as: RELIGST 382

**RELIGST 283. Religion and Literature. 4 Units.**

A wide-ranging exploration of religious themes in literary works. Readings will include prose and poetry stemming from various world regions, time periods, and religious traditions.

**RELIGST 290. Majors Seminar. 5 Units.**

Required of all majors and combined majors. The study of religion reflects upon itself. Representative modern and contemporary attempts to "theorize," and thereby understand, the phenomena of religion in anthropology, psychology, sociology, cultural studies, and philosophy. WIM.

**RELIGST 293X. Church, State, & Schools: Issues in Education & Religion. 4 Units.**

This course will examine interactions between religion and education, focusing on both formal and experiential sites in which people and communities explore, articulate, encounter, and perform religious ideologies and identities. The class will focus on different religious traditions and their encounters the institutions and structures of education in American culture, both in the United States and as it manifests in American culture transnationally.

Same as: AMSTUD 293, EDUC 293

**RELIGST 297. Senior Essay/Honors Essay Research. 3-5 Units.**

Guided by faculty adviser. May be repeated for credit. Prerequisite: consent of instructor and department.

**RELIGST 298. Senior Colloquium. 5 Units.**

For Religious Studies majors writing the senior essay or honors thesis. Students present work in progress, and read and respond to others. Approaches to research and writing in the humanities.

**RELIGST 300. Theory in the Study of Religion. 4 Units.**

This course explores how religious belief, ritual, and tradition, interact with, embed, or respond to aspects of social reality or human nature, such as economics, institutions, law, art, values, and psychology. The course examines a number of approaches to the study of religion, including sociological and anthropological ones. The course is intended for Religious Studies MA students and graduate students from other departments.

**RELIGST 301. Islamic Law. 3-5 Units.**

(This course is combined with LAW 586) Topics include marriage, divorce, inheritance, ritual, war, rebellion, abortion, and relations with non-Muslims. The course begins with the premodern period, in which jurists were organized in legal traditions called *çschools of law.*ç After examining the nature and functions of these institutions, we turn to the present era to study the relationship between customary law, state law, and the Islamic legal heritage in Egypt and Indonesia. The course explores Muslim laws and legal institutions and the factors that have shaped them, including social values and customs, politics, legal precedents, and textual interpretation.

Same as: RELIGST 201

**RELIGST 301A. Gender in Classical Islamic Law. 3-5 Units.**

The course examines classical Islamic society and law. It covers historical development, the unity and diversity of Muslim legal traditions, and the relationship between laws and values. Constructions of gender in law are examined through rituals, marriage, divorce, birth control, child custody, and sexuality.

Same as: RELIGST 201A

**RELIGST 302. Islamic Studies Proseminar. 1-5 Unit.**

Research methods and materials for the study of Islam. May be repeated for credit.

**RELIGST 304A. Theories and Methods. 4 Units.**

Required of graduate students in Religious Studies. Approaches to the study of religion. Prerequisite: consent of instructor.

**RELIGST 304B. Theories and Methods. 4 Units.**

Required of graduate students in Religious Studies. Approaches to the study of religion. Prerequisite: consent of instructor.

**RELIGST 308A. Ex Oriente Lux: Orientalism and the Study of Religion. 3-5 Units.**

This seminar is designed to expose students to issues relating to discourse and subjectivity within the textual constructions of Oriental religions in the colonial era. We will begin with Edward W. Said's provocative work on notions of representation and power embedded in the discourse on the Orient that established, produced, and, ultimately, perpetuated western knowledge about the Other. We will then discuss the impact of the Oriental Renaissance and the vital role that Eastern wisdom played in constructing the field of Comparative Religious Studies. In addition, students will also read ethnographies, fables, and travelogues that both support and undermine Said's thesis of an active West constructing a largely passive East.

Same as: RELIGST 208A

**RELIGST 308C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.**

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 208C, MUSIC 408C, REES 208C, REES 408C, RELIGST 208C

**RELIGST 309. Priests, Prophets, and Kings: Religion and Society in Late Antique Iran. 4-5 Units.**

This course is designed as a broad introduction to the religious and social history of the Sasanian Empire, encompassing the period from 224-651 CE as well as the early years of Islamic rule in Iran. Among the topics we will discuss are: the lives and deeds of the powerful Iranian emperors such as Shapur I and II in relation to the the Roman emperors Diocletian and Constantine; the transformation of Zoroastrianism into a powerful official religion of the state and its subsequent orthodoxy; the emergence of the prophet Mani and the confrontation of Manicheism with the Zoroastrian priesthood; the conversion of Constantine to Christianity and its political and social ramifications in Iran; the establishment of an independent Iranian Christian church; the importance of Armenia in the Sasanian- Roman conflict; and a brief discussion of the history of the Jewish community under the Sasanians. We will end the quarter by examining the ArabçIslamicçconquests of Iran and the profound social changes experienced by the Zoroastrian communities in the early centuries of Islam in Iran.

Same as: CLASSICS 147, CLASSICS 247, RELIGST 209

**RELIGST 309A. Sugar in the Milk: Modern Zoroastrianism as Race, Religion, and Ethnicity. 4-5 Units.**

Modern Zoroastrian experience as race, religion, and ethnic identity. Some 60,000 Zoroastrians now live in India and have resided there for a millennium. In the 19th century, these peoples from Persia became colonial elites yet were acutely aware that they were not quite Indian, British, or Persian. Diverse ways this experience of dislocation has served as a defining characteristic in Parsi communal identity and contrast these South Asian experiences with the minority socio-politics of those who remained in Iran. Survey the colonial and post-colonial communities in England, East Africa, Hong Kong, Australia, and North America and examine the expression of these global diasporic experiences in literature and the arts.

Same as: RELIGST 209A

**RELIGST 309D. 'Crow Eaters' & 'Fire Worshippers': Exploring Contemporary Zoroastrianism Thru Reading Parsi Lit. 3-5 Units.**

In the past three decades Parsi fiction has rapidly emerged as a unique and creative voice in modern Anglophone literature from South Asia. From Bapsi Sidhwa to Thrity Umrigar to Rohinton Mistry, Parsi novelists address the most poignant concerns of Zoroastrians living in an era of rapid social, political, and religious transformation. The erosion of tradition; the breakdown of the Parsi family; the demise of religion among the young; and the cultural losses and gains of living in diaspora are common themes in their works. The unique vantage point of the Parsis; neither Hindu nor Muslim, neither quite Indian nor quite British; will serve as a lens for examining the inherent tensions in multicultural societies both East and West.

Same as: RELIGST 209D

**RELIGST 309E. Imperishable Heroes and Unblemished Goddesses: Myth, Ritual, and Epic in Ancient Iran. 3-5 Units.**

Designed as a broad introduction to the world of ancient Iran, students will be introduced to the Indo-European inheritance in ancient Iranian culture; the shared world of ritual, religion, and mythology between Zoroastrianism in Iran and Vedic Hinduism in India; and to the contours of early Zoroastrian religious thought. We will also survey mythoepic literature in translation from the archaic Avesta through the late antique Zoroastrian Middle Persian corpus to the early medieval national epic of Iran, the Book of Kings of Ferdowsi.

Same as: CLASSICS 148, CLASSICS 248, RELIGST 209E

**RELIGST 31. The Religious Life of Things. 3-5 Units.**

Temples, prayer beads, icons, robes, books, relics, candles and incense, scarves and hats, sacred food and holy water; objects of all sorts play a prominent role in all religions, evoking a wide range of emotional responses, from reverence, solace and even ecstasy, to fear, hostility and violence. What is it about these things that makes them so powerful? Is it beliefs and doctrines that inspire particular attitudes towards certain objects, or is it the other way around? Many see a tension or even contradiction between religion and material pursuits and argue that the true religious life is a life without things. But is such a life even possible? This course adopts a comparative approach, drawing on a variety of traditions to examine the place of images, food, clothing, ritual objects, architecture and relics in religious thought and practice. Materials for the course include scholarship, scripture, images and at least one museum visit.

**RELIGST 312. Buddhist Studies Proseminar. 1-5 Unit.**

Research methods and materials for the study of Buddhism. May be repeated for credit. Prerequisite: reading knowledge of Chinese or Japanese.

**RELIGST 313. Graduate Seminar in Chinese Buddhist Texts. 3-5 Units.**

Graduate Seminar in Chinese Buddhist Texts: An in-depth reading of Zongmi's Chanyuan zhuquanji duxu ("Preface to the Collected Writings on the Source of Chan") (T#2015). Written in 833, the "Preface" is Zongmi's most ambitious and well-known work. It seeks to delineate the historical and doctrinal origins of the Chan tradition. In doing so, it is the first work to formulate the paradigm of a multi-branched genealogical tree that becomes the template in terms of which the subsequent Chan tradition described itself. It also tries to harmonize Chan (the practice of meditation) with the canonical teachings (doctrinal study) by adapting a Huayan philosophical framework to correlate different Chan traditions with different Chinese Buddhist doctrinal schools. In addition, it is particularly noteworthy for its analysis of the so-called sudden/gradual controversy, in which Zongmi develops an overarching scheme in which the different contending positions can all be seen to fit. The text is an excellent vehicle for giving students a grounding in both Tang-dynasty Chan history and teachings as well as the teachings of the main philosophical schools of Chinese Buddhism. The seminar will focus on a close reading of selected sections from Zongmi's text, especially those bearing on his strategies for harmonizing Chan and doctrinal teachings as well as his analysis of the sudden/gradual controversy. In doing so it will pay special attention to problems of translation. Meetings will be held in Buddhist Studies Library, located in Bldg 70 (Main Campus Quad).

**RELIGST 313X. The Education of American Jews. 4 Units.**

This course will take an interdisciplinary approach to the question of how American Jews negotiate the desire to retain a unique ethnic sensibility without excluding themselves from American culture more broadly. Students will examine the various ways in which people debate, deliberate, and determine what it means to be an "American Jew". This includes an investigation of how American Jewish relationships to formal and informal educational encounters through school, popular culture, religious ritual, and politics.

Same as: EDUC 313, JEWISHST 393X

**RELIGST 314. Seminar in Buddhist Historiography. 3-5 Units.**

The focus of this course is on approaches to the past from within Buddhist traditions rather than modern academic writing on Buddhist history. We will briefly examine research on religious conceptions of the past in other religions before turning to the full range of Buddhist historiography, including writings from India, Ceylon, China, Tibet and Japan. The first half of the class will be dedicated to reading and discussing scholarship as well as some primary sources in translation. In the second half of the course, students will develop projects based on their interests, culminating in presentations and a research paper.

**RELIGST 315. Third Bhavanakrama & the Writings of Héshang Moheyan: Scripture in Buddhist Scholastic Polemics. 3-5 Units.**

Readings in the original languages (Sanskrit, Tibetan and Chinese) of materials from the debates of late 8th Century Tibet (so-called debate at Bsam-yas). The course focuses on the use of scriptural quotations in those passages where the arguments of Kamalasila, the leading Indian representative at the debates, best map on to the arguments of his Chinese rival, Héshang Moheyan.

**RELIGST 315A. Chinese Buddhism. 3-5 Units.**

This course provides an overview of the major themes and historical developments in 2000 years of Buddhist history in China, from its early transmission from India to contemporary developments in the PRC, Taiwan and Hong Kong. Themes include monasticism, doctrine, popular devotion, state policy and the encounter with modernity.

**RELIGST 317. Japanese Studies of Religion in China. 3 Units.**

(Graduate students register for 317.) Readings in Japanese secondary sources on Chinese religions.

Same as: RELIGST 217

**RELIGST 318. Islam, Race and Revolution: A Pan-American Approach. 3-5 Units.**

Taking a pan-American approach to the study of religious traditions, this upper-level course traces the history of the critical intersection between race, religion and revolution among Muslims from the turn of the nineteenth century until the present day. Moving from the Atlantic Revolutions of the late eighteenth and early nineteenth centuries, to the United States, to the decolonizing Third World, and then finally to the contemporary Middle East, this class will emphasize that Islam and race together have been used by many groups in order to challenge existing power structures, agitate for change, and more than occasionally, transform the social, cultural and governmental structures comprising their worlds. Moreover, although this class is concentrated upon religious formations in the Americas, students will explore global events throughout the Muslim world in order to examine how global politics contribute to religious formations, solidarities and identities. At the conclusion of this course, students will be expected to write a 10-15 page research paper, and a topic will be chosen in consultation with the instructor. Students will also be expected to write weekly reflection papers, which will serve to facilitate class discussion. Undergraduates register for 200-level for 5 units. Graduate students register for 300-level for 3-5 units.

Same as: AMSTUD 218, CSRE 218, RELIGST 218

**RELIGST 318X. The Holy Dead: Saints and Spiritual Power in Medieval Europe. 4-5 Units.**

Examines the cult of saints in medieval religious thought and life. Topics include martyrs, shrines, pilgrimage, healing, relics, and saints' legends. Same as: HISTORY 218, HISTORY 318, RELIGST 218X

**RELIGST 32. Spiritualism and the Occult. 4 Units.**

This course will examine the popular mystical practices of the nineteenth and early twentieth centuries when millions of people in Europe and America described themselves as spiritualists and shared a recognizable set of practices. These served as a platform for spiritual immediacy guided by the central questions: What is the relationship between seen and unseen? How can the living communicate with the dead? What technologies apply to our inner lives?

**RELIGST 320. Religion and Literature. 4 Units.**

grad seminar in religion and literature-description to follow.

**RELIGST 321. The Talmud. 4 Units.**

Strategies of interpretation, debate, and law making. Historical contexts. Prerequisite: Hebrew.

Same as: RELIGST 221

**RELIGST 321B. What is Talmud?. 5 Units.**

In what sense can Talmud be studied as literature? Which voices can be identified? Concepts of author, editor, or redactor. The basic textual units of Talmud: sugya, chapter, and tractate. The sugya as literary genre. The aesthetic of talmudic dialectics. Prerequisite: reading Hebrew with some understanding of biblical Hebrew.

Same as: RELIGST 221B

**RELIGST 321D. Readings in Syriac Literature. 2-5 Units.**

In recent years, there has been growing interest in the works of Syriac speaking Christians in antiquity and beyond. This course offers an introduction to the Syriac language, including its script, vocabulary and grammar, and a chance to read from a selection of foundational Syriac Christian texts.

Same as: JEWISHST 221D, JEWISHST 321D, RELIGST 221D

**RELIGST 322B. Sufism Seminar. 3-5 Units.**

Sufism through original texts and specialized scholarship. Prerequisite: ability to read at least one major language of Islamic religious literature (Arabic, Persian, Turkish, Urdu).

Same as: RELIGST 222B

**RELIGST 324. Classical Islamic Texts. 3 Units.**

The course is based on readings in primary Arabic sources in the key fields of pre-modern Islamic scholarship. The list of readings and topics will depend on the interests of the students. In addition to focusing on the language, contents, and context of the texts covered, the course introduces genre-specific historical research methods. The reading selections may be derived from Qur'anic interpretation (tafsir), the hadith literature, adab, biographical dictionaries, fiqh, ta'rikh, kalam, or Sufism. Reading knowledge of Arabic is required.

Same as: RELIGST 224

**RELIGST 324B. Unveiling the Sacred: Explorations in Islamic Religious Imagination. 3-5 Units.**

Poetry and prose in translation as well as historical studies. Islamic movements invested in the idea that the sensory world has a hidden or esoteric counterpart that can be understood or experienced through following particular religious programs. Various forms of Shi'ism and Sufism, millenarian and apocalyptic movements, the Nation of Islam and its offshoots. Philosophical propositions, historical contexts, and the role of ritual in the construction of religious systems.

Same as: RELIGST 224B

**RELIGST 326A. Judaism and Hellenism. 3-5 Units.**

interactions and conflicts between Jews and Greeks in the centuries following the conquests of Alexander the Great and the cultural/religious repercussions of their encounter. In what ways were Jews influenced by Greek culture? In what ways, and for what reasons, did they resist it? And how the interaction of these cultures shape the subsequent development of Judaism and Christianity? Jewish texts in the Greco-Roman period, including Jewish-Greek writers like Philo of Alexandria, the Apocrypha, the Dead Sea Scrolls, selected writings from the New Testament, and the Passover Haggadah.

Same as: RELIGST 226A

**RELIGST 327. The Qur'an. 5 Units.**

Early history, themes, structure, chronology, and premodern interpretation. Relative chronology of passages.

Same as: RELIGST 227

**RELIGST 328. The Buddha's Word at Stanford. 3-5 Units.**

Linked to an exhibition at the Cantor Museum, this course investigates the history of Buddhist manuscript and print culture in Asia using manuscripts and woodblock prints in Stanford's own collections (5 units for 228).

Same as: RELIGST 228

**RELIGST 328S. The Study of the Midrash. 1-2 Unit.**

Two-week block seminar; four sessions. Talmudic philology; development and transmission of the Talmudic text and manuscripts. Relationship between Midrash and Mishnah and between Mishnah and Tosefta; development of talmudic sugiot; relationship between the Babylonian and Palestinian Talmud.

**RELIGST 329. Winged Bulls and Sun Disks: Religion and Politics in the Persian Empire. 3-5 Units.**

Stretching from India to Ethiopia, the Persian Empire the largest empire before Rome has been represented as the exemplar of oriental despotism and imperial arrogance, a looming presence and worthy foil for the West and Greek democracy. This course will provide a general introduction to the Persian Empire, beginning in the 6th century BCE to the fall of Persia to Alexander the Great in 331 BCE. We shall not only examine the originality of the first world empire of antiquity, but the course will also attempt to present a broad picture of the diverse cultural institutions and religious practices found within the empire. Readings in translation from the royal edicts and the inscriptions of Cyrus, Darius, and Xerxes will allow us to better appreciate the subtle ways in which these Persian kings used religion to justify and propagate the most ambitious imperial agenda the world had ever seen. In concluding the quarter, students will evaluate contemporary representations of Persia and the Persians in politics and popular culture in a wide array of media, such as the recent film *300* and the graphic novel on which it is based, in an attempt to better appreciate the enduring legacy of the Greco-Persian wars.

Same as: CLASSICS 146, CLASSICS 246, RELIGST 229

**RELIGST 329X. Advanced Paleography. 5 Units.**

This course will train students in the transcription and editing of original Medieval and Early Modern textual materials from c. 1000 to 1600, written principally in Latin and English (but other European languages are possible, too). Students will hone their archival skills, learning how to describe, read and present a range of manuscripts and single-leaf documents, before turning their hand to critical interpretation and editing. Students, who must already have experience of working with early archival materials, will focus on the full publication of one individual fragment or document as formal assessment.

Same as: CLASSICS 216, HISTORY 315

**RELIGST 32S. Buddhism in America. 3 Units.**

This course examines the transmission, growth, and transformation of Buddhism in America from the nineteenth century to the present day. We will treat American Buddhism as a distinct regional variety of Buddhism with its own history, characteristics, and debates. Through select readings, films, discussions, and research, students will explore the main events and issues that have shaped the American encounter with Buddhism. We will learn the history of Buddhism in the United States, major traditions of American Buddhism, and contemporary issues and debates. Topics covered will include Orientalism, gender, race, science and meditation, and Buddhism in classrooms and prisons.

**RELIGST 330B. Zen Studies. 4 Units.**

Readings in recent English-language scholarship on Chan and Zen Buddhism.

Same as: RELIGST 230B

**RELIGST 332X. Religion and Modernity. 5 Units.**

What role has the category of religion played in the development of the modern state, both colonial and national? How have central concepts of liberal political thought, such as freedom, progress, and history, depended on certain normative ideas of religion? Through various genealogical, historical, and ethnographic inquiries, this course examines how the category of religion has both subtended and disturbed formations of colonial and post-colonial modernity.

Same as: ANTHRO 347

**RELIGST 333X. Workshop in Religion and Education. 1 Unit.**

This 1-unit workshop will explore the intersection of religion and education across a variety of learning environments and demographics. It invites an ongoing conversation of the relationships between schools, congregations, religious bodies, learners, seekers, philanthropy, and public education. Advanced students and visiting scholars will have an opportunity to present their work for discussion. May be repeat for credit.

Same as: EDUC 412

**RELIGST 334. Emmanuel Levinas: Ethics, Philosophy and Religion. 4 Units.**

Emmanuel Levinas (1906-1995) is a major French philosopher of the second half of the twentieth century and is among the half-dozen most important Jewish thinkers of the century. Born in Lithuania, Levinas lived most of his life in France; he was primarily a philosopher but also a deeply committed Jewish educator who often lectured and wrote about Judaism and Jewish matters. Levinas was influenced by Bergson, Husserl, Heidegger, and others, like Buber and Rosenzweig. We will look at the philosophical world in which he was educated and explore his unique development as a philosopher in the years after World War Two. Levinas reacted against the main tendencies of Western philosophy and religious thought and as a result shaped novel, powerful, and challenging ways of understanding philosophy, religion, ethics, and politics. In this course, we will examine works from every stage of Levinas's career, from his early study of Husserl and Heidegger to the emergence of his new understanding of the human condition and the primacy of ethics, the face-to-face encounter with the human other, the role of language and the relationship between ethics and religion, and finally his understanding of Judaism and its relationship to Western philosophy. We will be interested in his philosophical method, the relevance of his thinking for ethics and religion, the role of language in his philosophy and the problem of the limits of expressibility, and the implications of his work for politics. We shall also consider his conception of Judaism, its primary goals and character, and its relation to Western culture and philosophy.

Same as: JEWISHST 224, JEWISHST 324, RELIGST 234

**RELIGST 335. Religion in Modern Society: Secularization and the Sacred. 4 Units.**

What is the status of religion in modern life? Is the modern world "secular" in some fundamental, irreversible way and what does this mean? This course will explore these questions through variety of readings from leading sociologists, philosophers, and anthropologists. Our goal will be to understand in what ways industrialization, political liberalization, the rise of technology, and the success of modern science have been used to support the "secularization" thesis that the modern West rendered religion a thing of the past. A central question to be asked will be: do assessments of the place of religion in modernity necessitate a philosophy of history i.e., a theory not only of historical change, but of the meaning of this change as well? The course will begin by looking at the origins of the theory of secularization from its beginnings in Enlightenment attempts to understand the meaning of history. We will then turn to contemporary debates over the term "secular" against its counterpart, "religious", and the problems with their application to non-Western societies. We will read works by Talal Asad, Saba Mahmood, Max Weber, Charles Taylor, Jürgen Habermas, and Pope Benedict XVI.

Same as: RELIGST 235

**RELIGST 338. Christian Neo-Platonism, East and West. 3-5 Units.**

Christianity's shift to neo-Platonic Greek philosophical categories and its significance for contemporary spirituality. Readings from Plotinus, Proclus, Greek fathers such as Pseudo-Dionysus, and from Ambrose and Augustine.

Same as: RELIGST 238

**RELIGST 339. Luther and the Reform of Western Christianity. 3-5 Units.**

Luther's theology, ethics, biblical interpretation, and social reforms and their significance for the remaking of Western Christianity. Readings include Luther's own writings and secondary sources about Luther and his world.

Same as: RELIGST 239

**RELIGST 340. Contemporary Religious Reflection. 3-5 Units.**

Focus is on normative and prescriptive proposals by recent and contemporary philosophers and theologians, as opposed to the domination of Religious Studies by textual, historical, cultural, and other largely descriptive and interpretive approaches. Do such normative and prescriptive proposals belong in the academy? Has Religious Studies exorcised its theological nimbus only to find contemporary religious reflection reappearing elsewhere in the university?.

**RELIGST 341. Comparative Perspectives on Classical Chinese Texts. 4-5 Units.**

Classical Chinese texts, in prose and poetry, interpreted through comparative perspectives drawn from both inside and outside China. Consent of the instructor required.

**RELIGST 344. Explaining Religion. 3-5 Units.**

There are broadly two different, and sometimes mutually exclusive, ways of explaining social religious phenomena: idealism and materialism. One gives ideas ultimate causal primacy while the other emphasizes economic, technological, geographical, and demographic factors. This course examines arguments for and against each approach. Topics include rational choice theory, functionalism, Marxism, cultural materialism, and the unconscious. Case studies include Jewish and Indian dietary restrictions, competition between Christian denominations, survival strategies of minority religions, apocalyptic movements, etc. For the final paper, each student will write on a religious tradition of his/her choice.

Same as: RELIGST 244

**RELIGST 345. Christianity Seminar. 3-5 Units.**

Topics in the study of Christianity for doctoral students. Recent scholarship and approaches to research.

**RELIGST 346. Constructing Race and Religion in America. 4-5 Units.**

This seminar focuses on the interrelationships between social constructions of race, and social interpretations of religion in America. How have assumptions about race shaped religious worldviews? How have religious beliefs shaped racial attitudes? How have ideas about religion and race contributed to notions of what it means to be "American"? We will look at primary and secondary sources, and at the historical development of ideas and practices over time.

Same as: AFRICAAM 236, AMSTUD 246, CSRE 246, HISTORY 256G, HISTORY 356G, RELIGST 246

**RELIGST 347B. Readings in Chinese Religious Texts: The Lingbao Scriptures. 4 Units.**

A survey of the original Lingbao scriptures. Composed in the late-4th / early 5th century, these texts radically revised Daoist practice, incorporated elements of Buddhist thought and practice, and created liturgies that are still used in Daoist communities today. (Reading knowledge of Literary Chinese 22 required).

Same as: RELIGST 247B

**RELIGST 350. Modern Western Religious Thought Proseminar. 1-5 Unit.**

Selected topics in recent and contemporary religious thought. May be repeated for credit.

**RELIGST 351. Readings in Indian Buddhist Texts. 3-5 Units.**

(Graduate students register for 351.) Introduction to Buddhist literature through reading original texts in Sanskrit. Prerequisite: Sanskrit. Undergraduates register for 200-level for 5 units. Graduate students register for 300-level for 3-5 units.

Same as: RELIGST 251

**RELIGST 352A. The Story of a Buddhist Megascripture: Readings in the Avatamsaka. 3-5 Units.**

In this course we will explore the massive Mahayana Buddhist scriptural compilation known as the Avatamsaka Sutra (more correctly: Buddhavatamsaka Sutra). We will investigate the development of the text in India, study its contents, and consider its later reception in East Asia. Since much of the course will be devoted to reading sections of the Buddhavatamsaka, a reading knowledge of Chinese is required.

Same as: RELIGST 252A

**RELIGST 353. Recent Research on Japanese Buddhism. 3-5 Units.**

Readings in recent English-language scholarship on Japanese Buddhism. Undergraduates must enroll for 5 units; graduate students can enroll for 3-5 units. Prerequisite: Solid foundation in either Buddhist studies or East Asian Studies (5 units for 253, 3-5 units for 353).

Same as: RELIGST 253

**RELIGST 354. Recent Contributions to Buddhist Studies. 3-5 Units.**

This reading intensive course will examine nine areas in recent work in Buddhist studies, including ethnography, archaeology, monasticism, the study of "experience," and gender. May be repeated for credit.

Same as: RELIGST 254

**RELIGST 355. Religion and Power in the Making of Modern South Asia. 3-5 Units.**

This course examines the diverse ways that religious traditions have been involved in the brokering of power in South Asia from the late seventeenth century to the present day. We will examine the intersection of religion and power in different arenas, including historical memory, religious festivals, language politics, and violent actions. At the core of our inquiry is how religion is invoked in political contexts (and vice-versa), public displays of religiosity, and the complex dynamics of religion and the state. Among other issues, we will particularly engage with questions of religious identity, knowledge, and violence. Undergraduates must enroll in RELIGST 255 for 5 units. Graduate students must enroll RELIGST 355 for 3-5 units. HISTORY297F must be taken for 4-5 units.

Same as: HISTORY 297F, RELIGST 255

**RELIGST 356. The Brahma Net Sutra (Fanwang Jing). 4 Units.**

A study of an important Chinese Buddhist apocryphal work, with special attention to interpretation of content, impact on monastic codes in medieval China, transmissional history and commentarial tradition.

Same as: RELIGST 256

**RELIGST 357. Readings in Daoist Texts. 4 Units.**

Readings from primary sources. Prerequisite: classical Chinese.

Same as: RELIGST 257

**RELIGST 357X. Female Divinities in China. 4-5 Units.**

This course examines the fundamental role of powerful goddesses in Chinese religion. It covers the entire range of imperial history and down to the present. It will look at, among other questions, what roles goddesses played in the spirit world, how this is related to the roles of human women, and why a civilization that excluded women from the public sphere granted them a dominant place, in the religious sphere. It is based entirely on readings in English.

Same as: FEMGEN 293E, HISTORY 293E, HISTORY 393E, RELIGST 257X

**RELIGST 358. Japanese Buddhist Texts. 3-5 Units.**

Readings in medieval Japanese Buddhist materials. May be repeated for credit. Prerequisite: background in Japanese or Chinese.

Same as: RELIGST 258

**RELIGST 359. Readings in Buddhist Studies. 3-5 Units.****RELIGST 36. Philosophy of Religion. 3 Units.**

(Formerly RELIGST 62S) Explores fundamental questions about the existence of God, free will and determinism, faith and reason, through traditional philosophical texts. Course is divided into four sections: first asks what is religion; second surveys the western philosophical tradition from Boethius through Descartes, Hume, Kant, and Kierkegaard regarding the foundation for theist beliefs; third investigates questions mystical experience raises through both western and Buddhist materials; and fourth takes up the ethics of belief, what we have a right to believe, through the Clifford and James debate and the opposing stances of Camus and Pascal.

Same as: PHIL 77S

**RELIGST 360. Buddhism & Modernity. 3-5 Units.**

Is Buddhism a philosophy? A mind science? An ancient mystical path? A modern construct? This seminar will evaluate a variety of answers to these questions by exploring how Buddhism has been understood in the modern era. Our primary source materials will range from Orientalist poetry to Zen essays to Insight Meditation manuals to 21st-century films. We will examine how these works shape Buddhism, consider their pre-modern influences, and turn to recent scholarship to discuss how romantic, imperialist, anti-modern, nationalist, therapeutic, and scientific frames depict one of today's most popular religions. This course is cross-listed as RELIGST 260/360. Undergraduates must enroll in RELIGST 260 for 5 units. Graduate students must enroll RELIGST 360 for 3-5 units.

Same as: RELIGST 260

**RELIGST 361. Precepts and Ordinations in East Asia. 4 Units.**

Japanese Buddhism is well-known for its very loose interpretation of monastic precepts and ordinations. Although some may think that these subjects are nothing more than out-of-date lists of rules, the study of the precepts involves social history, doctrine, and religious practice. In this course, we examine the origins and the development of the bodhisattva precepts, beginning with a brief outline of the vinaya, and then progressing to Indian and Chinese views of the bodhisattva precepts. The last half of the course focuses on how Japanese Tendai's unique interpretation of the precepts was based on Chinese apocryphal texts and Chinese Tiantai doctrines. We conclude with reading Japanese Tendai texts written in Chinese. Because the Tendai tradition had a loose administrative structure, a variety of interpretations developed. The course is composed of reading texts written in Chinese by East Asian monks. Although I will lecture for approximately 30 minutes of each class, the focus of the class will be on reading and translating short sections of primary sources together. We will also pay attention to the use of such tools as dictionaries, encyclopedias, bibliographies, and data bases of texts. Students are expected to participate in discussions and to come to class prepared to read the primary sources in class.

**RELIGST 362. Sex and the Early Church. 4 Units.**

Sex and the Early Church examines the ways first- through sixth-century Christians addressed questions regarding human sexuality. We will pay particular attention to the relationship between sexuality and issues of gender, culture, power, and resistance. We will read a Roman gynecological manual, an ancient dating guide, the world's first harlequin romance novels, ancient pornography, early Christian martyrdom accounts, stories of female and male saints, instructions for how to best battle demons, visionary accounts, and monastic rules. These will be supplemented by modern scholarship in classics, early Christian studies, gender studies, queer studies, and the history of sexuality. The purpose of our exploration is not simply to better understand ancient views of gender and sexuality. Rather, this investigation of a society whose sexual system often seems so surprising aims to denaturalize many of our own assumptions concerning gender and sexuality. In the process, we will also examine the ways these first centuries of what eventually became the world's largest religious tradition has profoundly affected the sexual norms of our own time. The seminar assumes no prior knowledge of Judaism, Christianity, the bible, or ancient history.

Same as: FEMGEN 262, RELIGST 262

**RELIGST 363. A Ripple on the Ocean of Zen: Reading the Zenkai Ichiran. 3-5 Units.**

Imakita Ksen (1816-1892), the master of D. T. Suzuki's teacher, wrote the Zenkai Ichiran in 1862 for his feudal lord, a staunch supporter of Confucianism, in order to convey the attraction of Zen to him in Confucian language. One way of reading this short work in Classical Chinese is as a product of religious conflict within the nineteenth century Japanese world, but the text also reflects the form that had been taken by a lengthy tradition of polemical Buddhist writing dating back over one and a half millennia in East Asia at the very point that Buddhists were about to turn to resisting the inroads not of Confucianism but of Christianity. This reading class will allow students familiar with original East Asian Buddhist materials to appreciate some related non-Buddhist sources. But it possible to translate into English a book that itself translated Buddhism into Confucian terms? Undergraduates register for 200-level for 5 units. Graduate students register for 300-level for 3-5 units. Same as: RELIGST 263A

**RELIGST 364. Hindu Tantra. 4 Units.**

What is Tantra? Tantric forms of ritual and philosophy have been integral to the practice of Hinduism for most of its history. Tantra has provided initiates with a spiritual technology for embodying the divine and transcending the cycle of rebirth; on a social and political level, Tantra has mediated the institutions of Hindu kingship and appealed to a diverse population of initiates. This course covers a number of influential and well-documented Hindu tantric traditions, exploring several prominent features of Tantric religion as they develop historically, including: tantric ritual practice (core technologies of the subtle body, mantras, ma, alas, etc., along with the more notorious elements of sex and transgression), theology and philosophical speculation, as well as Tantra's relationship to the outside world and state power.

Same as: RELIGST 264

**RELIGST 365. Creating the Universe: Buddhist Science, Ritual and Art. 5 Units.**

Much of Buddhist ritual and art can usefully be thought of as technology—physical pieces that, when arranged systematically, make a given practice effective. This class is about the Buddhist scientific perspectives underlying the production of such ritual and art in Tibet, Nepal, and India. The course is organized around cosmological and biological topics such as physical models of the universe, the types of beings that dwell in the world, and the cycles of life and death. Within these topics, we will investigate the relationships between sacred texts, ritual practices, and visual arts as the material culture of religion.

Same as: RELIGST 265

**RELIGST 367. Seminar in Religion and Material Culture. 3-5 Units.**

The first part of the course will examine approaches to the role of material culture in religion, including scholarship on icons, sacred space, clothing and food. In the second part of the course, students will develop research projects in their area of specialization.

**RELIGST 369. Plotinus and Augustine. 3-5 Units.**

Professor's permission required to register. A reading course focused on the influence of Plotinus Enneads on Augustine's Confessions, early dialogues, and sections on reason and memory in the De trinitate. Proficiency in Greek and Latin will be helpful but is not required. Professor's prior permission required, interested students should contact the professor about course schedule: tsheehan@stanford.edu . Undergraduates register for 200-level for 5 units. Graduate students register for 300-level for 3-5 units.

Same as: PHIL 229, PHIL 329, RELIGST 269

**RELIGST 370. Comparative Religious Ethics. 4 Units.**

The difference that the word religious makes in religious ethics and how it affects issues of genre. Theoretical analyses with examples from W. and E. Asia. Prerequisite: consent of instructor.

**RELIGST 371. Writing Religious History. 4-5 Units.**

This course offers graduate students a sustained opportunity to think about the craft of writing religious history. We will work together on issues ranging from structuring sentences, to revising an article, to conceptualizing a dissertation. Students will be encouraged to establish a daily writing habit and to formulate clear and searchable research strategies. Readings will include exemplars of different kinds of writing in the field. Students will write and workshop several brief (3-5 page) papers applying different approaches. The final project will be a revision of an article-length paper.

**RELIGST 373. Historicism and Its Problems: Ernst Troeltsch, the Study of Religion, and the Crisis of Historicism. 3-5 Units.**

Examination of the early twentieth-century historian of religion, philosopher of culture, sociologist of religion, Christian theologian, and philosopher of history, Ernst Troeltsch, within the context of the late nineteenth-century "crisis of historicism," i.e., the historicization and relativization of religious, ethical, social, and political norms. Attention to seminal theorists of history (Herder, Kant, Ranke, Hegel, Nietzsche) in the post-Enlightenment German intellectual tradition and the attempts of Christian and Jewish thinkers in the Weimar era (Barth, Gogarten, Rosenzweig, L. Strauss) to "overcome" the crisis wrought by a radically historical approach to human culture.

Same as: RELIGST 273

**RELIGST 374. From Kant to Kierkegaard. 3-5 Units.**

(Graduate students register for 374. Undergrads register for 274 for 5 units.) The philosophy of religion emerged from the European Enlightenment as a new genre of reflection on religion distinct from both dogmatic theology and rationalist dreams of a "natural" religion of reason. Neither beholden to pre-critical tradition, nor dismissive of what Thomas Nagel has termed "the religious attitude," this new, ostensibly secular, genre of religious thought sought to rethink the meaning of Christianity at a time of immense philosophical ferment. The main currents of religious thought in Germany from Kant's critical philosophy to Kierkegaard's revolt against Hegelianism. Emphasis on the theories of religion, the epistemological status of religious discourse, the role of history (especially the figure of Jesus), and the problem of alienation/reconciliation in seminal modern thinkers: Kant, Schleiermacher, Hegel, and Kierkegaard.

Same as: RELIGST 274

**RELIGST 374F. Science, Religion, and Democracy. 3-5 Units.**

How should conflicts between citizens with science-based and religion-based beliefs be handled in modern liberal democracies? Are religion-based beliefs as suitable for discussion within the public sphere as science-based beliefs? Are there still important conflicts between science and religion, e.g., Darwinian evolution versus creationism or intelligent design? How have philosophy and recent theology been engaged with such conflicts and how should they be engaged now? What are the political ramifications? This is a graduate-level seminar; undergraduates must obtain permission of the instructors.

Same as: ETHICSOC 374R, PHIL 374F

**RELIGST 375. Kierkegaard. 3-5 Units.**

(Graduate students register for 375.) Close reading of Kierkegaard's magnum opus, *Concluding Unscientific Postscript to Philosophical Fragments*, in its early 19th-century context.

Same as: RELIGST 275

**RELIGST 377. The Later Heidegger: Art, Poetry, Language. 3 Units.**

Lectures and seminar discussions of the problematic of the later Heidegger (1930 - 1976) in the light of his entire project. Readings from "On the Origin of the Work of Art" and *Elucidations of Holderlin's Poetry*.

Same as: PHIL 234B, RELIGST 277

**RELIGST 378. Heidegger: Confronting the Ultimate. 3-5 Units.**

Heidegger's work on meaning, the self, and the sacred. Texts include *Being and Time*, courses and opuscula up to 1933, the *Letter on Humanism*, and *Contributions of Philosophy*.

Same as: RELIGST 278

**RELIGST 379. After God: Why religion at all?. 4 Units.**

God is dead, but where does religion come from? The end of the quest for God in twentieth century philosophy. Robert Bellah's *Religion in Human Evolution* plus seminal works of Heidegger, including *Being and Time*, "What Is Metaphysics?" Nietzsche's *Saying 'God is Dead.'* N.B.: Class size limited. Apply early at tsheehan@stanford.edu.

Same as: RELIGST 279

**RELIGST 379A. Heidegger on human being and God. 4 Units.**

This lecture-seminar first raises the question of essential characteristics of human being, such as temporality, mortality, hermeneutics and the relation to meaning, and then, via readings from Karl Rahner, asks whether human being is open to a possible relation to a supernatural divinity.

Same as: RELIGST 279A

**RELIGST 380. Schleiermacher: Reconstructing Religion. 3-5 Units.**

Idealist philosopher, Moravian pietist, early German Romantic, co-founder of the University of Berlin, head preacher at Trinity Church, translator of Plato's works, Hegel's opponent, pioneer in modern hermeneutics, father of modern theology. Schleiermacher's controversial reconception of religion and theology in its philosophical context.

Same as: RELIGST 280

**RELIGST 381. Asian Religions in America; Asian American Religions. 4 Units.**

This course will analyze both the reception in America of Asian religions (i.e. of Buddhism in the 19th century), and the development in America of Asian American religious traditions.

Same as: AMSTUD 281, ASNAMST 281, RELIGST 281

**RELIGST 382. King Solomon and the Search for Wisdom. 4 Units.**

What is wisdom according to the Bible? The course addresses this question by surveying various biblical and post-biblical texts associated with King Solomon. Other topics include the on-going debate over the historical existence of a Solomonic kingdom, the origins and history of the Jerusalem Temple, and Solomon's role in Jewish, Christian and Islamic tradition.

Same as: RELIGST 282

**RELIGST 384. Research in Christian Studies. 1-15 Unit.**

Independent study in Christianity. May be repeated for credit. Prerequisite: consent of instructor.

**RELIGST 385. Research in Buddhist Studies. 1-15 Unit.**

Independent study in Buddhism. May be repeated for credit. Prerequisite: consent of instructor.

**RELIGST 387. Research in Jewish Studies. 1-15 Unit.**

Independent study in Jewish Studies. May be repeated for credit. Prerequisite: consent of instructor.

**RELIGST 388. Research in Modern Religious Thought, Ethics, and Philosophy. 1-15 Unit.**

Independent study in Modern Religious Thought, Ethics, and Philosophy. May be repeated for credit. Prerequisite: consent of instructor.

**RELIGST 389. Individual Work for Graduate Students. 1-15 Unit.**

May be repeated for credit. Prerequisite: consent of instructor.

**RELIGST 390. Teaching Internship. 3-5 Units.**

Required supervised internship for PhDs.

**RELIGST 391. Teaching Religious Studies. 3 Units.**

Workshop/seminar for doctoral students in Religious Studies and adjacent fields designed to cultivate methods for teaching Religious Studies in an academic setting.

**RELIGST 392. Paper in the Field. 1-15 Unit.**

Prerequisite: consent of graduate director. May be repeated for credit.

**RELIGST 395. Master of Arts Thesis. 2-9 Units.**



**RELIGST 399. Recent Works in Religious Studies. 1-2 Unit.**

Readings in secondary literature for Religious Studies doctoral students. May be repeated for credit.

**RELIGST 50. Exploring Buddhism. 5 Units.**

From its beginnings to the 21st century. Principal teachings and practices, institutional and social forms, and artistic and iconographical expressions. (Formerly RELIGST 14.)

**RELIGST 53. Exploring Jewish Spirituality. 4 Units.**

It was once accepted as fact that Judaism is a purely rational religion devoid of any authentic mystical tradition. But the past century of scholarship has reversed this claim, demonstrating that the spiritual life has been integral to Judaism's vital heart since ancient times. This yearning for a direct immediate experience of God's Presence, a longing to grasp the mysteries of the human soul and know the inner dynamics of the Divine realm, has taken on many different forms across the centuries. This course will introduce students to the major texts and core ideas of Jewish mysticism and spirituality, tracking their development from the Hebrew Bible to the present day. Close attention will be paid to the sources, historical context, and we will also engage with broader methodological questions regarding the academic study of religion and the comparative approach to mysticism.

Same as: JEWISHST 53

**RELIGST 55. Exploring Zen Buddhism. 4 Units.**

This course is an introduction to Chan/Zen Buddhism. We will study the historical and doctrinal development of this tradition in China and Japan and examine various facets of Zen, such as the philosophy, practices, rituals, culture, and institution. For this aim, we will read and discuss classical Zen texts in translation and important secondary literature. This course will further feature a fieldtrip to a local Zen center.

**RELIGST 56. Exploring Chinese Religions. 4 Units.**

An overview of major themes and historical developments in 5000 years of Chinese religion. In this course, we will try as much as possible to appreciate Chinese religion from the Chinese perspective, paying particular attention to original texts in translation in an attempt to discern the logic of Chinese religion and the role it has played in the course of Chinese history. To a greater extent perhaps than any other civilization, Chinese have left behind a continuous body of written documents and other artifacts relating to religion stretching over thousands of years, providing a wealth of material for studying the place of religion in history and society.

**RELIGST 61. Exploring Islam. 4 Units.**

This course introduces some of the most important features of the Islamic religious tradition. It explores the different ways in which Muslims have interpreted and practiced their religion. The main subjects of discussion — including the life of the Prophet Muhammad, the Qur'an, law, ritual, mysticism, theology, politics, and art — will be considered with reference to their proper historical contexts. Some of the topics covered include abortion, gender, rebellion and violence, and the visual vocabulary of paintings. Students will be exposed to important theories and methods in the academic study of religion. No prior knowledge is required.

**RELIGST 65. Exploring Global Christianity. 4 Units.**

Explore the world's largest religion as a multicultural, global faith, with attention to Christianity's origins, spread and impact around the world up to the present. Special attention to recent shifting demographics leading to declining numbers in mainline Christian denominations in North America and Europe and the rapid expansion of Christianity in Africa, Asia, and South America; the explosion of international Pentecostalism and other new Christianities; Christianity, global politics, and the global economy; Christian-Muslim relations and conflicts.

**RELIGST 6N. Religion in Anime and Manga. 3 Units.**

Religious themes and topics are ubiquitous in Japanese anime and manga. In this course, we will examine how religions are represented in these new media and study the role of religions in contemporary Japan. By doing this, students will also learn fundamental concepts of Buddhism and Shinto.

**RELIGST 71. Jews and Christians: Conflict and Coexistence. 3 Units.**

The relationship between Judaism and Christianity has had a long a controversial history. Christianity originated as a dissident Jewish sect but eventually evolved into an independent religion, with only tenuous ties to its Jewish past and present. Since the Holocaust, Jews and Christians have begun the serious work of forging more meaningful relationships with each other. This course explores the most significant moments that have shaped the relationship between Judaism and Christianity and examines some of the theological complexities imbedded in these traditions, while searching constructive ways of situating oneself amidst such complexities.

Same as: JEWISHST 71

**RELIGST 801. TGR Project. 0 Units.**

(Staff).

**RELIGST 802. TGR Dissertation. 0 Units.****RELIGST 81. Exploring Indian Religions. 4 Units.**

This course provides an overview of Indian religious traditions, including Hinduism, Buddhism, Jainism, Islam, and Sikhism. We will spend approximately half the course on Hindu thought and traditions from the Vedic period until the present day, emphasizing the diverse forms of this religion in different times and places. The second half of the course will be devoted to religions that emerged in South Asia (e.g., Jainism) and those that came to find a home and particular forms of expression on the subcontinent (e.g., Islam). Throughout students will read selections from a range of theological texts, epics, and literature that have permeated many aspects of daily religious life in India. We will also emphasize ritual activities, visual experiences in temples, and networks of pilgrimage places that dot the subcontinent. We will often pair primary sources (in translation) with later interpretations and impacts of those texts in modern South Asia. We will also survey the modern incarnations of particular Indian religious traditions throughout South Asia and the diaspora. By the conclusion of this course, students will be conversant with the texts, beliefs, and practices of the major Indian religions in their cultural and historical contexts and also have a working knowledge of basic categories important for the study of religion more broadly.

**RELIGST 82. Approaches to the Study of Religion: Exploring Christianity. 4 Units.**

Historical and contemporary Christianity from four viewpoints: ritual and prayer; sacred texts and creeds; ethics and life; and community governance.

**RELIGST 86. Exploring the New Testament. 4 Units.**

To explore the historical context of the earliest Christians, students will read most of the New Testament as well as many documents that didn't make the final cut. Non-Christian texts, Roman art, and surviving archeological remains will better situate Christianity within the ancient world. Students will read from the Dead Sea Scrolls, explore Gnostic gospels, hear of a five-year-old Jesus throwing divine temper tantrums while killing (and later resurrecting) his classmates, peruse an ancient marriage guide, and engage with recent scholarship in archeology, literary criticism, and history.

Same as: CLASSICS 43, JEWISHST 86

**RELIGST 91. Exploring American Religious History. 4 Units.**

This course will trace how contemporary beliefs and practices connect to historical trends in the American religious landscape.

Same as: AMSTUD 91, CSRE 91, HISTORY 260K

**RELIGST 9N. What Didn't Make it into the Bible. 3 Units.**

Over two billion people alive today consider the New Testament to be sacred scripture. But how did the books that made it into the bible get there in the first place? Who decided what was to be part of the bible and what wasn't? How would the history of the world's largest modern religion look differently if a given book didn't make the final cut and another one did? Hundreds of ancient Christian texts are not included in the New Testament. What Didn't Make It in the Bible focuses on these excluded writings. We will explore Gnostic gospels, hear of a five-year-old Jesus throwing temper tantrums while killing (and later resurrecting) his classmates, peruse ancient Christian romance novels, tour heaven and hell, read the garden of Eden story told from the perspective of the snake, and learn how the world will end. The seminar assumes no prior knowledge of Judaism, Christianity, the bible, or ancient history. It is designed for students who are part of faith traditions that consider the bible to be sacred, as well as those who are not. The only prerequisite is an interest in exploring books, groups, and ideas that eventually lost the battles of history and to keep asking the question "why." In critically examining these ancient narratives and the communities that wrote them, you will learn about the content and history of the New Testament, better appreciate the diversity of formative Christianity, understand the historical context of the early church, and explore the politics behind what did and did not make it into the bible.

## Russian E Euro Eurasia Studies (REES)

**REES 100. Current Issues in Russian, East European, and Eurasian Studies. 1-2 Unit.**

Enrollment limited to REES students. Scholars present analyses of methodologies, challenges, and current issues in the study of Russia, E. Europe, and Eurasia.  
Same as: REES 200

**REES 105. Central and East European Politics. 5 Units.**

Focus is on how the states of Central and East Europe, including the Baltic states, have moved from communism and the Soviet Bloc to democracy, NATO and the EU. Topics include the communist legacy, transitions and their legacies, ethnic issues, and the evolution of economic and social policies, and the comparison of democratization processes in these countries to democracies in other regions, such as Latin America and southern Europe.  
Same as: REES 205

**REES 130. With God in Russia: Orthodox Christianity in the 19th and 20th Centuries. 4-5 Units.**

The experience of religion, particularly Orthodoxy, under tsars and commissars. Religion as a lived experience; practice and belief in the provinces and villages, intertwining of religion and folk customs (the so-called double faith); condition of the Church before and after the Revolutions of 1917; religion under Soviet control; and liberation of the Church since the collapse of the Soviet Union.  
Same as: REES 330

**REES 145D. Jewish American Literature. 5 Units.**

From its inception, Jewish-American literature has taken as its subject as well as its context the idea of Jewishness itself. Jewish culture is a diasporic one, and for this reason the concept of Jewishness differs from country to country and across time. What stays remarkably similar, though, is Jewish self-perception and relatedly Jewish literary style. This is as true for the first-generation immigrant writers like Isaac Bashevis Singer and Anzia Yezierska who came to the United States from abroad as it is for their second-generation children born in the United States, and the children of those children. In this course, we will consider the difficulties of displacement for the emigrant generation and their efforts to sustain their cultural integrity in the multicultural American environment. We'll also examine the often comic revolt of their American-born children and grandchildren against their (grand-)parents nostalgia and failure to assimilate. Only by considering these transnational roots can one understand the particularity of the Jewish-American novel in relation to mainstream and minority American literatures. In investigating the link between American Jewish writers and their literary progenitors, we will draw largely but not exclusively from Russia and the countries of Eastern Europe.

Same as: AMSTUD 145D, ENGLISH 145D, JEWISHST 155D

**REES 18. Understanding the Jews of Russia and Poland. 1 Unit.**

A preparatory course, for field trip to Moscow and Warsaw, that would cover Russian and Polish History, former Soviet Jewry, international relations, and current social realities.

**REES 185B. Jews in the Contemporary World: Faith and Ethnicity, Vulnerability and Visibility. 4-5 Units.**

(Same as HISTORY 85B.) This course explores the full expanse of Jewish life today and in the recent past. The inner workings of religious faith, the content of Jewish identity shorn of belief, the interplay between Jewish powerlessness and influence, the myth and reality of Jewish genius, the continued pertinence of antisemitism, the rhythms of Jewish economic life – all these will be examined in weekly lectures, classroom discussion, and with the use of a widely diverse range of readings, films, and other material. Explored in depth will the ideas and practices of Zionism, the content of contemporary secularism and religious Orthodoxy, the impact Holocaust, the continued crisis facing Israel and the Palestinians. Who is to be considered Jewish, in any event, especially since so many of the best known (Spinoza, Freud, Marx) have had little if anything to do with Jewish life with their relationships to it indifferent, even hostile?.

Same as: CSRE 185B, HISTORY 185B, HISTORY 385C, JEWISHST 185B

**REES 200. Current Issues in Russian, East European, and Eurasian Studies. 1-2 Unit.**

Enrollment limited to REES students. Scholars present analyses of methodologies, challenges, and current issues in the study of Russia, E. Europe, and Eurasia.  
Same as: REES 100

**REES 204. Cities of Empire: An Urban Journey through Eastern Europe and the Mediterranean. 3-5 Units.**

This course explores the cities of the Habsburg, Ottoman and Russian empires in the dynamic and turbulent period of their greatest transformation from the 19th century through the Two World Wars. Through the reading of urban biographies of Venice and Trieste, Vienna, Budapest, Cracow, Lviv, Sarajevo, Belgrade, Salonica, and Odessa, we consider broad historical trends of political, economic, and social modernization, urbanization, identity formation, imperialism, cosmopolitanism, and orientalism. As vibrant centers of coexistence and economic exchange, social and cultural borderlands, and sites of transgression, these cities provide an ideal lens through which to examine these themes in the context of transition from imperial to post-imperial space.

Same as: HISTORY 223E, HISTORY 323E, REES 304

**REES 205. Central and East European Politics. 5 Units.**

Focus is on how the states of Central and East Europe, including the Baltic states, have moved from communism and the Soviet Bloc to democracy, NATO and the EU. Topics include the communist legacy, transitions and their legacies, ethnic issues, and the evolution of economic and social policies, and the comparison of democratization processes in these countries to democracies in other regions, such as Latin America and southern Europe.

Same as: REES 105

**REES 206. Media, Democratization and Political Transformations in Post-Soviet Societies. 3-5 Units.**

The course provides an introduction to the study of media transformations in post-Soviet countries and the role of media in the democratization of post-communist societies. The course addresses theoretical approaches and concepts developed for the study of media and their role in the democratization of societies in transition, provides an extensive empirical overview of media developments in the post-Soviet countries, with a central focus on Ukraine and Russia, and explores the relationship between media and politics in these countries.

Same as: REES 306

**REES 208. Constitutional Cultures in Transition: Constitutional Identities and Values in the Post-Soviet Space. 3-5 Units.**

This course examines post-Soviet constitutional cultures and identities (with a focus on Armenia, Moldova and Ukraine). It explores the role of constitutional identity in post-Soviet transformation, regional integration and 'Europeanization' processes; analyzes constitutional values in post-Soviet countries; discusses why there is a disharmony between declared values and constitutional reality; and explores the role of the judiciary in the formation and preservation of constitutional identity.

Same as: REES 308

**REES 208C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.**

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 208C, MUSIC 408C, REES 408C, RELIGST 208C, RELIGST 308C

**REES 209. Democratic Transition in Ukraine: Values, Political Culture, Conflicts. 3-5 Units.**

This course introduces students to issues of social and political transition in Ukraine from the early 1990s through the Orange Revolution to the Euromaidan and the present-day Russian-Ukrainian crisis in a comparative perspective. Topics to include: democratization, shifts in values, identity, dynamics of political protest and revolutions, economics, corruption, and the international security context (NATO, EU). Class discussions to be based on analysis of relevant survey data and live, online interviews with experts on selected topics.

**REES 213. US-Russia Relations After the Cold War. 2 Units.**

A quarter century ago, the Soviet Union collapsed and the Cold War ended. At the time, Russian leaders aspired to build democratic and market institutions at home. They also wanted to join the West. American presidents Democrat and Republican encouraged these domestic and international changes. Today, U.S.-Russia relations are once again confrontational, reminiscent of relations during the Cold War. This course seeks to analyze shifts in U.S.-Russia relations, with special attention given to the U.S.-Russia relationship during Obama's presidency. Readings will include academic articles and a book manuscript by Professor McFaul on Obama's reset policy. Open to students with previous coursework involving Russia.

Same as: POLISCI 213, POLISCI 313

**REES 213A. Russia and the West. 5 Units.**

Today, American-Russian relations, and Russia's relations with West more generally, are tense and confrontational. One has to look deep into the Cold War to find a similar era of confrontation and competition. Yet, relations between Russia and the West were not always this way. The end of the Cold War, for instance, ushered in a period of cooperation. Back then, many believed that Russia was going to develop democratic and market institutions and integrate into Western international institutions. This seminar will examine various explanations for these variations in Russia's relations with the West, starting in the 19th century, and briefly examining the Cold War period, but a real focus on the last thirty years. In evaluating competing explanations, the course will focus on balance of power theories, culture, historical legacies, institutional design, and individual actors in both the United States (and sometimes Europe) and Russia. **NOTE:** The enrollment of the class is by application only. Please send a one page document to Anya Shkurko (ashkurko@stanford.edu) by March 23rd with the following information: full name, class year, major, contact email, which version of the course you want to enroll in (PoliSci/REES/IPS). In the document please also outline previous associated coursework and/or relevant experience and write why you want to enroll in the seminar. Application results will be announced on March 30th. Any questions related to this course can be directed to Anya Shkurko.

Same as: IPS 231A, POLISCI 213A

**REES 219. The Russian Economy. 4-5 Units.**

Brief introduction to the economic history of Russia, general overview of the modern Russian economy with analysis of its macroeconomic features and dynamics, industrial structure, and the major institutional features that are important for understanding Russian economic development. The period of transition from Soviet-type planned economy to a market economy and market reforms (1991-1998), the period of economic growth (1999-2007), and the economic development of Russia during the current global crisis of 2008-2010. Analysis of Russia's social structure and social policy, labor markets, the regional structure of the economy, the role of the state, and major Russian industries (oil, metals, machinery). Emphasis on the specific institutional aspects that have shaped Russia's economic development.

Same as: ECON 119

**REES 220A. Literature and Cultural Politics in the Former Yugoslavia. 3-5 Units.**

Socialist Yugoslavia disintegrated after 46 years. The story is a telling one, let's read it! Literature in Yugoslavia went through transformations from socialist-realism at the beginning toward nationalist-realism at the end. To understand this process, it is crucial to relate it to its political and ideological background: social myths and taboos, questions of language, cultural and class identity, individual and collective rights. These issues will be explored through fictional texts by prominent Yugoslav writers, including Ivo Andric, Miroslav Krleža, Milos Crnjanski, Mesa Selimovic, Danilo Kis.

Same as: REES 320A

**REES 220G. Demons, Witches, Old Believers, Holy Fools, and Folk Belief: Popular Religion in Russia. 4-5 Units.**

19th and early 20th centuries. Peasants, parish priests, witches, possessed persons, cults and sects, old believers, saints, and women's religious communities. Nominally Christian, and members of the Orthodox Church, Russians embraced beliefs and customs that combined teaching from Church and folk traditions.

Same as: HISTORY 220G, HISTORY 320G, REES 320G

**REES 224A. The Soviet Civilization. 4-5 Units.**

Socialist visions and practices of the organization of society and messianic politics; the Soviet understanding of mass violence, political and ethnic; and living space. Primary and secondary sources. Research paper or historiographical essay.

Same as: HISTORY 224A, HISTORY 424A

**REES 227. All Quiet on the Eastern Front? East Europe and Russia in the First World War. 3-5 Units.**

Until recently history has been comparatively quiet about the experience of World War I in the east. Far from being a peripheral theater of war, however, the experiences of war on the Eastern Front were central to shaping the 20th century. Not only was the first shot of the war fired in the east, it was also the site of the most dramatic political revolution. Using scholarly texts, literature and film, this course combines political, military, cultural and social approaches to introduce the causes, conduct and consequences of World War I with a focus on the experiences of soldiers and civilians on the Eastern Front. Topics include: the war of movement, occupation, extreme violence against civilians, the Armenian genocide, population exchanges, the Russian Revolution and civil war, and the disintegration of empires and rise of nation-states.  
Same as: HISTORY 227D, HISTORY 327D, REES 327

**REES 23. Issues in Global Health: Russia and Eastern Europe. 1-2 Unit.**

Activity course features Stanford faculty and researchers who lecture weekly on their experiences working international health issues. Focus this year will be on the global region including Russia, and East Europe.

**REES 231. Russia, the West and the Rest. 4 Units.**

Focus on understanding the diversity of political, social, and economic outcomes in Russia since the collapse of the Soviet Union. Exploration of questions, including: Is Russia still a global power? Where does it have influence internationally, how much, and why? Developmentally, what is the relevant comparison set of countries? Is Russia's economic growth over the last decade truly similar to Brazil, China, and India or is it more comparable to Kazakhstan, Nigeria, and Kenya? How has Russia's domestic political trajectory from liberalizing country to increasingly autocratic affected its foreign policy toward Ukraine, Georgia, and other formerly Soviet states? Finally, is Russia's reemergence as an important global actor more apparent than real?  
Same as: IPS 231

**REES 244A. Practice of Everyday Life in Kazakhstan: From Nomadism to Modernity. 3-5 Units.**

An interdisciplinary introduction to the historically nomadic land of Kazakhstan, its peoples and their lifestyles & the practice of everyday life. Ranked as the ninth largest country in the world, Kazakhstan is also the world's largest landlocked country; its territory is greater than Western Europe: it stretches from the fringes of Europe to the borders of Mongolia and China. The seminar surveys language and society, traditional economics and customary law, rituals and folk customs, local dwelling, craft and art, the cultural panorama, the historical relationship between sedentary and nomadic peoples as well as new approaches to the study of nomads in modernity. Speaking of the present time, we will follow the changing nomads in a changing world. The instructor is going to base, to the extent possible, on the extremely rich fieldwork data recently discovered in Kazakhstan -- the data is yet little known in the West. The seminar will make extensive use of audio-visual materials and films.  
Same as: ANTHRO 144A

**REES 247A. Folklore, Mythology, and Islam in Central Asia. 3-5 Units.**

Central Asian cults, myths, and beliefs from ancient time to modernity. Life crisis rites, magic ceremonies, songs, tales, narratives, taboos associated with childbirth, marriage, folk medicine, and calendrical transitions. The nature and the place of the shaman in the region. Sources include music from the fieldwork of the instructor and the Kyrgyz epoch *Manas*. The cultural universe of Central Asian peoples as a symbol of their modern outlook.  
Same as: ANTHRO 147A

**REES 250A. Minaret and Mahallah: Women and Islam in Central Asia. 3-5 Units.**

Introduction to women's culture and art in Muslim countries of Central Asia. Women, bearers of family rites and folklore, are the key figures in transmission of traditional culture and guardians of folk Islam. Women helped to keep the continuity of Islamic education in Central Asia during the harsh times of Communist dominance. The whole wealth of women's oral tradition will be demonstrated and examined to the extent possible. The course will make broad use of audio-visual materials.  
Same as: ANTHRO 150A, FEMGEN 150A

**REES 259C. Ecological Humanities. 3 Units.**

What sort of topics, research questions, approaches, theories and concepts lead to an integration of various kinds of knowledges? Ecological Humanities provides a conceptual platform for a merger of humanities and social sciences with earth and life sciences, soil science and forensic sciences. The course will discuss such selected topics as the Anthropocene, geologic/mineral and exhumed subjects/personae, bio- and geosocial collectives, symbiotic life-forms, non-human agencies, and forensic landscapes as examples of this merger.  
Same as: ANTHRO 159C, ANTHRO 259C, DLCL 259C

**REES 260. History and Politics of Russian Language. 3-4 Units.**

How did standard Russian develop? Who determines how the language is spoken and written? How does Russian interact with other languages of the region (such as Ukrainian and Yiddish)? This class examines the development of the standard literary Russian language, focusing on the 19th century, the Soviet period, and post-Soviet language politics. Taught in English, reading in Russian.

**REES 299. Directed Reading. 1-12 Unit.****REES 300. MA Capstone Seminar. 1-3 Unit.**

Required for and limited to REES MA candidates. Colloquia with CREEES Director and Associate Director to assist with refinement of research topic, advisor support, literature review, research, and thesis writing.

**REES 301. An Introduction to Russian, East European and Eurasian Studies. 5 Units.**

This seminar investigates the origins and evolution of the field and exposes students to major debates about the history, geography, politics, societies, economies, cultures, and languages of the region.

**REES 301B. History and Politics in Russian and Eastern European Cinema. 5 Units.**

From 1945 to the mid-80s, emphasizing Polish, Hungarian, Czech, Slovak, and Yugoslav contexts. The relationship between art and politics; postwar establishment of film industries; and emergence of national film movements such as the Polish school, Czech new wave, and new Yugoslav film. Thematic and aesthetic preoccupations of filmmakers such as Wajda, Jancso, Forman, and Kusturica. Permission of instructor required prior to the first day of classes.  
Same as: FILMSTUD 245B, FILMSTUD 445B

**REES 304. Cities of Empire: An Urban Journey through Eastern Europe and the Mediterranean. 3-5 Units.**

This course explores the cities of the Habsburg, Ottoman and Russian empires in the dynamic and turbulent period of their greatest transformation from the 19th century through the Two World Wars. Through the reading of urban biographies of Venice and Trieste, Vienna, Budapest, Cracow, Lviv, Sarajevo, Belgrade, Salonica, and Odessa, we consider broad historical trends of political, economic, and social modernization, urbanization, identity formation, imperialism, cosmopolitanism, and orientalism. As vibrant centers of coexistence and economic exchange, social and cultural borderlands, and sites of transgression, these cities provide an ideal lens through which to examine these themes in the context of transition from imperial to post-imperial space.  
Same as: HISTORY 223E, HISTORY 323E, REES 204

**REES 306. Media, Democratization and Political Transformations in Post-Soviet Societies. 3-5 Units.**

The course provides an introduction to the study of media transformations in post-Soviet countries and the role of media in the democratization of post-communist societies. The course addresses theoretical approaches and concepts developed for the study of media and their role in the democratization of societies in transition, provides an extensive empirical overview of media developments in the post-Soviet countries, with a central focus on Ukraine and Russia, and explores the relationship between media and politics in these countries.

Same as: REES 206

**REES 308. Constitutional Cultures in Transition: Constitutional Identities and Values in the Post-Soviet Space. 3-5 Units.**

This course examines post-Soviet constitutional cultures and identities (with a focus on Armenia, Moldova and Ukraine). It explores the role of constitutional identity in post-Soviet transformation, regional integration and 'Europeanization' processes; analyzes constitutional values in post-Soviet countries; discusses why there is a disharmony between declared values and constitutional reality; and explores the role of the judiciary in the formation and preservation of constitutional identity.

Same as: REES 208

**REES 310. Identity, Memory and Cultural Politics in Post-Soviet Societies. 3-5 Units.**

Although often undifferentiated, post-Soviet societies demonstrate a variety of transformation trajectories and diverse approaches to identity and memory politics. This course draws on cases from Ukraine, Belarus and Moldova, the Baltic States, the Caucasus, Russia, and Kazakhstan to explore the sociocultural transformation of post-Soviet countries in comparative perspective. We will analyze the construction of new identities and related issues, including language politics and collective memory and mythscapes as well as their media discourses. We will also examine political and civic participation in reforms, including citizens; value orientations and attitudes towards human rights and the rule of law.

**REES 312. Socio-Economic Issues in Contemporary Russia and Eastern. 3-5 Units.**

Course focus on the political dynamics of market liberalization and response to economic crisis in these emerging markets, including the sources of support and opposition to reform, the interplay between international organizations and domestic politics, and the challenges of protecting the losers of economic liberalization.

**REES 313. Transformation of Socialist Societies. 3-5 Units.**

A quarter-century from the fall of the Berlin Wall, we have gained broad perspective on the challenges of wholesale transformations away from socialism. This course explores the process and social consequences of opening the economies of Eastern Europe, Eurasia, and China to market forces. We will answer questions about how individuals and social systems respond to the particular challenges of rapid economic and political openings, including demographic challenges, corruption, nationalism, and growing inequality. We will compare the Eastern European and Post-Soviet experiences of these issues with the Chinese experience, and highlight the similarities and distinctions between transformations in these societies.

Same as: SOC 213A, SOC 313A

**REES 320. State and Nation Building in Central Asia. 3-5 Units.**

Issues of identity, development, and security following the dissolution of the Soviet Union and the emergence of independent states in Central Asia and the Southern Caucasus. Topics include the impact of 9/11, the spread of radical Islamist movements in the region, its growing role as a transit route for drugs, weapons, and possibly nuclear materials, the impact of the Soviet legacy, the nature of political and economic transformations, relations with neighboring countries, security challenges, and options facing U.S. policy makers.

**REES 320A. Literature and Cultural Politics in the Former Yugoslavia. 3-5 Units.**

Socialist Yugoslavia disintegrated after 46 years. The story is a telling one, let's read it! Literature in Yugoslavia went through transformations from socialist-realism at the beginning toward nationalist-realism at the end. To understand this process, it is crucial to relate it to its political and ideological background: social myths and taboos, questions of language, cultural and class identity, individual and collective rights. These issues will be explored through fictional texts by prominent Yugoslav writers, including Ivo Andric, Miroslav Krleža, Milos Crnjanski, Mesa Selimovic, Danilo Kis.

Same as: REES 220A

**REES 320G. Demons, Witches, Old Believers, Holy Fools, and Folk Belief: Popular Religion in Russia. 4-5 Units.**

19th and early 20th centuries. Peasants, parish priests, witches, possessed persons, cults and sects, old believers, saints, and women's religious communities. Nominally Christian, and members of the Orthodox Church, Russians embraced beliefs and customs that combined teaching from Church and folk traditions.

Same as: HISTORY 220G, HISTORY 320G, REES 220G

**REES 326. The Russian Revolution: Politics, Society, Culture. 3-5 Units.**

The centennial of the Russian Revolution of 1917 serves as the occasion for this course, which surveys the political, social, and cultural upheavals that transformed Russia under the last Tsars and the first Soviet commissars. The course will be offered in conjunction with the exhibition "The Crown under the Hammer: Russia, Romanovs & Revolution," jointly sponsored by the Hoover Institution and the Cantor Arts Center at Stanford and opening at both venues on October 18, 2017. Several class sessions will be held at the Hoover Institution, where students will be invited to examine archival documents, rare books and periodicals, and the visual arts, including propaganda posters, photographs, motion picture film, and paintings in the collections of the Hoover Institution Library & Archives. One class session will be held at the Cantor Arts Center. The course is open to undergraduate and graduate students.

**REES 327. All Quiet on the Eastern Front? East Europe and Russia in the First World War. 3-5 Units.**

Until recently history has been comparatively quiet about the experience of World War I in the east. Far from being a peripheral theater of war, however, the experiences of war on the Eastern Front were central to shaping the 20th century. Not only was the first shot of the war fired in the east, it was also the site of the most dramatic political revolution. Using scholarly texts, literature and film, this course combines political, military, cultural and social approaches to introduce the causes, conduct and consequences of World War I with a focus on the experiences of soldiers and civilians on the Eastern Front. Topics include: the war of movement, occupation, extreme violence against civilians, the Armenian genocide, population exchanges, the Russian Revolution and civil war, and the disintegration of empires and rise of nation-states.

Same as: HISTORY 227D, HISTORY 327D, REES 227

**REES 330. With God in Russia: Orthodox Christianity in the 19th and 20th Centuries. 4-5 Units.**

The experience of religion, particularly Orthodoxy, under tsars and commissars. Religion as a lived experience; practice and belief in the provinces and villages, intertwining of religion and folk customs (the so-called double faith); condition of the Church before and after the Revolutions of 1917; religion under Soviet control; and liberation of the Church since the collapse of the Soviet Union.

Same as: REES 130

**REES 335A. Animism and Alter-Native Modernities. 5 Units.**

For many years indigenous knowledges were treated as a field of research for anthropologists and as "mistaken epistemologies," i. e., unscientific and irrational folklore and childish worldviews. This old view of animism was a product of the evolutionist and anthropocentric worldview of the Enlightenment. However within the framework of ecological humanities, current interest in posthumanism, postsecularism and discussions on building altermodernity (Michael Hardt and Antonio Negri), indigenous thought is used to critique modern epistemology and develop an alternative to the Western worldview. Treating native thought as an equivalent to Western knowledge is presented as a decolonizing and liberating practice. The term alter-native modernities as response to the challenges of Euromodernity and suggests modernities that might emerge out of indigenous ways of being in the world. Comparison between literature on indigenous cultures from Latin America and from Russia (animism in Amazonia and Siberia). Following recent works by anthropologists and archaeologists such as Nurit Bird-Rose, Philippe Descola, Graham Harvey, Tim Ingold and Viveiros de Castro, new animism is treated as an alternative (relational) ontology that allows rethinking the problem of matter and agency, goes beyond human exceptionalism and embraces non-humans. Topics include: alternative and alter-native modernities; Jean Piaget's theory of childhood animism; problem of anthropomorphism and personification; indigenous knowledge and the problem of epistemic violence; vitalist materialism (Jane Bennett, Rosi Braidotti); connectedness as the principle of life (relational epistemologies and ontologies); non-human agency (Bruno Latour). Same as: ANTHRO 335A, FRENCH 335A

**REES 340A. Post-secular Humanities: Religion and Spirituality in the Contemporary World. 5 Units.**

The term *postsecularism* refers to various theories and approaches regarding the revival of religion in the present, as well as current reevaluations of the relationship between faith and reason in knowledge building. When thinking about a postsecular humanities, the course would follow scholars that are usually associated with this trend (like Agamben, Badiou, Derrida, Habermas), on the one hand, and discuss Braidotti's ideas of a new vitalism, Chakrabarty's postcolonial postsecularism, and Harvey's new animism, on the other. The course will examine the way interactions and collisions among various worldviews can provoke the rethinking of key ideas of our times: what it means to be secular, religious, a citizen, a hybrid, an indigenous, a non-human. Same as: ANTHRO 340A, FRENCH 341A

**REES 35. Films of Central Asia. 1-2 Unit.**

Films with English subtitles from Tajikistan, Uzbekistan, Kazakhstan, Kyrgyzstan, and Turkmenistan. May be repeated once for credit. (AU).

**REES 371B. New Methodologies in the Humanities and Social Sciences. 3-5 Units.**

The course will discuss how social virtues are converted into methods of research (hope, friendship, sincerity, trust, utopia), and how they affect processes of knowledge building within the humanities and social sciences in terms of revival of futurity. The concepts will be critically examined in their positive as well as negative potential for practicing prefigurative politics the creation of desirable modes of social relationships of conviviality and co-existence in the world. Same as: ANTHRO 371B, DLCL 371

**REES 408C. Architecture, Acoustics and Ritual in Byzantium. 1-3 Unit.**

Onassis Seminar "Icons of Sound: Architecture, Acoustics and Ritual in Byzantium". This year-long seminar explores the creation and operations of sacred space in Byzantium by focusing on the intersection of architecture, acoustics, music, and ritual. Through the support of the Onassis Foundation (USA), nine leading scholars in the field share their research and conduct the discussion of their pre-circulated papers. The goal is to develop a new interpretive framework for the study of religious experience and assemble the research tools needed for work in this interdisciplinary field.

Same as: ARTHIST 208C, ARTHIST 408C, CLASSICS 175, MUSIC 208C, MUSIC 408C, REES 208C, RELIGST 208C, RELIGST 308C

**REES 409. Iconoclasm. 5 Units.**

By the seventh century three large political entities formed in the Mediterranean the Umayyads, the Carolingians, and the Byzantines each competed for legitimacy; all three emerged from the ashes of Late Antique culture, yet each tried to carve out an identity out of this common foundation. In this parting of the ways, the three empires took among others the issue of what constitutes an image and what role it plays in devotion. Eik'n, imago, ura became the basis on which to built differences and accuse the other political players of idolatry. This course explores medieval image theory, especially the phenomena of iconoclasm, iconophobia, and aniconism. The discussions focus on monuments in the Mediterranean as well as objects in the Cantor collection and facsimiles of manuscripts at the Bowes Art Library.

Same as: ARTHIST 209C, ARTHIST 409, CLASSICS 158, CLASSICS 258

**REES 54A. Central Asia Through Films: A Weekly 3-Hour Seminar. 3-5 Units.**

Through films this course explores major issues of contemporary peoples of Central Asia while learning fundamental concepts in cultural anthropology. In this seminar we will consider a wide range of examples, including first of all the new feature films, which will be used as a window into the modern reality and therefore could be served in a certain sense as anthropological fieldwork data. Films are prearranged by the instructor according to certain thematic subjects for in-class discussions.

Same as: ANTHRO 54A

**REES 801. TGR Project. 0 Units.****REES 85B. Jews in the Contemporary World: Faith and Ethnicity, Visibility and Vulnerability. 3 Units.**

(Same as HISTORY 185B. History majors and others taking 5 units, register for 185B.) This course explores the full expanse of Jewish life today and in the recent past. The inner workings of religious faith, the content of Jewish identity shorn of belief, the interplay between Jewish powerlessness and influence, the myth and reality of Jewish genius, the continued pertinence of antisemitism, the rhythms of Jewish economic life – all these will be examined in weekly lectures, classroom discussion, and with the use of a widely diverse range of readings, films, and other material. Explored in depth will the ideas and practices of Zionism, the content of contemporary secularism and religious Orthodoxy, the impact Holocaust, the continued crisis facing Israel and the Palestinians. Who is to be considered Jewish, in any event, especially since so many of the best known (Spinoza, Freud, Marx) have had little if anything to do with Jewish life with their relationships to it indifferent, even hostile?.

Same as: CSRE 85B, HISTORY 85B, JEWISHST 85B

**Sci Comput & Comput'l Math (SCCM)****SCCM 398. Curricular Practical Training. 1 Unit.**

Provides students with on-the-job training under the guidance of experienced, on-site supervisors. Students must register the quarter after their training. Students receive credit and a grade after submitting a concise report detailing work activities, problems worked on, and key results. Prerequisite: written consent of adviser. (Staff).

**SCCM 499. Advanced Reading and Research. 1-15 Unit.**

Prerequisites: majoring in SC/CM; consent of adviser. (Staff).

## Science, Technology, & Society (STS)

### STS 1. The Public Life of Science and Technology. 4 Units.

The course focuses on key social, cultural, and values issues raised by contemporary scientific and technological developments through the STS interdisciplinary lens by developing and applying skills in three areas: (a) The historical analysis of contemporary global matters (e.g., spread of technologies; climate change response); (b) The bioethical reasoning around health issues (e.g., disease management; privacy rights); and (c) The sociological study of knowledge (e.g., intellectual property, science publishing). A discussion section is required and will be assigned the first week of class.

### STS 103Q. Reading and Writing Poetry about Science. 4 Units.

Preference to sophomores. Students will study recent poetry inspired by the phenomena and history of the sciences in order to write such poems themselves. These poems bring sensuous human experience to bear on biology, ecology, astronomy, physics, earth science, and medicine, as well as on technological advances and calamities. Poets such as Linda Bierds, Mark Doty, Albert Goldbarth, Sarah Lindsay, W.S. Merwin, Adrienne Rich, Pattiann Rogers, Tracy K. Smith, Arthur Sze, and C. K. Williams. Grounding in poetics, research in individually chosen areas of science, weekly analytical and creative writing. Fulfills the Creative Expression requirement. Enrollment limited to 12.

### STS 123. Making of a Nuclear World: History, Politics, and Culture. 4 Units.

Nuclear technology has shaped our world through its various applications (e.g., weapons, energy production, medicine) and accidents and disasters (e.g., Chernobyl, Three Mile Island, Fukushima). This course will examine the development of nuclear technology and its consequences to politics and culture at the global, national, regional and local levels from interdisciplinary perspectives. Some of the key questions addressed are: How did different countries and communities experience and respond to the 1945 bombings of Hiroshima and Nagasaki? How did such experiences affect the later development of the technology in different national contexts? How have nuclear tests and disasters change the ways in which risks are understood and managed globally and locally? What kinds of political activism, international arrangements, and cultural tropes and imageries emerged in response to nuclear technology? We explore these questions through key works and recent studies in history, anthropology, sociology, and science and technology studies, as well as through films and literature.

### STS 131. Science, Technology, and Environmental Justice. 4 Units.

The Bay Area is renowned for its technological innovations and progressive politics, including environmental justice activism. This course explores the multifaceted intersections of science, technology, and environmental issues, in the Bay Area and beyond. Throughout, students investigate the politics of place, with an eye to inequalities of race, class, gender, generation, and citizenship. Topics include: histories of environmentalism; socio-technological systems; urban and regional planning; public health and biomedicine; food systems; climate change; innovation ecosystems; undone science.

### STS 136. Anthropological Inquiries: Cold War, Nuclear Testing, Energy, and Human Rights. 4 Units.

The atomic age has remade communities, public cultures, and the consciousness of individuals all across the globe. What are the political, social, cultural, and scientific legacies of nuclear testing and disasters? Think: Hiroshima, Nagasaki, Chernobyl, Fukushima and Soviet, French, and American nuclear weapons testing. But also think: nuclear energy production as a *“forward thinking”* solution to carbon emissions. Indeed, the military and peaceful use of the atom is a transnational phenomenon with local manifestations and consequences, but what are the social implications of the nuclear age? How do scientists and institutions attempt to manage and control risk? This class explores these questions by studying the aftermath of the nuclear age through full-length ethnographies, journal articles, and film. Each week we will investigate the contested nature of this topic through a diversity of perspectives, past and present. This is a survey course, designed for advanced placement high school, undergraduate, and graduate students.

### STS 140. Science, Technology and Politics. 5 Units.

This course will critically interrogate the relationship between science and technology and politics. Politics plays a significant role in the production of scientific knowledge and technological artifacts. Science and technology in turn constitute crucial elements of politics and governance in modern democracy. This course will explore these interactions through (1) key theoretical texts in STS and (2) case studies of such issues as climate change, race and science, urban planning, elections and technology, and information technology in social movements. Preference to juniors and seniors. First class attendance mandatory. Enrollment limited to 16.

### STS 151. The Future of Information. 4 Units.

As information has a fascinating history (see HISTORY 5A), so it possesses a promising if concerning future. Through lecture, demonstration, and in-class web-work, this course will provide students with advanced strategies in (a) identifying sources and tools for advancing the quest for information; (b) assessing elements of trust, authority, and chicanery in the provision of information; (c) recognizing the economic and legal structures shaping information sources, services, and rights; and (d) discovering who is behind what information. With a focus on the info-worlds of journalism, learning, governance, students will acquire and practice the forensic skills and web savvy of fact-checkers and investigative reporters, activists and scholars. Here's a class set to determine the future course of information.

Same as: EDUC 151

### STS 160Q. Technology in Contemporary Society. 4 Units.

Preference to sophomores. Introduction to the STS field. The natures of science and technology and their relationship, what is most distinctive about these forces today, and how they have transformed and been affected by contemporary society. Social, cultural, and ethical issues raised by recent scientific and technological developments. Case studies from areas such as information technology and biotechnology, with emphasis on the contemporary U.S. Unexpected influences of science and technology on contemporary society and how social forces shape scientific and technological enterprises and their products. Enrollment limited to 12.

### STS 165N. Cars: Past, Present, and Future. 3 Units.

(Formerly COMM 165N.) Preference to freshmen. Focus is on the past, present and future of the automobile, bridging the humanities, social sciences, design, and engineering. Focus on the human experiences of designing, making, driving, being driven, living with, and dreaming of the automobile. A different theme featured each week in discussion around a talk and supported by key readings and media. Course is informed by history, archaeology, ethnography, human-technology interaction, mechanical engineering, and cognitive science.

**STS 166. Knowledge and Information Infrastructures. 3-4 Units.**

This course introduces historical, theoretical, and comparative perspectives on knowledge and information systems from the medieval world to the present. Cases include libraries, meteorology, climate science, the Internet, the World Wide Web, and social science data systems. It theorizes how infrastructures form, how they change, and how they shape (and are shaped by) social systems. The course ends with challenges to modern knowledge infrastructures, such as crowdsourcing, citizen science, and alternative and bogus knowledge. Same as: HISTORY 242D

**STS 181. Techno-metabolism: technology and society in the Anthropocene. 3-5 Units.**

The technosphere metabolizes energy, materials, and information to feed human consumption. It transforms not only fossil fuels, but also solar energy, through processes such as photosynthesis (agriculture), wind, and hydroelectric power. The technosphere also metabolizes information, ingesting some kinds of data as inputs and producing other data as outputs. Techno-metabolism's waste products-greenhouse gases, microplastics, nuclear waste, etc. - are transforming both the biosphere and the geosphere, with radically different effects on disparate peoples and places. Scientists, historians, and others have proposed new ways to conceptualize techno-metabolism in order to reduce energy requirements and material waste. Meanwhile, "data exhaust" - the "waste" data generated by individual activity, from web searches to Facebook and Instagram - is increasingly "recycled" to detect patterns, trends, and individual preferences. Can data exhaust be harnessed to tame the technosphere's destructive effects? Course assignments include readings and group projects that creatively visualize the interplay of energy, materials and information in the radical inequality of the technosphere.

**STS 190. Issues in Technology and the Environment. 4 Units.**

Humans have long shaped and reshaped the natural world with technologies. Once a menacing presence to conquer or an infinite reserve for resources, nature is now understood to require constant protection from damage and loss. This course will examine humanity's varied relationship with the environment, with a focus on the role of technology. Topics include: industrialization, modernism, nuclear technology, and biotechnology. Students will explore theoretical and methodological approaches in STS and conduct original research that addresses this human-nature-technology nexus. Enrollment limited to juniors and seniors, or with consent of instructor. First week attendance mandatory.

**STS 191. Introduction to Research in STS. 4 Units.**

This seminar introduces key analytical approaches and methodologies in STS, as well as basic tools for conducting original research in STS. Students survey a series of influential empirical studies; identify productive questions of their own interest; and explore how to pursue them through strong research design. Research proposal as final assignment. Preference to STS juniors and those seeking Interdisciplinary Honors in STS; others require consent of instructor. The final proposal can serve as an honors prospectus for students who seek to participate in the STS honors program.

**STS 199. Independent Study. 1-5 Unit.**

Every unit of credit is understood to represent three hours of work per week per term and is to be agreed upon between the student and the faculty member. Instructor consent required. Please contact the department for a permission number.

**STS 199A. Curricular Practical Training. 1 Unit.**

Students obtain internship in a relevant research or industrial activity to enhance their professional experience consistent with their degree program and area of concentration. Prior to enrolling students must get internship approved by the STS Program Director. At the end of the quarter, a one-page final report must be supplied documenting work done and relevance to degree program. Meets the requirements for Curricular Practical Training for students on F-1 visas. Student is responsible for arranging own internship. Limited to declared STS majors only. Course may be repeated twice. Instructor consent required. Please contact the department for a permission number.

**STS 199J. Editing a Science Technology and Society Journal. 1-2 Unit.**

The Science Technology and Society (STS) Program has a student journal, *Intersect*, that has been publishing STS student papers for a number of years. This course involves learning about how to serve as an editor of a peer-reviewed journal, while serving as one of the listed editors of *Intersect*. Entirely operated online, the journal uses a work-flow management to help with the submission process, peer-review, editing, and publication. Student editors learn by being involved in the publishing process, from soliciting manuscripts to publishing the journal's annual issue, while working in consultation with the instructor. Students will also learn about current practices and institutional frameworks around open access and digital publishing.

**STS 200A. Food and Society: Politics, Culture and Technology. 5 Units.**

This course will examine how politics, culture, and technology intersect in our food practices. Through a survey of academic, journalistic, and artistic works on food and eating, the course will explore a set of key analytical frameworks and conceptual tools in STS, such as the politics of technology, classification and identity, and nature/culture boundaries. The topics covered include: the industrialization of agriculture; technology and the modes of eating (e.g., the rise of restaurants); food taboos; globalization and local foodways; food and environmentalism; and new technologies in production (e.g., genetically modified food). Through food as a window, the course intends to achieve two broad intellectual goals. First, students will explore various theoretical and methodological approaches in STS. In particular, they will pay particular attention to the ways in which politics, culture, and technology intersect in food practices. Second, student will develop a set of basic skills and tools for their own critical thinking and empirical research, and design and conduct independent research on a topic related to food. First class attendance mandatory. STS majors must have Senior status to enroll in this Senior Capstone course.

**STS 200D. Predictive Technologies of Text. 5 Units.**

This course will examine conventions and patterns in the history of recorded human communication to consider how future technologies of text (methods of recording, modes of information exchange, devices for reading text) might develop. All forms of communication from the earliest times to today belong to discrete, discernible systems, whether that's writing, or representational (art, music, binary code) or paralinguistic (gesture, radio-waves, the stars) and all, it might be argued, follow similar biographies that we'll describe, authenticate, and model predictively. Same as: ENGLISH 184G

**STS 200E. Technology, Nature, and Environmentalism. 5 Units.**

Humans have long shaped and reshaped the natural world with technologies. Once a menacing presence to conquer or an infinite reserve for resources, nature is now understood to require constant protection from damage and loss. Humanity's relationships with the environment have changed over time and differed across societies. In this course, students (1) explore diverse ways in which people in different historical and cultural settings have conceptualized nature and their relationships with it, with a focus on the role of technology; and (2) learn the basics of STS research and conduct an original study that addresses this human-nature-technology nexus. First class attendance mandatory. STS majors must have senior status to enroll in this senior capstone course.



**STS 200F. Sociology of Innovation and Invention. 5 Units.**

This course examines the social, cultural, and economic factors that foster novelty. We will study a wide array of historical contexts, from the Renaissance to the present day, in which clusters of related innovations transformed the way things are done. We ask when do such innovations cascade out and produce social inventions that, for good and bad, create profound changes in how things are done, leading to new forms of organizations and new categories of people. Seminar/lecture format, reading intensive, final term paper. Prerequisite: admission to the course is restricted to declared STS seniors and is by application only. Email Emily Van Poetsch (emilyvp@stanford.edu) for an application. Applications must be submitted by 5pm on November 1st.

**STS 200H. Ethics, Science, & Technology. 4 Units.**

Critical analysis of ethical issues raised by recent or emerging advances in science and engineering. Issues: privacy, intellectual property, design equity, the public interest, ethical responsibilities of technical practitioners, research ethics, and freedom of inquiry. Advances from fields such as IT, biotechnology, nanotechnology, neurotechnology, construction technology, and transport technology. Seminar limited to 20 senior STS majors. Prerequisite: a course in ethics or permission of the instructor.

**STS 200K. Sciences of Learning. 4 Units.**

Understanding the process of learning has enticed and eluded scientists for generations. Abetted by the rise of massive open online courses (MOOCs), learning has attracted new cadres of researchers and stars from scientists in adjacent fields, as well as new forms of financial support and visibility. This seminar investigates the recent dynamics of learning science as a case study in the politics of knowledge. Student projects will enable focused empirical inquiry.

**STS 200L. Critique of Technology. 3-5 Units.**

Informed citizens living in today's world, and especially in Silicon Valley, should be able to formulate their own articulate positions about the role of technology in culture. The course gives students the tools to do so. Against the trend towards the thoughtless celebration of all things technological, we will engage in critique in the two senses of the term: as careful study of the cultural implications of technology and as balanced, argumentative criticism. Can technology make life more meaningful, society more fair, people smarter, and the world smaller? We will pay special attention to the insights that literature, and other arts, can offer for reframing digital culture. Selections by Latin American fiction writers (Cortázar, Zambra), philosophers and thinkers (Heidegger and Beller), as well as recent popular works of social commentary, such as *You are not a Gadget*, *The Shallows*, *24/7*, and *Present Shock*. Taught in English.

**STS 200M. Tobacco and Health in World History. 4-5 Units.**

Cigarettes are the world's leading cause of death—but how did we come into this world, where 6 trillion cigarettes are smoked every year? Here we explore the political, cultural, and technological origins of the cigarette and cigarette epidemic, using the tobacco industry's 80 million pages of secret documents. Topics include the history of cigarette advertising and cigarette design, the role of the tobacco industry in fomenting climate change denial, and questions raised by the testimony of experts in court.

**STS 200N. Funkentelechy: Technologies, Social Justice and Black Vernacular Cultures. 4 Units.**

From texts to techne, from artifacts to discourses on science and technology, this course is an examination of how Black people in this society have engaged with the mutually constitutive relationships that endure between humans and technologies. We will focus on these engagements in vernacular cultural spaces, from storytelling traditions to music and move to ways academic and aesthetic movements have imagined these relationships. Finally, we will consider the implications for work with technologies in both school and community contexts for work in the pursuit of social and racial justice.

Same as: AFRICAAM 200N

**STS 299. Advanced Individual Work. 1-5 Unit.**

For students in the STS Honors program. Every unit of credit is understood to represent three hours of work per week per term and is to be agreed upon between the student and the faculty member. May be repeated for credit.

## Slavic Languages & Literatures (SLAVIC)

**SLAVIC 118N. Other People's Words: Folklore and Literature. 4 Units.**

What happens when you collect and use other people's words? This class considers folklore and literature based on it, focusing on the theme of objects that come to life and threaten their makers or owners (including Russian fairy tales and Nikolai Gogol's stories, the Golem legend and Michael Chabon's *Amazing Adventures of Kavalier and Clay*, and Ovid's and Shaw's *Pygmalion*). We read essays by Jacob Grimm, Sigmund Freud, Roman Jakobson, and others, to understand what folklore can mean and how the oral and the written can interact. Students collect living folklore from a group of their choosing. This course fulfills the second-level Writing and Rhetoric Requirement (Write-2) and emphasizes oral and multimedia presentation. Prerequisite: PWR 1. Same as: JEWISHST 148N

**SLAVIC 120. Hacking Russia: Technological Dreams and Nightmares of Russian Culture. 3-5 Units.**

At a time being termed the Second Cold War, it is of key importance to examine Russian cultural and political phenomena and their international repercussions. In particular, this course will explore the role of technology in constructing the social and ideological fabric, as well as the material reality, of Soviet and Russian society. From the early Soviet period, when technological progress was linked to humanistic utopia, through dystopian critiques of a totalitarian machine of conformity and constraint, we proceed along the assembly line of communist production, avant-garde and constructivist artistic utopia, socialist realism, the space race, and information technology, using examples from Russian literature, film, art, visual arts, performance, and current events. With the media's concern for fake news and Russian hacking today, it is our course's goal to "hack Russia": to understand the politics and technology shaping Russia, and the creative responses that have made its society a site of both dreamlike promise and nightmarish threat, through its history and today. NOTE: This course must be taken for a Letter Grade to be eligible for WAYS credit. "Counts towards Europe and Russia specialization (International Relations)". Same as: SLAVIC 220

**SLAVIC 129. Russian Versification: History and Theory. 1-5 Unit.**

A survey of metric forms, rhyming principles and stanzaic patterns in the Russian poetry of the 18th - 21st centuries. Taught in Russian. Prerequisite: Two years of Russian. NOTE: To be eligible for WAYS credit, you must take SLAVIC 129 for a minimum of 3 Units and a Letter Grade. Same as: SLAVIC 329

**SLAVIC 145. Survey of Russian Literature: The Age of Experiment. 1-5 Unit.**

This course discusses the transition from predominantly poetic to predominantly prosaic creativity in the Russian literature of the first half of the 19th century Russian literature and the birth of the great Russian novel. It covers three major Russian writers -- Alexander Pushkin, Mikhail Lermontov and Nikolai Gogol -- and examines the changes in the Russian literary scene affected by their work. An emphasis is placed on close reading of literary texts and analysis of literary techniques employed in them. Taught in English. NOTE: To be eligible for WAYS credit, you must take SLAVIC 145 for a minimum of 3 Units and a Letter Grade.

Same as: SLAVIC 345

**SLAVIC 146. The Great Russian Novel: Tolstoy and Dostoevsky. 1-5 Unit.**

Connections of philosophy and science to literary form in War and Peace, Brothers Karamazov, Chekhov stories: alternative shapes of time, perception, significant action. Taught in English. Note: To be eligible for WAYS/WIM credit, you must take SLAVIC 146 for a minimum of 3 Units and a Letter Grade.

Same as: SLAVIC 346

**SLAVIC 148. Slavic Literature and Culture since the Death of Stalin. 1-5 Unit.**

The course offers a survey of Soviet and post-Soviet literary texts and films created by Russian, Ukrainian and Belarusian artists and marginalized or repressed by the Soviet regime. The first part of the course will focus on the topics of opposition and dissent, generational conflict, modernization, Soviet everyday life, gender, citizenship and national identity, state-published and samizdat literature, "village" and "cosmopolitan" culture, etc. The second part of it will be devoted to the postmodernist aesthetics and ideology in the dismantlement of totalitarian society, as well in the process of shaping post-Soviet identities. The reading materials range from the fictional, poetic, and publicistic works written by Noble-prize (Solzhenitsyn, Brodsky, Alexievich) and other major writers of the period to the drama, film, and popular culture. nNOTE: To be eligible for WAYS credit, you must take SLAVIC 148 for a minimum of 3 Units and a Letter Grade.

Same as: SLAVIC 348

**SLAVIC 155. St. Petersburg: Imagining a City, Building a City. 1-2 Unit.**

St. Petersburg, the world's most beautiful city, was designed to display an 18th-century autocrat's power and to foster ties between Russia and the West - on the tsar's terms. It went through devastating floods and a deadly siege; it birthed the "Petersburg myth," poems and prose that explore the force of the state and the individual's ability to resist. This class addresses the struggle between the authorities and the inhabitants; the treacherous natural environment; the city as a node in national and international networks of communication; the development of urban transportation networks; and the supply of goods. NOTE: *This course is required of students attending the overseas seminar to St. Petersburg in September 2018.* Class times to be determined upon the availability of all enrolled students. Please contact instructor(s) via email if you have any questions.

Same as: URBANST 156

**SLAVIC 156. Vladimir Nabokov: Displacement and the Liberated Eye. 1-5 Unit.**

How did the triumphant author of "the great American novel" *Lolita* evolve from the young author writing at white heat for the tiny sad Russian emigration in Berlin? We will read his short stories and the novels *The Luzhin Defense*, *Invitation to a Beheading*, *Lolita*, *Lolita* the film, and *Pale Fire*, to see how Nabokov generated his sinister-playful forms as a buoyant answer to the "hypermodern" visual and film culture of pre-WWII Berlin, and then to America's all-pervading postwar "normalcy" in his pathological comic masterpieces *Lolita* and *Pale Fire*. Buy texts in translation at the Bookstore; Slavic grad students will supplement with reading and extra sessions in original Russian.

Same as: COMPLIT 115, COMPLIT 315, SLAVIC 356

**SLAVIC 181. Philosophy and Literature. 5 Units.**

Required gateway course for Philosophical and Literary Thought; crosslisted in departments sponsoring the Philosophy and Literature track. Majors should register in their home department; non-majors may register in any sponsoring department. Introduction to major problems at the intersection of philosophy and literature, with particular focus on the question of value: what, if anything, does engagement with literary works do for our lives? Issues include aesthetic self-fashioning, the paradox of tragedy, the paradox of caring, the truth-value of fiction, metaphor, authorship, irony, make-believe, expression, edification, clarification, and training. Readings are drawn from literature and film, philosophical theories of art, and stylistically interesting works of philosophy. Authors may include Sophocles, Chaucer, Dickinson, Proust, Woolf, Borges, Beckett, Kundera, Charlie Kaufman; Barthes, Foucault, Nussbaum, Walton, Nehamas; Plato, Montaigne, Schopenhauer, Nietzsche, and Sartre. Taught in English.

Same as: CLASSICS 42, COMPLIT 181, ENGLISH 81, FRENCH 181, GERMAN 181, ITALIAN 181, PHIL 81

**SLAVIC 188. 20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky. 1-5 Unit.**

Developments in and 20th-century Russian poetry including symbolism, acmeism, futurism, and literature of the absurd. Emphasis is on close readings of individual poems. Taught in Russian. NOTE: To be eligible for WAYS credit, you must take SLAVIC 188 for a minimum of 3 Units and a Letter Grade.

Same as: SLAVIC 388

**SLAVIC 195. Russian and East European Theater. 1-5 Unit.**

Evolution of modernist Russian/Eur. dramaturgy, theatrical practices, landmark productions from Chekhov-Meyerhold-Grotowski to present; re-performance of classics; techniques of embodiment. Taught in English.

Same as: SLAVIC 395

**SLAVIC 198. Writing Between Languages: The Case of Eastern European Jewish Literature. 1-5 Unit.**

Eastern European Jews spoke and read Hebrew, Yiddish, and their territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well. \*\*\*This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit\*\*\*.

Same as: JEWISHST 148, JEWISHST 348, SLAVIC 398

**SLAVIC 199. Individual Work for Undergraduates. 1-5 Unit.**

Open to Russian majors or students working on special projects. May be repeated for credit. Prerequisite: consent of instructor.

**SLAVIC 220. Hacking Russia: Technological Dreams and Nightmares of Russian Culture. 3-5 Units.**

At a time being termed the Second Cold War, it is of key importance to examine Russian cultural and political phenomena and their international repercussions. In particular, this course will explore the role of technology in constructing the social and ideological fabric, as well as the material reality, of Soviet and Russian society. From the early Soviet period, when technological progress was linked to humanistic utopia, through dystopian critiques of a totalitarian machine of conformity and constraint, we proceed along the assembly line of communist production, avant-garde and constructivist artistic utopia, socialist realism, the space race, and information technology, using examples from Russian literature, film, art, visual arts, performance, and current events. With the media's concern for fake news and Russian hacking today, it is our course's goal to "hack Russia": to understand the politics and technology shaping Russia, and the creative responses that have made its society a site of both dreamlike promise and nightmarish threat, through its history and today. n NOTE: This course must be taken for a Letter Grade to be eligible for WAYS credit. "Counts towards Europe and Russia specialization (International Relations)".

Same as: SLAVIC 120

**SLAVIC 226. Bakhtin and his Legacy. 3-5 Units.**

"Quests for my own word are in fact quests for a word that is not my own, a word that is more than myself," writes Mikhail Bakhtin towards the end of his life. It was this ceaseless pursuit of another word that allowed Bakhtin, one of the most distinguished literary critics of the twentieth century, to author several influential literary theory concepts, many of which deal with the ideas of multiplicity, diversity and unfinalizability. The seminar explores these core concepts through close reading of key texts in English and investigates their reverberations in the writings of other thinkers such as Kristeva, de Man and Derrida.

**SLAVIC 230. 18th Century Russian Literature. 2-4 Units.**

For graduate students and upper-level undergraduates. Russian literature of the long 18th century, from the late 1600s to 1800. Readings in the Baroque, Neoclassicism and Sentimentalism. Major works are examined in their literary and historical context and also in relation to the principal subcultures of the period, including the court, academy, church and Old Believer diaspora. NOTE: This course must be taken for a minimum of 3 units and a letter grade to be eligible for WAYS credit.

**SLAVIC 231. Tarkovsky. 3-5 Units.**

The relatively slim body of work produced by the great Russian director Andrei Tarkovsky helped redefine the possibilities of the art of cinema. Older and younger generations of directors continue to be inspired by his trademark long shot, unconventional narrative techniques, reverence for landscape and nature, and by general spatio-temporal discontinuity. The course provides a systematic examination of the director's complete oeuvre (seven feature films and his works for radio and opera) along with his main theoretical treatise *Sculpting in Time*. NOTE: To be eligible for WAYS credit, you must take SLAVIC 231 for a minimum of 3 Units and a Letter Grade.

**SLAVIC 261. Reading Leo Tolstoy in the Digital Age. 3-5 Units.**

The novelist and philosopher Leo Tolstoy pioneered ideas of multi-perspectivism, relativism, "contagious" art, and literary montage. How can we analyze the link between his prose fiction and modernist art by means of digital humanities methods? This course is arranged as a series of digital labs and seminar discussions and utilizes a project-based learning approach, with individual and collaborative projects. We create character networks in Gephi, side-by-side visualization of different versions of Tolstoy's texts in Beyond Compare, and text mining in RStudio. Taught in English. Note: To be eligible for WAYS credit, you must take SLAVIC 261 for a minimum of 3 Units and a Letter Grade.

Same as: SLAVIC 361

**SLAVIC 300B. Research Tools and Professionalization Workshop. 1 Unit.**

This course introduces graduate students in Slavic Studies to library, archival, and web resources for research, grant opportunities, publication strategies, and professional timelines. Open to PhD students in the Slavic Department and other departments and to MA students in CREEES.

NOTE: Those wishing to enroll, please contact Prof. Safran to obtain the course's meeting time and location.

**SLAVIC 325. Readings in Russian Realism. 3-4 Units.**

For graduate students or upper-level undergraduates. What did Realism mean for late imperial Russian writers? What has it meant for twentieth-century literary theory? As we seek to answer these questions, we read Tolstoy, Dostoevsky, Turgenev, and Chekhov, alongside their brilliant but less often taught contemporaries such as Goncharov, Saltykov-Shchedrin, Leskov, Garshin, Korolenko, Gorky, Andreev, and Bunin. Taught in English; readings in Russian. Prerequisite: Three years of Russian.

**SLAVIC 329. Russian Versification: History and Theory. 1-5 Unit.**

A survey of metric forms, rhyming principles and stanzaic patterns in the Russian poetry of the 18th - 21st centuries. Taught in Russian. Prerequisite: Two years of Russian. NOTE: To be eligible for WAYS credit, you must take SLAVIC 129 for a minimum of 3 Units and a Letter Grade.

Same as: SLAVIC 129

**SLAVIC 340. Russia's Castaway Classic: Andrei Platonov. 3-5 Units.**

"The power of devastation [Platonov's texts] inflict upon their subject matter exceeds by far any demands of social criticism and should be measured in units that have very little to do with literature as such," wrote Joseph Brodsky. Explores key texts of Andrei Platonov, who is frequently considered the greatest Russian prose writer of the twentieth century, and covers major critical approaches to his "devastating" oeuvre. The texts will be read in Russian, discussion in English.

**SLAVIC 345. Survey of Russian Literature: The Age of Experiment. 1-5 Unit.**

This course discusses the transition from predominantly poetic to predominantly prosaic creativity in the Russian literature of the first half of the 19th century Russian literature and the birth of the great Russian novel. It covers three major Russian writers -- Alexander Pushkin, Mikhail Lermontov and Nikolai Gogol -- and examines the changes in the Russian literary scene affected by their work. An emphasis is placed on close reading of literary texts and analysis of literary techniques employed in them. Taught in English. NOTE: To be eligible for WAYS credit, you must take SLAVIC 145 for a minimum of 3 Units and a Letter Grade.

Same as: SLAVIC 145

**SLAVIC 346. The Great Russian Novel: Tolstoy and Dostoevsky. 1-5 Unit.**

Connections of philosophy and science to literary form in *War and Peace*, *Brothers Karamazov*, Chekhov stories: alternative shapes of time, perception, significant action. Taught in English. Note: To be eligible for WAYS/WIM credit, you must take SLAVIC 146 for a minimum of 3 Units and a Letter Grade.

Same as: SLAVIC 146

**SLAVIC 347. Modern Russian Literature and Culture: The Age of War and Revolution. 1-5 Unit.**

The Age of Revolution: Readings in Russian Modernist Prose of the 1920-30s: What makes Russian modernist prose special? Or is there anything special about Russian modernist prose? This course aims to answer these questions through close readings of works by Babel, Mandelstam, Zoshchenko, Platonov, Olesha and Bulgakov. Aesthetic issues such as hero, plot, and narrative devices will be addressed with the aid of contemporaneous literary theory (Shklovsky, Tynianov, Eikhenbaum, Bakhtin). Novels and theory will be read in English. (This course must be taken for a letter grade and a minimum of 3 units to satisfy a WAYS requirement.)

**SLAVIC 348. Slavic Literature and Culture since the Death of Stalin. 1-5 Unit.**

The course offers a survey of Soviet and post-Soviet literary texts and films created by Russian, Ukrainian and Belarusian artists and marginalized or repressed by the Soviet regime. The first part of the course will focus on the topics of opposition and dissent, generational conflict, modernization, Soviet everyday life, gender, citizenship and national identity, state-published and samizdat literature, "village" and "cosmopolitan" culture, etc. The second part of it will be devoted to the postmodernist aesthetics and ideology in the dismantlement of totalitarian society, as well in the process of shaping post-Soviet identities. The reading materials range from the fictional, poetic, and publicistic works written by Noble-prize (Solzhenitsyn, Brodsky, Alexievich) and other major writers of the period to the drama, film, and popular culture. NOTE: To be eligible for WAYS credit, you must take SLAVIC 148 for a minimum of 3 Units and a Letter Grade.

Same as: SLAVIC 148

**SLAVIC 356. Vladimir Nabokov: Displacement and the Liberated Eye. 1-5 Unit.**

How did the triumphant author of "the great American novel" <em>Lolita</em> evolve from the young author writing at white heat for the tiny sad Russian emigration in Berlin? We will read his short stories and the novels <em>The Luzhin Defense, Invitation to a Beheading, Lolita, Lolita</em> the film, and <em>Pale Fire</em>, to see how Nabokov generated his sinister-playful forms as a buoyant answer to the "hypermodern" visual and film culture of pre-WWII Berlin, and then to America's all-pervading postwar "normalcy" in his pathological comic masterpieces <em>Lolita</em> and <em>Pale Fire</em>. Buy texts in translation at the Bookstore; Slavic grad students will supplement with reading and extra sessions in original Russian.

Same as: COMPLIT 115, COMPLIT 315, SLAVIC 156

**SLAVIC 36. Dangerous Ideas. 1 Unit.**

Ideas matter. Concepts such as race, progress, and evil have inspired social movements, shaped political systems, and dramatically influenced the lives of individuals. Others, like religious tolerance, voting rights, and wilderness preservation play an important role in contemporary debates in the United States. All of these ideas are contested, and they have a real power to change lives, for better and for worse. In this one-unit class we will examine these dangerous ideas. Each week, a faculty member from a different department in the humanities and arts will explore a concept that has shaped human experience across time and space. Some weeks will have short reading assignments, but you are not required to purchase any materials.

Same as: ARTHIST 36, COMPLIT 36A, EALC 36, ENGLISH 71, FRENCH 36, HISTORY 3D, MUSIC 36H, PHIL 36, POLISCI 70, RELIGST 21X

**SLAVIC 361. Reading Leo Tolstoy in the Digital Age. 3-5 Units.**

The novelist and philosopher Leo Tolstoy pioneered ideas of multi-perspectivism, relativism, "contagious" art, and literary montage. How can we analyze the link between his prose fiction and modernist art by means of digital humanities methods? This course is arranged as a series of digital labs and seminar discussions and utilizes a project-based learning approach, with individual and collaborative projects. We create character networks in Gephi, side-by-side visualization of different versions of Tolstoy's texts in Beyond Compare, and text mining in RStudio. Taught in English. Note: To be eligible for WAYS credit, you must take SLAVIC 261 for a minimum of 3 Units and a Letter Grade.

Same as: SLAVIC 261

**SLAVIC 370. Pushkin. 2 Units.**

Pushkin's poems, prose, and drafts in dialogue with contemporaries and cultural milieu. Emphasis on innovation and controversy in genre, lyrical form and personal idiom, shaping a public discourse. Taught in English.

**SLAVIC 388. 20th century Russian Poetry: From Aleksandr Blok to Joseph Brodsky. 1-5 Unit.**

Developments in and 20th-century Russian poetry including symbolism, acmeism, futurism, and literature of the absurd. Emphasis is on close readings of individual poems. Taught in Russian. NOTE: To be eligible for WAYS credit, you must take SLAVIC 188 for a minimum of 3 Units and a Letter Grade.

Same as: SLAVIC 188

**SLAVIC 395. Russian and East European Theater. 1-5 Unit.**

Evolution of modernist Russian/Eur. dramaturgy, theatrical practices, landmark productions from Chekhov-Meyerhold-Grotowski to present; re-performance of classics; techniques of embodiment. Taught in English.

Same as: SLAVIC 195

**SLAVIC 398. Writing Between Languages: The Case of Eastern European Jewish Literature. 1-5 Unit.**

Eastern European Jews spoke and read Hebrew, Yiddish, and their co-territorial languages (Russian, Polish, etc.). In the modern period they developed secular literatures in all of them, and their writing reflected their own multilinguality and evolving language ideologies. We focus on major literary and sociolinguistic texts. Reading and discussion in English; students should have some reading knowledge of at least one relevant language as well. \*\*\*This course must be taken for a minimum of 3 units and a letter grade to be eligible for Ways credit\*\*\*.

Same as: JEWISHST 148, JEWISHST 348, SLAVIC 198

**SLAVIC 399. INDIVIDUAL WORK. 1-15 Unit.**

Open to Russian majors or students working on special projects. May be repeated for credit. Prerequisite: consent of instructor.

**SLAVIC 680. Curricular Practical Training. 1-3 Unit.**

CPT course required for international students completing degree.

Prerequisite: Slavic Languages and Literatures Ph.D. candidate.

**SLAVIC 77Q. Russia's Weird Classic: Nikolai Gogol. 3-4 Units.**

Preference to sophomores. An investigation of the works and life of Nikolai Gogol, the most eccentric of Russian authors and the founder of what is dubbed Fantastic Realism. Our investigation will be based on close reading of works written in various genres and created in various stages of Gogol's literary career. Taught in English.

**SLAVIC 801. TGR PROJECT. 0 Units.****SLAVIC 802. TGR Dissertation. 0 Units.**

## Structured Liberal Education (SLE)

**SLE 199. Teaching SLE. 1 Unit.****SLE 299. Structured Liberal Education Capstone Seminar. 1 Unit.**

Senior capstone project for students who were enrolled in SLE their freshman year.

**SLE 81. Public Service Program. 1 Unit.**

This one-unit course is for participation in quarter-long service programs set up by the SLE program and conducted in consultation with the Haas Public Service Center. Available programs will vary by quarter. May be repeat for credit.

**SLE 91. Structured Liberal Education. 8 Units.**

Focusing on great works of philosophy, religion, literature, painting, and film drawn largely from the Western tradition, the SLE curriculum places particular emphasis on artists and intellectuals who brought new ways of thinking and new ways of creating into the world, often overthrowing prior traditions in the process. These are the works that redefined beauty, challenged the authority of conventional wisdom, raised questions of continuing importance to us today, and for good or ill created the world we still live in. Texts may include: Homer, Sappho, Greek tragedy, Plato, Aristotle, Zhuangzi, Confucius, the Heart Sutra, Hebrew Bible, New Testament, and the Aeneid.

**SLE 92. Structured Liberal Education. 8 Units.**

Focusing on great works of philosophy, religion, literature, painting, and film drawn largely from the Western tradition, the SLE curriculum places particular emphasis on artists and intellectuals who brought new ways of thinking and new ways of creating into the world, often overthrowing prior traditions in the process. These are the works that redefined beauty, challenged the authority of conventional wisdom, raised questions of continuing importance to us today, and for good or ill created the world we still live in. Texts may include: Augustine, the Qur'an, Dante, Rumi, Machiavelli, Montaigne, Shakespeare, Cervantes, Las Casas, Descartes, Locke, Mill, Schleiermacher, and Flaubert.

**SLE 93. Structured Liberal Education. 8 Units.**

Focusing on great works of philosophy, religion, literature, painting, and film drawn largely from the Western tradition, the SLE curriculum places particular emphasis on artists and intellectuals who brought new ways of thinking and new ways of creating into the world, often overthrowing prior traditions in the process. These are the works that redefined beauty, challenged the authority of conventional wisdom, raised questions of continuing importance to us today, and created the world we still live in. Texts may include: Marx, Nietzsche, Freud, Du Bois, Eliot, Woolf, Kafka, Brecht, Vertov, Beauvoir, Sartre, Fanon, Gandhi, and Morrison.

**SLE 98. Directed Reading. 1 Unit.**

Directed reading for undergraduate students. Consult faculty in area of interest for appropriate topics involving one of the research groups or other special projects. May be repeated for credit. Prerequisite: consent of instructor.

**SLE 99. Directed Reading. 1 Unit.**

Directed reading for undergraduate students. Consult faculty in area of interest for appropriate topics involving one of the research groups or other special projects. May be repeated for credit. Prerequisite: consent of instructor."

## Surgery (SURG)

**SURG 100. Virtual and Real: Clinical Anatomy and Sports Injuries. 3 Units.**

This undergraduate course is designed to teach human anatomy through radiographs, CT scans, MRIs and cadaver material with the emphasis on the understanding of common clinical conditions and sports injuries. To aid students in developing their image interpretive skills, additional resources such as virtual interactive scans, the 3D anatomy table, and interactive digital applications will be utilized. This course divides the anatomy of the body into five areas; each area will be presented in a two-week block. In the first week of each block, students will develop an understanding of human anatomy through the identification of relevant structures on prosecutions (cadaver material), and in the second week, students will utilize this knowledge in the interpretation of radiographs, CT scans and MRIs. The anatomy will be taught in relation to common clinical conditions and sports injuries; and, student projects will focus on the understanding of the anatomy and treatment of these conditions and injuries.

**SURG 101. Regional Study of Human Structure. 5 Units.**

Enrollment limited to seniors and graduate students. Comprises two parts, lecture and lab, both of which are required. Lectures in regional anatomy and dissection of the human cadaver; the anatomy of the trunk and limbs through the dissection process, excluding the head and neck.

**SURG 101A. Head and Neck Anatomy. 3 Units.**

Introduces students to human anatomy of the head and neck through a dissection based course. Students use proper anatomical terminology to describe structures and their relationships. Emphasis on typical anatomy as seen in healthy individuals, with some examples of anatomical variation introduced through dissection and clinical cases. Ideal for senior undergraduate students who have completed SURG 101 or equivalent, are familiar with basic anatomy, and have some dissection experience. Prerequisites: Surgery 101 or equivalent.

**SURG 150. Principles and Practice of International Humanitarian Surgery. 4 Units.**

Open to undergraduate students. Focus is on understanding the theory behind medical humanitarianism, the growing role of surgery in international health, and the clinical skills necessary for students to partake in global medical service. Guest speakers include world-renowned physicians and public health workers. Students work in groups to complete a substantial final project on surgical program development. Same as: SURG 250

**SURG 199. Undergraduate Research. 1-18 Unit.**

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

**SURG 201. Embryology. 1 Unit.**

The course focuses on the structural development of the human body from embryo to fetus to early post-natal life. Topics include formation of the cardiovascular, respiratory, musculoskeletal, gastrointestinal, reproductive, and renal systems, as well as common clinical conditions which arise from abnormalities of development. Course open to MD and MSPA students only.

**SURG 202B. Practical Applications for Qualitative Data Analysis. 3 Units.**

Second quarter of a two-quarter course provides hands-on experience summarizing qualitative data and describing findings for dissemination. Final course product will be a draft manuscript for submission with students listed as co-authors. Core topics include: identifying themes and representative quotes, community-engaged dissemination, abstract submission, posters, oral presentations, manuscript writing, and journal selection. Prerequisite: Successful completion of PEDS 202A.

Same as: PEDS 202B

**SURG 202C. Qualitative Research Methods and Study Design. 2-3 Units.**

In-depth introduction to qualitative research methods and study design. Gain theoretical and practical knowledge necessary to design and implement a qualitative study. Explore qualitative methods through class lectures, foundational readings and hands-on learning. Core topics include: theoretical frameworks, research questions, methodological approaches (i.e. interviews, focus groups, participant observation, photovoice), data collection, sampling, reliability and validity, and IRB protocols. Students enrolled for 2-units participate in journal club-style discussions of literature employing qualitative methods to gain an appreciation for how qualitative projects are conducted, and what settings and research questions are relevant to qualitative inquiry. Students enrolled for 3-units plan and design an independent research project (i.e. Med Scholars, dissertation, honors thesis), receiving extensive support and feedback to further develop individual study designs and data collection instruments. Prerequisite: Consent from instructor for undergraduates.

Same as: PEDS 202C

**SURG 203. Clinical Anatomy. 15 Units.**

Introduction to human structure and function presented from a clinical perspective. Includes clinical scenarios, medical imaging techniques, and interventional procedures to illustrate the underlying anatomy. Course consists of lectures and dissection of the human body in the anatomy laboratory. Surgery 203 presents structures of the thorax, abdomen, pelvis, back, upper and lower limbs, and head & neck. Course opened to MD, MSM, and MSPA students only.

**SURG 204. Introduction to Surgery. 1 Unit.**

This lunch seminar is designed to give preclinical medical students a broad overview of surgical specialties and life as a surgeon. Interactive talks by leading surgeons from the General Surgery, Plastic Surgery, Neurosurgery, Orthopedic Surgery, Head and Neck Surgery, Transplantation Surgery, and Cardiac Surgery departments will highlight the array of operation types performed and diseases and conditions encountered in their disciplines. In addition, each lecturer will provide students with a "road map" as to how to successfully enter each specialty field of surgery. Lunch will be provided.

**SURG 205. Technical Training and Preparation for the Surgical Environment. 1 Unit.**

This course is designed for preclinical medical students interested in acquiring the technical skills and clinical orientation necessary to learn and participate in the surgical environment. Scrub training starts the course to facilitate the learning of sterile technique required prior to participation in the operating room, and students will learn basic surgical techniques (including basic knot tying, suturing, hand-sewn bowel anastomoses, and laparoscopic skills) to enhance their operating room experiences. The class requires one mandatory operative shadowing experience with an attending surgeon outside of normal class hours. The course will introduce students to the field of surgery both in this technical sense, as well as in regards to life as a surgeon, as opportunities for one-on-one surgical faculty membership will be provided. Preference is given to second year students.

**SURG 208. Plastic Surgery Tutorial. 2 Units.**

Diagnosis, theory, and practice of plastic and reconstructive surgery. Limited to two students per faculty member.

**SURG 209. Plastic Surgery. 1-18 Unit.**

Students participate in plastic and reconstructive surgery as functioning members of the clinical team. Students are exposed to operative surgery, emergency and trauma care, evaluation of operative candidates in the outpatient setting, and also attend teaching conferences. Limited to four students. Prerequisite: completion of first year or clinical experience.

**SURG 214. Medical Etymology. 1 Unit.**

A survey of medical etymology and terminology that parallels preclinical medical education. Topics focus on Greek and Latin roots and their appearances in the medical lexicon.

**SURG 230. Obesity in America. 1 Unit.**

Prevalence and effects of the obesity epidemic in America and the growing prevalence of associated comorbidities such as diabetes, hypertension, hyperlipidemia, sleep apnea, and joint problems. Risk factors, multi-disciplinary treatment options, the role of food in society, patients' perspectives, and current research in the field.

**SURG 231. Healthcare in Haiti and other Resource Poor Countries. 1 Unit.**

Originally developed to highlight healthcare in extreme poverty in Haiti, related lectures have been added covering healthcare in resource poor environments with the objective to introduce students to the complexity and unique problems of working in the Third World's healthcare morass.

**SURG 233. Close Encounters, Distance Learning by Telemedicine. 1 Unit.**

Students will attend weekly lectures where they can meet and interact with telemedicine leaders who will deliver a 30-minute lecture followed by a 30-minute question and answer session. Course topics include: Present Landscape of Telemedicine in the XXI Century; Finding what is suitable to evaluate, diagnose and treat via Telemedicine; Challenges and opportunities of Telemedicine; Building a successful Telemedicine program; Telemedicine Business models; Ethics, Law and Telemedicine; Entrepreneurial opportunities in Telemedicine; Education in Telemedicine. All students are welcome regardless of their medical related experience.

**SURG 234. Service Through Surgery: Surgeons with an Impact. 1 Unit.**

Surgeons with an Impact is a weekly seminar course with guest lectures and facilitated workshops with the following objectives: 1) Participants will be able to understand the role of surgeons in addressing health inequities, social justice and poverty 2) Participants will be exposed to the potential of expert surgeons through lectures from diverse professionals 3) Participants will reflect on how addressing inequities can align with their career goals in surgery. Topic covered will include; building diversity in surgery, inequities in pediatric surgery, immigration and surgery, access to colorectal surgery, Medecins Sans Frontieres, surgery and global health, policy advocacy and surgery, LGBTQ advocacy and surgery, inequities and neurosurgery, women in surgery, transplant justice, and race and surgery. Course open to MD and PA students only.

**SURG 236. Seminar in Global Surgery and Anesthesia. 1-2 Unit.**

Providing safe, mutually beneficial, and sustainable surgical services in low-resource settings presents a unique set of considerations. This seminar, formatted as five two-hour sessions, will explore the background rationale for the evolving field of Global Surgery and discuss the unique implications surrounding implementation of global surgical programs. Course format will blend didactic presentation, discussion-based journal clubs, and case-based study. Topics covered will include the burden of surgical disease, human and infrastructure capacity building, outcomes, ethics/equity, economics, innovation/technology, volunteerism, training, safety, and research agenda. Instructors will provide mentorship to participants, helping them to formulate feasible research or potential MedScholar project.

**SURG 241. Portraiture and Facial Anatomy for Artists. 4 Units.**

Focus is on the art of portraiture and underlying structures of the face, fundamental anatomical elements such as the skull and muscles of facial expressions, and the intersections between human anatomy and art. Studio sessions incorporate plastic models, dry bones, cadaveric specimens, and live models. Encourages use of proper anatomical terminology for describing structures and their relationships. Same as: ARTSTUDI 139

**SURG 242. Art and Anatomy Studio. 1 Unit.**

Lectures highlight the intersections and influences between human anatomy and art. Studio sessions provide an opportunity for students to immerse in anatomically inspired studio projects. Drawing, mixed media, and some painting mediums will be used during the studio sessions. Plastic models, dry bones, cadaveric specimens, and live models will be used for the studio sessions. Class time includes art instruction, creation and feedback. May be repeated for credit. Honing individual style is encouraged; both beginning and advanced students are welcome. Previous coursework in anatomy is recommended, but not required.

**SURG 243. Anatomy for Artists. 3 Units.**

Lectures highlight the intersections and influences between human anatomy and art. Studio sessions provide an opportunity for students to immerse in anatomically inspired studio projects. Drawing, mixed media, and some painting mediums will be used during the studio sessions. Plastic models, dry bones, cadaveric specimens, and live models will be used for the studio sessions. Class time includes art instruction, creation and feedback. May be repeated for credit. Honing individual style is encouraged; both beginning and advanced students are welcome. Same as: ARTSTUDI 243

**SURG 250. Principles and Practice of International Humanitarian Surgery. 4 Units.**

Open to undergraduate students. Focus is on understanding the theory behind medical humanitarianism, the growing role of surgery in international health, and the clinical skills necessary for students to partake in global medical service. Guest speakers include world-renowned physicians and public health workers. Students work in groups to complete a substantial final project on surgical program development. Same as: SURG 150

**SURG 251A. Imaging Anatomy. 1 Unit.**

Accompanies existing clinical anatomy course for first year medical students (SURG 203A). Sessions focus on the anatomical region being taught and dissected during the same week in SURG 203A. Students revisit anatomy using a variety of basic and advanced imaging modalities. Emphasis on correlating imaging to dissection, studying anatomical variations, discussing clinical vignettes. Enrollment limited to MD students.

**SURG 251B. Imaging Anatomy (Head & Neck) II. 1 Unit.**

Accompanies existing clinical anatomy course for first year medical students (SURG 203B) concentrating on the head and neck region. Sessions focus on the anatomical region being taught and dissected during the same week in SURG 203B. Students revisit anatomy using a variety of basic and advanced imaging modalities. Emphasis on correlating imaging to dissection, studying anatomical variations, discussing clinical vignettes. Enrollment limited to MD students.

**SURG 252. Bedside Anatomy. 1 Unit.**

Provides an opportunity to revisit anatomy in a clinical context. Using case discussions, clinical vignettes, radiological imaging, and hands-on exercises, students are challenged to apply their knowledge of anatomy to explain common diagnostic maneuvers and interventional procedures performed at the bedside or in the outpatient setting. Emphasis will be on anatomical considerations in successfully performing these procedures and avoiding errors that may arise due to anatomical changes, oddities, or variations.

**SURG 253. Topics in Simulation of Human Physiology & Anatomical Systems. 1 Unit.**

Biweekly interdisciplinary lecture series on the development of computational tools for modeling and simulation of human physiological and anatomical systems. Lectures by instructors and guest speakers on topics such as surgical simulation, anatomical & surgical Modeling, neurological Systems, and biomedical models of human movement. Group discussions, team based assignments, and project work. Prerequisite: Medical students, residents or fellows from school of medicine, and computationally oriented students with a strong interest to explore computational and mathematical methods related to the health sciences.

Same as: CME 520

**SURG 254. Operative Anatomy and Techniques. 1 Unit.**

For preclinical students; provides a background in and integrates knowledge of surgical anatomy and therapy. Surgical or operative anatomy differs from gross anatomy in that the area exposed during surgery may be limited, the dissection may require exposing other seemingly unrelated anatomic structures with unique landmarks, and the procedure may require unusual technical facility. Provides an opportunity for students to understand the goals of representative surgical procedures (translating pathophysiology to surgical decision making to actual incision). Students learn surgical skills and perform the dissection of a number of commonly performed operations in the bio-skills laboratory. Emphasizes hands-on participation in surgical procedures in the laboratory and is taught by attending physicians in general, cardiothoracic, vascular, plastic, head and neck, urologic, and orthopedic surgery.

**SURG 255. Quality & Safety in U.S. Healthcare. 3 Units.**

The course will provide an in-depth examination of the quality & patient safety movement in the US healthcare system, the array of quality measurement techniques and issues, and perspectives of quality and safety improvement efforts under the current policy landscape.

Same as: BIOMEDIN 254, HRP 254

**SURG 256. Clinical Anatomy and Surgical Education Series. 2 Units.**

Intended for first-year MD students. Builds on prior experience in the first-year medical curriculum consisting of the required Clinical Anatomy and the elective Operative Anatomy courses. Focuses on case-based didactic sessions for teaching the approach to a variety of surgical cases and their management. Students perform simulated cadaveric surgical procedures using standard operative instruments and techniques based on clinical case presentations and analysis. Covers hand surgery, vascular surgery, minimally invasive surgery, ear surgery and eye surgery specialties.

Same as: CASES

**SURG 257. Clinical Teaching Seminar Series. 1 Unit.**

The Clinical Teaching Seminar Series (CTSS) is a year-long program in medical education, designed to introduce clinical educators to fundamental concepts in education. The seminars are high-yield, relevant, and interactive, providing practical tips for bedside teaching, curriculum development, and education research. The HONORS CERTIFICATE PROGRAM IN MEDICAL EDUCATION is meant to recognize participants with a dedication to medical education, who regularly attend the seminars and complete a scholarly project. The Honors Program is a multi-disciplinary program open to all medical students, residents, fellows, staff, and faculty with an interest in medical education.

**SURG 271. Anatomy of Medical Mysteries. 1 Unit.**

This elective course for medical students explores areas of health and disease that are poorly understood presently. A variety of topics are covered such as placebo effect, techniques of meditation, presence of extra-sensory perception, and near death experiences. Scientific evidence for and against these topics presented and discussed. Current literature is evaluated and reading assignments are included. Pre-requisites: SURG 203A and SURG 203B.

**SURG 281A. Musculoskeletal Disorders. 1 Unit.**

Focuses on in-depth understanding of human musculoskeletal anatomy, biomechanics, and disease processes. Emphasis will be on the dynamic nature of musculoskeletal tissue with its complex biochemistry and cellular activity. Topics include fundamentals of musculoskeletal development, growth, repair and vascularization. In addition, students receive an introduction to musculoskeletal imaging, forensics, pathology, and the clinical principals of fixation and treatment protocols.

**SURG 281B. Musculoskeletal Disorders II. 1 Unit.**

Continuation of in-depth understanding of human musculoskeletal anatomy, biomechanics, and disease processes. Emphasis will be on the dynamic nature of musculoskeletal tissue with its complex biochemistry and cellular activity. Topics include fundamentals of musculoskeletal development, growth, repair and vascularization. In addition, students receive an introduction to musculoskeletal imaging, forensics, pathology, and the clinical principals of fixation and treatment protocols.

**SURG 290. 3D Biomedical Visualization: Techniques, Methods, and Applications. 1 Unit.**

Explores the power of digital anatomy. How 3D anatomical data sets like CT and MRI scans are created from human specimens; how they are processed, analyzed, and rendered. Focus on how digital content is best used for learning anatomy, patient education, and clinical practice.

**SURG 296. Individual Work: Human Anatomy. 1-18 Unit.**

Carried out under the supervision of one or more members of the staff. Prerequisite: consent of instructor.

**SURG 298. Procedure-Based Specialty Capstone Course. 1 Unit.**

Designed for graduating medical students entering a procedure-based internship or residency (e.g. general surgery, surgical sub-specialties, obstetrics-gynecology, anesthesia, and emergency medicine). Prepares students with practical, high-yield clinical and procedural skills. Clinical skills include fielding common calls regarding surgical patients, obtaining informed consent, completing operative dictations, discharging patients, writing prescriptions, running trauma surveys, and interpreting surgically relevant radiology studies. The hands-on portion of the course covers basic open and laparoscopic surgical skills utilizing bench models, laparoscopic box trainers, and full cadaveric simulations. Prerequisite: graduating medical student. For those students who are not enrolled for the quarter in which this Capstone Course is offered, please contact Karen Cockerill at [misskay@stanford.edu](mailto:misskay@stanford.edu) to register.

**SURG 299. Directed Reading in Surgery. 1-18 Unit.**

Consists of studies in progress, including cardiovascular and circulatory problems; gastric physiology; hemostatic disorders; homotransplantation; liver disorders; orthopedic pathology; bone growth; radiation injury; immunology, bacteriology, pathology, and physiology of the eye; physiological optics; comparative ophthalmology; neurophysiology of hearing; spatial orientation and disorientation; nasal function; and psychophysics of sensation. Prerequisite: consent of instructor.

**SURG 370. Medical Scholars Research. 4-18 Units.**

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

**SURG 399. Graduate Research. 1-18 Unit.**

Students undertake investigations sponsored by individual faculty members.

**SURG 60Q. Virtual to Real: Fundamentals of Human Anatomy. 3 Units.**

Advances in imaging technologies allow us to interact with anatomical information in ways that have not been previously possible. This course is designed to teach human anatomy through the interpretation of radiographs and CT scans, and the correlation of these images to real anatomy. Utilizes resources such as virtual interactive scans via the virtual anatomy table and interactive digital applications to aid students in developing their image interpretive skills. First six weeks focus on image interpretation and the remaining four weeks on the utilization of this knowledge in the understanding and identification of human anatomy on human prosecutions (cadaver material).

**SURG 68Q. Current Concepts in Transplantation. 3 Units.**

Preference to sophomores. Biological aspects of cell and organ transplantation, including issues that arise in the popular media. Diseases for which transplantation is a treatment, the state of the art in human transplantation, transplantation of animal tissue into humans (xenotransplantation), development of new tissue and organs in the laboratory (tissue engineering and cloning), and development of drugs and biological strategies to promote long-term survival of the tissue or organ (tolerance). How to write a scientific abstract, critique scientific literature, and research and present topics in contemporary transplantation.

**SURG 70Q. Surgical Anatomy of the Hand: From Rodin to Reconstruction. 2 Units.**

The surgical anatomy of the hand is extremely complex in terms of structure and function. Exploration of the anatomy of the hand in different contexts: its representation in art forms, the historical development of the study of hand anatomy, current operative techniques for reconstruction, advances in tissue engineering, and the future of hand transplantation.

**SURG 71Q. Procedural Anatomy. 3 Units.**

Study of human anatomy through the understanding of eight to ten common conditions, such as diseases, injuries, and genetic defects, that affect the head and neck region and the associated surgical procedures to treat these conditions. Students are exposed to the modalities involved in confirming the diagnosis of these common conditions, the benefits and risks of the procedures to treat these conditions, and the anatomy affected by the conditions and procedures. The laboratory component exposes students to surgical procedures on cadaver material and the learning of anatomy via 3D digital images, the 3D dissection table and models. The focus is on learning clinically relevant anatomy of the head and neck region.

**SURG 72Q. Anatomy in Society. 3 Units.**

Preference to sophomores. The influence of human anatomy on the design of commercial products and performance (such as headphone and ear bud design, automobile interior design, table music performance and handicap devices design). How societal advancements have evolved to increasingly accommodate human form and function. Guest speakers are experts in the fields of audiology, design and music. Exposure to human anatomy via cadaver material, 3D digital images, the 3D dissection table and models.

## Theater and Performance Studies (TAPS)

**TAPS 1. Introduction to Theater and Performance Studies. 4 Units.**

TAPS 1 provides you with a solid foundation in Theater Studies and traces the development of the burgeoning field of Performance Studies. We will consider a range of canonical plays and emerging performance forms, and explore how performance can also function as an interpretive framework for analyzing a broad range of social behaviors, sites, and institutions. Through a series of close readings, discussions, written and practical exercises, and viewings of live performance, this course will help you achieve a richer understanding of the performances you see and the performances you may wish to make. This quarter, TAPS 1 will serve as the platform for the Theater & Performance Studies professionalization series. We will host several guest speakers (directors, actors, playwrights, and dance practitioners), who will give you some real connections in the theater world and will provide you with information and skills to help you build a career in the arts.

**TAPS 101P. Theater and Performance Making. 4 Units.**

A creative workshop offering a range of generative exercises and techniques in order to devise, compose and perform original works. Students will explore a variety of texts (plays, poems, short stories, paintings) and work with the body, object and site. Students will be encouraged to think critically about various compositional themes and ideas including: the relationship between form and content, aesthetics, space, proximity, and audience. Students will work independently and collaboratively creating original performances. Same as: TAPS 371P

**TAPS 103. Beginning Improvising. 3 Units.**

The improvisational theater techniques that teach spontaneity, cooperation, team building, and rapid problem solving, emphasizing common sense, attention to reality, and helping your partner. Based on TheatreSports by Keith Johnstone. Readings, papers, and attendance at performances of improvisational theater. Limited enrollment. Improv, Improvisation, creativity and creative expression. All who sign up are placed on a waitlist. Official enrollment will be determined after the first day of class. Attendance at the first class session is mandatory to be considered for enrollment in the course.

**TAPS 104. Intermediate Improvisation. 3 Units.**

This class is the continued study of improvisational theater with a focus on stage skills, short and long form performance formats, and offstage applications of collaborative creativity. It is open to any students who have taken TAPS 103 or have previous onstage improv experience AND consent of the instructor. May be repeat for credit.

**TAPS 108. Introduction to Feminist, Gender, and Sexuality Studies. 4-5 Units.**

Introduction to interdisciplinary approaches to gender, sexuality, queer, trans and feminist studies. Topics include the emergence of sexuality studies in the academy, social justice and new subjects, science and technology, art and activism, history, film and memory, the documentation and performance of difference, and relevant socio-economic and political formations such as work and the family. Students learn to think critically about race, gender, and sexuality from local and global perspectives.

Same as: AMSTUD 107, CSRE 108, FEMGEN 101



**TAPS 115. Musical Theater. 1-3 Unit.**

In this workshop we will traverse the landscape of world of Musical Theater. It will serve as an introduction for the beginning actor and singer, and expand the more experienced performer's range in this genre. The world of Musical Theater is filled with stories of love, passion, joy, violence, heartbreak and rage. The class will include an introduction to vocal and movement skills for musical theater, beginning with exercises to build an ensemble and encourage a sense of play and relaxation in supportive environment. Our class must be a place where everyone feels safe. As ensemble members, we will be responsible for each other in this environment. Students will choose one solo song, and perform in a group number from this exciting discipline. The instructor will work with the actors on technique, utilization of action, specificity of language, personalization, and emotional truth. A professional coach from the theater community will conduct vocal coaching. Physical warm-ups and choreography will be suited for both the dancer and non-dancer. The class will culminate in the last week with live performance for friends and family. STUDENTS ARE ENCOURAGED TO BRING THEIR OWN SUGGESTIONS. (Isn't there a role you've always wanted to sing?) Required text: Broadway Musicals Show by Show: Sixth Edition - Stanley Green; Paperback.  
Same as: MUSIC 183D

**TAPS 119. Modern Theatre. 1-5 Unit.**

Modern theatre in Europe and the US, with a focus on the most influential works from roughly 1880 to the present. What were the conventions of theatrical practice that modern theatre displaced? What were the principal innovations of modern playwriting, acting, stage design, and theatrical architecture? How did modern theatrical artists wrestle with the revolutionary transformations of the modern age? Plays by Büchner, Ibsen, Strindberg, Shaw, Chekhov, Wilde, Wedekind, Treadwell, Pirandello, Brecht, O'Neill, Beckett, Smith, Parks, and Nottage.  
Same as: GERMAN 319, TAPS 319

**TAPS 11N. Dramatic Tensions: Theater and the Marketplace. 3 Units.**

Preference to freshmen. The current state of the American theater and its artists. Conventional wisdom says that theater is a dying art, and a lost cause, especially in an age of multi-media entertainment. But there are more young playwrights, actors, and directors entering the field today than at any other time in American history. Focus is on the work of today's theater artists, with an emphasis on an emerging generation of playwrights. Students read a cross-section of plays from writers currently working in the US and UK, covering a spectrum of subjects and styles from serious to comic, from the musical to the straight play. Hits and misses from recent seasons of the New York and London stages and some of the differences of artistic taste across the Atlantic. Hands-on exploration of the arts and skills necessary to make a play succeed. Students develop their own areas of interest, in guided projects in design, direction or performance. Conversations with playwrights, designers, and directors. Labs and master classes to solve problems posed in areas of creative production. Class meets literary managers and producers who are on the frontlines of underwriting new talent. Class trips include two plays at major Bay Area Stages.

**TAPS 120A. Acting I: Fundamentals of Acting. 4 Units.**

A substantive introduction to the basics of the craft of acting, this course gives all incoming students the foundation of a common vocabulary. Students will learn fundamental elements of dramatic analysis, and how to apply it in action. Topics include scene analysis, environment work, psychological and physical scoring, and development of a sound and serviceable rehearsal technique. Scene work will be chosen from accessible, contemporary, and realistic plays. Outside rehearsal time required.

**TAPS 120B. Acting II: Advanced Acting. 3 Units.**

Learn how to expand character work, beyond what is immediately familiar. Continuing basic practices from the first part of the sequence, in this quarter they will look beyond the strictly contemporary, and may begin to approach roles drawn from more challenging dramatic texts. This might include plays chosen from mid-century American classics, World Theater, or other works with specific historic or cultural requirements. Actors begin to learn how a performing artist researches and how that research can be used to enrich and deepen performance. Prerequisite: 120A or consent of instructor. Priority given to TAPS majors and minors.

**TAPS 121C. Physical Characterization. 3 Units.**

A practical course in movement, acting and character development for stage or screen. This course is appropriate for all artists; no prior movement training is required. We will explore expressive possibilities in the body in order to build characters with nuanced physicality and rich emotional life. Students will learn strategies for awakening the body, find a greater range of expression, and widen the variety of characters they can inhabit. We will conduct live observations and take inspiration from photographs, memories, dramatic texts and other sources to build vivid portraits of character in performance. Actors will work independently and as an ensemble, learning techniques derived from Michael Chekhov. We will also practice physical conditioning for the actor through a daily warm-up sequence that improves strength, flexibility and alignment.

**TAPS 121P. Period and Style: Acting. 3 Units.**

This course is designed for the actor and theater-lover who has completed 120a or an equivalent basic acting class. Students will develop their acting skills towards the ability to perform in some of the major classics of the theater, from Shakespeare's plays through the fast-paced physical comedies of twentieth-century farce. Acting in "big" plays without damaging the voice, working physically with safety, how to research like an artist, and rehearse like a professional are all topics that will be covered. Class culminates in an open Scene Showing of Period Plays.

**TAPS 121V. Voice for the Actor. 3 Units.**

This course will focus on releasing a voice that effectively reaches the listener and is responsive to the actor's thoughts and feelings. Through work on breath awareness, alignment, resonance, and muscularity, students will learn to identify habits that help or hinder performance. Students will practice exercises to develop vocal strength, clarity, ease, and expressiveness while exploring the vocal demands of various texts and performing environments. Course will culminate in a presentation of classical and contemporary monologues. This course is a good preparation for auditions, rehearsal, and performance, and is appropriate for all levels. Priority space reserved for TAPS majors and minors.

**TAPS 122A. Expressive Techniques in Multimedia Installation And Live Art. 4 Units.**

The course focus on multimedia installation and live performances. The theme of the course will be an offshoot of the campus wide celebration of the 200th year anniversary of the *Frankenstein* novel written by Mary Shelly. For the course the issues of advance medical science in the areas of artificial life forms, stem cell research, biological ethical questions, fictional and non fictional approaches and mythical creation stories will be included. Students will obtain an understanding of alternative ways to speak to issues using various art forms.  
Same as: ARTSTUDI 122A

**TAPS 122P. Undergrad Performance Project: Life is a Dream. 1-9 Unit.**

The Undergraduate Performance Project provides students the opportunity to study and perform in major dramatic works. The Winter 2018 Undergraduate Performance Project presents *Life is a Dream*. Students learn to form an artistic ensemble, develop dramaturgical materials, learn professional arts protocols and practice, devise within the ensemble, and develop live performance ability. Audition required. Preference to majors/minors. Maybe repeated for credit. 3 maximum completions allowed. If repeated, 15 total units allowed.

**TAPS 124D. Acting for Non-Majors. 1-3 Unit.**

Formerly TAPS 20. Creative play, ensemble work in a supportive environment. Designed for the student to experience a range of new creative skills, from group improvisation to partner work. Introductory work on freeing the natural voice and physical relaxation. Emphasis on rediscovering imaginative and creative impulses. Movement improvisation, listening exercises, and theater games release the energy, playfulness and willingness to take risks that is the essence of free and powerful performance. Course culminates with work on dramatic text.

**TAPS 125. Acting Shakespeare. 3 Units.**

This course explores the unique demands of playing Shakespeare on the stage. Through deep exploration of language and performance techniques in sonnets, speeches and scenes, the student will learn how to bring Shakespeare's passions to life through research, analysis, and a dynamic use of voice, body and imagination. This course is designed to increase the actor's physical, vocal, emotional, and intellectual responsiveness to the demands, challenges and joys of playing Shakespeare.

**TAPS 125C. Acting Chekhov. 3 Units.**

Playwright Anton Chekhov helped revolutionize the theater with his naturalistic representation of life onstage. In this course, students will explore the creation of character and ensemble by doing scenes from Chekhov's plays with a particular focus on relationship, subtext, sensory life, and Russian history and culture in 1900. Students will practice the improvisational technique of Active Analysis to connect with and embody characters and events, as well as exploring various exercises of Michael Chekhov's such as the Psychological Gesture, and exercises involving tempo-rhythm, physical centers, and archetypes. Prerequisite: Acting 120A. Priority given to TAPS majors and minors.

**TAPS 125S. Shakespeare Now: An Actor's Lab. 3 Units.**

This active workshop will provide the actor with skills for performing Shakespeare with clarity, joy and power. Actors work with scenes and monologues to develop ease with scansion, freedom of voice, and to expand their physical and imaginative range. We will also become acquainted with some of the ways that Shakespeare and other classic texts are being re-invigorated at the hands of modern writers and adapters. We will investigate the world of styles and approaches an actor may encounter in new takes on classic plays in our own time. (Priority to TAPS majors-minors. Previous acting class required, or instructor permission.)

**TAPS 126. Sound Stories. 4 Units.**

This special seminar is designed for students interested in creating stories for radio, podcast, and other sound media. Students will learn both the core principles of telling strong stories, whatever the medium, and the strategies of telling entertaining, persuasive stories for the ear. Just like film or the novel, sonic stories offer a fascinating mix of constraints and opportunities, and you'll learn how to invite listeners into an experience or insight that combines theories, facts and feelings into a single space of empathy. This is a hybrid class, equal parts classic seminar and creative workshop, and students will create stories from start to finish and learn skills from pitching and interviewing to writing, editing, and digital production. Students will work in small groups to document places through the stories that inhabit them, from the Menlo Park Police department to local shelters and community centers. Recommended for students interested in creative nonfiction, documentary, film, and even sound art. No prior experience necessary. Students wishing to enroll in this course must complete the following survey: <http://web.stanford.edu/~jwarga/S17TAPS126.fb> (Cardinal Course certified by the Haas Center).

**TAPS 127. Movement for the Actor. 3-4 Units.**

This course is an exploration of movement techniques for the actor, designed to provide a foundation for performance practice. Students will develop a more grounded sense of ease and breath onstage, learn fundamentals of physical partnership, and acquire an expanded physical vocabulary. Areas of study include Laban movement analysis, observation and embodiment, basic contact improvisation, and physical characterization. Students will also engage a personalized warmup process for rehearsal and performance. All coursework will be entirely experiential, practical, and participatory. No previous experience necessary. Some outside rehearsal/investigation time required.

**TAPS 127C. Introduction to Stage Combat. 3 Units.**

A course designed to cover the fundamental techniques to safely and convincingly create the illusion of violence. Stressing safety, storytelling, and partnering, this class will explore the most commonly used unarmed combat techniques, including fighting with found objects and comedic violence. Additionally, students will explore the essential techniques and vocabulary for theatrical broadsword including parries, cuts, thrusts, footwork and evasions. Students will have the opportunity to take a "skills proficiency test" in both disciplines for recognition as a beginning theatrical combatant with Dueling Arts International. This class will be taught by Dave Maier.

**TAPS 127S. Acting Through Song. 2-4 Units.**

How does a singer develop the strategies to shape nuanced, emotional performances? What clues does the singer mine from lyrics and a score in order to communicate through song? This is a studio course in acting and movement techniques for vocal performers who want to expand their expressive range, refine multi-faceted performances, and cultivate compelling stage presence. This course is suitable for any vocalist; classical singers, a cappella performers, musical theater actors and others are all welcome. The three foundational underpinnings of our work will be actor personalization technique, basic movement training and text analysis strategies. We will develop flexibility, relaxation and the freedom to follow expressive impulses while also deepening our knowledge of character, narrative and theme. Students should be prepared to engage in intensive work with performance pieces, selected according to each student's preferred style and tradition. We will focus on close textual analysis and find connections between the ways performers use various written scores (for spoken dialogue, song lyrics and musical composition) as the blueprints for dynamic performances that tell a powerful story. The course will culminate in a public performance of material from a musical performance genre.

**TAPS 127W. Introduction to Clown. 3 Units.**

This course is an introduction to the world and play of the theatrical clown, constructed for actors to explore truth in size, vulnerability, and a personal sense of humor. Students will develop their ability to play with the audience, a greater capacity for freedom and abandon onstage, and a healthier relationship to failure and human idiocy. Areas of study include partnership and status play, comic rhythm and timing, the structure and development of comic material, and the beginnings of a personal eccentric Clown character. All coursework will be experiential and practical. Some stage experience is recommended but not required. Some outside rehearsal/investigation time required.

**TAPS 12N. To Die For: Antigone and Political Dissent. 3 Units.**

(Formerly CLASSGEN 6N.) Preference to freshmen. Tensions inherent in the democracy of ancient Athens; how the character of Antigone emerges in later drama, film, and political thought as a figure of resistance against illegitimate authority; and her relevance to contemporary struggles for women's and workers' rights and national liberation. Readings and screenings include versions of *Antigone* by Sophocles, Anouilh, Brecht, Fugard/Kani/Ntshona, Paulin, Glowacki, Gurney, and von Trotta. Same as: CLASSICS 17N

**TAPS 130. ReDesigning Theater: Live & Digital Performance. 3 Units.**

This quarter's version of ReDesigning Theater looks at Live and Digital Performance. We will examine the use of digital technology in collaboration with live performance. Students will learn and employ the design thinking process as well as improv and theatrical techniques. We aim to create user-centric, interactive experiences where technology enables the audience to become part of and/or influence the outcome of the story or its presentation. Student projects will begin with the concepts enabled by personal technology such as smart phones and expand to animation, video projection, and other media. Students will work in small groups to investigate and experiment with formats that blur the lines between live and digital, performer and audience, and physical and virtual platforms. This project-based course is accessible to students of all backgrounds interested in exploring and transforming the frontiers of technology, art, and live performance.

**TAPS 131. Lighting Design. 4 Units.**

With the tools newly acquired from the previous quarter, this hands-on course features laboratory projects in lighting and designing live stage productions. Prerequisite TAPS 31.

**TAPS 132. Costume Design. 4 Units.**

This course introduces the goals, directives and techniques of designing costumes for performance. From the first reading of the script to opening night, all aspects will be covered including director/designer relationships, design approach, research, rendering, fabric selection, procurement or construction of costumes, fittings and final dress rehearsals. Each student will work on, or be assigned one main project of their choice. This class can coincide or be taken in advance of a student's involvement in a campus show, utilizing the campus project as their main project in the class. Smaller exercises will be given throughout the quarter to emphasize principles and invigorate design discussions. All students will be required to attend the performances of their peers' projects. One field trip to a professional theater may be planned.

**TAPS 133. Stage Scenery Design. 3-4 Units.**

Craft and Theory of stage scenery design including visual research, spatial organization, basic drafting, sketching and model-building. Prerequisite: 30, or consent of instructor.

**TAPS 133D. Set Design Practicum. 3-4 Units.**

This course is intended for students who are in the process of designing scenery for a Stanford club or department production and seek guidance in developing and refining their design. It is also open to students who have not yet committed to a fully realized set design project but would like to in the future, or anyone who would like to focus on the practical aspects of set design in general. Each week students present their work on a current or future set design and receive feedback and suggestions from classmates and the instructor. Also, the instructor will create project oriented assignments adapted to the needs and timeline of each individual project and student. Topics include: visual research, sketching, computer and hand drafting, and model making. During the first two weeks of the course students and instructor will determine a final project, such as a color model or design drafting, which will be required for completion of the course.

**TAPS 133T. Transgender Performance and Performativity. 4 Units.**

This course examines theater, performance art, dance, and embodied practice by transgender artists. Students will learn the history and politics of transgender performance while considering the creative processes and formal aesthetics trans artists use to make art. We will analyze creative work in conversation with critical and theoretical texts from the fields of performance studies, art history, and queer studies. Same as: FEMGEN 133

**TAPS 134. Stage Management Project. 3-5 Units.**

For students stage managing a production in the Department of Theater and Performance Studies.

**TAPS 135C. Theory & Craft of the Scenographic Model. 3 Units.**

Students learn studio techniques for constructing dimensional models for stage designs. Students will work with their hands using common materials such as cardboard, paint and wood. Use of Stanford's Product Realization Lab encouraged for specialty items such as miniature furniture depending on departmental coordination.

**TAPS 135M. Introduction to Media Production. 3 Units.**

Students will explore ways to incorporate video and other multimedia tools in their theatrical work. We will analyze the use of prerecorded sound, video and slides in theater productions, both as scripted and as staged -- from Beckett's Krapp's Last Tape to The Wooster Group's Hamlet to Young Jean Lee's Untitled Feminist Show. Hands-on practical instruction will cover the fundamentals of cinematography, sound recording, picture and sound editing, directing for camera, and producing (planning, budgets, scheduling, permits, fair use, rights and clearances). Students will work in teams to create multimedia projects that can be used in a theatrical production.

**TAPS 136S. Hidden Gems: Bay Area Theater Architecture post 1906. 3 Units.**

An active investigation of Bay Area theater architecture through a close look at five buildings built specifically for performance and how their use has changed over time. Students uncover building histories by researching drawing plans, photographs and other contextual documents in public and university archives in addition to site visits when possible. Particular attention will be paid to understanding shifting attitudes toward the proscenium arch in American popular culture. Possible buildings to be included: California Theater (San Jose), Memorial Auditorium (Stanford), Lucie Stern Theater (Palo Alto), Fox Theater (Redwood City) and The Curran Theater (San Francisco).

**TAPS 137. Hand Drafting for Designers. 3 Units.**

Fundamentals of hand-drafting. Standard drawing conventions; the use of line weight, color, composition, and graphic style. Creation of construction documents for real-world applications. May be repeated for credit.

**TAPS 140. Introduction to Projects in Theatrical Production. 1-4 Unit.**

A seminar course for students performing significant production work on Theater and Performance Studies Department or other Stanford University student theater projects. Students serving as producers, directors, designers or stage managers, who wish mentorship and credit for their production work sign up for this course and contact the instructor, Laxmi Kumaran. Prerequisite: consent of instructor.

**TAPS 150G. Performing Race, Gender, and Sexuality. 4 Units.**

This theory and practice-based course will examine performances by and scholarly texts about artists who critically and mindfully engage race, gender, and sexuality. Students will cultivate their skills as artist-scholars through written assignments and the creation of performance-based works in response to the assigned material. Attendance and written reflection on the TAPS Vital Signs: Performance Art in the 21st Century performance art series are required. The practical component of the class will also incorporate meditation into the process of preparing for, making, and critiquing performance. We will approach mindfulness as method and theory in our own practice, as well in relation to the works studied, while attending to the ethics and current debates concerning its use. Examples of artists studied include James Luna, Nao Bustamante, William Pope.L, Yoko Ono, Cassils, Adrian Piper, Guillermo Gomez-Peña, Nikki S. Lee, and Ana Mendieta. Same as: CSRE 150G, FEMGEN 150G

**TAPS 151. Dramaturgy. 4 Units.**

In this seminar, we will take the conventional idea of dramaturgy for narrative performance as developed in Western European theater since the enlightenment, and investigate its relation to non-narrative forms of performance in 20th and 21st (performance art, conceptual dance). Further, we will use dramaturgical procedures to explore the ideological content of performance and position of art institutions in our society. Finally, the students will get acquainted with production dramaturgy and get necessary tools to take the role of dramaturgs in actual performance productions.

Same as: TAPS 315

**TAPS 152. Introduction to Improvisation in Dance: From Salsa to Vodun to Tap Dance. 3-4 Units.**

This seminar introduces students to Dance Studies by exploring the topic of improvisation, a central concept in multiple genres of dance and music. We will survey a range of improvised dance forms from salsa to vodun to tap dance through readings, video viewings, discussion, and movement exercises (no previous dance experience required).

When studying each genre, we will examine how race, gender, sexuality, citizenship, and other power structures affect the practices and theorizations of improvisation. Topics include community and identity formation; questions of technique versus natural ability; improvisation as a spiritual practice; and the role of history in improvisers' quest for spontaneity. Course material will focus on improvised dance, but we will also read pertinent literature in jazz music, theatre, and the law.

Same as: AFRICAAM 52, CSRE 152

**TAPS 153. Revenge: From Aeschylus to ABC. 4 Units.**

How has the topic of revenge inspired some of theatre history's most dramatic masterpieces? Covering works from ancient Greek and Roman tragedy to Chinese Opera, from Japanese samurai intrigues to Renaissance drama, and from nineteenth-century comedy to postcolonial plays, this course examines how the powerful impetus to take revenge has spurred or stymied some of theatre's most compelling characters. Blending theory and practice, we will experiment with an array of theatrical forms and styles; we will also discuss the philosophical dimensions and moral implications of revenge, including various cultural understandings of retribution and redress.

**TAPS 153M. Mechanics of the Theater: The Technologies of Stagecraft. 3-4 Units.**

This course explores the history of technologies vital to the theatre: traps, lifts, lights, and sounds have been crucial for creating stage illusion. Divided into three main sections, Mechanics and Machines, Lighting and Projections, and Acoustics and Sound, we will examine the history of technological innovation and theatrical experimentation from the Enlightenment to the present. We will also be conducting case studies for each section with a core text or texts. We will cover Shakespeare's Hamlet, Ibsen's Ghosts, Chekhov's The Seagull, and Dreamgirls, The Musical. Technologies such as mechanical traps, electrical lights, and sound machines have been used to create stunning illusions and spectacular theater. Many of these technologies were also significant for the histories of industrialization and modernization. We will ask: How did theater makers develop and innovate using technological innovations? What role does technological aesthetics play in understanding human culture? What are the relationships between theater, technology, and society? In class, we will be reading, experimenting, and performing with various technological artifacts. We will be conducting experiments alongside our reading practice to better understand our historical subjects.

**TAPS 154G. Black Magic: Ethnicity, Race, and Identity in Performance Cultures. 3-4 Units.**

In 2013, CaShawn Thompson devised a Twitter hashtag, #blackgirlmagic, to celebrate the beauty and intelligence of black women. Twitter users quickly adopted the slogan, using the hashtag to celebrate everyday moments of beauty, accomplishment, and magic. In contrast, #blackmagic is used to describe everything from the uncanny to the personal. This course examines the discursive phenomenon of "black magic" and its permutations throughout Anglo-American histories. We will investigate the binaries of black/dark, white/light magic that has entered our contemporary lexicon, reading material on religion, magic performance, and theater.

Same as: AFRICAAM 154G, CSRE 154D, FEMGEN 154G

**TAPS 155. Social Sculpture. 4 Units.**

This course investigates the immediacy of the body as material and sculpture in order to investigate private and social spaces. Actions are often used to understand or question the function and psychological aspects of a space and are documented for the perpetuation of these ideas. Throughout the quarter we will investigate the body as material and develop site specific performances enacted for: Private/Domestic and Public Space; Constructed Space & Physical Space; ecological systems; and generate both Individual & Collaborative based Actions, Interventions, & Events."

Same as: ARTSTUDI 155

**TAPS 156. Performing History: Race, Politics, and Staging the Plays of August Wilson. 4 Units.**

This course purposefully and explicitly mixes theory and practice. Students will read and discuss the plays of August Wilson, the most celebrated and most produced contemporary American playwright, that comprise his 20th Century History Cycle. Class stages scenes from each of these plays, culminating in a final showcase of longer scenes from his work as a final project.

Same as: AFRICAAM 156, CSRE 156T, TAPS 356

**TAPS 156A. Warhol: Painting, Photography, Performance. 4 Units.**

This course focuses on the career of Andy Warhol as a means to consider the broader history of American art and culture since 1950. It examines little-studied aspects of Warhol's visual production (e.g. his career as a commercial artist in the 1950s and his everyday photographs of the 1970s and 1980s) alongside his now-canonical Pop paintings of the 1960s. Warhol's critical and scholarly reception will be scrutinized in detail, as will published interviews of and writings by the artist. Finally, we will consider Warhol's legacy and wide-ranging influence on American culture in the decades since his death in 1987.

Same as: ARTHIST 156A, ARTHIST 356A, TAPS 356A

**TAPS 156V. Vital Signs: Performance in the 21st Century. 1 Unit.**

The first decade and a half of the 21st century have been transformative for performance art. On the one hand, it brought an unprecedented cultural acceptance of this art form, which is now featured in most prestigious museums and art festivals; on the other, the most recent generation of performance artists is showing a great awareness of the historicity and complexity of this form. In this class, we will try to recognize and investigate these and other prominent features of performance art produced since the turn of the millennium. We will use as our primary case studies performances that will be featured in the series *Vital Signs: Contemporary Performance Art Series*, hosted by TAPS in 2017-2018. The primary objective of the series is to highlight and showcase underrepresented performance forms such as experimental performance art, durational art, and body art, among others, by artists from communities that remain invisible or underrepresented in mainstream performing arts. The series is curated by the Los Angeles-based artist Cassils, who has been listed by the Huffington Post as 'one of ten transgender artists who are changing the landscape of contemporary art' and has achieved international recognition for a rigorous engagement with the body as a form of social sculpture. Cassils's curatorial vision is to present established performance artists alongside emerging artists. Each quarter, a pair of artists will visit Stanford for two days (Thursday-Friday). On day one of their visit they will offer a workshop or a public performance, and on the second day they will engage in a public dialogue. The class will meet each quarter for three weeks: before, during, and after the artists' visit. This way, the students will have an opportunity to prepare for the visit, engage with the visiting artists, and reflect on their work. They will receive their grades upon completion of the class, in the spring of 2018. Same as: ARTSTUDI 256V, TAPS 256V

**TAPS 157. World Drama and Performance. 4 Units.**

This course takes up a geographically expansive conversation by looking at modern and contemporary drama from nations including Ghana, Egypt, India, Argentina, among others. Considering influential texts from the Global South will also enable us to explore a range of themes and methodologies that are radically re-shaping the field of Performance Studies. We will examine the relationship between colonialism and globalization, empire and capital, cosmopolitanism and neoliberalism. Re-situating our perspective from the Global South and the non-western world, we will ¿provincialize Europe¿ and probe the limits of its universalizing discourses. Same as: TAPS 357

**TAPS 160. Performance and History: Rethinking the Ballerina. 4 Units.**

The ballerina occupies a unique place in popular imagination as an object of over-determined femininity as well as an emblem of extreme physical accomplishment for the female dancer. This seminar is designed as an investigation into histories of the ballerina as an iconographic symbol and cultural reference point for challenges to political and gender ideals. Through readings, videos, discussions and viewings of live performances this class investigates pivotal works, artists and eras in the global histories of ballet from its origins as a symbol of patronage and power in the 15th century through to its radical experiments as a site of cultural obedience and disobedience in the 20th and 21st centuries. Same as: DANCE 160, FEMGEN 160, TAPS 260

**TAPS 160M. Introduction to Representations of the Middle East in Dance, Performance, & Popular Culture. 3-4 Units.**

This course will introduce students to the ways in which the Middle East has been represented and performed by/in the 'West' through dance, performance, and popular culture in both historical and contemporary contexts. A brief look through today's media sources exposes a wide range of racialized and gendered representations of the Middle East that shape the way the world imagines the Middle East to be. As postcolonial theorist Edward Said explains, the framework we call Orientalism establishes the ontological character of the Orient and the Oriental as inherently 'Other'. Starting with 19th century colonialism and continuing into the post-9/11 era, this course will trace the Western production, circulation, and consumption of representations of the Middle East as 'Other' in relation to global geopolitics. We will further examine dance forms produced in mid-twentieth century Iran and Egypt, with particular attention to nation-state building and constructions of gender. Finally, we will examine artistic productions and practices from the Middle East and Middle Eastern diasporic communities that respond to colonialism, war, displacement, secularism, and Euro-American Empire. Using dance studies, postcolonial feminist, and critical race theoretical frameworks, we will consider the gender, racial, political, and cultural implications of selected performance works and practices in order to analyze how bodies produce meaning in dance, performance art, theater, film, photography, and new media. Students will engage in multiple modes of learning; the course will include lectures, engaged group discussions, viewing of live and recorded performance, embodied participation in dance practice, student oral presentations, and a variety of writing exercises. Course assignments will culminate in a final research project related to class themes and methods. Same as: CSRE 160M, DANCE 160M, FEMGEN 160M

**TAPS 161D. Introduction to Dance Studies: Dancing Across Stages, Clubs, Screens, and Borders. 3-4 Units.**

This introduction to dance studies course explores dance practice and performance as means for producing cultural meaning. Through theoretical and historical texts and viewing live and recorded dance, we will develop tools for analyzing dance and understanding its place in social, cultural, and political structures. This uses dance and choreography as a lens to more deeply understand a wide range of identity and cultural formations, such as gender, race, sexuality, (dis)ability, (trans)nationality, and empire. We will analyze dancing bodies that move across stages, dance clubs, film screens, and border zones. We will examine dance from diverse locales and time periods including ballet, modern and contemporary dance, contact improvisation, folkloric dance, burlesque, street dance, queer club dance, drag performance, music videos, TV dance competitions, and intermedia/new media performance. In addition to providing theoretical and methodological grounding in dance studies, this course develops performance analysis skills and hones the ability to write critically and skillfully about dance. No previous experience in dance is necessary to successfully complete the course. Same as: CSRE 61, DANCE 161D, FEMGEN 161D

**TAPS 161H. Dance, History and Conflict. 4 Units.**

This seminar investigates how moving bodies are compelling agents of social, cultural, and political change. Through readings, videos, discussions and viewings of live performances this class questions the impact of social conflict and war on selected 20th and 21st century dances and dance practices. This class asks to what extent dance, in its history as well as contemporary development, is linked to concepts of the political and conflict. Same as: DANCE 161H

**TAPS 162I. The Idea of a Theater. 5 Units.**

Examines the idea of a theater from the religious street theater of Medieval York, through Shakespeare's Globe, and onto the mental theater of the Romantic reader and the alienation effects of Brecht's radical playhouse in the 20th cent.

**TAPS 164T. Queer Art and Performance. 4-5 Units.**

Examines the late 19th, 20th and 21st century forms of performance—including examples from drama, theater, cabaret, and performance art – through the perspectives of contemporary critical gender and queer theories. Texts and movements range from early avant-garde (Dada, Futurism) to gay and lesbian drama (Lillian Hellmann, Joe Orton, Tony Kushner) to post-liberation Queer performance and video (Split Britches, Carmelita Tropicana, Kalup Linzy). Theorists include Judith Butler, Michel Foucault, and Eve Kosofsky Sedgwick.

Same as: TAPS 364T

**TAPS 165. Introduction to Comparative Studies in Race and Ethnicity. 5 Units.**

How different disciplines approach topics and issues central to the study of ethnic and race relations in the U.S. and elsewhere. Lectures by senior faculty affiliated with CSRE. Discussions led by CSRE teaching fellows. Includes an optional Haas Center for Public Service certified Community Engaged Learning section.

Same as: CSRE 196C, ENGLISH 172D, PSYCH 155, SOC 146

**TAPS 165C. Ancient Dance and its Modern Legacy. 3-5 Units.**

Descriptions of dance in the Greek and Greco-Roman world; theories about dance in antiquity; dance and the senses; modern and modernist dancers and choreographers discussing ancient dance.

Same as: CLASSICS 137, CLASSICS 237, TAPS 265C

**TAPS 167. Introduction to Greek Tragedy: Gods, Heroes, Fate, and Justice. 4 Units.**

(Formerly CLASSGEN 110.) Gods and heroes, fate and free choice, gender conflict, the justice or injustice of the universe: these are just some of the fundamental human issues that we will explore in about ten of the tragedies of Aeschylus, Sophocles, and Euripides.

Same as: CLASSICS 112

**TAPS 167H. Revolutions in Theater. 4 Units.**

This course surveys the period from the turn of the 20th century until WWII, during which the European avant-garde movements transformed modern art. This period in history is marked by dynamic political events that had a deep impact on experimental art and on culture in general. This interaction between poetics and politics makes the first decades of the 20th century the formative period of western and global theater.

Same as: TAPS 267

**TAPS 168H. Poor Theater. 4 Units.**

The goal of this class is not to offer a survey of Happenings and other happening-related art of the late twentieth century. Instead, we will use Happenings as a paradigm of "poor theater" and "poor art" - umbrella terms for a number of experimental performance and art practices that emerged in the aftermath of the WWII. We will use the idea of poor theater as an organizing principle in our investigation of the main currents in the experimental performance in the last five decades. The class has a tripartite structure. First we will outline the paradigm of happenings, then trace the origins of Happenings in music, visual arts and theater of the mid twentieth century, and finally look at Happenings' immediate impact, as well as at its ripple effects that continued to reverberate long after the disappearance of this new art form. This course counts as a Writing in the Major course for TAPS in 2016-17.

Same as: TAPS 268H

**TAPS 169. Hysteria and Modern Culture. 3-5 Units.**

The term "hysteria" has been used for centuries to categorize the mysterious ailments of others. This course will focus on the history of hysteria's representation and production from the late nineteenth century through WWI. Readings will include medical writings (Charcot, Bernheim, Freud), plays (Ibsen, Strindberg, Toller), and feminist theory (Cixous, Clément, Diamond). We will also devote some attention to the ongoing influence of the discourse of hysteria on contemporary medical and popular cultures.

**TAPS 170. Directing and Dramaturgy: Composition and Adaptation for Theatre. 4-5 Units.**

This course explores dramaturgy and directing in the research and production of theatre primarily through practical creative projects with secondary readings on dramaturgy as a discipline. In this course we will consider the role of the dramaturg in its broadest sense, running across theatrical production from research to playwriting, adaptation, choreography, devising and directing. Students will work individually and in small groups researching, adapting, crafting and workshopping material.

Same as: TAPS 370

**TAPS 170A. The Director's Craft. 4 Units.**

This workshop class guides students through the directing process from investigating the big ideas of a play and analysing the action to organizing and running rehearsals to building up the world of the play through character work and visual composition. Over the quarter we will look at the use of creative visualization and improvisation alongside working with actors on ideas, emotions, relationships, textual analysis and blocking. This course also attends to the process of communicating with designers and production teams as well as structuring rehearsals, run-throughs and technical and dress rehearsals. Each student will select a theatrical text to work from across the quarter. In many cases the student's text will be a play that they are planning to direct in future, such as productions for student groups like Ram's Head or Stanford Shakespeare Company, TAPS capstone projects, TAPS 2nd year grad shows and/or TAPS Second Stage productions. No previous directing experience is necessary.

Same as: TAPS 370A

**TAPS 170B. Directing Workshop: The Actor-Director Dialogue. 4 Units.**

This course focuses on the actor-director dialogue. We will work with actors and directors developing approaches to collaboration that make the actor-director dialogue in theater.

Same as: TAPS 372

**TAPS 171. Performance Making. 4 Units.**

A studio course focused on creative processes and generating original material. Students will be encouraged to think critically about the relationship between form and content exploring the possibilities of site specific, gallery and theatre settings. Students will reflect throughout on the types of contact and communication uniquely possible in the live moment, such as interaction or the engagement of the senses. The emphasis is on weekly experimentation in the creation of short works rather than on a final production.

Same as: TAPS 371

**TAPS 173D. Theater Production Lab: Dramaturgy and Development. 4 Units.**

173/373: In this course students will explore general dramaturgical history and methodology as well as engaging in applied dramaturgy from evaluating works for a productions seasons, to developing dramaturgical materials for specific productions. Students will agree the focus of their course-work with the instructor depending on their specific interests. The TAPS 2nd year grad students enrolled in this course will act as a dramaturgical team, supporting the TAPS winter production of *The Tempest* in Pigott Theater March 2-11 2017, directed by Amy Freed. Students will support the actors and the creative team through providing research materials and presentations and helping actors with guided research, write program essays for general audiences, attend rehearsals and provide constructive notes, and curate and/or present on a Preface panel prior to opening night.

Same as: TAPS 373

**TAPS 175T. Collaborative Theater-Making. 1-4 Unit.**

Instructor Young Jean Lee is a playwright and director who will have two plays premiering on Broadway in 2018-2019. In this workshop, students will collaborate on the creation of one of these plays, which explores the intersection of class and race. The point of this class will be to replicate as closely as possible Lee's process for developing a new play in a professional setting. Students will "learn by doing" as they serve as actors, assistant directors, and dramaturgs in the same way that her actual actors, assistant directors, and dramaturgs would do. Please note that this is not designed to be an acting class with lots of fun moving around. There is no guarantee that every student will have a chance to perform. Also, Lee's new play development process is challenging, slow, and often requires sitting around a table having gruelingly intense conversations for hours at a time. This class is designed to teach students skills they need to succeed in a professional theater environment. Please contact the instructor ASAP at [yjl@stanford.edu](mailto:yjl@stanford.edu) for an application, which will be due on March 1, with notifications being sent out on March 15. If you find out about this class after the application deadline and send the instructor an email asking her to allow you to apply late, you must present a convincing explanation for why an exception should be made in your case. Nobody who misses the first class will be permitted to take the course.

Same as: TAPS 275T

**TAPS 176. Living with Mindfulness, Meaning, and Compassion. 5 Units.**

Living with mindfulness, meaning, and compassion is a journey of contemplation, self reflection, and guided action. We examine "the good life" through the insightful eyes and inspirational words of others as well as through the light of our own experience. We explore success, happiness, and well being through the wisdom of spiritual traditions and scientific discoveries. Our focus is on acceptance, vulnerability, humility, kindness, and courage. Our integrative learning approach creates a transformative, synergistic community through appreciative inquiry and connected knowing.

**TAPS 176N. The Inside Story. 3 Units.**

The Inside Story is a workshop that focuses on the generation of autobiographical material by exploring the connections between biology and biography. Students will gather autobiographical and autobiographical material, investigate stories of their bodies and explore "gut feelings". They will work on individual and group exercises looking at cellular and body memory from which they will create text, gesture, image, performance and installation. The exercises will include autobiographical writing prompts, body memory exercises, Yin Yoga, and body mapping.

**TAPS 176S. Finding Meaning in Life's Struggles: Narrative Ways of Healing. 5 Units.**

We can find meaning in life's struggles through narrative ways of healing. The self-reflective, dynamic process of finding, telling, and living our stories connects us with our whole selves as well as with others. We find our stories through vulnerability and courage; tell them with humility and honesty; and live them authentically and responsibly. Our shared stories will focus on gratitude, acceptance, reconciliation, forgiveness and compassion, empowering us to overcome personal, community, and historical traumas and wounds. In a respectful, caring community we will discover our hidden wholeness by improvising with various experiential and embodied means of finding our stories; telling our stories in diverse ways, including writing, storytelling, music, and art; and living our stories by putting values into action.

Same as: CSRE 176S

**TAPS 177. Dramatic Writing: The Fundamentals. 4 Units.**

Course introduces students to the basic elements of playwriting and creative experimentation for the stage. Topics include: character development, conflict and plot construction, staging and setting, and play structure. Script analysis of works by contemporary playwrights may include: Marsha Norman, Patrick Shanley, August Wilson, Suzan-Lori Parks, Paula Vogel, Octavio Solis and others. Table readings of one-act length work required by quarter's end.

Same as: CSRE 177, FEMGEN 177, TAPS 277

**TAPS 177C. Creating a Musical. 4 Units.**

This practical, hands on class in the making of musicals explores all aspects of creating musical theater, including writing, composing, producing, directing, designing, and casting this most American of theater genres. The class will include direct engagement and discussion with the producers and artists of TheatreWorks Silicon Valley's production of *The Bridges of Madison County*, book by Marsha Norman and music by Jason Robert Brown, including off-campus field trip to rehearsal of the show. The class will explore the creation of several renowned musicals including Stephen Sondheim's *Merrily We Roll Along*, and will include live Skype interviews with Broadway composers Andrew Lippa (*The Wild Party*), Paul Gordon (*Jane Eyre*), and David Hein and Irene Sankoff (*Come from Away*, winner of the 2017 Drama Desk Award for Best Musical). The quarter will culminate in the creation, production, and performance of several mini-musicals created by members of the class. Instructor Robert Kelley is the Founding Artistic Director of TheatreWorks Silicon Valley, where he has directed 170 productions, including many world and regional premieres.

Same as: MUSIC 184D

**TAPS 177W. Workshop with Young Jean Lee. 2-4 Units.**

Instructor Young Jean Lee is a playwright and director who will have two plays premiering on Broadway in 2018-2019. In this workshop, students will help to collaboratively perform, direct, and rewrite the script of one of these plays, which is about the intersection of class and race. The class will involve acting for students who want to act, directing for students who want to direct, and writing for students who want to write. The current character breakdown is as follows: 2 black women, 1 Asian-American woman, 1 Colombian woman, 1 Mexican-American man, 2 black men, 2 white women, 2 white men.

Same as: CSRE 177I, TAPS 277W

**TAPS 178B. Intensive Playwriting. 4 Units.**

Intermediate level study of fundamentals of playwriting through an intensive play development process. Course emphasizes visual scripting for the stage and play revision. Script analysis of works by contemporary playwrights may include: Suzan-Lori Parks, Tony Kushner, Adrienne Kennedy, Edward Albee, Maria Irene Fornes and others. Table readings of full length work required by quarter's end.

Same as: CSRE 178B, TAPS 278

**TAPS 178C. Writing a Full-Length Play. 2-4 Units.**

Instructor Young Jean Lee is a playwright and director who will have two plays premiering on Broadway in 2018-2019. This workshop will guide students through the process of writing a full-length play, and will focus on helping students to find their own voices. Students will be required to write every week and share their work with the class, completing a full-length first draft by the end of the term. This class will be geared towards generating new material, rather than on editing in response to critiques, which will be covered in a spring course, EDITING A FULL-LENGTH PLAY. Topics to be discussed: the relationship between naturalistic and experimental theater; writing about unfamiliar subjects; and writing what you are afraid to write. Students must contact the instructor at [yjl@stanford.edu](mailto:yjl@stanford.edu) ASAP in order to obtain an application for the class, which will be due on December 1.

Same as: TAPS 278C

**TAPS 178D. Editing a Full-Length Play. 1-4 Unit.**

To participate in this workshop, students must bring in a draft of a full length straight play for revision, which was written in part one of this course, WRITING A FULL-LENGTH PLAY. In conjunction with a variety of other editing techniques, students will focus on editing in collaboration with others. They will learn how to edit in response to hearing their plays read aloud; how to give and solicit the most useful kinds of feedback; how to cope with harsh criticism; what to do when people are offended by what they have written; how to know which notes to pay attention to and which notes to ignore; and how to let go of ideas and text that are not working. Other topics to be discussed: getting your work produced vs. self-producing; directing your own work vs. working with a director; and starting your own theater company. Enrollment for this course is closed. Same as: TAPS 278D

**TAPS 17N. Acting for Activists. 3 Units.**

Acting for Activists is designed for students who are interested in combining acting with activism, performance with politics. We will work with theatre that responds to specific political events and crisis such as hate crimes or war through the performance of activist texts. We will also explore works that challenge inequalities of income, race, gender and sexual orientation. By the end of the course students will cultivate a critical vocabulary for discussing and critiquing work within acting/activist contexts and develop new strategies for creating theatre in relation to issues they are passionate about. Acting for Activists encourages students to think about what they want to say and helps them craft how they want to say it.

**TAPS 180P. Color. 3-4 Units.**

Hands-on study of color to develop color sensitivity and the ability to manipulate color to exploit its expressive potential. Guided experimentation and observation. Topics include color relativity, color and light, color mixing, color harmony, and color and content. (lower level).

Same as: ARTSTUDI 180

**TAPS 180Q. Noam Chomsky: The Drama of Resistance. 3 Units.**

Preference to sophomores. Chomsky's ideas and work which challenge the political and economic paradigms governing the U.S. Topics include his model for linguistics; cold war U.S. involvements in S.E. Asia, the Middle East, Central and S. America, the Caribbean, and Indonesia and E. Timor; the media, terrorism, ideology, and culture; student and popular movements; and the role of resistance.

**TAPS 183C. Interpretation of Musical Theater Repertoire. 1-2 Unit.**

By audition only: Contact instructor prior to enrolling (bnies1@gmail.com). Ability to read music expected, but students with experience singing in musical theater can be accepted. For singers and pianists as partners. Performance class in a workshop setting along with lecture/discussion of important eras of musical theater history. Composers include Kern, Porter, Gershwin, Rodgers, Sondheim, Lloyd Weber, Jason Robert Brown and others. May be repeated for credit a total of 2 times. Enrollment limit: 20 (ten singers maximum). Prerequisite: consent of instructor. Recommended prerequisite: 170 (pianists). Same as: MUSIC 183C

**TAPS 183E. Singing for Musicals. 2 Units.**

This course provides training in vocal technique, stylistic musical phrasing, and acting for students interested in performing musical theater. Students will learn about the physical process of singing, including posture, breath support, and vocal exercises. They will incorporate vocal technique with the study of phrasing in different styles of Broadway repertoire, and apply both to the art of acting the song. Each student will work on solo selections and ensembles, and sing in most classes. Through understanding vocal technique, students will become more confident and joyful performers. The course will culminate in a final public workshop performance.

Same as: MUSIC 183E

**TAPS 184C. Dramatic Vocal Arts: Songs and Scenes Onstage. 1-2 Unit.**

Studies in stagecraft, acting and performance for singers, culminating in a public performance. Repertoire to be drawn from the art song, opera, American Songbook and musical theater genres. Audition or consent of instructor required. May be repeated for credit a total of 4 times. Zero unit enrollment option available with instructor permission. See website: (<http://music.stanford.edu>) for policy and procedure. By enrolling in this course you are giving consent for the video and audio recording and distribution of your image and performance for use by any entity at Stanford University.

Same as: MUSIC 184C

**TAPS 190. Special Research. 1-5 Unit.**

Individual project on the work of a playwright, period, or genre. Prerequisite: consent of instructor.

**TAPS 191. Independent Study. 1-18 Unit.**

Individual research with a faculty member. Prerequisite: consent of instructor.

**TAPS 192. Nitery Board Practicum. 1 Unit.**

Credit given for student board members of the Experimental Nitery Studio. Undergraduate students should enroll in TAPS 192. Ph.D. students should enroll in TAPS 292.

Same as: TAPS 292

**TAPS 200. Senior Project. 2-9 Units.**

All TAPS Majors must complete a Senior Project that represents significant work in any area of theater and/or performance. The project must be an original contribution and can consist of any of the following: devising a performance, choreographing a dance, stage managing a production, designing a large theater work, performing a major role, writing a play, directing a show, or researching and writing a senior essay. Work for this project normally begins in Spring Quarter of the junior year and must be completed by the end of the senior year. Students receive credit for senior projects through TAPS 200. A minimum of 4 units is required, but additional units are available for larger projects. Students pursuing senior projects must submit a two-page proposal to a faculty advisor of their choice, which must be approved by the Undergraduate Advisor and the department faculty no later than the end of Spring Quarter of the junior year.

**TAPS 201. Theater History. 4 Units.**

A survey of the history of theatre and dance from the ancient Greeks to the modern world. While primarily intended to help TAPS graduate students prepare for their Comprehensive Exam, this course may also be taken by undergraduates or non-TAPS graduate students in order to gain a broad understanding of some of the seminal plays, dances, theories, and performance practices of the past 2500 years.

**TAPS 202. Honors Thesis. 1-2 Unit.**

An advanced written project to fulfill the requirements for the Honors degree in TAPS. There are two ways to undertake an honors thesis. The first is to write a 40-50 page essay, which presents research on an important issue or subject of the student's choice. The second option is a 30-page essay that takes the student's capstone project as a case study and critically analyzes the creative work. Students are expected to work consistently throughout the year with their advisor, whom they identify at the time of application. Advisors can be selected from Academic Council faculty or artists-in-residence. Students should enroll in TAPS 202 each quarter during the senior year (1 unit in Autumn; 1 unit in Winter; 2 units in Spring).



**TAPS 20A. Acting for Non-Majors. 2 Units.**

A class designed for all interested students. Creative play, ensemble work in a supportive environment. Designed for the student to experience a range of new creative skills, from group improvisation to partner work. Introductory work on freeing the natural voice and physical relaxation. Emphasis on rediscovering imaginative and creative impulses. Movement improvisation, listening exercises, and theater games release the energy, playfulness and willingness to take risks that is the essence of free and powerful performance. Course culminates with work on dramatic text. This version of the class is offered in summer only. During the year, students should register for TAPS 124D.

**TAPS 20N. Prisons and Performance. 3 Units.**

Preference to Freshmen. This seminar starts with the unlikely question of what can the performing arts – particularly dance and theater – illuminate about the situation of mass incarceration in America. Part seminar, part immersive context building, students will read and view a cross-section of dance and theater works where the subject, performers, choreographers or authors, belong to part of the 2.4 million people currently behind bars in US prisons. Class includes conversations with formerly incarcerated youth, prison staff, juvenile justice lawyers and artists working in juvenile and adult prisons as well as those who are part of the 7.3 million people currently on parole or probation. Using performance as our lens we will investigate the unique kinds of understanding the arts make possible as well as the growing use of theater and dance to affect social change and personal transformation among prison inmates. Class trips will include visits to locked facilities and meetings with artists and inmates working behind bars.

**TAPS 21. StoryCraft. 2 Units.**

StoryCraft is a hands-on, experiential workshop offering participants the opportunity, structure and guidance to craft compelling personal stories to be shared in front of a live audience. The class will focus on several areas of storytelling: Mining (how do you find your stories and extract the richest details?); Crafting (how do you structure the content and shape the language?); and Performing (how do you share your stories with presence, authenticity and connection?).

**TAPS 210V. Vocal Production and Audition. 1-3 Unit.**

An introductory study of the vocal mechanism and the development of voice and articulation for the stage. Students will be introduced to the actor's tools of phonetics, verbal action and text analysis. Vocal technique will then be applied to the actor's process in preparation for audition. Actors will fully participate in the audition process, from beginning to end. Emphasis will be on relaxation, selection of appropriate material, and versatility to show contrast and range.

**TAPS 21N. The Idea of Virtual Reality. 3 Units.**

What is virtual reality and where is it heading? Was there VR before digital technology? What is the value of the real in a virtual culture? How, where, and when do we draw the line between the virtual and the real, the live and the mediated today? Concentrating on three aspects of VR simulation, immersion, and interactivity this course will examine recent experiments alongside a long history of virtual performance, from Plato's Cave to contemporary CAVEs, from baroque theatre design to Oculus Rift.

**TAPS 21S. StoryCraft: On Relationships. 2 Units.**

This class prepares students to tell their stories in front of the audience for Beyond Sex Ed: Intimacy & Relationships in Spring 2018. Do we need love? And if so, what does it look like? In this class, students will learn about relationships from the inside-out: through an examination and telling of their lived experiences. We will explore various perspectives on intimacy and relationships that illuminate different aspects of our lives, and then dive into our own stories to discover the many facets of intimacy. Due to the personal nature of the topic, we will emphasize safety, trust, and confidentiality throughout. The class offers the structure and guidance to 1) mine your life for stories, 2) craft the structure and shape of your stories, and 3) perform with presence, authenticity, and connection.

Same as: FEMGEN 21S

**TAPS 21T. StoryCraft: On Sexuality. 2 Units.**

What is "sexuality education", and what could it be? How do I tell a compelling story? In this class, students will learn about sexuality and storytelling from the inside out. We will explore various perspectives on sexuality that illuminate different aspects of our lives and then dive into our own stories to discover the richness and vibrancy of human sexuality. Due to the personal nature of the topic, we will emphasize safety, trust, and confidentiality throughout. The class offers the structure and guidance to 1) mine your life for stories, 2) craft the structure and shape of your stories, and 3) perform with presence, authenticity, and connection. Students will be selected from this class to tell their stories in Beyond Sex Ed: Consent & Sexuality at Stanford during NSO 2018. Before enrolling, ensure that you will be on campus Sept 20-22, 2018 for rehearsal and performance. Email the TA, Eisa, with any questions, equalshamma@stanford.edu. Class will be held in KINGSCOTE Gardens First Floor Conference Room.

Same as: FEMGEN 21T

**TAPS 22. Scene Work. 1-2 Unit.**

For actors who complete substantial scene work with graduate directors in the graduate workshop.

**TAPS 220A. Being John Wayne. 5 Units.**

John Wayne's imposing corporeality and easy comportment combined to create an icon of masculinity, the American West, and America itself. Focus is on the films that contributed most to the establishment, maturation, and deconstruction of the iconography and mythology of the John Wayne character. The western and war film as genres; the crisis of and performance of masculinity in postwar culture; gender and sexuality in American national identity; relations among individualism, community, and the state; the Western and national memory; and patriotism and the Vietnam War.

Same as: AMSTUD 220B, FILMSTUD 220

**TAPS 231. Advanced Stage Lighting Design. 1-5 Unit.**

Individually structured class in lighting mechanics and design through experimentation, discussions, and written reports. Prerequisite: 131 or consent of instructor.

**TAPS 232. Advanced Costume Design. 1-5 Unit.**

Individually structured tutorial for costume designers. May be repeated for credit. Prerequisite: 132 or consent of instructor.

**TAPS 233. Advanced Scene Design. 1-5 Unit.**

Individually structured workshop. May be repeated for credit. Prerequisite: 133 or consent of instructor.

**TAPS 234. Advanced Stage Management Project. 2-9 Units.**

For students stage managing a Department of Drama production. Prerequisite: 134.

**TAPS 248. Family Drama: American Plays about Families. 5 Units.**

Focus on great dramas about family life (Albee, Kushner, Shephard, Vogel, Kron, Nottage, Parks). Communication in writing and speaking about conflict central to learning in this class.

Same as: ENGLISH 148

**TAPS 25. Acting Short Narrative: From Shakespeare to YouTube. 2 Units.**

This course will help beginning students understand basic dramatic structure for acting short scenes. Using classic models (Euripides, Shakespeare, Noel Coward, Stephen Sondheim), we will explore how compelling dramatic scenes are constructed. Students will work with the instructor and with professional actors from Stanford Repertory Theater to come to grips with what makes these scenes successful and how best to bring them to life. As a final project, students will work together to develop and write their own short dramatic scenes, suitable for posting on YouTube.

**TAPS 252. Objects and Things: Theater, Performance, and Material Culture. 4 Units.**

Objects, devices, machines, technologies—how do we engage with the material things that come across our research, into our performances, and out of our lives? This course examines how various scholars, theorists, and practitioners have defined and engaged with material culture. We will read popular theories of thing-ness including but not limited to object-oriented ontology (Bill Brown and Jane Bennett), commodity things (Arjun Appadurai), actor-network theory (Bruno Latour), scriptive things (Robin Bernstein), and prop theory (Andrew Sofer). The course will use their theories as lenses on the objects of our own research, countering the Western historiography through case studies, alternative readings, and in-class presentations. New work from performance studies (Uri McMillian etc.) will also provide current case studies in scholarship. Focusing on theater and performance studies, this class will also draw on sociology, anthropology, the history of technology, and art history.

**TAPS 253T. Virtual Realities: Art, Technology, Performance. 2-4 Units.**

Contemporary virtual reality extends a long-standing quest to create a fully immersive, multisensory environment, a quest that may go back to the earliest cave paintings and includes such projects as cathedrals, operas, panoramas, theme parks, video games, and multimedia "happenings." What is VR's relation to this long and varied history? What are the ethics, aesthetics, promises, and perils of this new medium? What is meant by "immersion," "interactivity," and "presence," and how is VR changing those terms? How might VR relate to contemporary immersive theater and installation art - as well as to the mediatization of society more generally?.

**TAPS 256V. Vital Signs: Performance in the 21st Century. 1 Unit.**

The first decade and a half of the 21st century have been transformative for performance art. On the one hand, it brought an unprecedented cultural acceptance of this art form, which is now featured in most prestigious museums and art festivals; on the other, the most recent generation of performance artists is showing a great awareness of the historicity and complexity of this form. In this class, we will try to recognize and investigate these and other prominent features of performance art produced since the turn of the millennium. We will use as our primary case studies performances that will be featured in the series *Vital Signs: Contemporary Performance Art Series*, hosted by TAPS in 2017-2018. The primary objective of the series is to highlight and showcase underrepresented performance forms such as experimental performance art, durational art, and body art, among others, by artists from communities that remain invisible or underrepresented in mainstream performing arts. The series is curated by the Los Angeles-based artist Cassils, who has been listed by the Huffington Post as 'one of ten transgender artists who are changing the landscape of contemporary art' and has achieved international recognition for a rigorous engagement with the body as a form of social sculpture. Cassils's curatorial vision is to present established performance artists alongside emerging artists. Each quarter, a pair of artists will visit Stanford for two days (Thursday-Friday). On day one of their visit they will offer a workshop or a public performance, and on the second day they will engage in a public dialogue. The class will meet each quarter for three weeks: before, during, and after the artists' visit. This way, the students will have an opportunity to prepare for the visit, engage with the visiting artists, and reflect on their work. They will receive their grades upon completion of the class, in the spring of 2018.

Same as: ARTSTUDI 256V, TAPS 156V

**TAPS 258. Black Feminist Theater and Theory. 4 Units.**

From the rave reviews garnered by Angelina Weld Grimke's lynching play, Rachel to recent work by Lynn Nottage on Rwanda, black women playwrights have addressed key issues in modern culture and politics. We will analyze and perform work written by black women in the U.S., Britain and the Caribbean in the 20th and 21st centuries. Topics include: sexuality, surrealism, colonialism, freedom, violence, colorism, love, history, community and more. Playwrights include: Angelina Grimke, Lorriane Hansberry, Winsome Pinnock, Adrienne Kennedy, Suzan-Lori Parks, Ntzoze Shange, Pearl Cleage, Sarah Jones, Anna DeVeare Smith, Alice Childress, Lydia Diamond and Zora Neale Hurston.). Same as: AFRICAAM 258, CSRE 258, FEMGEN 258X

**TAPS 260. Performance and History: Rethinking the Ballerina. 4 Units.**

The ballerina occupies a unique place in popular imagination as an object of over-determined femininity as well as an emblem of extreme physical accomplishment for the female dancer. This seminar is designed as an investigation into histories of the ballerina as an iconographic symbol and cultural reference point for challenges to political and gender ideals. Through readings, videos, discussions and viewings of live performances this class investigates pivotal works, artists and eras in the global histories of ballet from its origins as a symbol of patronage and power in the 15th century through to its radical experiments as a site of cultural obedience and disobedience in the 20th and 21st centuries.

Same as: DANCE 160, FEMGEN 160, TAPS 160

**TAPS 265C. Ancient Dance and its Modern Legacy. 3-5 Units.**

Descriptions of dance in the Greek and Greco-Roman world; theories about dance in antiquity; dance and the senses; modern and modernist dancers and choreographers discussing ancient dance.

Same as: CLASSICS 137, CLASSICS 237, TAPS 165C

**TAPS 267. Revolutions in Theater. 4 Units.**

This course surveys the period from the turn of the 20th century until WWII, during which the European avant-garde movements transformed modern art. This period in history is marked by dynamic political events that had a deep impact on experimental art and on culture in general. This interaction between poetics and politics makes the first decades of the 20th century the formative period of western and global theater.

Same as: TAPS 167H

**TAPS 268H. Poor Theater. 4 Units.**

The goal of this class is not to offer a survey of Happenings and other happening-related art of the late twentieth century. Instead, we will use Happenings as a paradigm of "poor theater" and "poor art" - umbrella terms for a number of experimental performance and art practices that emerged in the aftermath of the WWII. We will use the idea of poor theater as an organizing principle in our investigation of the main currents in the experimental performance in the last five decades. The class has a tripartite structure. First we will outline the paradigm of happenings, then trace the origins of Happenings in music, visual arts and theater of the mid twentieth century, and finally look at Happenings' immediate impact, as well as at its ripple effects that continued to reverberate long after the disappearance of this new art form. This course counts as a Writing in the Major course for TAPS in 2016-17.

Same as: TAPS 168H

**TAPS 275T. Collaborative Theater-Making. 1-4 Unit.**

Instructor Young Jean Lee is a playwright and director who will have two plays premiering on Broadway in 2018-2019. In this workshop, students will collaborate on the creation of one of these plays, which explores the intersection of class and race. The point of this class will be to replicate as closely as possible Lee's process for developing a new play in a professional setting. Students will "learn by doing" as they serve as actors, assistant directors, and dramaturgs in the same way that her actual actors, assistant directors, and dramaturgs would do. Please note that this is not designed to be an acting class with lots of fun moving around. There is no guarantee that every student will have a chance to perform. Also, Lee's new play development process is challenging, slow, and often requires sitting around a table having gruelingly intense conversations for hours at a time. This class is designed to teach students skills they need to succeed in a professional theater environment. Please contact the instructor ASAP at [yjl@stanford.edu](mailto:yjl@stanford.edu) for an application, which will be due on March 1, with notifications being sent out on March 15. If you find out about this class after the application deadline and send the instructor an email asking her to allow you to apply late, you must present a convincing explanation for why an exception should be made in your case. Nobody who misses the first class will be permitted to take the course.

Same as: TAPS 175T

**TAPS 277. Dramatic Writing: The Fundamentals. 4 Units.**

Course introduces students to the basic elements of playwriting and creative experimentation for the stage. Topics include: character development, conflict and plot construction, staging and setting, and play structure. Script analysis of works by contemporary playwrights may include: Marsha Norman, Patrick Shanley, August Wilson, Suzan-Lori Parks, Paula Vogel, Octavio Solis and others. Table readings of one-act length work required by quarter's end.

Same as: CSRE 177, FEMGEN 177, TAPS 177

**TAPS 277W. Workshop with Young Jean Lee. 2-4 Units.**

Instructor Young Jean Lee is a playwright and director who will have two plays premiering on Broadway in 2018-2019. In this workshop, students will help to collaboratively perform, direct, and rewrite the script of one of these plays, which is about the intersection of class and race. The class will involve acting for students who want to act, directing for students who want to direct, and writing for students who want to write. The current character breakdown is as follows: 2 black women, 1 Asian-American woman, 1 Colombian woman, 1 Mexican-American man, 2 black men, 2 white women, 2 white men.

Same as: CSRE 177I, TAPS 177W

**TAPS 278. Intensive Playwriting. 4 Units.**

Intermediate level study of fundamentals of playwriting through an intensive play development process. Course emphasizes visual scripting for the stage and play revision. Script analysis of works by contemporary playwrights may include: Suzan-Lori Parks, Tony Kushner, Adrienne Kennedy, Edward Albee, Maria Irene Fornes and others. Table readings of full length work required by quarter's end.

Same as: CSRE 178B, TAPS 178B

**TAPS 278C. Writing a Full-Length Play. 2-4 Units.**

Instructor Young Jean Lee is a playwright and director who will have two plays premiering on Broadway in 2018-2019. This workshop will guide students through the process of writing a full-length play, and will focus on helping students to find their own voices. Students will be required to write every week and share their work with the class, completing a full-length first draft by the end of the term. This class will be geared towards generating new material, rather than on editing in response to critiques, which will be covered in a spring course, EDITING A FULL-LENGTH PLAY. Topics to be discussed: the relationship between naturalistic and experimental theater; writing about unfamiliar subjects; and writing what you are afraid to write. Students must contact the instructor at [yjl@stanford.edu](mailto:yjl@stanford.edu) ASAP in order to obtain an application for the class, which will be due on December 1.

Same as: TAPS 178C

**TAPS 278D. Editing a Full-Length Play. 1-4 Unit.**

To participate in this workshop, students must bring in a draft of a full length straight play for revision, which was written in part one of this course, WRITING A FULL-LENGTH PLAY. In conjunction with a variety of other editing techniques, students will focus on editing in collaboration with others. They will learn how to edit in response to hearing their plays read aloud; how to give and solicit the most useful kinds of feedback; how to cope with harsh criticism; what to do when people are offended by what they have written; how to know which notes to pay attention to and which notes to ignore; and how to let go of ideas and text that are not working. Other topics to be discussed: getting your work produced vs. self-producing; directing your own work vs. working with a director; and starting your own theater company. Enrollment for this course is closed. Same as: TAPS 178D

**TAPS 279C. Chroniclers of Desire: Creative Non-Fiction Writing Workshop. 3-5 Units.**

This course emphasizes the study and practice of personal memoir writing and literary journalism. The class will explore those writings that contain a public and private story, navigating an intimate and institutional world. Student writers will serve as public chroniclers whose subjective point of view and experience attempt to provide a truth greater than what the facts can offer.

Same as: CSRE 179C, CSRE 279C, FEMGEN 179C

**TAPS 28. Makeup for the Stage. 2 Units.**

Techniques of make-up application and design for the actor and artist including corrective, age, character, and fantasy. Emphasis placed on utilizing make-up for development of character by the actor. Limited enrollment.

**TAPS 284. Empathy Lab. 5 Units.**

This lab-based class examines the ways in which various disciplines and art forms conceive of, and tell stories about, the experiences and stories of others. With permission of instructor.

Same as: ANTHRO 379

**TAPS 289. Buechner and Wedekind. 3-5 Units.**

Modern theatre owes an incalculable debt to two German playwrights: Georg Büchner (1813-1837) and Frank Wedekind (1864-1918). We will read their still-shocking portraits of sex, madness, and social brutality in plays such as *Woyzeck* and *Spring's Awakening*, and explore the international journeys these works have made from stage to film and from opera to musical theatre.

**TAPS 289A. Interactive Art / Performance Design. 2 Units.**

This class is for those who want the experience of designing and creating interactive art and performance pieces for public audiences, using design thinking as the method, and supported by guest speakers, artist studio visits and needfinding trips to music festivals, museums and performances. Drawing on the fields of design, art, performance, and engineering, each student will ideate, design, plan and lead a team to build an interactive art and/or performance piece to be showcased to audience of 5000 at the Frost Music and Art Festival held on the Stanford campus on May 17th 2014. Projects can range from interactive art to unconventional set design, and from site-specific sculpture to immersive performance. This is a two-quarter long commitment during which students will first learn the design, planning, story boarding, budgeting, engineering, proposal creation and concept pitching of projects for applying for grants and presenting to funders. The second quarter will concentrate on prototyping, maquette making, testing, team forming, project management, creative leadership, construction, site installation and documentation. Part one of a two course series: ME 289A&B.

Same as: ME 289A

**TAPS 289B. Interactive Art / Performance Creation. 3-4 Units.**

This class is the continuation of ME289A where students experience the designing and creating of interactive art and performance pieces for public audiences, using design thinking as the method, and supported by guest speakers, artist studio visits and needfinding trips to music festivals, museums and performances. Drawing on the fields of design, art, performance, and engineering, each student will ideate, design, plan and lead a team to build an interactive art and/or performance piece to be showcased to audience of 5000 at the Frost Music and Art Festival held on the Stanford campus on May 17th 2014. Projects can range from interactive art to unconventional set design, and from site-specific sculpture to immersive performance. During this second quarter students will concentrate on prototyping, maquette making, testing, team forming, project management, creative leadership, construction, site installation and documentation. Part two of a two course series : ME 289A&B.

Same as: ME 289B

**TAPS 29. Theater Performance: Acting. 1-3 Unit.**

Students cast in department productions receive credit for their participation as actors; 1-2 units for graduate directing workshop projects and 1-3 units for major productions (units determined by instructor). May be repeated for credit. Prerequisite: consent of instructor.

**TAPS 290. Special Research. 1-5 Unit.**

Individual project on the work of a playwright, period, or genre.

**TAPS 292. Nitery Board Practicum. 1 Unit.**

Credit given for student board members of the Experimental Nitery Studio. Undergraduate students should enroll in TAPS 192. Ph.D. students should enroll in TAPS 292.

Same as: TAPS 192

**TAPS 30. Introduction to Theatrical Design. 4 Units.**

Introduction to Theatrical Design is aimed at students interested in exploring the fundamentals of design for the stage. Students are introduced to the practical and theoretical basics of design and are challenged to answer the question: What makes good design? Students should expect to try their hand at communicating their ideas visually through research, drawing, sketching and model making. Readings, field trips, guest lecturers and class discussion will complement these projects. This course is intended as a gateway to more specialized courses in set, costume and lighting design and is also an excellent primer for actors, directors and scholars who wish to know more about design. Collaboration will be emphasized. No prior experience in these areas is necessary.

**TAPS 31. Introduction to Lighting and Production. 4 Units.**

Good visual storytelling begins and ends with good lighting. All visual storytelling forms—from photos to films to stage productions—provide a canvas in which lighting paints the scene. Lighting sets a mood, a tone, and can shape character and stories. This course teaches critical thinking, how to conduct thorough research, practical skills, and a mindfulness for live artforms.

**TAPS 311. Performance and Historiography. 4 Units.**

This graduate seminar introduces you to advanced methodologies in two key areas of theatre and performance studies research: historiography and ethnography. The course is divided into two sections. The first concentrates on questions of historiography and the archive as they relate to studies of theater, dance, and performance. We will think about how events have been historicized, how absence has been represented, and how bodies are re-figured and remembered, and we will investigate important principles and best practices of performance documentation and historiography. The second part of the course explores the relationship between performance and ethnography. We will discuss different critical perspectives on ethnographic methods and data gathering, including participant-observation fieldwork and interview techniques. This course purposefully blends theory and practice, connecting philosophical discussions to concrete case studies, field trips, and your own research practices. In this spirit, you will also be encouraged to conduct research and present findings in different modes and media.

**TAPS 313. Performance and Performativity. 1-4 Unit.**

Performance theory through topics including: affect/trauma, embodiment, empathy, theatricality/performativity, specular/visibility, liveness/disappearance, belonging/abjection, and utopias and dystopias. Readings from Schechner, Phelan, Austin, Butler, Conquergood, Roach, Schneider, Silverman, Caruth, Fanon, Moten, Anzaldúa, Agamben, Freud, and Lacan. May be repeated for credit.

Same as: ENGLISH 313, FEMGEN 313

**TAPS 314. Performing Identities. 4 Units.**

This course examines claims and counter-claims of identity, a heated political and cultural concept over the past few decades. We will consider the ways in which theories of performance have offered generative discursive frameworks for the study of identities, variously shaped by vectors of race, gender, sexuality, religion, class, nation, ethnicity, among others. How is identity as a social category different from identity as a unique and personal attribute of selfhood? Throughout the course we will focus on the inter-locking ways in which certain dimensions of identity become salient at particular historical conjunctures. In addition, we will consider the complex discourses of identity within transnational and historical frameworks. Readings include Robin Bernstein, Ann Pellegrini, Tavia Nyong'o, Jose Munoz, Michael Taussig, Wendy Brown, Talal Asad, Jasbir Puar, among others.

Same as: FEMGEN 314

**TAPS 315. Dramaturgy. 4 Units.**

In this seminar, we will take the conventional idea of dramaturgy for narrative performance as developed in Western European theater since the enlightenment, and investigate its relation to non-narrative forms of performance in 20th and 21st (performance art, conceptual dance). Further, we will use dramaturgical procedures to explore the ideological content of performance and position of art institutions in our society. Finally, the students will get acquainted with production dramaturgy and get necessary tools to take the role of dramaturgs in actual performance productions.

Same as: TAPS 151

**TAPS 319. Modern Theatre. 1-5 Unit.**

Modern theatre in Europe and the US, with a focus on the most influential works from roughly 1880 to the present. What were the conventions of theatrical practice that modern theatre displaced? What were the principal innovations of modern playwriting, acting, stage design, and theatrical architecture? How did modern theatrical artists wrestle with the revolutionary transformations of the modern age? Plays by Büchner, Ibsen, Strindberg, Shaw, Chekhov, Wilde, Wedekind, Treadwell, Pirandello, Brecht, O'Neill, Beckett, Smith, Parks, and Nottage.

Same as: GERMAN 319, TAPS 119

**TAPS 32. The 5th Element: Hip Hop Knowledge, Pedagogy, and Social Justice. 1-5 Unit.**

This course-series brings together leading scholars with critically-acclaimed artists, local teachers, youth, and community organizations to consider the complex relationships between culture, knowledge, pedagogy and social justice. Participants will examine the cultural meaning of knowledge as "the 5th element" of Hip Hop Culture (in addition to MCing, DJing, graffiti, and dance) and how educators and cultural workers have leveraged this knowledge for social justice. Overall, participants will gain a strong theoretical knowledge of culturally relevant and culturally sustaining pedagogies and learn to apply this knowledge by engaging with guest artists, teachers, youth, and community youth arts organizations.

Same as: AFRICAAM 32, AMSTUD 32, CSRE 32A, EDUC 32, EDUC 432

**TAPS 321. Proseminar. 3 Units.**

Prepares PhD students for the academic profession by honing skills in presenting and publishing research, navigating the job market, and managing a career.

**TAPS 32F. Godiva to Gaga: A Survey of Western Fashion and Societal Implications. 4 Units.**

The evolution of fashion and costume with an emphasis on the relationship between social, cultural, and political events and clothing style. Attention to major designers and creators and their shaping of resultant fashion and artistry in clothing.

**TAPS 33. Introduction to Technical Theater and Production. 2-3 Units.**

A fun, collaborative, hands-on course subjecting students to the basics of scenery, props, painting, rigging, sound, lighting, costumes, and other production elements used in theater. This class is good for all types of theater students interested in producing theater at Stanford and beyond.

**TAPS 335. Introduction to Graduate Production. 1 Unit.**

This course introduces first-year TAPS PhD student to the TAPS production process and resources. Meetings will be scheduled ad hoc.

**TAPS 336. Comprehensive 1st Year Exam. 2 Units.**

Required course for first-year Ph.D. students in Theater & Performance Studies. Credits for work toward the Comprehensive 1st-year Exam taken in late February or Early March.

**TAPS 34. Stage Management Techniques. 3 Units.**

The production process, duties, and responsibilities of a stage manager. Skills needed to stage manage a production.

**TAPS 341E. English Drama Before Shakespeare. 5 Units.**

English dramatic and theatrical culture from the mystery cycles of the late medieval period to the establishment of professional playhouses in late sixteenth-century London. Different dramatic genres (interludes, moralities, farces, tragedies, comedies, histories, pastoral plays), performance venues (streets, households, inns, schools, universities, court, playhouses), and dramatic traditions (classical, native, continental European) will be represented. Authors (of those who have names) range from Medwall, Skelton, Heywood, Preston, and Edwards to Lyly, Kyd, Greene, Peele, and Marlowe.

**TAPS 344A. Gender and Performance. 5 Units.**

This seminar seeks to investigate relationships between performance, gender, and the body politic through a discussion of embodiment, body cultures, queerness, desire, representation. Through a weekly engagement with film texts from across the world as well as theoretical perspectives on gender and performance in various geo-political contexts, we will explore the intersections of gender with race, class, national discourse, and performance traditions. The seminar is conceived to be interdisciplinary and participants are encouraged to introduce and work with texts from other disciplines, including visual arts, theatre, dance, literature etc. No prior engagement with film studies is required. Screening times may range from 90 to 180 minutes.

Same as: FEMGEN 434, FILMSTUD 434, MUSIC 434

**TAPS 351. Great Books: Dramatic Traditions. 4 Units.**

The most influential and enduring texts in the dramatic canon from Sophocles to Shakespeare, Chekhov to Soyinka. Their historical and geopolitical contexts. Questions about the power dynamics involved in the formation of canons. This course counts as a Writing in the Major course for TAPS in 2016-17.

**TAPS 356. Performing History: Race, Politics, and Staging the Plays of August Wilson. 4 Units.**

This course purposefully and explicitly mixes theory and practice. Students will read and discuss the plays of August Wilson, the most celebrated and most produced contemporary American playwright, that comprise his 20th Century History Cycle. Class stages scenes from each of these plays, culminating in a final showcase of longer scenes from his work as a final project.

Same as: AFRICAAM 156, CSRE 156T, TAPS 156

**TAPS 356A. Warhol: Painting, Photography, Performance. 4 Units.**

This course focuses on the career of Andy Warhol as a means to consider the broader history of American art and culture since 1950. It examines little-studied aspects of Warhol's visual production (e.g. his career as a commercial artist in the 1950s and his everyday photographs of the 1970s and 1980s) alongside his now-canonical Pop paintings of the 1960s. Warhol's critical and scholarly reception will be scrutinized in detail, as will published interviews of and writings by the artist. Finally, we will consider Warhol's legacy and wide-ranging influence on American culture in the decades since his death in 1987.

Same as: ARTHIST 156A, ARTHIST 356A, TAPS 156A

**TAPS 356T. Intro to Psychoanalysis as a Critical Method. 3-5 Units.**

Primary reading in Freud, Lacan, Laplanche, Irigaray and Kristeva. Secondary readings in film theory (Mulvey to Silverman), art history (Bryson, Bersani) and poststructuralism (Derrida, Foucault, Butler). Same as: ENGLISH 356T

**TAPS 357. World Drama and Performance. 4 Units.**

This course takes up a geographically expansive conversation by looking at modern and contemporary drama from nations including Ghana, Egypt, India, Argentina, among others. Considering influential texts from the Global South will also enable us to explore a range of themes and methodologies that are radically re-shaping the field of Performance Studies. We will examine the relationship between colonialism and globalization, empire and capital, cosmopolitanism and neoliberalism. Re-situating our perspective from the Global South and the non-western world, we will provincialize Europe and probe the limits of its universalizing discourses.

Same as: TAPS 157

**TAPS 359. The Other Body/The Body Other. 4 Units.**

Writing creatively through critical thinking. Writing critically through creative imagination. Advanced Creative/Critical Writing course, designed for those "other" creative writers and thinkers who want to use language in original, innovative and embodied introspective ways to respond to (and from) non-dominant cultures, themes and identities. All genres. Readings, performances, films assigned to provoke an(other) response. Permission of Instructor.

**TAPS 364T. Queer Art and Performance. 4-5 Units.**

Examines the late 19th, 20th and 21st century forms of performance—including examples from drama, theater, cabaret, and performance art – through the perspectives of contemporary critical gender and queer theories. Texts and movements range from early avant-garde (Dada, Futurism) to gay and lesbian drama (Lillian Hellmann, Joe Orton, Tony Kushner) to post-liberation Queer performance and video (Split Britches, Carmelita Tropicana, Kalup Linzy). Theorists include Judith Butler, Michel Foucault, and Eve Kosofsky Sedgwick.

Same as: TAPS 164T

**TAPS 370. Directing and Dramaturgy: Composition and Adaptation for Theatre. 4-5 Units.**

This course explores dramaturgy and directing in the research and production of theatre primarily through practical creative projects with secondary readings on dramaturgy as a discipline. In this course we will consider the role of the dramaturg in its broadest sense, running across theatrical production from research to playwriting, adaptation, choreography, devising and directing. Students will work individually and in small groups researching, adapting, crafting and workshopping material.

Same as: TAPS 170

**TAPS 370A. The Director's Craft. 4 Units.**

This workshop class guides students through the directing process from investigating the big ideas of a play and analysing the action to organizing and running rehearsals to building up the world of the play through character work and visual composition. Over the quarter we will look at the use of creative visualization and improvisation alongside working with actors on ideas, emotions, relationships, textual analysis and blocking. This course also attends to the process of communicating with designers and production teams as well as structuring rehearsals, run-throughs and technical and dress rehearsals. Each student will select a theatrical text to work from across the quarter. In many cases the student's text will be a play that they are planning to direct in future, such as productions for student groups like Ram's Head or Stanford Shakespeare Company, TAPS capstone projects, TAPS 2nd year grad shows and/or TAPS Second Stage productions. No previous directing experience is necessary.

Same as: TAPS 170A

**TAPS 371. Performance Making. 4 Units.**

A studio course focused on creative processes and generating original material. Students will be encouraged to think critically about the relationship between form and content exploring the possibilities of site specific, gallery and theatre settings. Students will reflect throughout on the types of contact and communication uniquely possible in the live moment, such as interaction or the engagement of the senses. The emphasis is on weekly experimentation in the creation of short works rather than on a final production.

Same as: TAPS 171

**TAPS 371P. Theater and Performance Making. 4 Units.**

A creative workshop offering a range of generative exercises and techniques in order to devise, compose and perform original works. Students will explore a variety of texts (plays, poems, short stories, paintings) and work with the body, object and site. Students will be encouraged to think critically about various compositional themes and ideas including: the relationship between form and content, aesthetics, space, proximity, and audience. Students will work independently and collaboratively creating original performances.

Same as: TAPS 101P

**TAPS 372. Directing Workshop: The Actor-Director Dialogue. 4 Units.**

This course focuses on the actor-director dialogue. We will work with actors and directors developing approaches to collaboration that make the actor-director dialogue in theater.

Same as: TAPS 170B

**TAPS 373. Theater Production Lab: Dramaturgy and Development. 4 Units.**

173/373: In this course students will explore general dramaturgical history and methodology as well as engaging in applied dramaturgy from evaluating works for a production season, to developing dramaturgical materials for specific productions. Students will agree the focus of their course-work with the instructor depending on their specific interests. The TAPS 2nd year grad students enrolled in this course will act as a dramaturgical team, supporting the TAPS winter production of *The Tempest* in Pigott Theater March 2-11 2017, directed by Amy Freed. Students will support the actors and the creative team through providing research materials and presentations and helping actors with guided research, write program essays for general audiences, attend rehearsals and provide constructive notes, and curate and/or present on a Preface panel prior to opening night.

Same as: TAPS 173D

**TAPS 376. Projects in Performance. 4 Units.**

Creative projects to be determined in consultation with Drama graduate faculty and production advisor.

**TAPS 377. Graduate Directors' Staged Reading Project. 2 Units.**

Presentation of a new or newly adapted work for the stage, in a mode employed in professional theater for the development of new plays. Two to four rehearsals. Public performance.

**TAPS 379. Chicano & Chicana Theater: Politics In Performance. 4 Units.**

This is a practicum course, where the basic tenets and evolving politics and philosophies of Chicano and Latin American liberationist theater are examined through direct engagement with its theatrical forms, including, social protest & agit-prop, myth & ritual, scripting through improvisation, in-depth character and solo work, collective conceptualization and more. The course will culminate in an end-of-the-quarter play performance in the Niteri Theater (Old Union) and at a Mission District theater in San Francisco.

Same as: CHILATST 179

**TAPS 379A. Empathy Lab II: The Potential of Anthropology for the 21st Century. 1-5 Unit.**

This interdisciplinary arts/anthropology lab class will study and practice methods from performing arts to expand our understandings of cultural contact and develop methods of thinking more expansively about the creative elements and possibilities for ethnographic fieldwork and critical cultural studies. Prerequisite, by instructor consent.

Same as: ANTHRO 379A

**TAPS 39. Theater Crew. 1-3 Unit.**

For students working backstage, on run crew, or in the theater shops on TAPS department productions. Night and weekend time required. Pre-approval from Jane Casamajor (janecasa@stanford.edu) is required for enrollment.

**TAPS 390. Directed Reading. 1-6 Unit.**

Students may take directing reading only with the permission of their dissertation advisor. Might be repeatable for credit twice for 6 units total.

**TAPS 39D. Small Project Stage Management. 2-4 Units.**

For students Stage Managing a TAPS Senior Project or Assistant Stage Managing a TAPS department production. Pre-approval by Laxmi Kumaran (laxmik@stanford.edu) required for enrollment.

**TAPS 41N. Inventing Modern Theatre: Georg Büchner and Frank Wedekind. 3 Units.**

The German writers Georg Büchner (1813-1837) and Frank Wedekind (1864-1918). Many of the most important theater and film directors of the last century, including Max Reinhardt, G. W. Pabst, Orson Welles, Robert Wilson, and Werner Herzog, have wrestled with their works, as have composers and writers from Alban Berg and Bertolt Brecht through Christa Wolf and Thalia Field. Rock artists as diverse as Tom Waits, Lou Reed, Duncan Sheik, and Metallica have recently rediscovered their urgency. Reading these works in translation and examining artistic creations they inspired. Classroom discussions and written responses; students also rehearse and present in-class performances of excerpts from the plays. The aim of these performances is not to produce polished stagings but to creatively engage with the texts and their interpretive traditions. No previous theatrical experience required.

**TAPS 42. Costume Construction. 2 Units.**

Course will cover the basics of costume and garment construction. Includes hand and machine skills as well as basic patterning ideas that may be applied to more advanced projects. Lecture/Lab.

**TAPS 50. Arts in Context: The Process of Cultural Production. 1-2 Unit.**

A combination of practical skill-building and discussions with practicing arts professionals, this course will provide students with the foundational skills necessary to produce programs on campus and/or work in the arts. The talks and workshops will cover topics including curatorial practice and programming (for both visual and performing arts); grant writing and other fundraising methodology; budgeting and financial management; contracts and other legal considerations; and public relations and marketing. Every session is open for drop-in attendance, or students may take the entire series for credit. May be repeat for credit. Same as: ARTSINST 50, MUSIC 50

**TAPS 802. TGR Dissertation. 0 Units.**

(Staff).

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